Read This First

For information not in this manual, refer to the HTML/PDF files on the supplied CD-ROM.

M1328529

Read this manual carefully before you use this machine and keep it handy for future reference. For safe and correct use, be sure to read the Safety Information in this manual before using the machine.

TABLE OF CONTENTS

4. Appendix

Introduction

Read this manual carefully before you use this machine and keep it handy for future reference. For safe and correct use, be sure to read the Safety Information in this manual before using the machine.

How to Read the Manuals

Symbols Used in the Manuals

This manual uses the following symbols:

⭐ **Important**

Indicates points to pay attention to when using the machine, and explanations of likely causes of paper misfeeds, damage to originals, or loss of data. Be sure to read these explanations.

⬇ **Note**

Indicates supplementary explanations of the machine's functions, and instructions on resolving user errors.

📄 **Reference**

This symbol is located at the end of sections. It indicates where you can find further relevant information.

[ ]

Indicates the names of keys on the machine's display or control panels.

💿

Indicates instructions stored in a file on a provided CD-ROM.

🌐 **Region A** (mainly Europe and Asia)

🌐 **Region B** (mainly North America)

Differences in the functions of Region A and Region B models are indicated by two symbols. Read the information indicated by the symbol that corresponds to the region of the model you are using. For details about which symbol corresponds to the model you are using, see "Model-Specific Information", Operating Instructions 💿.

Disclaimer

Contents of this manual are subject to change without prior notice.

To the maximum extent permitted by applicable laws, in no event will the manufacturer be liable for any damages whatsoever arising out of failures of this machine, losses of the registered data, or the use of this product and operation manuals provided with it.

Make sure that you always copy or have backups of the data registered in this machine. Documents or data might be erased due to your operational errors or malfunctions of the machine.

In no event will the manufacturer be responsible for any documents created by you using this machine or any results from the data executed by you.

Notes

The manufacturer shall not be responsible for any damage or expense that might result from the use of parts other than genuine parts from the manufacturer with your office products.

For good output quality, the manufacturer recommends that you use genuine toner from the manufacturer.

Some illustrations in this manual might be slightly different from the machine.

Certain options might not be available in some countries. For details, please contact your local dealer.

Depending on which country you are in, certain units may be optional. For details, please contact your local dealer.

1. Manuals Provided with This Machine

This chapter explains manuals for this machine.

Manuals for This Machine

Read this manual carefully before you use this machine.

Refer to the manuals that are relevant to what you want to do with the machine.

⭐ **Important**

- Media differ according to manual.
- Adobe® Acrobat® Reader®/Adobe Reader must be installed in order to view the manuals as PDF files.
- A Web browser must be installed in order to view the html manuals.

User Guide

Regarding the basic usage of this machine, frequently used functions, troubleshooting when an error message appears, etc., summaries are provided below for html manual.

Read This First

Before using the machine, be sure to read the section of this manual entitled Safety Information. It also describes each regulation and environmental conformance.

Quick Installation Guide

Describes procedures from unpacking the machine to connecting it to a computer.

Operating Instructions

Provides detailed information about the operation of the printer in HTML format. The following are main topics of the manual:

- Setting Up the Printer
- Getting Started
- Printing
- Configuring and Managing the Printer
- Troubleshooting
- Maintenance and Specifications
- VM Card Extended Feature Settings

Security Guide

This manual is for administrators of the machine. It explains security functions that you can use to prevent unauthorized use of the machine, data tampering, or information leakage. For enhanced security, we recommend that you first make the following settings:

1

- Install the Device Certificate.

- Enable SSL (Secure Sockets Layer) Encryption.

- Change the user name and password of the administrator using Web Image Monitor.

For details, see "Before Using This Machine", Security Guide.

Be sure to read this manual when setting the enhanced security functions, or user and administrator authentication.

Driver Installation Guide

Describes how to install and configure each driver. This manual is included in the drivers CD.

Note

- Manuals provided are specific to machine types.

- Driver Installation Guide and HTML manuals are available in English, German, French, Italian, Spanish, Dutch, and Russian.

Manuals List

Manual Name	Printed Manuals Provided	HTML Manuals Provided	PDF Manuals Provided
User Guide	No	No	Yes
Read This First	Yes	No	No
Quick Installation Guide	Yes	No	No
Operating Instructions	No	Yes	No
Security Guide	No	No	Yes
Driver Installation Guide	No	No	Yes

🔽 Note

- Driver Installation Guide and HTML manuals are available in English, German, French, Italian, Spanish, Dutch, and Russian.

On-screen Operating Instructions

This section describes the on-screen operating instructions of this machine. The on-screen operating instructions are included in the supplied manual CD-ROM.

Formats of the Operating Instructions

The operating instructions of this machine are provided in the following formats:

- Printed manuals
- HTML manuals
- PDF manuals

For details about the contents of each manual, see p.7 "Manuals for This Machine". The various manuals are available in different formats. For details about availability, see p.9 "Manuals List".

Reading the HTML Manuals on the CD-ROM

This section describes how to read the HTML manuals on the supplied manual CD-ROM.

1. **Insert the CD-ROM in the CD-ROM drive of your computer.**

2. **Select a language and a product, and then click [OK].**

3. **Click [Read HTML manuals].**

4. **Click the title of manual you want to read.**

↓Note

- Recommended browsers:
    - Internet Explorer 6 or later
    - Firefox 3.5 or later
    - Safari 4.0 or later
- If you want to read the HTML manuals on a Macintosh, insert the CD-ROM in the CD-ROM drive, and then click [Read HTML manuals].
- If JavaScript is disabled or unavailable in your browser, you will not be able to search or use certain buttons in the HTML documentation.
- HTML manuals are available in English, German, French, Italian, Spanish, Dutch, and Russian.

Installing and Opening the HTML Manuals

This section describes how to install and open the HTML manuals on your computer.

1

For your convenience, we recommend you install these manuals on your computer.

1. **Insert the CD-ROM in the CD-ROM drive of your computer.**

2. **Select a language and a product, and then click [OK].**

3. **Click [Install manuals].**

4. **Install the HTML manuals by following the on-screen instructions.**

5. **When the installation is complete, click [Finish].**

6. **Click [Exit].**

7. **Open the HTML manuals that you installed.**

   To open the manuals from an icon, double-click the icon on the desktop. To open the manuals from the [Start] menu, point to [All Programs], and then click [(product name)].

8. **Click the title of the manual you want to read.**

⬇ **Note**

- You need administrator permissions to install the manuals. Log in as an Administrators group member.

- The system requirements for installing the manuals are as follows:

  - Operating system: Windows XP/Vista/7, Windows Server 2003/2003 R2/2008/2008 R2

  - Minimum display resolution: 800 × 600 pixels

- If you cannot install a manual, copy the "MANUAL_HTML" folder to your computer's hard drive, and then run "Setup.exe".

- To delete an installed manual, on the [Start] menu, point to [All Programs], click [(product name)], and then uninstall the data.

- Depending on the settings made during installation, menu folder names may differ.

- HTML manuals are available in English, German, French, Italian, Spanish, Dutch, and Russian.

Reading the PDF Manuals on the CD-ROM

This section describes how to read the PDF manuals on the supplied manual CD-ROM.

File path

   The manuals are included in the following folder on the CD-ROM:

   MANUAL_PDF\(language)

1. **Insert the CD-ROM in the CD-ROM drive of your computer.**

2. **Select a language and a product, and then click [OK].**

3. **Click [Read PDF manuals].**

Note

- To view the PDF manuals, you need to have Adobe Acrobat Reader/Adobe Reader installed on your computer.

- If you want to read the PDF manuals on a Macintosh, insert the CD-ROM in the CD-ROM drive, and then click [Read PDF manuals].

2. Safety Information

This chapter describes the safety precautions.

Safety During Operation

In this manual, the following important symbols are used:

⚠ **WARNING**
Indicates a potentially hazardous situation which, if instructions are not followed, could result in death or serious injury.

⚠ **CAUTION**
Indicates a potentially hazardous situation which, if instructions are not followed, may result in minor or moderate injury or damage to property.

Safety Precautions to Be Followed

This section explains safety precautions that should always be followed when using this machine.

Environments where the Machine can be Used

This section explains safety precautions about environments where the machine can be used.

⚠ WARNING

- Do not use flammable sprays or solvents in the vicinity of this machine. Doing so could result in fire or electric shock.

⚠ WARNING

- Do not place vases, plant pots, cups, toiletries, medicines, small metal objects, or containers holding water or any other liquids, on or close to this machine. Fire or electric shock could result from spillage or if such objects or substances fall inside this machine.

⚠ CAUTION

- Keep the machine away from humidity and dust. Otherwise a fire or an electric shock might occur.

⚠ CAUTION

- Do not place the machine on an unstable or tilted surface. If it topples over, an injury might occur.

⚠ CAUTION

- Do not place heavy objects on the machine. Doing so can cause the machine to topple over, possibly resulting in injury.

⚠ CAUTION

- Make sure the room where you are using the machine is well ventilated and spacious. Good ventilation is especially important when the machine is used heavily.

⚠ CAUTION

- Keep the machine away from salt-bearing air and corrosive gases. Also, do not install the machine in places where chemical reactions are likely (laboratories, etc.), as doing so will cause the machine to malfunction.

⚠ **CAUTION**

> • Do not obstruct the machine's vents. Doing so risks fire caused by overheated internal components.

Handling Power Cords and Power Cord Plugs

This section explains safety precautions about handling power cords and power cord plugs.

⚠ **WARNING**

> • Do not use any power sources other than those that match the specifications shown. Doing so could result in fire or electric shock.

⚠ **WARNING**

> • Do not use any frequencies other than those that match the specifications shown. Doing so could result in fire or electric shock.

⚠ **WARNING**

> • Do not use multi-socket adaptors. Doing so could result in fire or electric shock.

⚠ **WARNING**

> • Do not use extension cords. Doing so could result in fire or electric shock.

⚠ **WARNING**

> • Do not use power cords that are damaged, broken, or modified. Also, do not use power cords that have been trapped under heavy objects, pulled hard, or bent severely. Doing so could result in fire or electric shock.

⚠ **WARNING**

> • Be sure to disconnect the plug from the wall outlet at least once a year.
>
>   • There are burn marks on the plug.
>
>   • The prongs on the plug are deformed.
>
> • If any of the above conditions exist, do not use the plug and consult your dealer or service representative. Use of the plug could result in fire or electric shock.

⚠ **WARNING**

- Be sure to disconnect the power cord from the wall outlet at least once a year.
  - The power cord's inner wires are exposed, broken, etc.
  - The power cord's coating has a crack or dent.
  - When bending the power cord, the power turns off and on.
  - Part of the power cord becomes hot.
  - The power cord is damaged.
- If any of the above conditions exist, do not use the power cord and consult your dealer or service representative. Use of the power cord could result in fire or electric shock.

⚠ **WARNING**

- Touching the prongs of the power cable's plug with anything metallic constitutes a fire and electric shock hazard.

⚠ **WARNING**

- The supplied power cord is for use with this machine only. Do not use it with other appliances. Doing so could result in fire or electric shock.

⚠ **WARNING**

- It is dangerous to handle the power cord plug with wet hands. Doing so could result in electric shock.

⚠ **WARNING**

- If the power cord is damaged and its inner wires are exposed or broken, contact your service representative for a replacement. Use of damaged power cords could result in fire or electric shock.

⚠ **CAUTION**

- Be sure to push the plug of the power cord fully into the wall outlet. Partially inserted plugs create an unstable connection that can result in unsafe buildup of heat.

⚠ **CAUTION**

- If this machine is not going to be used for several days or longer at a time, disconnect its power cord from the wall outlet.

⚠ CAUTION

- When disconnecting the power cord from the wall outlet, always pull the plug, not the cord. Pulling the cord can damage the power cord. Use of damaged power cords could result in fire or electric shock.

⚠ CAUTION

- Be sure to disconnect the plug from the wall outlet and clean the prongs and the area around the prongs at least once a year. Allowing dust to build up on the plug constitutes a fire hazard.

⚠ CAUTION

- When performing maintenance on the machine, always disconnect the power cord from the wall outlet.

Handling the Main Machine

This section explains safety precautions about handling the main machine.

⚠ WARNING

- Be sure to locate the machine as close as possible to a wall outlet. This will allow easy disconnection of the power cord in the event of an emergency.

⚠ WARNING

- If the machine emits smoke or odours, or if it behaves unusually, you must turn off its power immediately. After turning off the power, be sure to disconnect the power cord plug from the wall outlet. Then contact your service representative and report the problem. Do not use the machine. Doing so could result in fire or electric shock.

⚠ WARNING

- If metal objects, or water or other fluids fall inside this machine, you must turn off its power immediately. After turning off the power, be sure to disconnect the power cord plug from the wall outlet. Then contact your service representative and report the problem. Do not use the machine. Doing so could result in fire or electric shock.

⚠ WARNING

- Do not touch this machine if a lightning strike occurs in the immediate vicinity. Doing so could result in electric shock.

⚠ WARNING

- The following explains the warning messages on the plastic bag used in this product's packaging.
    - Keep the polythene materials (bags, etc.) supplied with this machine away from babies and small children at all times. Suffocation can result if polythene materials are brought into contact with the mouth or nose.

⚠ CAUTION

- Unplug the power cord from the wall outlet before you move the machine. While moving the machine, take care that the power cord is not damaged under the machine. Failing to take these precautions could result in fire or electric shock.

⚠ CAUTION

- If you have to move the machine when the optional paper tray unit is attached, do not push on the main unit's top section. Doing so can cause the optional paper tray unit to detach, possibly resulting in injury.

⚠ CAUTION

- Before moving the machine, be sure to pull all four handles fully out. If not, an injury might occur. After moving the machine, return the four handles to their original positions.

⚠ CAUTION

- After you move the machine, use the caster fixture to fix it in place. Otherwise the machine might move or come down to cause an injury.

⚠ CAUTION

- Contact your service representative if you need to lift the machine (such as when relocating it to another floor). Do not attempt to lift the machine without the assistance of your service representative. The machine will be damaged if it topples or is dropped, resulting in malfunction and risk of injury to users.

⚠ CAUTION

- Before installing or removing options, always disconnect the power cord plugs from the wall outlet and allow time for the main unit to fully cool. Failing to take these precautions could result in burns.

⚠ **CAUTION**

> - Do not hold the control panel while moving the machine. Doing so may damage the control panel, cause a malfunction, or result in injury.

Handling the Machine's Interior

This section explains safety precautions about handling the machine's interior.

⚠ **WARNING**

> - Do not remove any covers or screws other than those explicitly mentioned in this manual. Inside this machine are high voltage components that are an electric shock hazard and laser components that could cause blindness. Contact your sales or service representative if any of the machine's internal components require maintenance, adjustment, or repair.
> - Do not attempt to disassemble or modify this machine. Doing so risks burns and electric shock. Note again that exposure to the laser components inside this machine risks blindness.

⚠ **CAUTION**

> - Some of this machine's internal components get very hot. For this reason, take care when removing misfed paper. Not doing so could result in burns.

⚠ **CAUTION**

> - The inside of the machine could be very hot. Do not touch the parts with a label indicating the "hot surface". Otherwise, an injury might occur.

⚠ **CAUTION**

> - When removing jammed paper, make sure not to trap or injure your fingers.

⚠ **CAUTION**

> - When loading paper, take care not to trap or injure your fingers.

⚠ **CAUTION**

> - Keep your hands clear of the booklet finisher tray when removing misfed paper, pulling out or pushing in the finisher's staple unit. You can trap and injure your fingers if you do not.

⚠CAUTION

> • During operation, rollers for transporting the paper and originals revolve. A safety device has been installed so that the machine can be operated safely. But take care not to touch the machine during operation. Otherwise, an injury might occur.

⚠CAUTION

> • If the machine's interior is not cleaned regularly, dust will accumulate. Fire and breakdown can result from heavy accumulation of dust inside this machine. Contact your sales or service representative for details about and charges for cleaning the machine's interior.

⚠CAUTION

> • Do not place your hand inside the machine when installing the controller board. If your finger gets trapped in the machine, an injury might occur.

Handling the Machine's Supplies

This section explains safety precautions about handling the machine's supplies.

⚠WARNING

> • Do not incinerate toner (new or used) or toner containers. Doing so risks burns. Toner will ignite on contact with naked flame.

⚠WARNING

> • Do not store toner (new or used) or toner containers anywhere near naked flames. Doing so risks fire and burns. Toner will ignite on contact with naked flame.

⚠WARNING

> • Do not use the cleaner to suck spilled toner (including used toner). Sucked toner may cause firing or explosion due to electrical contact flickering inside the cleaner. However, it is possible to use the cleaner designed for dust explosion-proof purpose. If toner is spilled over the floor, sweep up spilled toner slowly and clean remainder with wet cloth.

⚠ **WARNING**

- The following explains the warning messages on the plastic bag used in this product's packaging.
  - Keep the polythene materials (bags, gloves, etc.) supplied with this machine away from babies and small children at all times. Suffocation can result if polythene materials are brought into contact with the mouth or nose.

⚠ **CAUTION**

- Do not crush or squeeze toner containers. Doing so can cause toner spillage, possibly resulting in dirtying of skin, clothing, and floor, and accidental ingestion.

⚠ **CAUTION**

- Store toner (new or used), toner containers, and components that have been in contact with toner out of reach of children.

⚠ **CAUTION**

- If toner or used toner is inhaled, gargle with plenty of water and move into a fresh air environment. Consult a doctor if necessary.

⚠ **CAUTION**

- If toner or used toner gets into your eyes, flush immediately with large amounts of water. Consult a doctor if necessary.

⚠ **CAUTION**

- If toner or used toner is swallowed, dilute by drinking a large amount of water. Consult a doctor if necessary.

⚠ **CAUTION**

- When removing jammed paper or replacing toner, avoid getting toner (new or used) on your clothing. If toner comes into contact with your clothing, wash the stained area with cold water. Hot water will set the toner into the fabric and make removing the stain impossible.

⚠ **CAUTION**

- When removing jammed paper or replacing toner, avoid getting toner (new or used) on your skin. If toner comes into contact with your skin, wash the affected area thoroughly with soap and water.

⚠️CAUTION

- Do not attempt to print on stapled sheets, aluminum foil, carbon paper, or any kind of conductive paper. Doing so risks fire.

⚠️CAUTION

- Keep SD cards or USB flash memory devices out of reach of children. If a child accidentally swallows an SD card or USB flash memory device, consult a doctor immediately.

Safety Labels of This Machine

This section explains the machine's safety information labels.

Positions of WARNING and CAUTION labels

This machine has labels for △WARNING and △CAUTION at the positions shown below. For safety, please follow the instructions and handle the machine as indicated.

Main unit and optional paper trays

CQT802

1

CAUTION ATTENTION ACHTUNG
ATTENZIONE PRECAUCIÓN 注意 주의

● High temperature parts. ● Piezas muy calientes.
● T˚ des pièces élevée. ● 高温部件 ● 高温部分
● Heiße Geräteteile! ● 고온주의
● Temperatura elevata. ● 高温になっています。
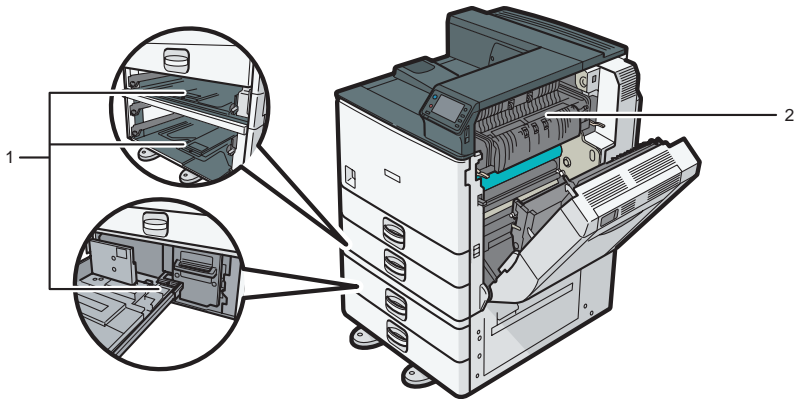
CQT821

(This label is put on the place only when the optional anti-humidity heater is installed)

The inside of the machine could be very hot. Do not touch the parts which a label is put on. Otherwise, an injury might occur.

2

CQT825

High temperature. Be careful of hot parts when clearing paper jams.

Finisher SR3120 and bridge unit
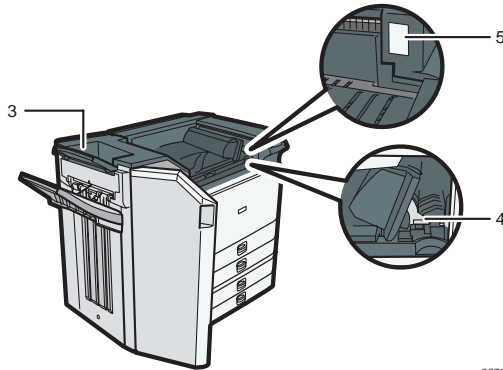
CQT803

3

CQT831

During operation, rollers for transporting the paper revolve. Take care not to touch rollers during operation. Otherwise, an injury might occur.

4

CQT832

Do not touch the parts a label indicates. The inside of the bridge unit could be very hot. Caution should be taken when removing misfed paper.

5

CQT833

During operation, rollers for transporting the paper revolve. Take care not to touch rollers during operation. Otherwise, an injury might occur.

Finisher SR3090

9

CQT804

9

CQT834

During operation, rollers for transporting the paper revolve. Take care not to touch rollers during operation. Otherwise, an injury might occur.

Power Switch Symbols

The meanings of the symbols for the switches on this machine are as follows:
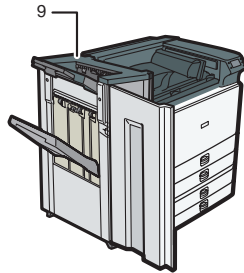
- **I** : POWER ON
- ⏻ : STANDBY

3. Information for This Machine

This chapter describes laws and regulations related to this machine.

Duplication and Printing Prohibited

Do not copy or print any item for which reproduction is prohibited by law.

Copying or printing the following items is generally prohibited by local law:

bank notes, revenue stamps, bonds, stock certificates, bank drafts, checks, passports, driver's licenses.

The preceding list is meant as a guide only and is not inclusive. We assume no responsibility for its completeness or accuracy. If you have any questions concerning the legality of copying or printing certain items, consult with your legal advisor.

3

Laser Safety

CDRH Regulations

This equipment complies with requirements of 21 CFR subchapter J for class I laser products. This equipment contains two GaAlAs laser diodes, 11 milliwatts, 775–790.7 nanometer wavelength for each emitter. The beam divergence angle is 25 degrees (minimum) and 36 degrees (maximum) in the vertical direction, and 7.0 degrees (minimum) and 12.5 degrees (maximum) in the horizontal direction, and laser beams are generated in Continuous Wave (CW) mode.

Caution:

Use of controls or adjustments or performance of procedures other than those specified in the manuals might result in hazardous radiation exposure.

Notes to Users in the United States of America

FCC Requirements

Part 15 of the FCC rules and IC rules

Declaration of Conformity

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible party: Ricoh Americas Corporation

Address: 5 Dedrick Place, West Caldwell, NJ 07006

Telephone number: 973-882-2000

Product Name: Laser Printer

Model Number: SP 8300DN/Aficio SP 8300DN

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio /TV technician for help.

Caution:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Using the shield cable

Properly shielded and grounded cables and connectors must be used for connections to a host computer (and/or peripheral) in order to meet FCC emission limits.

When using the ethernet connection and the optional Gigabit Ethernet board

Properly shielded twisted pair cable (STP cable) must be used for connections to a host computer (and/or peripheral) in order to meet FCC emission limits.

Notes to users in the state of California

Perchlorate Material - special handling may apply, See www.dtsc.ca.gov/hazardouswaste/ perchlorate

Notes to Users in Canada

Notes to Canadian Users of ICES -003 Conformance

Notes to users in Canada

This Class B digital apparatus complies with Canadian ICES-003.

Remarques à l'attention des utilisateurs canadiens

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Notes to Canadian Users of IC Rules

Notes to users in Canada

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:

(1) this device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Remarques à l'attention des utilisateurs canadiens

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

3

ENERGY STAR Program

ENERGY STAR® Program Requirements for Imaging Equipment

This company is a participant in the ENERGY STAR® Program.

This machine is compliant with the regulations specified by the ENERGY STAR® Program.

The ENERGY STAR® Program Requirements for Imaging Equipment encourage energy conservation by promoting energy efficient computers and other office equipment.

The program backs the development and dissemination of products that feature energy saving functions.

It is an open program in which manufacturers participate voluntarily.

Targeted products are computers, monitors, printers, facsimiles, copiers, scanners, and multi-function devices. Energy Star standards and logos are internationally uniform.

↓Note

- For details about the "default delay time", see p.33 "Energy Saving Functions".

Recycled Paper

We recommend use of recycled paper which is environment friendly. Please contact your sales representative for recommended paper.

Energy Saving Functions

To reduce its power consumption, this machine has the following functions:

Sleep mode

- If this machine remains idle for a specified period or when the [Energy Saver] key is pressed, it enters Sleep mode to reduce its electrical consumption.

- The default delay time the machine waits before entering Sleep mode is 1 minute. This default time can be changed.

- The machine can print jobs from computers while in Sleep mode.

Specification

Reduced electrical consumption in Sleep mode	2.3 W
Time of switch into Sleep mode	1 minute
Time of switch out from Sleep mode	15 seconds

Note

- Specifications can vary depending on which options are installed on the machine.

- For details about how to change the default interval, see "Timer Settings", Operating Instructions.

- Depending on which embedded software application is installed on it, the machine might take longer than indicated to enter Sleep mode.

4. Appendix

This chapter describes trademarks.

Trademarks

Adobe, Acrobat, and Reader are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Firefox® is a registered trademark of the Mozilla Foundation.

Macintosh and Safari are trademarks of Apple Inc., registered in the United States and other countries.

Microsoft®, Windows®, Windows Server®, Windows Vista®, and Internet Explorer® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

The proper name of Internet Explorer 6 is Microsoft® Internet Explorer® 6.

The proper names of the Windows operating systems are as follows:

- The product names of Windows XP are as follows:

    Microsoft® Windows® XP Professional Edition

    Microsoft® Windows® XP Home Edition

    Microsoft® Windows® XP Media Center Edition

    Microsoft® Windows® XP Tablet PC Edition

- The product names of Windows Vista are as follows:

    Microsoft® Windows Vista® Ultimate

    Microsoft® Windows Vista® Business

    Microsoft® Windows Vista® Home Premium

    Microsoft® Windows Vista® Home Basic

    Microsoft® Windows Vista® Enterprise

- The product names of Windows 7 are as follows:

    Microsoft® Windows® 7 Home Premium

    Microsoft® Windows® 7 Professional

    Microsoft® Windows® 7 Ultimate

    Microsoft® Windows® 7 Enterprise

- The product names of Windows Server 2003 are as follows:

    Microsoft® Windows Server® 2003 Standard Edition

    Microsoft® Windows Server® 2003 Enterprise Edition

- The product names of Windows Server 2003 R2 are as follows:

Microsoft® Windows Server® 2003 R2 Standard Edition

Microsoft® Windows Server® 2003 R2 Enterprise Edition

• The product names of Windows Server 2008 are as follows:

Microsoft® Windows Server® 2008 Standard

Microsoft® Windows Server® 2008 Enterprise

• The product names of Windows Server 2008 R2 are as follows:

Microsoft® Windows Server® 2008 R2 Standard

Microsoft® Windows Server® 2008 R2 Enterprise

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SP 8300DN
Afício SP 8300DN

User Guide

For information not in this manual, refer to the HTML/PDF files on the supplied CD-ROM.

Read this manual carefully before you use this machine and keep it handy for future reference. For safe and correct use, be sure to read the Safety Information in "Read This First" before using the machine.

TABLE OF CONTENTS

3. Troubleshooting

4. Replenishing and Replacing Consumables

1. Getting Started

This section describes the symbols used in the manuals supplied with the printer, available options, names and functions of components, and setup procedures.

Before You Start

How to Read the Manuals

Symbols used in the manuals

This manual uses the following symbols:

⭐ **Important**

Indicates points to pay attention to when using the machine, and explanations of likely causes of paper misfeeds, damage to originals, or loss of data. Be sure to read these explanations.

🔽 **Note**

Indicates supplementary explanations of the machine's functions, and instructions on resolving user errors.

📄 **Reference**

This symbol is located at the end of sections. It indicates where you can find further relevant information.

[ ]
Indicates the names of keys on the machine's display or control panels.

🌐 **Region A** (mainly Europe and Asia)

🌐 **Region B** (mainly North America)

Differences in the functions of Region A and Region B models are indicated by two symbols. Read the information indicated by the symbol that corresponds to the region of the model you are using. For details about which symbol corresponds to the model you are using, see p.7 "Model-Specific Information".

Disclaimer

Contents of this manual are subject to change without prior notice.

To the maximum extent permitted by applicable laws, in no event will the manufacturer be liable for any damages whatsoever arising out of failures of this machine, losses of the registered data, or the use of this product and operation manuals provided with it.

Make sure that you always copy or have backups of the data registered in this machine. Documents or data might be erased due to your operational errors or malfunctions of the machine.

In no event will the manufacturer be responsible for any documents created by you using this machine or any results from the data executed by you.

Notes

The manufacturer shall not be responsible for any damage or expense that might result from the use of parts other than genuine parts from the manufacturer with your office products.

For good output quality, the manufacturer recommends that you use genuine toner from the manufacturer.

Some illustrations in this manual might be slightly different from the machine.

About IP address

In this manual, "IP address" covers both IPv4 and IPv6 environments. Read the instructions that are relevant to the environment you are using.

List of Options

This section provides a list of options for this printer and the names commonly used in this manual.

Option name	Description
Paper Feed Unit PB3130	1000-sheet paper feed unit
LCIT PB3140	2000-sheet paper feed unit
LCIT RT3020	1200-sheet paper feed unit
Bridge Unit BU3060	Bridge unit
Finisher SR3090	1000-sheet finisher
Finisher SR3120	3000-sheet finisher
Punch Unit PU 3030 NA Punch Unit PU 3030 EU Punch Unit PU 3030 SC	Punch unit
Output Jogger Unit Type 9002A	Output jogger unit
Memory Unit Type L 512MB	SDRAM module

Option name	Description
Hard Disk Drive Option Type 8300	Hard disk
🌐 Region **A** Gigabit Ethernet Board Type A 🌐 Region **B** Giabit Ethernet Board Type C	Gigabit Ethernet board
🌐 Region **A** IEEE802.11a/g Interface Unit Type M IEEE802.11 Interface Unit Type P 🌐 Region **B** IEEE802.11a/g Interface Unit Type L	Wireless LAN interface board
IEEE 1284 Interface Board Type A	IEEE 1284 interface board
SD card for NetWare printing Type N	NetWare card
VM Card Type U	VM card

Model-Specific Information

This section explains how to identify the region to which your printer belongs.

There is a label on the rear of the printer, located in the position shown below. The label contains details that identify the region to which your printer belongs. Read the label.
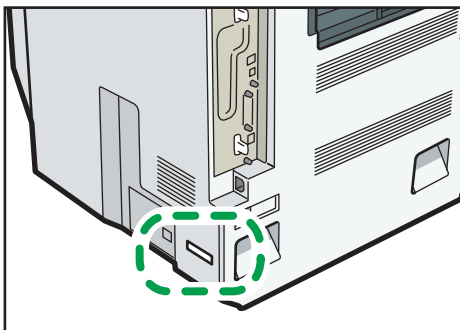
CQT652

The following information is region-specific. Read the information under the symbol that corresponds to the region of your printer.

🌐 Region **A** (mainly Europe and Asia)

If the label contains the following, your printer is a region A model:

- CODE XXXX -22, -27

- 220–240 V

Region B (mainly North America)

If the label contains the following, your printer is a region B model:

- CODE XXXX -17

- 120–127 V

↓ Note

- Dimensions in this manual are given in two units of measure: metric and inch. If your printer is a Region A model, refer to the metric units. If your printer is a Region B model, refer to the inch units.

Guide to Names and Functions of Components

Guide to Components

⭐ **Important**

- Do not obstruct the ventilation holes by placing objects near or against them. If the printer overheats, a fault might occur.

Front and right view
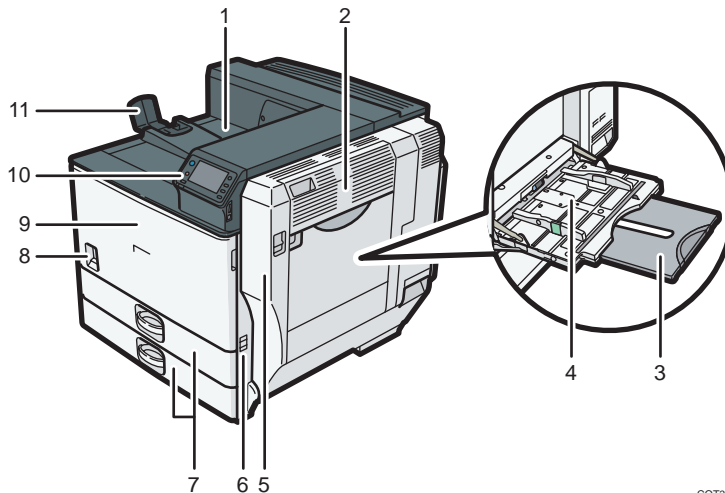
CQT300

1. **Standard output tray**

   Printed pages are output here.

2. **Upper right cover**

   Open this cover to remove jammed paper.

3. **Bypass tray extension**

   When loading paper larger than A4▷, pull out the bypass tray extension.

4. **Bypass tray**

   Up to 100 sheets of plain paper can be loaded.

5. **Right cover (Duplex unit)**

   Open this cover to remove jammed paper, or to replace Maintenance Kit B (the fusing unit and transfer unit).

6. **Handle**

   Pull out this handle when lifting the printer.

7. **Tray 1, Tray 2**

   Up to 550 sheets of plain paper can be loaded in each tray.

8. Power switch

Use this switch to turn the power on and off.

Perform the shutdown procedure before turning the power off. For details about how to shut down the printer, see p.25 "Turning Off the Power".

9. Front cover

Open this cover to replace the toner or Maintenance Kit A (the development unit).

10. Control panel

See p.11 "Guide to the Names and Functions of the Printer's Control Panel".

11. Paper support

Extend the paper support when printing on paper larger than A3⬌.

Rear and left view
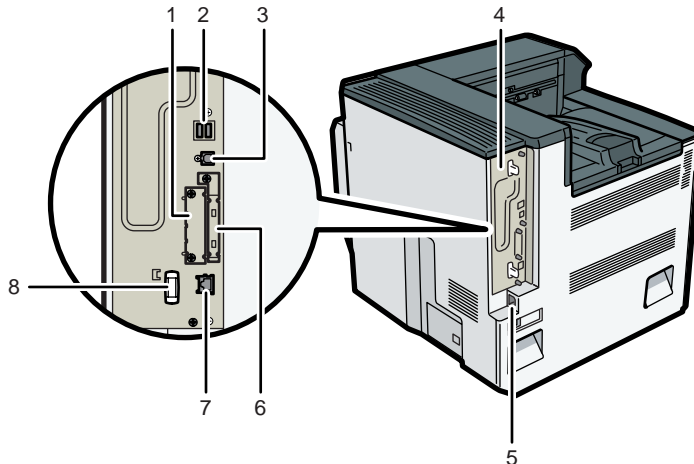
CQT302

1. Optional interface board slot

Optional interface boards can be inserted.

Insert an optional Gigabit Ethernet board, wireless LAN interface board, or IEEE 1284 interface board.

2. USB port A

Connect external devices to the printer, such as a card authentication device.

3. USB port B

Use a USB cable to connect the printer to a computer.

4. Controller board

Slide this out to install the hard disk or SDRAM module.

5. Power connector

Connect the power cord to the printer. Insert the other end of the cable into an electrical outlet.

6. Expansion card slots

Remove the cover and install the SD cards.

7. **Ethernet port**

   Use a network interface cable to connect the printer to a network.

8. **Handle**

   Hold this handle when pulling out the controller board.

Interior
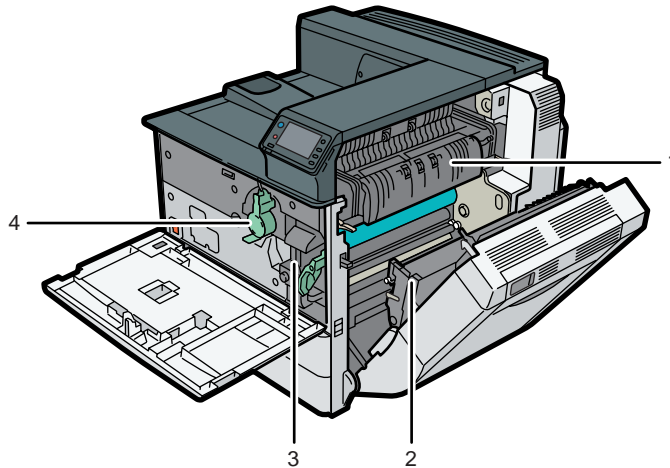
CQT301

1. **Fusing unit**

   Replace the fusing unit when the following message appears:

   - "Replacement of Maintenance Kit B is now necessary. Replace Maintenance Kit B."

     The fusing unit is included in Maintenance Kit B.

2. **Transfer unit**

   Replace the transfer unit when the following message appears:

   - "Replacement of Maintenance Kit B is now necessary. Replace Maintenance Kit B."

     The transfer unit is included in Maintenance Kit B.

3. **Development unit**

   Replace the development unit when the following message appears:

   - "Replacement of Maintenance Kit A is now necessary. Replace Maintenance Kit A."

     The development unit is included in Maintenance Kit A.

4. **Toner**

   Replace the toner when the following message appears:

   - "🖾 No toner. Replace Toner Cartridge."

Guide to the Names and Functions of the Printer's Control Panel

This illustration shows the control panel of the printer with options fully installed.

1
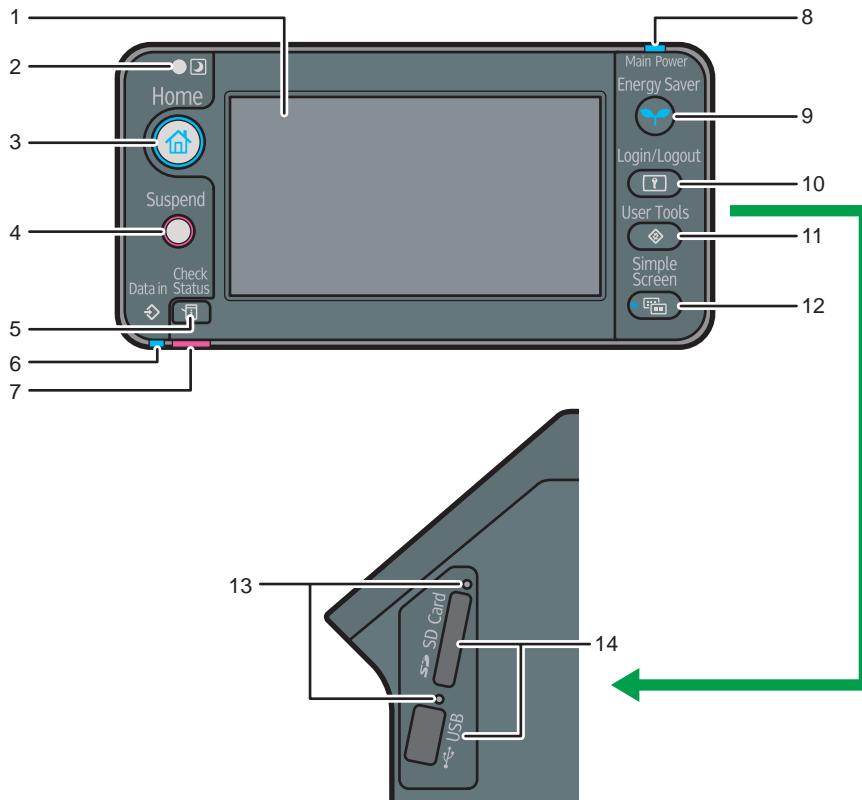
CQT135

1. **Display panel**

    Displays keys for each function, operation status, or messages. See p.16 "How to Use the Screens on the Control Panel".

2. **Light Sensor**

    The sensor that detects the ambient light level when the ECO Night Sensor function is enabled.

3. **[Home] key**

    Press to display the [Home] screen. For details, see p.14 "How to Use the [Home] Screen".

4. **[Suspend] key**

    Press this key to suspend a print job. The key lights up while the job is suspended.

5. **[Check Status] key**

    Press to check the printer's system status, operational status of each function, and current jobs. You can also display the job history and the printer's maintenance information.

6. **Data In indicator**

    Flashes when the printer is receiving print jobs from a computer. The data in indicator is lit if there is data to be printed.

7. **Check Status indicator**

    Lights up or flashes when a printer error occurs.

1

Steady red: printing is not possible.

Flashing yellow: the printer will soon require maintenance or a replacement consumable such as a print cartridge. Printing is possible, but print quality cannot be ensured.

Follow the instructions that appear on the display.

8. Power indicator

Remains lit while the power is on. It is unlit when the power is off or while the printer is in energy saver mode.

9. [Energy Saver] key

Press to switch to and from Sleep mode. See p.26 "Saving Energy". When the printer is in Sleep mode, the [Energy Saver] key flashes slowly.

10. [Login/Logout] key

Press to log in or log out.

11. [User Tools] key

Press to change the default settings to meet your requirements. See "Displaying the Printer Configuration Screens Using the Control Panel", Operating Instructions.

12. [Simple Screen] key

Press to switch to the simple screen. See p.18 "Switching Screen Patterns".

13. Media access lamp

Lights up when a memory storage device is inserted in the media slot or accessed.

14. Media slots

Use to insert an SD card or a USB flash memory device.

Using the Screen on the Control Panel

This section describes how to use the screen on the control panel.
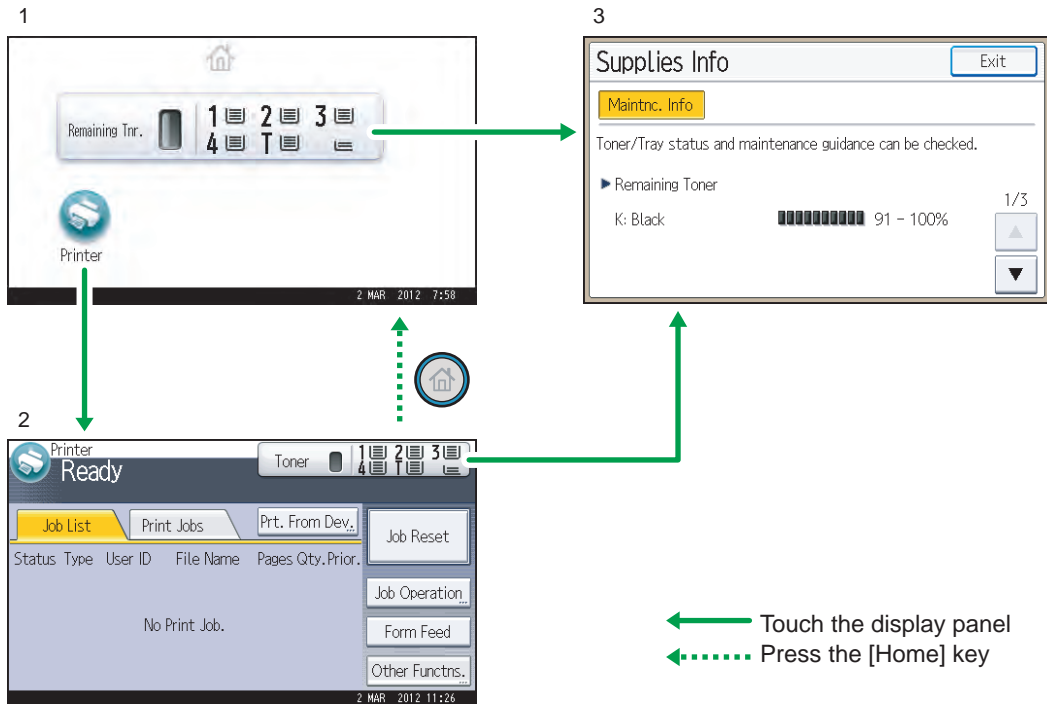
CQT659

1. **[Home] screen**

   Displays function and shortcut icons. For details, see p.14 "How to Use the [Home] Screen".

2. **[Printer] screen**

   Displays operation status, messages, and function menus. For details, see p.16 "How to Use the Screens on the Control Panel".

3. **[Supplies Info] screen**

   Allows you to check the printer status, such as toner and paper levels.

⬇Note

- The [Home] screen is set as the default screen when the printer is turned on. You can change this default setting under Function Priority. See "System Settings", Operating Instructions.

How to Use the [Home] Screen

To display the [Home] screen, press the [Home] key.

The icons of each function are displayed on the [Home] screen.

You can add shortcuts to frequently used embedded software applications to the [Home] screen. The icons of added shortcuts appear on the [Home] screen. The embedded software applications can be recalled easily by pressing the shortcut icons.

⭐**Important**

- Do not apply strong impact or force to the screen. Otherwise, it may be damaged. Maximum force allowable is approx. 30 N (approx. 3 kgf). (N = Newton, kgf = Kilogram force. 1 kgf = 9.8 N.)

CQT657
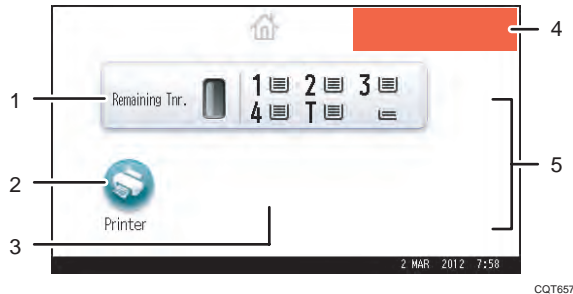
1. **Supply Information icon**

   Press to display the [Supplies Info] screen to check toner and paper levels.

2. **[Printer]**

   Press to display the [Printer] screen.

3. **Shortcut icon area**

   You can add shortcuts to embedded software applications to the [Home] screen. For details about how to register shortcuts, see "Adding icons to the [Home] screen", Operating Instructions..

4. **Home screen image**

   You can display an image such as a corporate logo on the [Home] screen. To change the image, see "Displaying the image on the [Home] screen", Operating Instructions.

5. **▲/▼**

   Press to switch pages when the icons are not displayed on one page.

⬇**Note**

- When an embedded software application is installed, a function icon for the application is displayed on the [Home] screen.

- You can change the order of icons. For details, see "Changing the order of icons on the [Home] screen", Operating Instructions.

System Reset

After finishing a job, the printer waits a specified length of time and then restores its settings to the default values specified under Function Priority. This function is called "System Reset". For the procedure for specifying default settings under Function Priority, see "System Settings", Operating Instructions.

To change the length of time that the printer waits before restoring its settings to their default values, use the System Auto Reset Timer setting. See "System Settings", Operating Instructions.

How to Use the Screens on the Control Panel

The display panel shows the operation status, messages, and function menus.

The function items displayed serve as selector keys. You can select or specify an item by lightly pressing them.

When you select or specify an item on the display panel, it is highlighted such as `Change`. Keys appearing as `Change` cannot be used.

⭐ **Important**

- Do not apply strong impact or force to the screen. Otherwise, it may be damaged. Maximum force allowable is approx. 30N (approx. 3 kgf). (N = Newton, kgf = Kilogram force. 1 kgf = 9.8N.)

The [Home] screen is set as the default screen when the printer is turned on.
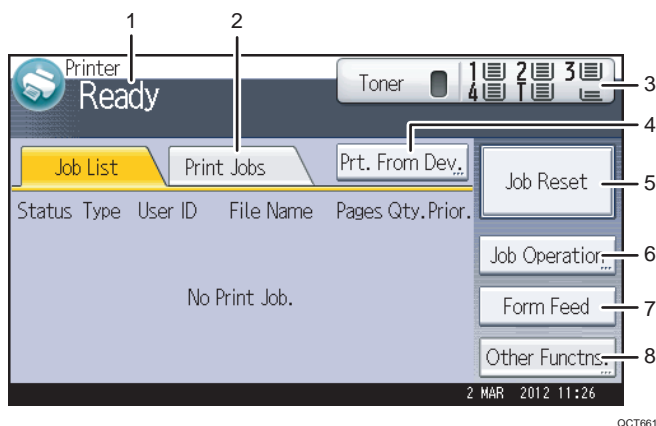
QCT661

1. **Operational status or messages**

   Displays current printer status, such as "Ready", "Offline", and "Printing...". Information about the print job (user ID and document name) appears in this section.

2. **[Print Jobs]**

   Press to display print jobs sent from a computer.

3. **Supply Information**

   You can check the remaining toner and paper. Press to display the [Supplies Info] screen.

4. **[Prt. From Dev.]**

   Press to display the screen for printing files stored on memory storage devices directly.

5. **[Job Reset]**

   Press to cancel the current print job.

   If you press it when Hex Dump is selected, Hex Dump is canceled.

6. [Job Operation]

Press to suspend a job being processed.

7. [Form Feed]

Press to print all the data left in the printer's input buffer.

8. [Other Functns.]

Press to display the error logs and status of spooled jobs.

How to use the [Information] screen

To improve user's environmental consciousness, you can configure the printer to notify users how much they have conserved paper usage by utilizing various paper conserving function of the printer.

When user authentication is enabled, the screen is displayed when you log in to the printer. When user authentication is not enabled, the screen is displayed after returning from Sleep mode or after a system reset. The [Information] screen appears when the power is turned on, regardless of the authentication settings.

CQT201
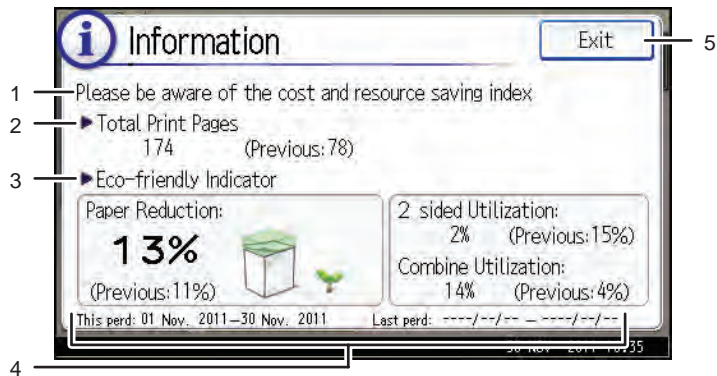
1. Message

A message from the administrator is displayed.

2. Total Print Pages

Total numbers of pages printed in the current count period and the previous count period are displayed.

3. Eco-friendly Indicator

- Paper Reduction:

  Shows the amount of paper saved by using the duplex and combine printing functions. The value indicates the percentage of paper saved from the total of all the paper used. As the percentage increases, the stack of paper decreases and the flower grows. When the ratio is 76% or more, the flower starts to bloom.

- 2 sided Utilization:

  The ratio of 2-sided prints to the total number of prints is displayed.

- Combine Utilization:

The ratio of combined prints to the total number of prints is displayed.

4. **Count periods**

   The current and previous count periods are displayed.

5. **[Exit]**

   Press this to close the [Information] screen and return to operation.

↓Note

- Depending on the printer settings, the [Information] screen may not be displayed. For details, see Security Guide.

- You can also use Web Image Monitor to check the usage status. For details about how to check them, see Web Image Monitor Help.

- Under [Eco-friendly Counter Period/Administrator Message] in [System Settings], you can check "Count Period", "Administrator Message", "Display Information Screen", and "Display Time". Only the administrator can change the settings. For details, see Security Guide.

Switching Screen Patterns

This section explains how to switch to the simple screen and the keys that are displayed.

When you press the [Simple Screen] key, the screen changes from the initial display to the simple screen.

Only the main functions are presented on the simple screen.

Letters and keys are displayed at a larger size, making operations easier.

1. **Press the [Simple Screen] key.**
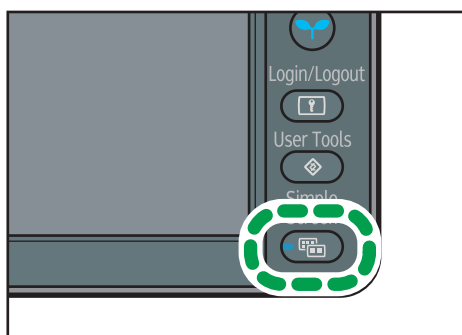
CQT663

This illustration shows the simple display of the [Printer] screen.
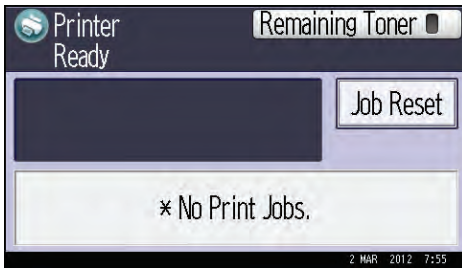
To increase the screen contrast, press the [Simple Screen] key again.

Note

- To return to the initial display from the high contrast screen, press the [Simple Screen] key again.
- Certain keys do not appear on the simple screen.

Adding Icons to the [Home] Screen

You can also review icons of functions and embedded software applications that you deleted from the [Home] screen.

Note

- Shortcut names of up to 32 characters can be displayed in a standard screen. If the name of the shortcut is longer than 32 characters, the 32nd character is replaced with "...". Only 30 characters can be displayed in a simple screen. If the name of the shortcut is longer than 30 characters, the 30th character is replaced with "...".
- You can register up to 72 function and shortcut icons. Delete unused icons if the limit is reached. For details see "Deleting an icon on the [Home] screen", Operating Instructions.
- You can change the position of icons. For details, see "Changing the order of icons on the [Home] screen", Operating Instructions.

In the following procedure, a shortcut to an embedded software application is registered to the [Home] screen.

For using Web Image Monitor

1. **Log in to Web Image Monitor as an administrator.**

   For details, see "Displaying the Printer Configuration Screens Using a Web Browser", Operating Instructions.

2. **Point to [Device Management], and then click [Device Home Management].**
3. **Click [Edit Icons].**
4. **Point to [⁺Icon can be added.] of the position that you want to add, and then click [⁺ Add].**
5. **Select the function or shortcut icon you want to add.**

6. **Click [OK] four times.**

For using User Tools

1. **Press [Add Icon] in the [Edit Home] screen.**

   For details about how to access the [Edit Home] screen, see "Displaying the Printer Configuration Screens Using the Control Panel", Operating Instructions.

2. **Press [Select Icon to Add].**

3. **Press [Application].**

4. **Select the application you want to add.**

5. **Press [Select Destination].**

6. **Specify the position where [Blank] is displayed.**

7. **Press [Exit].**

8. **Press the [User Tools] key.**

↓Note

- Press [•••] on the upper-right corner of the [Select Destination] screen to check the position on the simple screen.

Logging in the Printer

This section describes how to log in to the printer.

If Basic Authentication, Windows Authentication, LDAP Authentication, or Integration Server Authentication is enabled, the authentication screen appears on the display. The printer only becomes operable after entering your own Login User Name and Login Password. If User Code Authentication is enabled, you cannot use the printer until you enter the User Code.

If you can use the printer, you are logged in. When you exit the operable state, you are logged out. Be sure to log out to prevent unauthorized usage.

⭐ **Important**

- Ask the user administrator for the Login User Name, Login Password, and User Code. For details about user authentication, see Security Guide.

User Code Authentication Using the Control Panel

This section explains the procedure for logging in to the printer using the control panel while User Code Authentication is enabled.

If User Code Authentication is enabled, a screen prompting you to enter a User Code appears.

1. **Enter a User Code (up to eight digits), and then press [OK].**

🔽 **Note**

- To log out, press the [Energy Saver] key after jobs are completed.

User Code Authentication Using a Printer Driver

This section explains the procedure for logging in to the printer using a printer driver while User Code Authentication is enabled.

If User Code Authentication is enabled., specify the User Code in the printer properties of the printer driver. For details, see the printer driver Help.

🔽 **Note**

- The PCL printer driver supports User Code Authentication.

- When logged in using User Code Authentication, you do not have to log out.

Logging In Using the Control Panel

This section explains the procedure for logging in when Basic Authentication, Windows Authentication, LDAP Authentication, or Integration Server Authentication is enabled.

1. **Press [Login].**
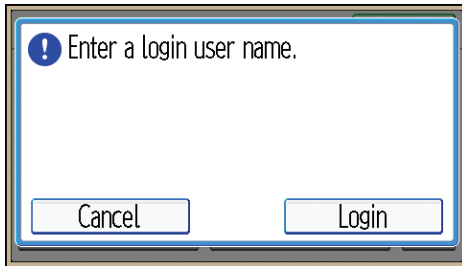
2. **Enter a Login User Name, and then press [OK].**

3. **Enter a Login Password, and then press [OK].**

   When the user is authenticated, the screen for the function you are using appears.

Logging Out Using the Control Panel

This section explains the procedure for logging out when Basic Authentication, Windows Authentication, LDAP Authentication, or Integration Server Authentication is enabled.

⭐**Important**

- To prevent use of the printer by unauthorized persons, always log out when you have finished using the printer.

1. **Press the [Login/Logout] key.**

CQT599
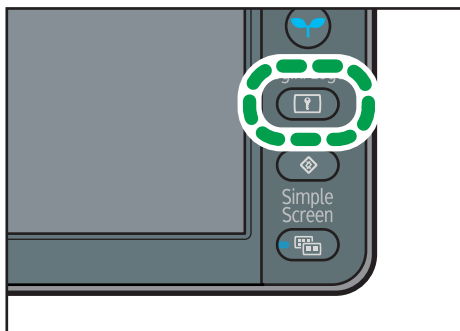
2. **Press [Yes].**

Logging In Using a Printer Driver

Enter your login user name and password as registered in the printer. You need only do this the first time you access the printer.

The PCL printer driver supports User Code Authentication.

The procedure is explained using Windows 7 as an example.

1. **Open the printer properties dialog box, and then click the [Advanced Options] tab.**

   For details about displaying the printer properties dialog box, see p.28 "Displaying the Printer Driver Properties with Windows".

2. **Select the [User Authentication] check box.**

3. **If you want to encrypt the login password, click [Driver Encryption Key...].**

   If you do not want to encrypt the password, proceed to step 6.

4. **Enter the driver encryption key already set on the printer.**

5. **Click [OK] to close the [Driver Encryption Key] dialog box.**

6. **Click [OK] to close the printer properties dialog box.**

7. **Open the printing preferences dialog box.**

8. **Specify the user authentication setting.**

   If you are using the PCL 5e printer driver, click the [Valid Access] tab, and then click [Authentications...].

   If you are using the PCL 6 printer driver, click the [Detailed Settings] tab, click [Job Setup], and then click [Authentication...] in the [Job Setup] area.

9. **Enter a login user name and login password already set on the printer or the server for user authentication.**

   Be sure to enter the same login user name and login password that is registered on the printer or server.

   If you do not enter a valid login user name and login password, printing will not start.

10. **Click [OK] to close the [Authentication] dialog box.**

11. **Click [OK] to close the printing preferences dialog box.**

🔽 **Note**

- Depending on the application in use, the properties specified in this procedure may not take effect.

- If you log in using the printer driver, you do not need to log out when you finish.

Logging In Using Web Image Monitor

For details about how to log in via Web Image Monitor, see "Displaying the Printer Configuration Screens Using a Web Browser", Operating Instructions.

🔽 **Note**

- For User Code Authentication, enter a User Code in the [Login User Name] box, and then click [Login].

- The procedure may differ depending on the Web browser used.

Logging Out Using Web Image Monitor

This section explains the procedure for logging out via Web Image Monitor.

1. **Click [Logout] to log out.**

🔽**Note**

• Delete the cache memory of the Web browser after logging out.

Turning On/Off the Power

This section describes how to turn on/off the printer.

↓Note

- This printer automatically enters Sleep mode if you do not use it for a while. To specify the time that the printer waits before it enters Sleep mode, configure the Sleep Mode Timer setting. See "Timer Settings", Operating Instructions.

Turning On the Power

★ Important

- Do not turn off the power switch immediately after turning it on. Doing so may result in damage to the hard disk or memory, leading to malfunctions.

1. **Make sure the power cord is firmly plugged into the wall outlet.**

2. **Turn on the power switch.**

   The power indicator turns on.

CQT375
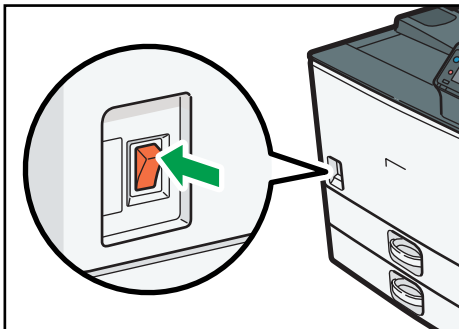
↓Note

- After you switch the power on, a screen may appear to indicate that the printer is initializing. Do not switch the power off during this process. Initialization takes about two minutes.

Turning Off the Power

⚠CAUTION

- When disconnecting the power cord from the wall outlet, always pull the plug, not the cord. Pulling the cord can damage the power cord. Use of damaged power cords could result in fire or electric shock.

⭐ **Important**

- After turning the printer's power off, wait at least a few seconds before turning it back on. If the message "Turn main Power Switch off" appears, turn the printer's power off, wait 10 seconds or more, and then turn it back on again. Never turn the power back on immediately after turning it off.

- Before unplugging the power cord plug, turn off the power switch and make sure the power switch indicator turns off. Not doing so may result in damage to the hard disk or memory, leading to malfunctions.

- Do not turn off the power while the printer is in operation.

1. **Turn off the power switch.**

   The power indicator goes out.

Saving Energy

This printer has the following energy saving functions.

Sleep mode

If the printer remains inactive for a specified period after entering Low Power mode, it enters Sleep mode to further reduce power consumption. The printer also enters Sleep mode under the following conditions:

- When the [Energy Saver] key is pressed

- The time the printer waits before entering Sleep mode is set in [Sleep Mode Timer]

- When the ECO Night Sensor detects the ambient light level

For details about setting [Sleep Mode Timer] and [ECO Night Sensor], see "Timer Settings" and "Administrator Tools", Operating Instructions.

To exit Sleep mode, do one of the following:

- Press the [Energy Saver] key

- Press the [Check Status] key

Off mode with Weekly Timer

Specify the time when the printer switches to and from Off mode. This timer can be set for Monday through Sunday. For details about setting [Weekly Timer], see "Timer Settings", Operating Instructions.

Off mode with ECO Night Sensor

The printer detects the ambient light level and enters Off mode at night automatically. For details about setting [ECO Night Sensor], see "Administrator Tools", Operating Instructions.

⬇ **Note**

- When the printer is in Sleep mode, the [Energy Saver] key flashes slowly.

- The energy saving functions will not operate in the following cases:
  - During communication with external equipment
  - When the hard disk is active
  - When a warning message appears
  - When the service call message appears
  - When paper is jammed
  - When the printer's covers are opened
  - When the "No toner. Replace Toner Cartridge." message appears
  - When toner is being replenished
  - When the [User Tools] screen is displayed
  - When fixed warm-up is in progress
  - When data is being processed
  - When operations are suspended during printing
  - When the Data In indicator is on or blinking
  - When the sample print, locked print, hold print, or stored print screen is displayed
  - When the screen of a document that was stored appears
- The printer consumes less energy when in Sleep mode, but it takes longer to start printing.
- If two or more energy saving functions are set, the function for which the predetermined conditions to enter energy saving mode are met takes effect first.

Displaying the Printer Configuration Screens

This section explains how to display the configuration screen of the printer.

Displaying the Printer Driver Properties with Windows

This section explains how to open the printer driver properties from [Devices and Printers].

⭐ **Important**

- Manage Printers permission is required to change the printer settings. Log on as an Administrators group member.

- You cannot change the printer default settings for individual users. Settings made in the printer properties dialog box are applied to all users.

1. On the [Start] menu, click [Devices and Printers].

2. Right-click the icon of the printer you want to use.

3. Click [Printer properties].

Displaying the Printing Preferences dialog box from the [Start] menu

This section explains how to open the [Printing Preferences] dialog box from [Devices and Printers].

⭐ **Important**

- When the printer driver is distributed from the print server, the setting values specified by the server are displayed as the default for [Printing Defaults...].

- You cannot configure different print settings for each user. The settings configured in this dialog box are used as the default.

1. On the [Start] menu, click [Devices and Printers].

2. Right-click the icon of the printer you want to use.

3. Click [Printing Preferences].

Displaying the Printing Preferences dialog box in an application

You can make printer settings for a specific application. To make printer settings for a specific application, open the [Printing Preferences] dialog box from that application.

The settings displayed in the [Printing Preference] dialog box opened from the [Devices and Printers] window are applied as the default in the [Printing Preference] dialog box opened in an application. When printing from an application, modify the settings as required.

1

The screens displayed may differ depending on the application. The following procedure explains how to print documents from an application using WordPad in Windows 7 as an example.

1. **Click the WordPad menu button in the upper left corner of the window, and then click [Print].**

2. **In the [Select Printer] list, select the printer you want to use.**

3. **Click [Preferences].**

Note

- Procedures for opening the [Printing Preferences] dialog box vary depending on the application. For details, see the printer driver Help or the manuals provided with the application.

Using One Click Presets

Some of the frequently used functions are registered under "One Click Preset List:" on the [One Click Presets] tab.

You can apply the relevant setting simply by clicking on the one click preset name. This helps to avoid incorrect settings and misprints.

One click presets can be added, modified, and deleted as required. By using registered one click presets, users without in-depth knowledge of the printer driver can utilize advanced printing functions easily.

Follow the procedure to register one click presets.

1. **Open the printing preferences dialog box.**

2. **Make the settings you require.**

3. **Click [Register Current Settings...].**

4. **Enter a name and comment that describe the setting, and then click [OK].**

5. **Click [OK].**

Note

- For details about modifying and deleting one click presets, see the printer driver Help.

Displaying the Printer Driver Help

Displaying the printer driver Help

If you click [Help] in the setting dialog box for the printer driver, the Help contents corresponding to the displayed tab appears.

Displaying the descriptions of the items on the printer driver's settings dialog box

If you click the question mark button in the upper right corner of the setting dialog box for the printer driver, the mouse's pointer changes to a question mark. Move this question mark over the item whose Help information you want to view, and then left-click to display the Help information.

Displaying the Printer Driver Properties with Mac OS X

This section explains how to display the printer driver settings screen on Mac OS X. Displayed screens may differ from those indicated in the following steps depending on the application. In the procedure below, Text Edit provided with Mac OS X 10.6 is used as an example.

1. **Start System Preferences.**
2. **Click [Print & Fax].**
3. **Click the icon of the printer you want to use.**

Displaying the printing preferences screen from an application

You can make printer settings for a specific application. To make printer settings for a specific application, open the printing preferences screen from that application.

1. **Select [Print] on the [File] menu.**
2. **Select the printer you are using in the [Printer:] pop-up menu.**

2. Printing

This chapter describes how to set up the printer before use including the procedures for loading paper into the paper trays and configuring printer settings, and how to print documents using various printing functions. Printing procedures using the printer drivers on Windows 7 and Mac OS X 10.6 are shown as an examples.

Paper Specification

This section describes the recommended paper sizes, types, and paper weight for each tray.

Supported Paper for Each Input Tray

The following tables provide details of the sizes, types, feed directions, and maximum number of sheets of paper that can be loaded in each of the printer input trays. It also provides supported paper information when duplex printing is specified.

⭐ **Important**

- The paper capacities described in the tables below are examples. The actual paper capacities might be lower, depending on the paper type.

Tray 1

Paper type	Plain Paper, Recycled Paper, Color Paper, Special Paper 1 to 3, Letterhead, Preprinted Paper, Prepunched Paper, Bond Paper, Label Paper, Thick: Back Side, Thick 2: Back Side, Envelope
Paper sizes selected automatically	🌐Region **A** A3▭, A4▭▭, A5▭, B4 JIS▭, B5 JIS▭▭, $8^1/_2 \times 11$▭ 🌐Region **B** 11 × 17▭, $8^1/_2 \times 14$▭, $8^1/_2 \times 11$▭▭, $7^1/_4 \times 10^1/_2$▭, A4▭, A5▭, B5 JIS▭

Paper sizes requiring manual setting	Standard size:
	🌐Region A 11 × 17▢, $8^1/_2$ × 14▢, $8^1/_2$ × 13▢, $8^1/_2$ × 11▢, $8^1/_4$ × 14▢, $8^1/_4$ × 13▢, 8 × 13▢, 8 × $10^1/_2$▢▢, 8 × 10▢
	$7^1/_4$ × $10^1/_2$▢▢, 11 × 15▢, 11 × 14▢, 10 × 15▢, 10 × 14▢, $4^1/_8$ × $9^1/_2$▢, C5 Env▢, DL Env▢
	🌐Region B A3▢, A4▢, B4 JIS▢, B5 JIS▢, $8^1/_2$ × 13▢, $8^1/_4$ × 14▢, $8^1/_4$ × 13▢, 8 × 13▢, 8 × $10^1/_2$▢▢, 8 × 10▢
	$7^1/_4$ × $10^1/_2$▢, 11 × 15▢, 11 × 14▢, 10 × 15▢, 10 × 14▢, $4^1/_8$ × $9^1/_2$▢, C5 Env▢, DL Env▢
	Custom size:
	• Vertical: 182.0–297.0 mm (7.17–11.69 inches)
	• Horizontal: 148.0–432.0 mm (5.83–17.00 inches)
Paper weight	60–216 g/m^2 (16 lb. Bond–80 lb. Cover)
Paper capacity	80 g/m^2 (20 lb. Bond): 550 sheets
	Envelopes: 50 sheets
Note	Load envelopes with their flaps fully open.

Tray 2

Paper type	Plain Paper, Recycled Paper, Color Paper, Special Paper 1 to 3, Letterhead, Preprinted Paper, Prepunched Paper, Bond Paper, Label Paper, Thick: Back Side, Thick 2: Back Side, Envelope
Paper sizes selected automatically	🌐Region A A3▢, A4▢▢, A5▢, B4 JIS▢, B5 JIS▢▢, $8^1/_2$ × 11▢
	🌐Region B 11 × 17▢, $8^1/_2$ × 14▢, $8^1/_2$ × 11▢▢, $7^1/_4$ × $10^1/_2$▢, A4▢, A5▢, B5 JIS▢

2

Paper sizes requiring manual setting	Standard size: 🌐 Region **A** 11 × 17▷, 8$^1/_2$ × 14▷, 8$^1/_2$ × 13▷, 8$^1/_2$ × 11▷, 8$^1/_4$ × 14▷, 8$^1/_4$ × 13▷, 8 × 13▷, 8 × 10$^1/_2$▽▷, 8 × 10▷, 7$^1/_4$ × 10$^1/_2$▽▷, 11 × 15▷, 11 × 14▷, 10 × 15▷, 10 × 14▷, 4$^1/_8$ × 9$^1/_2$▷, C5 Env▷, DL Env▷ 🌐 Region **B** A3▷, A4▷, B4 JIS▷, B5 JIS▷, 8$^1/_2$ × 13▷, 8$^1/_4$ × 14▷, 8$^1/_4$ × 13▷, 8 × 13▷, 8 × 10$^1/_2$▷, 8 × 10▷, 7$^1/_4$ × 10$^1/_2$▷, 11 × 15▷, 11 × 14▷, 10 × 15▷, 10 × 14▷, 4$^1/_8$ × 9$^1/_2$▷, C5 Env▷, DL Env▷ Custom size: • Vertical: 182.0–297.0 mm (7.17–11.69 inches) • Horizontal: 148.0–432.0 mm (5.83–17.00 inches)
Paper weight	60–216 g/m^2 (16 lb. Bond–80 lb. Cover)
Paper capacity	80 g/m^2 (20 lb. Bond): 550 sheets Envelopes: 50 sheets
Note	• Load envelopes with their flaps fully open.

Bypass Tray

Paper type	Plain Paper, Recycled Paper, Color Paper, Special Paper 1 to 3, Letterhead, Preprinted Paper, Prepunched Paper, Bond Paper, Cardstock, OHP(Transparency), Label Paper, Thick: Back Side, Thick 2: Back Side, Envelope
Paper sizes selected automatically	🌐 Region **A** A3▷, A4▽▷, A5▽▷, A6▷ 🌐 Region **B** 11 × 17▷, 8$^1/_2$ × 11▽▷, 5$^1/_2$ × 8$^1/_2$▷

Paper sizes requiring manual setting	Standard size:
	Region A B4 JIS, B5 JIS, B6 JIS, 11 × 17, $8^1/_2$ × 14, $8^1/_2$ × 13, $8^1/_2$ × 11, $8^1/_4$ × 14, $8^1/_4$ × 13, 8 × 13,
	8 × $10^1/_2$, 8 × 10, $7^1/_4$ × $10^1/_2$, $5^1/_2$ × $8^1/_2$, $4^1/_8$ × $9^1/_2$, $3^7/_8$ × $7^1/_2$, C5 Env, C6 Env, DL Env, 12 × 18, 11 × 15, 11 × 14, 10 × 15, 10 × 14
	Region B A3, A4, A5, A6, B4 JIS, B5 JIS, B6 JIS, $8^1/_2$ × 14, $8^1/_2$ × 13, $8^1/_4$ × 14, $8^1/_4$ × 13, 8 × 13,
	8 × $10^1/_2$, 8 × 10, $7^1/_4$ × $10^1/_2$, $4^1/_8$ × $9^1/_2$, $3^7/_8$ × $7^1/_2$, C5 Env, C6 Env, DL Env, 12 × 18, 11 × 15, 11 × 14, 10 × 15, 10 × 14
	Custom size
	• Vertical: 90.0–305.0 mm (3.55–12.00 inches)
	• Horizontal: 148.0–600.0 mm (5.83–23.62 inches)
Paper weight	52–216 g/m^2 (14 lb. Bond–80 lb. Cover)
Paper capacity	• 80 g/m^2 (20 lb. Bond) : 100 sheets • Thick Paper 1: 40 sheets • Thick Paper 2: 20 sheets • Label Paper: 1 sheet

1000-sheet paper feed unit

Paper type	Plain Paper, Recycled Paper, Color Paper, Special Paper 1 to 3, Letterhead, Preprinted Paper, Prepunched Paper, Bond Paper, Label Paper Thick: Back Side, Thick 2: Back Side, Envelope
Paper sizes selected automatically	**Region A** A3, A4, A5, B4 JIS, B5 JIS, $8^1/_2$ × 11
	Region B 11 × 17, $8^1/_2$ × 14, $8^1/_2$ × 11, $7^1/_4$ × $10^1/_2$, A4, A5, B5 JIS

2

Paper sizes requiring manual setting	Standard size:
	(Region A) 11 × 17, $8^1/_2$ × 14, $8^1/_2$ × 13, $8^1/_2$ × 11, $8^1/_4$ × 14, $8^1/_4$ × 13, 8 × 13, 8 × $10^1/_2$, 8 × 10, $7^1/_4$ × $10^1/_2$, 11 × 15, 11 × 14, 10 × 15, 10 × 14, $4^1/_8$ × $9^1/_2$, C5 Env, DL Env
	(Region B) A3, A4, B4 JIS, B5 JIS, $8^1/_2$ × 13, $8^1/_4$ × 14, $8^1/_4$ × 13, 8 × 13, 8 × $10^1/_2$, 8 × 10, $7^1/_4$ × $10^1/_2$, 11 × 15, 11 × 14, 10 × 15, 10 × 14, $4^1/_8$ × $9^1/_2$, C5 Env, DL Env
	Custom size:
	• Vertical: 182.0–297.0 mm (7.17–11.69 inches)
	• Horizontal: 148.0–432.0 mm (5.83–17.00 inches)
Paper weight	60–216 g/m^2 (16 lb. Bond–80 lb. Cover)
Paper capacity (80 g/m^2, 20 lb. Bond)	550 sheets × 2 tray

2000-sheet paper feed unit

Paper type	Plain Paper, Recycled Paper, Color Paper, Special Paper 1 to 3, Letterhead, Preprinted Paper, Prepunched Paper, Bond Paper, Thick: Back Side, Thick 2: Back Side
Paper sizes	(Region A) A4 (Region B) $8^1/_2$ × 11
Paper weight	60–216 g/m^2 (16 lb. Bond–80 lb. Cover)
Paper capacity (80 g/m^2, 20 lb. Bond)	1,000 sheets × 2 trays
Note	• Custom paper size is not supported. • The paper tray fence is fixed. If you wish to change the size of paper placed in this tray, contact your service representative.

1200-sheet paper feed unit

Paper type	Plain Paper, Recycled Paper, Color Paper, Special Paper 1 to 3, Letterhead, Preprinted Paper, Prepunched Paper, Bond Paper, Label Paper, Thick: Back Side, Thick 2: Back Side
Paper sizes	🌐Region **A** A4◻ 🌐Region **B** $8^1/_2$ × 11◻
Paper weight	60–216 g/m^2 (16 lb. Bond–80 lb. Cover)
Paper capacity (80 g/m^2, 20 lb. Bond)	1,200 sheets
Note	• Custom paper size is not supported. • The paper tray fence is fixed. If you wish to change the size of paper placed in this tray, contact your service representative.

Duplex printing

Paper type	Plain Paper, Recycled Paper, Color Paper, Special Paper 1 to 3, Letterhead, Preprinted Paper, Prepunched Paper, Bond Paper, Thick: Back Side, Thick 2: Back Side
Paper sizes	Standard size: A3◻, A4◱◻, A5◱◻, A6◻, B4 JIS◻, B5 JIS◱◻, B6 JIS◻, 11 × 17◻, $8^1/_2$ × 14◻, $8^1/_2$ × 13◻, $8^1/_2$ × 11◱◻, $8^1/_4$ × 14◻, $8^1/_4$ × 13◻, 8 × 13◻, 8 × $10^1/_2$◱◻, 8 × 10◱◻, $7^1/_4$ × $10^1/_2$◱◻, $5^1/_2$ × $8^1/_2$◻, 11 × 15◻, 11 × 14◻, 10 × 15◻, 10 × 14◻ Custom size: • Vertical: 90.0–297.0 mm (3.55–11.69 inches) • Horizontal: 148.0–432.0 mm (5.83–17.00 inches)
Paper weight	60–160 g/m^2 (16 lb. Bond–60 lb. Cover)

Supported Paper for Each Output Tray

The following tables provide details of the sizes, feed directions, and maximum number of sheets of paper that can be stacked in each of the printer's output trays. They also describe the specifications for the staple function of the optional finisher.

⭐ **Important**

- The paper capacities described in the tables below are examples. The actual paper capacities might be lower, depending on the paper type.

Standard output tray

Paper capacity (80 g/m^2, 20 lb. Bond):

- 500 sheets (A4⬒, 8^1/$_2$ × 11⬒ or smaller)
- 250 sheets (B4 JIS⬒, 8^1/$_2$ × 14⬒ or larger)

Bridge unit

Paper capacity (80 g/m^2, 20 lb. Bond):

- 250 sheets: A4, 8^1/$_2$ × 11 or smaller
- 125 sheets: B4 JIS, 8^1/$_2$ × 14 or larger

1000-sheet finisher

Finisher upper tray

Paper sizes	Standard size: A3⬒, B4 JIS⬒, A4⬒⬒, B5 JIS⬒⬒, A5⬒⬒, B6 JIS⬒, A6⬒, 12 × 18⬒, 11 × 17⬒, 11 × 15⬒, 10 × 14⬒, 8^1/$_2$ × 14⬒, 8^1/$_2$ × 13⬒, 8^1/$_2$ × 11⬒⬒, 8^1/$_4$ × 14 ⬒, 8^1/$_4$ × 13⬒, 8 × 13⬒, 8 × 10^1/$_2$⬒⬒, 8 × 10⬒⬒, 5^1/$_2$ × 8^1/$_2$⬒, 7^1/$_4$ × 10^1/$_2$⬒⬒, 11 × 14⬒, 10 × 15⬒ Custom size: • Vertical: 100.0–305.0 mm (3.94–12.00 inches) • Horizontal: 148.0–460.0 mm (5.83–18.11 inches)
Paper weight	52–216 g/m^2 (14 lb. Bond–80 lb. Cover)
Stack capacity (80 g/m^2, 20 lb. Bond)	• 250 sheets: A4, 8^1/$_2$ × 11 or smaller • 50 sheets: B4 JIS, 8^1/$_2$ × 14 or larger

Finisher shift tray

Paper sizes	A3▭, B4 JIS▭, A4▯▭, B5 JIS▯▭, A5▯▭, 12 × 18▭, 11 × 17▭, 11 × 15▭, 10 × 14▭, $8^1/_2$ × 14▭, $8^1/_2$ × 13▭, $8^1/_2$ × 11▯▭, $8^1/_4$ × 14▭, $8^1/_4$ × 13▭, 8 × 13▭, 8 × $10^1/_2$▯▭, 8 × 10▯▭, $5^1/_2$ × $8^1/_2$▭, $7^1/_4$ × $10^1/_2$▯▭, 11 × 14▭, 10 × 15▭
Paper weight	52–160 g/m² (14 lb. Bond–60 lb. Cover)
Paper sizes that can be shifted when delivered to the finisher shift tray	A3▭, A4▯▭, B4 JIS▭, B5 JIS▭, 12 × 18▭, 11 × 17▭, 11 × 15▭, 10 × 14▭, $8^1/_2$ × 14▭, $8^1/_2$ × 13▭, $8^1/_2$ × 11▯▭, $8^1/_4$ × 14▭, $8^1/_4$ × 13▭, 8 × 13▭, 8 × $10^1/_2$▯▭, 8 × 10▯▭, $7^1/_4$ × $10^1/_2$▯▭, 11 × 14▭, 10 × 15▭
Paper weight that can be shifted when delivered to the finisher shift tray	52–160 g/m² (14 lb. Bond–60 lb. Cover)
Paper capacity (80 g/m², 20 lb. Bond)	1,000 sheets: A4, $8^1/_2$ × 11 or smaller 500 sheets: B4 JIS, $8^1/_2$ × 14 or larger

Stapling

Paper sizes	A3▭, B4 JIS▭, A4▯▭, B5 JIS▯▭, 12 × 18▭, 11 × 17▭, 11 × 15▭, 11 × 14▭, 10 × 15▭, 10 × 14▭, $8^1/_2$ × 14▭, $8^1/_2$ × 11▯▭, $7^1/_4$ × $10^1/_2$▯▭, 8 × 13▭, $8^1/_2$ × 13▭, $8^1/_4$ × 14▭, $8^1/_4$ × 13▭, 8 × $10^1/_2$▯▭, 8 × 10▯▭
Paper weight	64–90 g/m² (17–24 lb. Bond)

2

Staple capacity (80 g/m2, 20 lb. Bond)	Without Mixed Size: • 30 sheets: A3▽, B4 JIS▽, 11 × 17▽, $8^1/_2$ × 14 ▽, 8 × 13▽, $8^1/_2$ × 13▽, $8^1/_4$ × 14▽, $8^1/_4$ × 13▽, 11 × 15▽, 10 × 14▽, 11 × 14▽, 10 × 15 ▽, 12 × 18▽ • 50 sheets: A4▽▽, B5 JIS▽▽, $8^1/_2$ × 11▽▽, 8 × $10^1/_2$▽▽, 8 × 10▽▽, $7^1/_4$ × $10^1/_2$▽▽ With Mixed Size: 16 sheets (A3▽/A4▽, B4 JIS▽/B5 JIS▽, 11 × 17 ▽/$8^1/_2$ × 11▽)
Stack capacity after stapling (80 g/m2, 20 lb. Bond)	• 2–9 sheets: 100 sets (A4▽▽, B5 JIS▽▽, $8^1/_2$ × 11▽▽) • 10–50 sheets: 100–20 sets (A4▽, $8^1/_2$ × 11▽) • 10–50 sheets: 50–10 sets (A4▽, B5 JIS▽▽, $8^1/_2$ × 11▽) • 2–9 sheets: 50 sets (A3▽, B4 JIS▽, 11 × 17▽, $8^1/_2$ × 14▽) • 10–30 sheets: 50–10 sets (A3▽, B4 JIS▽, 11 × 17▽, $8^1/_2$ × 14▽)

3000-sheet finisher

The finisher upper tray

Paper sizes[*]	Standard size: A3□, B4 JIS□, A4□□, B5 JIS□□, A5□□, B6 JIS□, A6□, 12 × 18□, 11 × 17□, 11 × 15□, 10 × 14□, $8^1/_2$ × 14□, $8^1/_2$ × 13□, $8^1/_2$ × 11□□, $8^1/_4$ × 14□, $8^1/_4$ × 13□, 8 × 13□, 8 × 10□□, 8 × $10^1/_2$□□, $5^1/_2$ × $8^1/_2$□, $7^1/_4$ × $10^1/_2$□□, 11 × 14□, 10 × 15□ Custom size: • Vertical: 100.0–305.0 mm (3.94–12.00 inches) • Horizontal: 148.0–600.0 mm (5.83–23.62 inches) When installing the output jogger unit, paper sizes for the finisher upper tray are listed below: A3□, B4 JIS□, A4□□, B5 JIS□, A5□, 11 × 17□, $8^1/_2$ × 14□, $8^1/_2$ × 11□□, $5^1/_2$ × $8^1/_2$□.
Paper weight	52–160 g/m^2 (14 lb. Bond–60 lb. Cover)
Stack capacity (80 g/m^2, 20 lb. Bond)	• A4, $8^1/_2$ × 11 or smaller: 250 sheets • B4 JIS, $8^1/_2$ × 14 or larger: 50 sheets

The finisher shift tray

Paper sizes	Standard size: A3□, B4 JIS□, A4□□, B5 JIS□□, A5□□, B6 JIS□, A6□, 12 × 18□, 11 × 17□, 11 × 15□, 10 × 14□, $8^1/_2$ × 14□, $8^1/_2$ × 13□, $8^1/_2$ × 11□□, $8^1/_4$ × 14□, $8^1/_4$ × 13□, 8 × 13□, 8 × 10□□, 8 × $10^1/_2$□□, $5^1/_2$ × $8^1/_2$□, $7^1/_4$ × $10^1/_2$□□, 11 × 14□, 10 × 15□ Custom size: • Vertical: 100.0–305.0 mm (3.94–12.00 inches) • Horizontal: 148.0–600.0 mm (5.83–23.62 inches)
Paper weight	52–216 g/m2 (14 lb. Bond–80 lb. Cover)

Paper sizes that can be shifted when delivered to the finisher shift tray	Standard size:
	A3, A4, A5, A6, B4 JIS, B5 JIS, 12 × 18, 11 × 17, 11 × 15, 10 × 14, $8^1/_2$ × 14, $8^1/_2$ × 13, $8^1/_2$ × 11,
	$8^1/_4$ × 14, $8^1/_4$ × 13, 11 × 14, 10 × 15, $5^1/_2$ × $8^1/_2$, 8 × 13, 8 × 10, 8 × $10^1/_2$, $7^1/_4$ × $10^1/_2$
	Custom size:
	• Vertical: 148.0–305.0 mm (5.83–12.00 inches)
	• Horizontal: 148.0–600.0 mm (5.83–23.62 inches)
Paper weight that can be shifted when delivered to the finisher shift tray	60–105 g/m^2 (16–28 lb. Bond)
Stack capacity (80 g/m2, 20 lb. Bond)	• 3,000 sheets: A4, $8^1/_2$ × 11
	• 1,500 sheets: A3, B4 JIS, A4, B5 JIS, 12 × 18, 11 × 17, $8^1/_2$ × 14, $8^1/_2$ × 11
	• 500 sheets: A5
	• 100 sheets: A5, B6 JIS, A6, $5^1/_2$ × $8^1/_2$

Stapling

Paper sizes	A3, B4 JIS, A4, B5 JIS, 12 × 18, 11 × 17, 11 × 15, 10 × 14, $8^1/_2$ × 14, $8^1/_2$ × 11, $7^1/_4$ × $10^1/_2$,
	8 × 13, $8^1/_2$ × 13, $8^1/_4$ × 14, $8^1/_4$ × 13, 8 × 10, 8 × $10^1/_2$, 11 × 14, 10 × 15
Paper weight	60–81 g/m^2 (16–20 lb. Bond)

Staple capacity (80 g/m2, 20 lb. Bond)	Without Mixed Size: • 30 sheets: A3▭, B4 JIS, 11 × 17▭, $8^1/_2$ × 14 ▭, 8 × 13▭, $8^1/_2$ × 13▭, $8^1/_4$ × 14▭, $8^1/_4$ × 13▭, 12 × 18▭,11 × 15▭, 10 × 14▭, 11 × 14 ▭, 10 × 15▭ • 50 sheets: A4▭▭, B5 JIS▭▭, $8^1/_2$ × 11▭▭, 8 × $10^1/_2$▭▭, 8 × 10▭▭, $7^1/_4$ × $10^1/_2$▭▭ With Mixed Size: • 30 sheets (A3▭/A4▭, B4 JIS▭/B5 JIS▭, 11 × 17▭/$8^1/_2$ × 11▭)
Stack capacity after stapling (80 g/m^2, 20 lb. Bond)	Without Mixed Size: • 2–19 sheets: 150 sets (A4▭, $8^1/_2$ × 11▭) • 20–50 sheets: 150–60 sets (A4▭, $8^1/_2$ × 11▭) • 2–14 sheets: 100 sets (A4▭, B5 JIS▭▭, $8^1/_2$ × 11▭) • 15–50 sheets: 100–30 sets (A4▭, B5 JIS▭▭, $8^1/_2$ × 11▭) • 2–14 sheets: 100 sets (other size paper) • 15–30 sheets: 100–33 sets (other size paper) With Mixed Size: • 2–30 sheets: 50 sets (A3▭/A4▭, B4 JIS▭/B5 JIS ▭, 11 × 17▭/$8^1/_2$ × 11▭)

Punch unit

Paper sizes for 2 & 4 holes type: 2 holes	Standard size: ▭: A3, B4 JIS, A4, B5 JIS, 11 × 17, $8^1/_2$ × 14, $8^1/_2$ × 11, 11 × 14, 10 × 15, $7^1/_4$ × $10^1/_2$, 8 × 13, $8^1/_2$ × 13, $8^1/_4$ × 13, $8^1/_4$ × 14, 8 × $10^1/_2$, 8 × 10, 11 × 15, 10 × 14 ▭: A4, B5 JIS, A5, 8 × $10^1/_2$, $8^1/_2$ × 11, $7^1/_4$ × $10^1/_2$ Custom size: • Vertical: 100.0–305.0 mm (3.94–12.00 inches) • Horizontal: 148.0–600.0 mm (5.83–23.62 inches)

2

Paper sizes for 2 & 4 holes type: 4 holes	Standard size: ▭: A3, B4 JIS, 11 × 17, 11 × 15, 11 × 14 ▯: A4, B5 JIS, 8 × 10^1/$_2$, 8^1/$_2$ × 11, 7^1/$_4$ × 10^1/$_2$ Custom size: • Vertical: 255.0–305.0 mm (10.04–12.00 inches) • Horizontal: 148.0–600.0 mm (5.83–23.62 inches)
Paper sizes for 4 holes type: 4 holes	Standard size: ▭: A3, B4 JIS, 11 × 17, 11 × 14, 10 × 15, 11 × 15, 10 × 14 ▯: A4, B5 JIS, 8^1/$_2$ × 11, 7^1/$_4$ × 10^1/$_2$, 8 × 10^1/$_2$ Custom size: • Vertical: 125.0–305.0 mm (4.93–12.00 inches) • Horizontal: 148.0–600.0 mm (5.83–23.62 inches)
Paper sizes for 2 & 3 holes type: 2 holes	Standard size: ▭: A3, B4 JIS, B5 JIS, 11 × 17, 8^1/$_2$ × 14, 8^1/$_2$ × 11, 11 × 14, 10 × 15, 7^1/$_4$ × 10^1/$_2$, 8 × 13, 8^1/$_2$ × 13, 8^1/$_4$ × 13, 8^1/$_4$ × 14, 8 × 10^1/$_2$, 8 × 10, 11 × 15, 10 × 14 ▯: A4, B5 JIS, A5, 8 × 10^1/$_2$, 8^1/$_2$ × 11, 7^1/$_4$ × 10^1/$_2$ Custom size: • Vertical: 100.0–305.0 mm (3.94–12.00 inches) • Horizontal: 148.0–600.0 mm (5.83–23.62 inches)
Paper sizes for 2 & 3 holes type: 3 holes	Standard size: ▭: A3, B4 JIS, 11 × 17, 11 × 15, 10 × 14, 11 × 14, 10 × 15 ▯: A4, B5 JIS, 8^1/$_2$ × 11, 8 × 10^1/$_2$, 7^1/$_4$ × 10^1/$_2$ Custom size: • Vertical: 230.0–305.0 mm (9.06–12.00 inches) • Horizontal: 148.0–600.0 mm (5.83–23.62 inches)
Paper weight	60–163 g/m^2 (16 lb. Bond–90 lb. Index)

Notes about Paper Thickness

The following tables define the paper weight for the paper thickness menu on the control panel.

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Paper thickness [1]	Paper weight
Thin Paper [2]	52–59 g/m^2 (14–15 lb. Bond)
Plain Paper	60–81 g/m^2 (16–20 lb. Bond)
Middle Thick	82–105 g/m^2 (20–28 lb. Bond)
Thick Paper 1	106–160 g/m^2 (28 lb. Bond–60 lb. Cover)
Thick Paper 2	161–216 g/m^2 (60–80 lb. Cover)

[1] Print quality will decrease if the paper you are using is close to the minimum or maximum weight. Change the paper weight setting to thinner or thicker.

[2] Depending on the type of thin paper, the edges may crease or the paper may be misfed.

Paper thickness for each paper type

The following tables provide the default paper thickness for each paper type. The paper thickness depending on each paper type is displayed Tray Paper Settings in the [User Tools] menu. Configure the appropriate paper thickness for the loaded paper type.

For details how to specify the setting, see "Specifying a Paper Type", Operating Instructions.

Paper type	Default paper thickness
Plain Paper, Recycled Paper, Color Paper, Letterhead, Special Paper 1, Special Paper 2, Special Paper 3, Preprinted Paper, Prepunched Paper, Bond Paper	Plain Paper
Label Paper	Thick Paper 1
Envelope	Middle Thick

If you select Cardstock, OHP (Transparency), Thick:Back Side, or Thick 2:Back Side for the paper type, "Paper Thickness" is not available.

Print Area

The following shows the recommended print area for this printer.
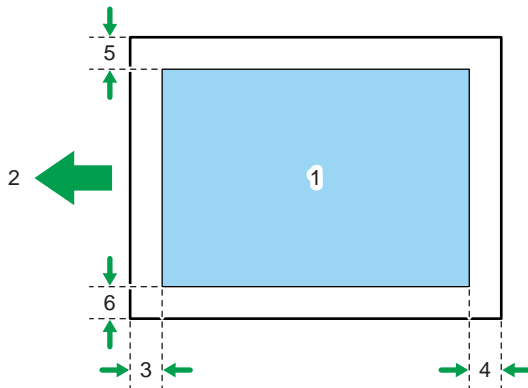
CLD001

1. **Print area**

2. **Feed direction**

3. **1.0 to 5.0 mm (0.04 to 0.20 inches)**

4. **0.0 to 4.0 mm (0.00 to 0.16 inches)**

5. **0.5 to 4.0 mm (0.02 to 0.16 inches)**

6. **0.5 to 3.5 mm (0.02 to 0.14 inches)**

Note

- The print area may vary depending on the paper size, printed language and printer driver settings.

- Depending on the printer driver settings, you may be able to print outside the recommended print area. However, the actual output may not be as desired, or a paper feed problem may occur.

- If [Edge to Edge Print] under [System] in [Printer Features] is enabled, the margins on the left, right, and bottom edges in relation to the feed direction will become 0 mm. For details about [Edge to Edge Print], see "System", Operating Instructions.

Loading Paper

This section explains how to load paper into the paper trays.

Precautions for Loading Paper

⚠ CAUTION

- When loading paper, take care not to trap or injure your fingers.

When loading paper, take care not to trap or injure your fingers.

⭐ **Important**

- **Do not stack paper over the limit mark.**

🔽 **Note**

- After changing the paper size, be sure to specify the appropriate paper size in the [Tray Paper Settings] menu. If you do not, misfeeds might occur. For details, see "Tray Paper Settings", Operating Instructions.

- To prevent multiple sheets from being fed at once, fan the paper before loading it.

- If you load paper when only a few sheets of paper remain in the tray, multiple sheet feeding may occur. Remove any remaining paper, stack them with the new sheets of paper, and then fan the entire stack before loading it into the tray.

- Straighten curled or warped paper before loading.

- For details about available paper sizes and types for each paper tray, see p.31 "Supported Paper for Each Input Tray".

- Depending on the environment where the printer is being used, you might at times hear a rustling noise from paper moving through the printer. This noise does not indicate a malfunction.

Unusable Paper

⚠ CAUTION

- Do not attempt to print on stapled sheets, aluminum foil, carbon paper, or any kind of conductive paper. Doing so risks fire.

Do not attempt to print on stapled sheets, aluminum foil, carbon paper, or any kind of conductive paper. Doing so risks fire.

⭐ **Important**

- **To prevent faults, do not use any of the following kinds of treated paper:**

2

- Paper for inkjet printers

- Thermal fax paper

- Art paper

- Aluminum foil

- Carbon paper

- Conductive paper

- Paper with perforated lines

- Hemmed-edge paper

- OHP transparencies for color printing

- Window envelopes

- Faults can occur if you print onto sides that are already printed. Take care to print onto unprinted sides only.

⬇Note

- To prevent misfeeds, do not use the following kinds of paper:

    - Bent, folded, or creased paper

    - Perforated paper

    - Slippery paper

    - Torn paper

    - Rough paper

    - Thin paper with little stiffness

    - Paper with a dusty surface

- Even supported types of paper may cause paper jams or malfunctions if the paper is not in good condition. (Sheets can become jammed if they have been improperly stored.)

- If you print onto rough grain paper, the output image might be blurred.

- Do not load sheets that have already been printed by another printer.

Paper Storage

When storing paper, the following precautions should always be followed:

- Do not store paper where it will be exposed to direct sunlight.

- Avoid storing paper in humid areas (humidity: 70% or less).

- Store on a flat surface.

- Do not store paper vertically.

- Once opened, store paper in plastic bags.

Loading Paper into Paper Trays

In the following example procedure, paper is loaded into Tray 2.

⭐ **Important**

- Check the paper edges are aligned at the right side.
- Slide the side fences until they are aligned with the sides of the paper, and then re-lock the side fences. If there is space between the side fences and the paper, it may cause the image to be misaligned or thin paper may wrinkle.
- When loading a low number of sheets, be sure not to squeeze the side fences in too tightly. If the side fences are squeezed too tightly against the paper, the edges may crease, thin paper may wrinkle, or the paper may be misfed.
- If a paper tray is pushed vigorously when putting it back into place, the position of the tray's side fences may slip out of place.

1. **Carefully pull out the paper tray until it stops.**
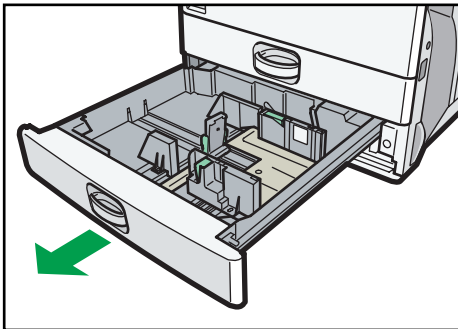
CQT346

2. **Release the lock on the side fences.**
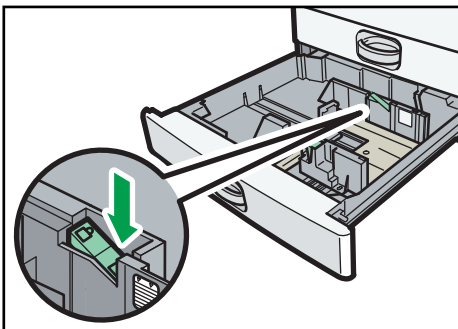
CQT349

3. **While pressing down the release lever, slide the side fences outward.**
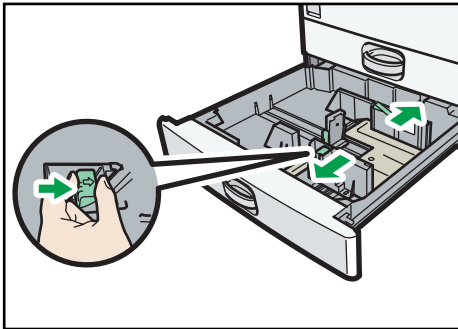
CQT350

4. **Slide the end fence outward.**
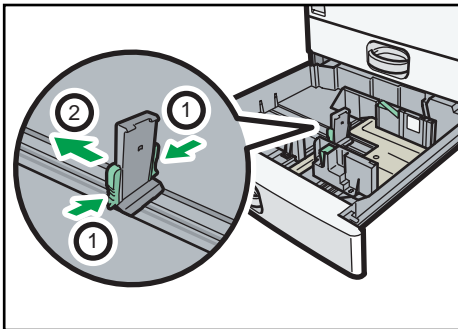
CQT351

1. **Pinch the release levers of the end fence.**

2. **Slide the end fence outward.**

5. **Square the paper and load it print side up.**

Do not stack paper over the limit mark.
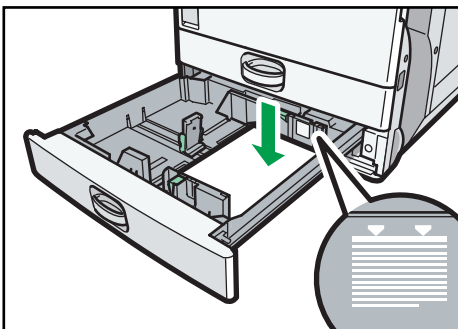
CQT352

6. **Align the back and side fences gently against the paper you loaded.**

CQT353
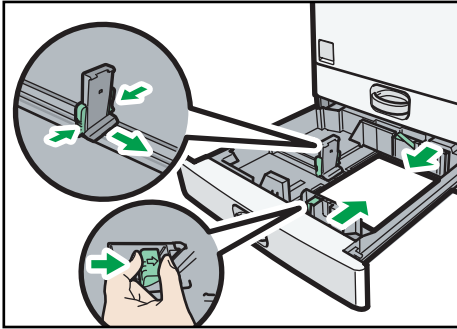
7. **Re-lock the side fences.**

8. **Carefully push the paper tray fully in.**

9. **Check the paper size on the display.**

Note

- You can load envelopes in the paper trays. Envelopes must be loaded in a specific orientation. For details, see p.61 "Loading Envelopes".

Loading Paper into the Bypass Tray

Use the bypass tray to use OHP transparencies, adhesive labels, translucent paper, and paper that cannot be loaded in the paper trays.

Important

- The maximum number of sheets you can load at the same time depends on paper type. Load only as much paper as can be held between the paper guides on the bypass tray. For the maximum number of sheets you can load, see p.31 "Supported Paper for Each Input Tray".

1. **Open the bypass tray.**

CQT676
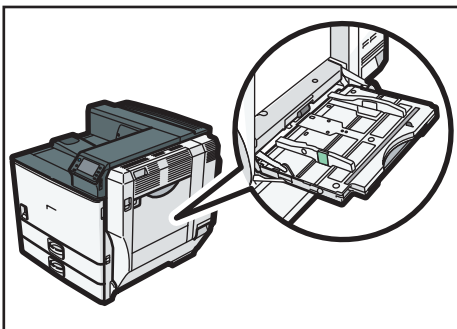
2. **Insert the paper face down until you hear the beep.**

3. **While pressing down the release lever, align the paper guides to the paper size.**

If the guides are not flush against the paper, images might be skewed or paper misfeeds might occur.
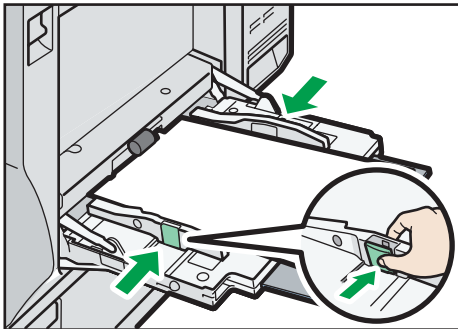
CJW014

Note

- When using the bypass tray, it is recommended that you set the paper direction to ▷.

- Certain types of paper might not be detected properly when placed on the bypass tray. If this happens, remove the paper and place it on the bypass tray again.

- Pull the bypass tray extension out when loading sheets larger than A4▷, $8^1/_2$ × 11▷ in the bypass tray.

- When the [Panel Key Sound] is turned off, it does not sound if you insert paper into the bypass tray. For details about [Panel Key Sound], see "General Features", Operating Instructions.

- If the printer stops detecting paper sizes while printing, remove the paper and reload it.

- Letterhead paper must be loaded in a specific orientation. For details, see p.54 "Loading Orientation-Fixed Paper or Two-Sided Paper".

- You can load envelopes into the bypass tray. Envelopes must be loaded in a specific orientation. For details, see p.61 "Loading Envelopes".

Loading Paper into Tray 3 (LCT)

Important

- When paper loaded in the right side of Tray 3 (LCT) runs out, paper on the left is automatically shifted to the right. Do not pull out Tray 3 (LCT) while the tray is moving paper; wait until sounds stop coming from the tray.

- For the right stack, align the right edge of the paper with the right edge of the tray. For the left stack, align the left edge of the paper to the left edge of the tray.

1. **Carefully pull out Tray 3 (LCT) until it stops.**
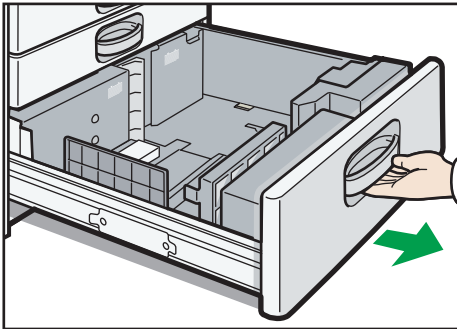
CJW320

2. **Square the paper and load it print side up.**

   Do not stack paper over the limit mark.

   • Whole tray pulled out
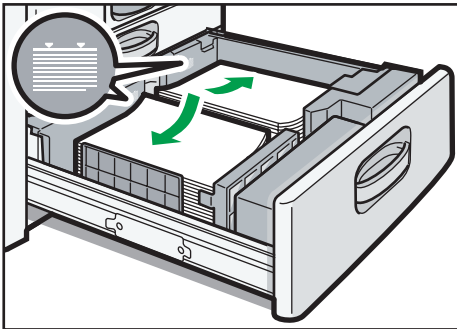
CJW016

   • Left half of the tray pulled out
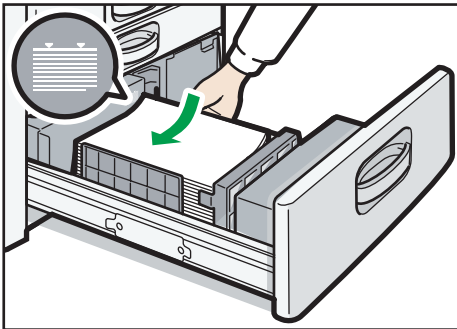
CJW017

3. **Carefully push the paper tray fully in.**

↓Note

• You can load paper even if Tray 3 (LCT) is in use. It is okay to pull out the left half of the tray while Tray 3 (LCT) is in use.

Loading Paper into the Large Capacity Tray (LCT)

1. **Open the right cover of the large capacity tray (LCT).**
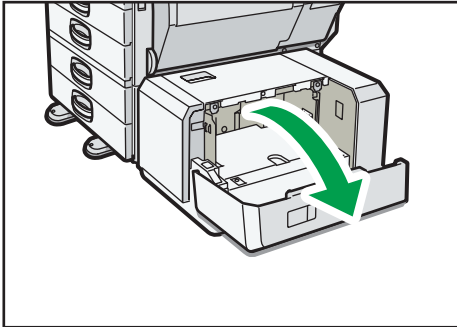
CJW018

2. **Load paper into the paper tray with the print side down and place it against the left side of the tray.**

   Do not stack paper over the limit mark.
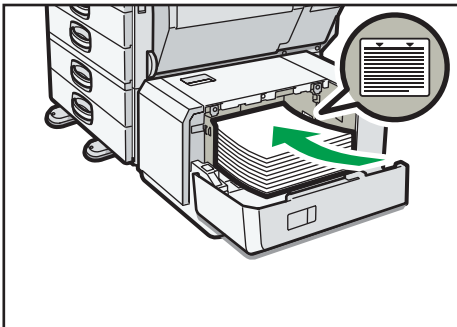
CJW019

3. **Press the [Down] key.**

   The bottom plate moves down.
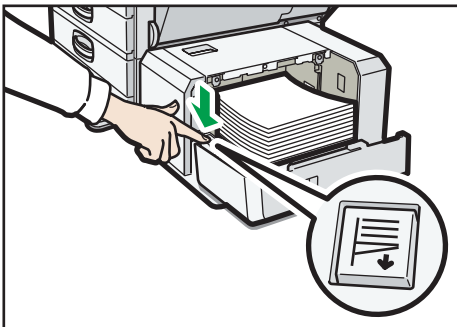
CJW020

4. **Load additional paper by repeating steps 2 and 3.**

5. **Close the right cover of the large capacity tray (LCT).**

Loading Orientation-Fixed Paper or Two-Sided Paper

Orientation-fixed (top to bottom) or two-sided paper (for example, letterhead paper, punched paper, or copied paper) might not print correctly, depending on how the paper is placed.

Settings for User Tools
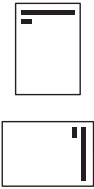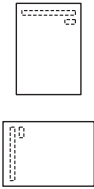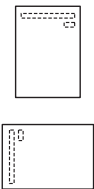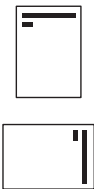
Specify [Auto Detect] or [On (Always)] for [Letterhead Setting] in [System] under the Printer Features menu, and then place the paper as shown below.

For details about the letterhead settings, see "System", Operating Instructions.

Paper orientation

The meanings of the icons are as follows:

Icon	Meaning
	Place or load paper printed side face up.
	Place or load paper printed side face down.

Print side	Tray 3 (LCT)	Trays 1–4	Large capacity tray (LCT)	Bypass tray
One-sided				
Two-sided				

Note

- To print on letterhead paper when [Auto Detect] is specified for [Letterhead Setting], you must specify [Letterhead] as the paper type in the printer driver's settings.

- If a print job is changed partway through printing from one-sided to two-sided printing, one-sided output after the first copy may be printed facing a different direction. To ensure all paper is output facing the same direction, specify different input trays for one-sided and two-sided printing. Note also that two-sided printing must be disabled for the tray specified for one-sided printing.

- For details about how to make two-sided prints, see p.58 "Printing on Both Sides of Sheets".

Standard Printing

Printing with Windows (PCL 6/PostScript 3)

⭐**Important**

- The default setting is duplex printing. If you want to print on only one side, select [Off] for the duplex setting.
- If you send a print job via USB 2.0 while the printer is in Low Power mode or Sleep mode, an error message might appear when the print job is complete. In this case, check if the document was printed.

1. After creating a document, open the [Printing Preferences] dialog box in the document's native application.

   For details about displaying the [Printing Preferences] dialog box, see p.28 "Displaying the Printing Preferences dialog box in an application".

2. In the "Job Type:" list, select [Normal Print].

3. In the "Document Size:" list, select the size of the document to be printed.

4. In the "Orientation:" list, select [Portrait] or [Landscape] for the orientation of the document.

5. In the "Input Tray:" list, select the paper tray that contains the paper to which you want to print.

   If you select [Auto Tray Select] in the "Input Tray:" list, the paper tray is automatically selected according to the paper size and type specified.

6. In the "Paper Type:" list, select the type of paper that is loaded in the paper tray.

7. To print multiple copies, specify the number of sets in the "Copies:" box.

8. Change any other print settings as necessary.

   You can set convenient print functions on the [Detailed Settings] tab. For details, see "Convenient Print Functions", Operating Instructions.

9. Click [OK].

10. Start printing from the application's [Print] dialog box.

Printing with Windows (PCL 5c/5e)

⭐**Important**

- The default setting is duplex printing. If you want to print on only one side, select [Off] for the duplex setting.

- If you send a print job via USB 2.0 while the printer is in Low Power mode or Sleep mode, an error message might appear when the print job is complete. In this case, check if the document was printed.

1. **After creating a document, open the [Printing Preferences] dialog box in the document's native application.**

   For details about displaying the [Printing Preferences] dialog box, see p.28 "Displaying the Printing Preferences dialog box in an application".

2. **In the "Job Type:" list, select [Normal Print].**

3. **To print multiple copies, specify the number of sets in the "Copies:" box.**

4. **In the "Orientation:" list, select [Portrait] or [Landscape] for the orientation of the document.**

5. **Click the [Paper] tab.**

6. **In the "Document Size:" list, select the size of the document to be printed.**

7. **In the "Input Tray:" list, select the paper tray that contains the paper to which you want to print.**

   If you select [Auto Tray Select] in the "Input Tray:" list, the paper tray is automatically selected according to the paper size and type specified.

8. **In the "Type:" list, select the type of paper that is loaded in the paper tray.**

9. **Change any other print settings as necessary.**

   You can set convenient print functions on the tabs of the printer driver. For details, see "Convenient Print Functions", Operating Instructions.

10. **Click [OK].**

11. **Start printing from the application's [Print] dialog box.**

Printing with Mac OS X

Follow the procedure below to print using the PostScript 3 printer driver for Mac OS X.

1. **After creating a document, open the printing preferences screen in the document's native application.**

   For details about displaying the printing preferences screen, see p.30 "Displaying the printing preferences screen from an application"

2. **In the " Paper Size:" menu, select the size of the document to be printed.**

3. **In the "Orientation:" menu, select the orientation of the document.**

4. **Select [Paper Feed] in the pop-up menu.**

5. **Select the paper tray that contains the paper to which you want to print.**

   If you select [Auto Select], the paper tray is automatically selected according to the paper size and type specified.

6. **Select [Printer Features] in the pop-up menu.**

7. **In the "Feature Sets:" menu, select the appropriate set of features to display the "Paper Type:" menu.**

8. **In the "Paper Type:" menu, select the type of paper that is loaded in the paper tray.**

9. **To print multiple copies, specify the number of sets in the "Copies:" box.**

10. **Select the [Collated] check box.**

    For some versions of Mac OS X, select [Paper Handling] or [Copies & Pages] in the pop-up menu, and then select the [Collate:] check box.

11. **Change any other print settings as necessary.**

    You can set convenient print functions in the pop-up menus of the printer driver. For details, see "Convenient Print Functions", Operating Instructions.

12. **Start printing.**

⬇Note

- For details about collate function, see "Collate", Operating Instructions.

- If the application has its own collate function, disable the function to use the collate function on this printer.

Printing on Both Sides of Sheets

This section explains how to print on both sides of each page using the printer driver.

Types of duplex printing

You can select which way the bound pages open by specifying which edge to bind.

Orientation	Open to Left	Open to Top
Portrait		
Landscape		

Duplex printing precautions

- The types of paper that can be printed on both sides are as follows:

Plain (60 to 81 g/m2), Recycled, Special, Special 2, Special 3, Middle Thick (82 to 105 g/m2), Thick 1 (106 to 160 g/m2), Color, Letterhead, Preprinted, Prepunched, Bond

- If the document contains pages with different original sizes, page breaks may occur.

⬇Note

- For details about setting the duplex printing function using the PCL 6 printer driver or PostScript 3 printer driver for Windows, see "Edit", Operating Instructions.
- For details about setting the duplex printing function using the PCL 5c/5e printer driver, see "Setup", Operating Instructions.
- For details about setting the duplex printing function using the PostScript 3 printer driver for Mac OS X, see "Layout", Operating Instructions.

Combining Multiple Pages into Single Page
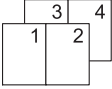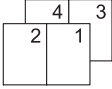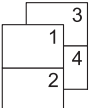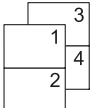
This section explains how to print multiple pages onto a single sheet. The combine printing function allows you to economize on paper by printing multiple sheets at reduced size onto a single sheet.

Types of combine printing

This function allows you to print 2, 4, 6, 9, or 16 pages at reduced size onto a single sheet and to specify a page ordering pattern for the combination. When combining 4 or more pages onto a single sheet of paper, four patterns are available.

The following illustrations show example page ordering patterns for 2- and 4-page combinations.

- 2 Pages per Sheet

Orientation	From Left to Right/Top to Bottom	From Right to Left/Top to Bottom
Portrait	3 4 / 1 2	4 3 / 2 1
Landscape	3 / 1 4 / 2	3 / 1 4 / 2

- 4 Pages per Sheet

Right, then Down	Down, then Right	Left, then Down	Down, then Left
1 2 / 3 4	1 3 / 2 4	2 1 / 4 3	3 1 / 4 2

Combine printing precautions

- If the document contains pages with different original sizes, page breaks may occur.

- If the application you are using also has a combine function, disable it. If the application's combine function is also enabled when the driver's combine function enabled, incorrect printing may occur.

- By combining the combine printing and booklet printing functions, you can print multiple pages onto a single sheet and bind them to form a booklet. For details about booklet printing, see "Booklet Printing", Operating Instructions.

Note

- For details about setting the combine printing function using the PCL 6 printer driver or PostScript 3 printer driver for Windows, see "Edit", Operating Instructions.

- For details about setting the combine printing function using the PCL 5c/5e printer driver, see "Setup", Operating Instructions.

- For details about setting the combine printing function using the PostScript 3 printer driver for Mac OS X, see "Layout", Operating Instructions.

Printing on Envelopes
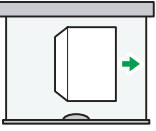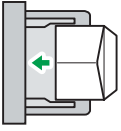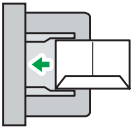
Loading Envelopes

This section gives you various details about and recommendations concerning envelopes.

⭐ **Important**

- Do not use window envelopes.
- Envelopes that are output to the internal tray may be pushed off as successive envelopes are output. If this happens, remove the envelopes as they are output.
- Fan the envelopes before loading them to separate them and prevent the glue on them from causing them to stick together. If fanning does not prevent them sticking together, load them one by one. Note that some types of envelopes cannot be used with this printer.
- Misfeeds might occur depending on the length and shape of the flaps.
- Only envelopes that are at least 139 mm (5.5 inches) wide and whose flaps are open can be loaded in the 🗁 orientation.
- When loading envelopes, load them in the 🗁 orientation. If you load envelopes in the 🗀 orientation, they might become creased.
- When loading envelopes in the 🗁 orientation, load them with flaps fully open. Otherwise, they might not feed into the printer.
- Load envelopes in the paper trays as shown below if they are between 139 mm (5.5 inches) and 148 mm (5.9 inches) wide when their flaps are open:
  - Align the envelopes with the right edge of the paper tray.
  - Envelopes may misfeed because there is a gap between the envelopes and the end fence. If this happens, reload the envelopes.
  - Carefully slide the paper tray completely in.
- Before loading envelopes, press down on them to remove any air from inside, flatten out all four edges. If they are bent or curled, flatten their leading edges (the edge going into the printer) by running a pencil or ruler across them.

The method for loading envelopes varies depending on the orientation of the envelopes. Be sure to load envelopes with the correct orientation.

Types of envelopes	Paper trays 1–4	Bypass tray
Side-opening envelopes	 • Flaps: open • Bottom side of envelopes: toward the right of the printer • Side to be printed: face up	 • Flaps: open • Bottom side of envelopes: toward the left of the printer • Side to be printed: face down
Side-opening envelopes	Not recommended	 • Flaps: closed • Bottom side of envelopes: toward the back of the printer • Side to be printed: face down

When loading envelopes, use both User Tools and the printer driver to select "Envelope" as the paper type and specify the thickness of the envelopes. For details, see p.61 "Printing on Envelopes", Printer.

To print on envelopes that are loaded with their short edges against the printer body, rotate the print image by 180 degrees using the printer driver.

Recommended envelopes

For information about recommended envelopes, contact your local dealer.

The size of envelopes that you can load depends on the tray in which you load them. For details, see p.31 "Supported Paper for Each Input Tray".

🔽 Note

- Load only one size and type of envelope at a time.
- The Duplex function cannot be used with envelopes.
- To achieve better output quality, it is recommended that you set the right, left, top, and bottom print margin to at least 15 mm (0.6 inches) each.
- The output quality on envelopes may be uneven if parts of an envelope have differing thicknesses. Print one or two envelopes to check the print quality.

- Printed sheets are delivered to the internal tray even if you specified a different tray.

- Flatten out prints if they are creased or curled.

- Check that the envelopes are not damp.

- High temperature and high humidity conditions can reduce print quality and cause envelopes to become creased.

- Depending on the environment, printing on envelopes may wrinkle them even if they are recommended.

- Certain types of envelopes might be output creased, dirtied, or misprinted. If you are printing a solid color on an envelope, lines may appear where the overlapped edges of the envelope make it thicker.

Printing on Envelopes with Windows (PCL 6/PostScript 3)

1. **After creating a document, open the [Printing Preferences] dialog box in the document's native application.**

   For details about displaying the [Printing Preferences] dialog box, see p.28 "Displaying the Printing Preferences dialog box in an application".

2. **In the "Input Tray:" list, select the paper tray where the envelopes are loaded.**

3. **In the "Document Size:" list, select the envelope size.**

4. **In the "Paper Type:" list, select [Envelope].**

5. **Change any other print settings as necessary. For details, see the printer driver Help.**

6. **Click [OK].**

7. **Start printing from the application's [Print] dialog box.**

🔸Note

- Configure the paper settings appropriately using both the printer driver and the control panel. For details about settings using the control panel, see "Configuring envelope settings using the control panel", Operating Instructions.

- Envelopes must be loaded in a specific orientation. For details, see p.61 "Loading Envelopes".

Printing on Envelopes with Windows (PCL 5c/5e)

1. **After creating a document, open the [Printing Preferences] dialog box in the document's native application.**

   For details about displaying the [Printing Preferences] dialog box, see p.28 "Displaying the Printing Preferences dialog box in an application".

2. **Click the [Paper] tab.**

3. **In the "Input Tray:" list, select the paper tray where the envelopes are loaded.**

4. **In the "Document Size:" list, select the envelope size.**

5. **In the "Type:" list, select [Envelope].**

6. **Change any other print settings as necessary. For details, see the printer driver Help.**

7. **Click [OK].**

8. **Start printing from the application's [Print] dialog box.**

↓Note

- Configure the paper settings appropriately using both the printer driver and the control panel. For details about settings using the control panel, see "Configuring envelope settings using the control panel", Operating Instructions.

- Envelopes must be loaded in a specific orientation. For details, see p.61 "Loading Envelopes".

Printing on Envelopes with Mac OS X

1. **After creating a document, open the printing preferences screen in the document's native application.**

   For details about displaying the printing preferences screen, see p.28 "Displaying the Printing Preferences dialog box in an application".

2. **Clear the [Two-Sided:] check box to disable duplex printing.**

3. **In the " Paper Size:" menu, select the envelope size.**

4. **In the "Orientation:" menu, select the orientation of the envelope.**

5. **Select [Paper Feed] in the pop-up menu.**

6. **Select the paper tray where the envelopes are loaded.**

7. **Select [Printer Features] in the pop-up menu.**

8. **In the "Feature Sets:" menu, select the appropriate set of features to display the "Paper Type:" menu.**

9. **In the "Paper Type:" menu, select [Envelope].**

10. **Change any other print settings as necessary.**

11. **Start printing.**

↓Note

- Configure the paper settings appropriately using both the printer driver and the control panel. For details about settings using the control panel, see "Configuring envelope settings using the control panel", Operating Instructions.

- Envelopes must be loaded in a specific orientation. For details, see p.61 "Loading Envelopes".

Storing a Document

Storing a Document with Windows

1. **After creating a document, open the [Printing Preferences] dialog box in the document's native application.**

   For details about displaying the [Printing Preferences] dialog box, see p.28 "Displaying the Printing Preferences dialog box in an application".

2. **In the "Job Type:" list, select a job type.**

   - Select [Sample Print] to store the document as a Sample Print file.

   - Select [Locked Print] to store the document as a Locked Print file.

   - Select [Hold Print] to store the document as a Hold Print file.

   - Two options are available when storing a Stored Print file:

     Select [Stored Print] to store the document in the printer and print it later using the control panel.

     Select [Store and Print] to store and print the document at the same time.

3. **Click [Details...].**

4. **Enter a User ID in the "User ID:" box.**

   - When storing a Locked Print file, enter a password in the "Password:" box.

   - When storing a Hold Print file, specify a file name and print time as necessary.

     To specify the time when the document is printed, select the [Set Print Time] check box, and then specify the time.

   - When storing a Stored Print file, specify a file name and password as necessary.

5. **Click [OK].**

6. **Change any other print settings as necessary.**

7. **Click [OK].**

8. **Start printing from the application's [Print] dialog box.**

⬇ Note

- The printer might not print a Hold Print file at the specified time under the following conditions:

  - When the specified print time is close to the time in the printer's built-in clock, printing may start immediately.

  - When the main power of the printer is turned off, printing will not start even if it is the specified print time. To print a document whose specified time has already passed, set [Jobs Not Printed As Machn. Was Off] to [On] on [System] under [Printer Features]. For details, see "System", Operating Instructions.

- If an error message is displayed on the control panel, printing will not start even if it is the specified print time.

- If [Stored Print (Shared)] or [Store and Print (Shared)] is selected when a Stored Print file is stored, the user who created the document and all users who have print privileges can print the document using the control panel. This setting is available when User Authentication is enabled using the PCL 6 printer driver. For details, see Security Guide.

Storing a Document with Mac OS X

1. **After creating a document, open the printing preferences screen in the document's native application.**

   For details about displaying the printing preferences screen, see p.30 "Displaying the printing preferences screen from an application".

2. **Select [Job Log] in the pop-up menu.**

3. **Enter the user ID in the "User ID:" box using up to eight alphanumeric characters.**

4. **In the "Job Type:" pop-up menu, select a job type.**

   - Select [Sample Print] to store the document as a Sample Print file.

   - Select [Locked Print] to store the document as a Locked Print file, and then enter the password in the "Password:" box.

     Use four to eight digits for the password.

   - Select [Hold Print] to store the document as a Hold Print file.

     You can add a name to the document using up to 16 alphanumeric characters.

     To print a document on the specified time, select the [Set Print Time] check box.

   - Two options are available when storing a Stored Print file:

     Select [Stored Print] to store the document in the printer and print it later using the control panel.

     Select [Store and Print] to store and print the document at the same time.

     You can add a name to the document using up to 16 alphanumeric characters.

     You can set a password for the document using four to eight digits.

5. **Change any other print settings as necessary.**

6. **Start printing.**

Note

- The printer may not print a Hold Print file at the specified time under the following conditions:

  - When the specified print time is close to the time in the printer's built-in clock, printing may start immediately.

- When the main power of the printer is turned off, printing will not start even if it is the specified print time. To print a document whose specified time has already passed, set [Jobs Not Printed As Machn. Was Off] to [On] on [System] under [Printer Features]. For details, see "System", Operating Instructions.

- If an error message is displayed on the control panel, printing will not start even if it is the specified print time.

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3. Troubleshooting

This chapter provides solutions to common problems and it also explains how to correct unwanted print results.

When Indicators Are Displayed

This section describes the indicators that appear when the printer requires user attention such as removing misfed paper, reloading paper, or performing other procedures.

Indicator	Status
⚡ : Paper Misfeed indicator	Appears when a paper misfeed occurs. For details about removing jammed paper, see p.112 "Removing Jammed Paper".
📥 : Load Paper indicator	Appears when paper runs out. For details about loading paper, see p.46 "Loading Paper".
📥 : Add Toner indicator	Appears when toner runs out. For details about adding toner, see p.121 "Adding Toner".
📥 : Add Staple indicator	Appears when staples run out. For details about adding staples, see p.125 "Adding Staples".
🗑 : Empty Hole Punch Receptacle indicator	Appears when the hole punch receptacle is full. For details about removing punch waste, see p.120 "Removing Punch Waste".
🔧 : Service Call indicator	Appears when the printer is malfunctioning or requires maintenance.
🚪 : Open Cover indicator	Appears when one or more covers of the printer are open.

When a Panel Tone Beeps

The following table describes various beep patterns that the printer produces to alert users about printer conditions and the meaning of each beep pattern.

Beep pattern	Meaning	Causes
Single short beep	Panel/screen input accepted.	A control panel or screen key was pressed.
Short, then long beep	Panel/screen input rejected.	An invalid key was pressed on the control panel or screen, or the entered password was incorrect.
Two long beeps	Printer has warmed up.	When the power is turned on or the printer exits Sleep mode, the printer has fully warmed up and is ready for use.
Five long beeps repeated four times.	Soft alert	An error message appears on the control panel if there is no tray for the selected paper size or the tray is empty.
Five short beeps repeated five times.	Strong alert	Paper has jammed, the toner needs replenishing, or other problems have occurred.

Note

- The beep alerts cannot be muted. If the printer's covers are opened and closed repeatedly within a short space of time during an alert indicating a paper jam or insufficient toner, the beep alert might continue, even after normal status has resumed.

- You can enable or disable beep alerts. For details about Panel Key Sound, see "General Features", Operating Instructions.

Checking Printer Status and Settings

Maintnc. Info

You can check the following items under [Maintnc. Info]:

- Remaining Toner

  Displays the amount of remaining toner.

  No Staples

  Displays whether there are staples remaining or not.

  Punch Receptcl Full

  Displays whether the hole punch receptacle is full.

- Paper Tray

  Displays the paper type and size loaded into the paper tray.

  Output Tray Full

  Displays whether the output tray is overloaded.

- Paper Misfeed

  Displays the state of and solutions for paper misfeeds.

- Cover Open

  Indicates whether one or more covers of the printer are open.

Data Storage

You can check the following items under [Data Storage]:

- HDD Remaining Mem.

  Displays the amount of available hard disk memory.

- HDD File(s)

  Displays the total number of jobs stored on the hard disk.

- Print Job(s)

  Displays the number of jobs for "Hold Print Job(s):", "Stored Print Job(s):", "Locked Print Job(s):", and "Sample Print Job(s):".

Machine Adres Info

You can check the following items under [Machine Adres Info]:

- Machine IPv4 Address

  Displays the printer's IPv4 address.

- Machine IPv6 Address

  Displays the printer's IPv6 address.

1. **Press the [Check Status] key.**
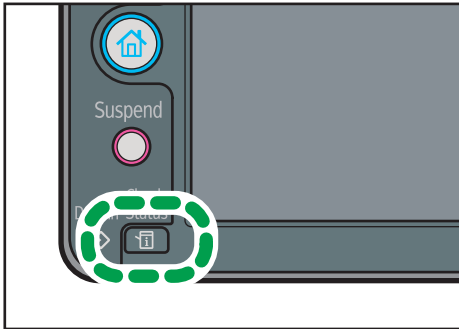
CQT664

2. **Press the [Maintnc/MacInfo] tab.**

3. **Press each key, and then check the contents.**

4. **After checking the information, press [Exit].**

Note

* [Paper Misfeed], [No Staples], [Punch Receptacle Full], [Output Tray Full], and [Cover Open] appear on [Maintnc. Info] only when these errors occur.

* Depending on the security settings, [Machine Adres Info] might not be displayed.

* For details about how to locate and remove misfeeds, see p.112 "Removing Jammed Paper".

When an Indicator for the [Check Status] Key Is Lit

If an indicator for the [Check Status] key lights up, press the [Check Status] key to display the [Check Status] screen. Check the status of the printer in the [Check Status] screen.

[Check Status] screen

CQT666
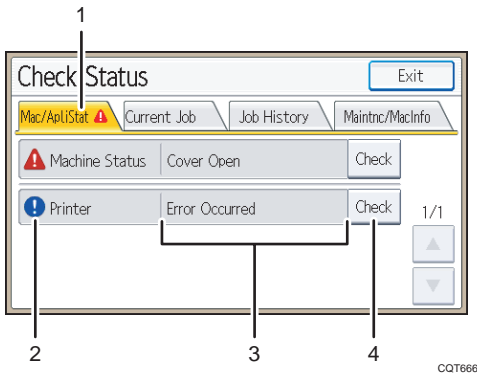
1. **[Mac/ApliStat] tab**

   Indicates the status of the printer.

2. **Status icons**

   The icons that can be displayed are described below:

   : The printer function is performing a job.

   : An error has occurred on the printer.

   : An error has occurred in the printer function being used, or the printer function cannot be used because an error has occurred on the printer.

3. **Messages**

   Displays a message that indicates the status of the printer.

4. **[Check]**

   If an error occurs, press [Check] to view details.

   Pressing [Check] displays an error message or the printer screen. Check the error message displayed on the printer screen and take the appropriate action. For details about error messages and their solutions, see p. 82 "When Messages Are Displayed".

The following table describes problems that cause the indicator to light:

Problem	Cause	Solution
Documents and reports do not print out.	The paper output tray is full.	Remove the prints from the tray.

Problem	Cause	Solution
Documents and reports do not print out.	There is no paper left.	Load paper. For details about loading paper, see p.46 "Loading Paper".
An error has occurred.	A function that has the status "Error Occurred" in the [Check Status] screen is defective.	Press [Check], and then check the displayed message and take appropriate action. For details about error messages and their solutions, see p.82 "When Messages Are Displayed".
The printer is unable to connect to the network.	A network error has occurred.	• Press [Check], and then check the displayed message and take appropriate action. For details about error messages and their solutions, see p.82 "When Messages Are Displayed". • Check that the printer is correctly connected to the network and that the printer is correctly set. For details about how to connect the network, see "Interface Settings", Operating Instructions. • For details about connecting to the network, contact your administrator. • If the indicator is still lit even after trying to solve the problem as described here, contact your service representative.

3

When You Have Problems Operating the Printer

This section describes common problems and messages. If other messages appear, follow the instructions displayed.

Problem	Causes	Solutions
The lamp remains lit and the printer does not enter Sleep mode even though the [Energy Saver] key was pressed.	• The printer is communicating with external equipment. • The hard disk is active.	• Check if the printer is communicating with external equipment. • Wait a little longer.
The display is off.	The printer is in Sleep Mode.	Press the [Energy Saver] key or the [Check Status] key to cancel Sleep Mode.
Nothing happens when the [Check Status] key or the [Energy Saver] key is pressed.	The power switch is turned off.	Turn on the main power switch.
"Please wait." appears.	This message appears when you press the [Energy Saver] key.	Wait for a while. If the printer is not ready in five minutes, contact your service representative.
"Please wait." appears.	This message appears when the printer is warming up.	• Wait until the message disappears. Do not turn off the power switch while the message is displayed. • If the printer is not ready in five minutes, contact your service representative.
"Please wait." appears.	This message appears when you change the toner cartridge.	• Wait until the message disappears. Do not turn off the power switch while the message is displayed. • If the message does not disappear in five minutes, contact your service representative.

3

Problem	Causes	Solutions
The machine unexpectedly enters standby mode.	ECO Night Sensor is enabled and the light sensor detected a low ambient light level.	Change the ECO Night Sensor settings. For details about ECO Night Sensor, see "Administrator Tools", Operating Instructions.
"Self checking..." appears.	The printer is performing image adjustment operations.	The printer may perform periodic maintenance during operations. The frequency and duration of maintenance depends on the humidity, temperature, and printing factors such as number of prints, paper size, and paper type. Wait for the printer to be ready.
The user code entry screen is displayed.	Users are restricted by User Code Authentication.	For details about how to log in when User Code Authentication is enabled, see p.21 "Logging in the Printer".
The Authentication screen appears.	Basic Authentication, Windows Authentication, LDAP Authentication or Integration Server Authentication is set.	Enter your Login User Name and Login Password. For details about the Authentication screen, see p.21 "Logging in the Printer".
"Authentication has failed." appears.	The entered Login User Name or Login Password is not correct.	For details about the correct Login User Name and Login Password, see Security Guide.
"Authentication has failed." appears.	The printer cannot perform authentication.	For details about authentication, see Security Guide.
"You do not have the privileges to use this function." continues to be displayed even though you have entered a valid user name.	The logged in user name does not have permission for the selected function.	For details about how to set permissions, see Security Guide.

Problem	Causes	Solutions
An error message remains, even if misfed paper is removed.	• When a misfeed message appears, it remains until you open and close the cover as required. • Paper is still jammed in the tray.	Remove misfed paper, and then open and close the cover. For details about removing jammed paper, see p.112 "Removing Jammed Paper".
Print images are printed on the reverse side of the paper.	You may have loaded the paper incorrectly.	• Load paper into the paper tray or tray 3 (LCT) with the print side up. • Load paper into the Large capacity tray (LCT), or bypass tray with the print side down.
Misfeeds occur frequently.	The tray's side or end fences may not be set properly.	• Remove misfed paper. For details about removing jammed paper, see p.112 "Removing Jammed Paper". • Check that the side or end fences are set properly. Also, check that the side fences are locked. For details about setting the side and end fences, see p.46 "Loading Paper".
Misfeeds occur frequently.	Paper size setting is not correct.	• Remove misfed paper. For details about removing jammed paper, see p.112 "Removing Jammed Paper". • If you load a paper size that is not selected automatically, you need to specify the paper size with the control panel. For details about specifying paper size with the control panel, see "Changing to a Size That Is Not Automatically Detected", Operating Instructions.

3

Problem	Causes	Solutions
Misfeeds occur frequently.	There is a foreign object on the finisher tray.	• Remove misfed paper. For details about removing jammed paper, see p.112 "Removing Jammed Paper". • Do not place anything on the finisher tray.
Cannot print in duplex mode.	You have selected a paper tray that is not set for duplex printing.	Change the setting for "Apply 2 sided" in [System Settings] to enable duplex printing for the paper tray. For details about setting "Apply 2 sided", see "Tray Paper Settings", Operating Instructions.
Cannot print in duplex mode.	You have selected a paper type that cannot be used for duplex printing.	In [Tray Paper Settings], select a paper type that can be used for duplex printing. For details about the paper types that can be used, see "Tray Paper Settings", Operating Instructions.
"Output tray is full. Remove paper." appears.	The output tray is full.	Remove paper from the output tray to resume printing. If paper is to be output to the finisher shift tray, press the [Suspend] key to suspend printing and prevent paper from falling off the tray, and then remove the paper. Press [Continue] on the display panel to resume printing.
"Turn main Power Switch off" appears.	The printer does not shut down normally when the main power switch is turned off, and then immediately turned on.	Turn off the main power switch. Wait for ten seconds or more after the printer shuts down, and then turn it on again.

Problem	Causes	Solutions
"Shutting down... Please wait. Main power will be turned off automatically." appears.	The shutdown procedure has begun because the main power switch was turned off while the printer was in standby mode or performing an operation.	Follow the message that appears and wait until the printer has shut down. Do not turn on the main power switch while this message is displayed. If the main power switch has been turned on, follow the message that appears. For details about turning the main power switch on and off, see p.25 "Turning On/Off the Power".
An error has occurred when the Address Book is changed from the display panel or Web Image Monitor.	The Address Book cannot be changed while deleting the multiple stored documents.	Wait a while, and then retry the operation.
"Home is in use by another function." appears.	The [Home] screen is being edited by another function.	Wait for a while, and then try to create the shortcut on the [Home] screen again.
"The image data size is not valid. See the manual for required data." appears.	The image data size is not valid.	For details about the file size for the shortcut image, see "Customizing the [Home] Screen", Operating Instructions.
"The format of the image data is not valid." appears.	The file format of the shortcut image to be added is not supported.	The file format of shortcut images to be added must be JPEG. Specify the image again.

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Note

- Using curled paper often causes misfeeds, soiled paper edges, or slipped positions while performing stack printing. When using curled paper, try to flatten the paper or load the paper upside down. Also, lay paper on a flat surface to prevent paper from curling, and do not lean it against a wall.
- If you cannot print as you want because of paper type, paper size, or paper capacity problems, use recommended paper. For details about recommended paper, see p.31 "Paper Specification".

When the Image Density Changes

After moving the printer, printing on thick paper, or printing repeatedly for some time, image degradation may occur. By performing automatic image adjustment, you can restore optimum print quality.

1. **Press [Adjust Image Density] on the [Maintenance: Image] screen.**

   For details about how to access the [Maintenance: Image] screen, see "Displaying the Printer Configuration Screens Using the Control Panel", Operating Instructions.

   Press [▼] to switch the screen.

2. **Press [Lighter] or [Darker] adjust the image density, and then press [OK].**

   Enter a value between -3 and 3.

3. **Press the [User Tools] key.**

If USB Connection Fails

Problem	Cause	Solution
The printer is not automatically recognized.	The USB cable is not connected properly.	Disconnect the USB cable, and then turn off the main power switch. Turn on the main power switch again. When the printer has fully booted up, reconnect the USB cable.
Windows has already configured the USB settings.	Check whether the computer has identified the printer as an unsupported device.	Open Windows' Device Manager, and then, under [Universal Serial Bus controllers], remove any conflicting devices. Conflicting devices have a [!] or [?] icon by them. Take care not to accidentally remove required devices. For details, see Windows Help.
The printer does not recognize the USB connection even when a USB cable is inserted.	If the USB cable is connected while the printer is off, the printer might not recognize the USB connection.	Press the [Energy Saver] key, and then disconnect the USB cable. Press the [Energy Saver] key again. When the printer has returned to the ready condition, reconnect the USB cable.

3

When Messages Are Displayed

This section describes the main messages that appear on the display panel and printed error logs and reports. If other messages appear, follow their instructions.

Status Messages

Message	Status
"Hex Dump Mode"	In Hex Dump mode, the printer receives data in hexadecimal format. Press [Job Reset] to cancel Hex Dump mode.
"Job suspended."	Printing was temporarily suspended because [Job Operation] or the [Suspended] key was pressed.
"Offline"	The printer is offline.
"Please wait."	This message might appear for a second or two while the printer is preparing, performing initial adjustments, or adding toner. Wait a while.
"Printing..."	The printer is printing. Wait a while.
"Ready"	This is the default ready message. The printer is ready for use. No action is required.
"Resetting job..."	The printer is resetting the print job. Wait until "Ready" appears on the display panel.
"Setting change..."	The printer is changing settings. You cannot use the control panel while this message is displayed. Wait a while.
"Suspended job exists."	Printing was temporarily stopped by SmartDeviceMonitor for Client. You can resume printing via [My Job List] in SmartDeviceMonitor for Client, or via the Web Image Monitor. To resume printing via Web Image Monitor, ask your system administrator first.
"Updating certif..."	The @Remote certificate is being updated. Wait a while.
"Waitg. for prt.data"	The printer is waiting for the next data to print. Wait a while.

Alert Messages (Displayed on the Control Panel)

↓Note

- Before turning the main power switch off, see p.25 "Turning On/Off the Power".

Message	Cause	Solution
"Cannot connect with the wireless card. Turn the main power switch off, then check the card."	• The wireless LAN board was not inserted when the printer was turned on. • The wireless LAN board was pulled out after the printer was turned on. • The settings are not updated although the unit is detected.	• Turn off the main power switch, and then confirm the wireless LAN board is inserted correctly. For details about installing the board, see "Installing the Interface Units", Operating Instructions. • If the message appears again, contact your service representative.
"Hardware Problem: Ethernet"	An error has occurred in the Ethernet interface.	Turn the main power switch off and then back on again. If the message appears again, contact your service representative.
"Hardware Problem: HDD"	An error has occurred in the hard disk.	• Turn the main power switch off and then back on again. If the message appears again, contact your service representative. • The hard disk may have not been installed properly if you have installed it yourself. Check that it is properly installed For details about installing the unit, see "Installing the Memory Expansion Units", Operating Instructions.

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Message	Cause	Solution
"Hardware Problem: Parallel I/F"	An error has occurred in the IEEE 1284 interface board.	• Turn the main power switch off and then confirm the IEEE 1284 interface board is inserted correctly. For details about installing the board, see "Installing the Interface Units", Operating Instructions. • If the message appears again, contact your service representative.
"Hardware Problem: USB"	An error has occurred in the USB interface.	Turn the main power switch off and then back on again. If the message appears again, contact your service representative.
"Hardware Problem: Wireless Card"	The wireless LAN board can be accessed, but an error was detected.	• Turn off the main power switch, and then confirm the wireless LAN board is inserted correctly. For details about installing the board, see "Installing the Interface Units", Operating Instructions. • If the message appears again, contact your service representative.
"Out of paper in n. Load paper of the following size and type. To cancel the current job, press [Job Reset]." ("n" is a figure.)	The printer driver settings are incorrect or the tray does not contain paper of the size selected in the printer driver.	Check that the printer driver settings are correct, and then load paper of the size selected in the printer driver into the input tray. For details about how to change the paper size, see p.46 "Loading Paper".

Message	Cause	Solution
"Tray setg. do not match spcfd siz&typ. Select new tray or use sz&typ below."	The printer driver settings are incorrect or the tray does not contain paper of the size or type selected in the printer driver.	• Check that the printer driver settings are correct, and then load paper of the size selected in the printer driver into the input tray. For details about how to load paper, see p.46 "Loading Paper". • Select the tray manually to continue printing, or cancel a print job. For details about how to select the tray manually, or cancel a print job, see "If an Error Occurs with the Specified Paper Size and Type", Operating Instructions.
"n ppr siz msmtch Select new tray or use ppr size below." ("n" is a tray name.)	The size of the paper in the tray does not match the paper size specified in the printer driver.	Select a tray containing paper that is the same size as the specified paper size.
"Problem: Printer Font Error"	An error has occurred in the font settings.	Contact your service representative.
"The selected file(s) contained file(s) without access privileges. Only file(s) with access privileges will be deleted."	You have tried to delete files without the authority to do so.	To check your access permission for stored documents, or to delete a document you do not have permission to delete, see Security Guide.
"The same paper tray cannot be set for the main sheets and slip sheets ([Designate]). Check the setting."	The tray selected for other pages is the same as the one for slip sheets.	Reset the job. Be sure the tray you select for slip sheets is not providing paper for other pages.
"You do not have the privileges to use this function."	The logged in user name does not have permission for the selected function.	For details about how to set permissions, see Security Guide.

Messages during Direct print from a memory storage device

Message	Causes	Solutions
"Unable to access the specified memory storage device."	The memory device used cannot be recognized.	For details about the recommended memory devices for the Direct printing function from memory storage devices, contact your service representative. The USB flash memory device that features password protection or other security features may not work normally.
"Exceeded the limit value for total data size of the selected files. Cannot select more files."	• The size of the selected file exceeds 1 GB. • The total size of the selected files exceeds 1 GB.	Files or groups of files larger than 1 GB cannot be printed. • When the total size of the multiple files that are selected exceeds 1 GB, select files separately. • When the size of the selected file exceeds 1 GB, print by using a function other than the Direct printing function from memory storage devices. You cannot select files of different formats at the same time.

Alert Messages (Printed on Error Logs and Reports)

This section describes likely causes of and possible solutions for the error messages that are printed on the error logs or reports.

Message	Cause	Solution
"84: Error"	There is no work area available for image processing.	• In [Printer Features], under [System], set [Memory Usage] to [Font Priority]. • Decrease the number of files sent to the printer or install the optional SDRAM module. For details about installing SDRAM module, see "Installing the SDRAM module", Operating Instructions.

Message	Cause	Solution
"85: Error"	The specified graphics library is unavailable.	• Check that the data is valid. • Decrease the number of files sent to the printer or install the optional SDRAM module. For details about installing SDRAM module, see "Installing the SDRAM module", Operating Instructions.
"86: Error"	Parameters of the control code are invalid.	Check the print settings.
"91: Error"	Printing was canceled by the auto job cancel function due to a command error.	Check that the data is valid.
"92: Error"	Printing was canceled because [Job Reset] or the [Suspended] key was selected on the printer's control panel.	Perform the print operation again as necessary.
"98: Error"	The printer could not access the hard disk correctly.	Turn the main power switch off and then back on again. If the message appears frequently, contact your service representative.
"Address Book is currently in use by another function. Authentication has failed."	The printer currently cannot perform authentication because the Address Book is being used by another function.	Wait a while, and then retry the operation.
"Auto-registration of user information has failed."	Automatic registration of information for LDAP Authentication or Windows Authentication failed because the Address Book is full.	For details about automatic registration of user information, see Security Guide.
"Classification Code is incorrect."	The classification code has not been entered, or the classification code has been entered incorrectly.	Enter the correct classification code.

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Message	Cause	Solution
"Classification Code is incorrect."	The classification code is not supported by the printer driver.	Select Optional for the classification code. For details about how to specify classification code settings, see "Registering Classification Codes", Operating Instructions.
"Collate has been cancelled."	Collate was canceled.	Decrease the number of files sent to the printer or install the optional SDRAM module. For details about installing SDRAM module, see "Installing the SDRAM module", Operating Instructions.
"Command Error"	An RPCS command error occurred.	Check that the communication between a device and the printer is working correctly.
"Compressed Data Error."	The printer detected corrupt compressed data.	• Check the connection between the computer and the printer. • Check that the program you used to compress the data is functioning correctly.
"Data storage error."	You tried to print a Sample Print, Locked Print, Hold Print, or Stored Print file while the hard disk was not installed.	The hard disk is required when printing a Sample Print, Locked Print, Hold Print, or Stored Print. If the message appear after installing the hard disk, contact your service representative.

Message	Cause	Solution
"Duplex has been cancelled."	Duplex printing was canceled.	• Select the proper paper size for the duplex function. For details about paper size, see p.31 "Supported Paper for Each Input Tray". • Change the setting for "Apply 2 sided" in [System Settings] to enable duplex printing for the paper tray. For details about setting "Apply 2 sided", see "Tray Paper Settings", Operating Instructions.
"Error has occurred."	A syntax error, etc., occurred.	Check that the PDF file is valid.
"Error occurred. Either job was printed with settings changed or it was cancelled."	An error occurred during printing, but it was skipped.	Check that the data is valid.
"Exceeded max. number of files to print for temporary/ stored jobs."	While printing a Sample Print, Locked Print, Hold Print, or Stored Print file, the maximum file capacity was exceeded.	Delete unneeded files stored in the printer.
"Exceeded max. number of files. (Auto)"	While using the error job store function to store Normal Print jobs as Hold Print files, the maximum file capacity for file storage or Hold Print file management (automatic) was exceeded.	Delete Hold Print files (automatic) or unneeded files stored in the printer.
"Exceeded max. number of pages to print for temporary/stored jobs."	While printing a Sample Print, Locked Print, Hold Print, or Stored Print file, the maximum page capacity was exceeded.	• Delete unneeded files stored in the printer. • Reduce the number of pages to print.

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Message	Cause	Solution
"Exceeded max. pages. Collate is incomplete."	The number of pages exceeds the maximum number of sheets that can be used with Collate.	Reduce the number of pages to print.
"Exceeded max. number of pages. (Auto)"	While using the error job store function to store Normal Print jobs as Hold Print files, the maximum page capacity was exceeded.	• Delete unneeded files stored in the printer. • Reduce the number of pages to print.
"Exceeded the maximum unit count for Print Volume Use. The job has been cancelled."	The number of pages the user is permitted to print has been exceeded.	For details about Print Volum. Use Limit., see Security Guide.
"Failed to obtain file system."	PDF direct printing could not be performed because the file system could not be obtained.	Turn the main power switch off and then back on again. If the message appears again, contact your service representative.
"File system is full."	The PDF file cannot be printed because the capacity of the file system is full.	Delete all unnecessary files from the hard disk, or decrease the file size sent to the printer.
"HDD is full."	The hard disk became full while printing a Sample Print, Locked Print, Hold Print, or Stored Print file.	• Delete unneeded files stored in the printer. • Reduce the data size of the Sample Print, Locked Print, Hold Print, or Stored Print file.
"HDD is full."	When printing with the PostScript 3 printer driver, the hard disk capacity for fonts and forms has been exceeded.	Delete unneeded forms or fonts registered in the printer.

Message	Cause	Solution
"HDD is full. (Auto)"	The hard disk became full while using the error job store function to store Normal Print jobs as Hold Print files.	• Delete unneeded files stored in the printer. • Reduce the data size of the Temporary Print file and/or the Stored Print file.
"I/O buffer overflow."	An input buffer overflow occurred.	• In [Printer Features], under [System], set [Memory Usage] to [Font Priority]. • In [Printer Features], under [Host Interface], select [I/O Buffer], and then set the maximum buffer size to a larger value. • Reduce the number of files being sent to the printer.
"Information for user authentication is already registered for another user."	The user name for LDAP Authentication or Integration Server Authentication was already registered in a different server with a different ID, and a duplication of the user name occurred due to a switching of domains (servers), etc.	For details about User Authentication, see Security Guide.

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Message	Cause	Solution
"Insufficient Memory"	A memory allocation error occurred.	**PCL 5/PostScript 3** Select a lower resolution on the printer driver. For details about how to change the resolution setting, see the printer driver Help. **PCL 6** Select a lower resolution on the printer driver. For details about how to change the resolution setting, see the printer driver Help. On the printer driver's [Detailed Settings] tab, click [Print Quality] in "Menu:", and then select [Raster] in the "Vector/Raster:" list. In some cases, it will take a long time to complete a print job. • Install the optional SDRAM module. For details about installing SDRAM module, see "Installing the SDRAM module", Operating Instructions.
"Memory Retrieval Error"	A memory allocation error occurred.	Turn the main power switch off and then back on again. If the message appears again, install or replace the RAM. For details about installing SDRAM module, see "Installing the SDRAM module", Operating Instructions.
"No response from the server. Authentication has failed."	A timeout occurred while connecting to the server for LDAP Authentication or Windows Authentication.	Check the status of the server.
"Output tray has been changed."	The output tray was changed because the paper size of the specified output tray is limited.	Specify the proper output tray.

Message	Cause	Solution
"Print overrun."	Images were discarded while printing.	Select a lower resolution on the printer driver. For details about how to change the resolution setting, see the printer driver Help.
"Printing privileges have not been set for this document."	The PDF document you have tried to print has no privileges to print.	Contact the owner of the document.
"Punch has been cancelled."	Punch printing was canceled.	Check the paper orientation, print orientation, and then punch position. Certain settings can produce print results that might not be as expected.
"Receiving data failed."	Data reception was aborted.	Resend the data.
"The selected paper size is not supported. This job has been cancelled."	Job Reset is automatically performed if the specified paper size is incorrect.	Specify the correct paper size, and then print the file again.
"Sending data failed."	The printer received a command to stop transmission from the printer driver.	Check if the computer is working correctly.
"Staple has been cancelled."	Stapling printing was canceled.	Check the paper orientation, paper quantity, print orientation, and staple position. Certain settings can produce print results that might not be as expected.
"The print job has been cancelled because capture file(s) could not be stored: Exceeded max. memory."	The hard disk became full after a file was stored.	Reduce the file size to be sent.
"The selected paper type is not supported. This job has been cancelled."	Job Reset is automatically performed if the specified paper type is incorrect.	Specify the correct paper type, and then print the file again.

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Message	Cause	Solution
"Unauthorized Copy Prevention error occurred. Job cancelled."	The [Enter User Text:] field on the [Unauthorized Copy Prevention for Pattern Details] screen is blank.	**PCL 6/PostScript 3** On the printer driver's [Detailed Settings] tab, click [Effects] in "Menu:". Select [Unauthorized Copy Prevention], and then click [Details] to display [Unauthorized Copy Prevention for Pattern Details]. Enter text in [Enter User Text:].
"Unauthorized Copy Prevention error occurred. Job cancelled."	The resolution is set to a value less than 600 dpi when [Unauthorized Copy Prevention] is specified.	On the printer driver, set the resolution to 600 dpi or higher, or deselect [Unauthorized Copy Prevention].
"User Paper Type Error"	The printer does not recognize the paper type specified using the printer driver.	Check that the printer is connected to the network correctly and bidirectional communication is enabled. If the problem persists, confirm the user paper type settings of the printer. For details, see "Registering Unique Names to Paper Types", Operating Instructions.
"You do not have a privilege to use this function. This job has been cancelled."	The entered Login User Name or Login Password is not correct.	Check that the Login User Name and Login Password are correct.
"You do not have a privilege to use this function. This job has been cancelled."	The logged in user is not allowed to use the selected function.	For details about how to set permissions, see Security Guide.
"You do not have a privilege to use this function. This operation has been cancelled."	The logged in user does not have the privileges to register programs or change the paper tray settings.	For details about how to set permissions, see Security Guide.

Messages during Direct print from a memory storage device

Message	Causes	Solutions
"99: Error"	This data cannot be printed. The specified data is either corrupt or not supported by the Direct printing function from memory storage devices.	Check that the data is valid. For details about the kinds of data supported by the Direct printing function from memory storage devices, see "Direct Printing from a Memory Storage Device", Operating Instructions.

If printing does not start, contact your service representative.

Note

- The contents of errors may be printed on the Configuration Page. Check the Configuration Page in conjunction with the error log. For details about how to print the Configuration Page, see "Test Printing", Operating Instructions.

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Checking the Error Log

If files could not be stored due to printing errors, identify the cause of the errors by checking the error log on the control panel.

⭐ Important

- The most recent 30 errors are stored in the error log. If a new error is added when there are 30 errors already stored, the oldest error is deleted. However, if the oldest error is a Sample Print, Locked Print, Hold Print, or Stored Print error, it is not deleted. The error is stored separately until the number of errors reaches 30.

- If the main power switch is turned off, the log is deleted.

- You cannot view [Error Log] on the Simple Screen.

1. **Press the [Printer] icon on the [Home] screen.**

   For details about how to access the [Home] screen, see p.14 "How to Use the [Home] Screen".

2. **Press [Other Functns.].**

3. **Press [Error Log].**

4. **Select the error log you want to check, and then press [Details].**

When You Cannot Print

Problem	Cause	Solution
Printing does not start.	The power is off.	For details about how to turn on the main power switch, see p.25 "Turning On/Off the Power".
Printing does not start.	The cause is displayed on the screen of the control panel.	Check the error message or warning status on the display panel, and then take the required action. For details about solutions, see p.82 "When Messages Are Displayed".
Printing does not start.	The interface cable is not connected correctly.	For details about how to connect interface cables correctly, see "Connecting the Printer", Operating Instructions.
Printing does not start.	The correct interface cable is not being used.	The type of interface cable to use depends on the computer. Be sure to use the correct one. If the cable is damaged or worn, replace it. For details about interface cable, see "Connecting the Printer", Operating Instructions.
Printing does not start.	The interface cable was connected after the printer was switched on.	Connect the interface cable before turning on the main power switch.
Printing does not start.	If the printer is using wireless LAN, failure to print might result from a weak wireless signal.	Check the radio signal status of the wireless LAN in [System Settings]. If the signal quality is not satisfactory, move the printer to a location where radio waves can pass or remove objects that might cause interference. You can check the signal status only when wireless LAN is used in infrastructure mode. For details about the radio signal status of the wireless LAN, see "Interface Settings", Operating Instructions.

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Problem	Cause	Solution
Printing does not start.	If the printer is using wireless LAN (IEEE802.11g/b), when there is a microwave oven, mobile phone, industrial machine, scientific instrument, or medical instrument which uses the same frequency range near the device, radio waves may be interfering with the wireless LAN's communication.	Turn off the microwave oven, mobile phone, industrial machine, scientific instrument, or medical instrument which uses the same frequency range and then try printing again. If printing is successful, move the device to a location where it does not interfere.
Printing does not start.	If the printer is using wireless LAN, SSID settings may be incorrect.	Check that the SSID is correctly set using the printer's display panel. For details about SSID Setting, see "Connecting to the Wireless LAN Interface", Operating Instructions.
Printing does not start.	If the printer is using wireless LAN, the receiver's MAC address may be preventing communication with the access point.	Check the access point settings when using the infrastructure mode. Depending on the access point, client access may be filtered by MAC address. Also, check that there are no transmission problems between the access point and wired clients, and between the access point and wireless clients.
Printing does not start.	The wireless LAN interface is not working.	Make sure the orange LED is lit, and the green LED is lit or flashing during transmission.
Printing does not start.	The Login User Name, Login Password, or Driver Encryption Key is incorrect.	Check the Login User Name, Login Password, and Driver Encryption Key.
Printing does not start.	Advanced encryption has been set using the Extended Security function.	Check the settings of the Extended Security function. For details about Extended Security function settings, see Security Guide.

Problem	Cause	Solution
[List / Test Print] is disabled.	A mechanical error might have occurred.	Contact your service representative.
Printing does not start when using the extended wireless LAN in Ad-hoc Mode.	The correct Communication Mode is not set.	• Turn the main power switch off and then back on again. For details about how to turn on/off the main power switch, see p.25 "Turning On/Off the Power". • Change [Communication Mode] in [System Settings] to [802.11 Ad-hoc Mode], and then select [Off] for [Security Method]. For details about Communication Mode, see "Interface Settings", Operating Instructions.

If printing does not start, contact your service representative.

When the Data In Indicator Does Not Light Up or Flash

When the Data In indicator does not light up or flash after starting a print job, data is not being sent to the printer.

When the printer is connected to the computer using the interface cable

Check that the print port setting is correct. When connecting using a parallel interface, connect using LPT1 or LPT2.

1. **Open the printer properties dialog box, and then click the [Ports] tab.**

   For details about displaying the printer properties dialog box, see "Displaying the Printer Driver Properties with Windows".

2. **In the [Print to the following port(s)] list, check that the correct port is selected.**

Network connection

For details about the network connection, contact your administrator.

Other Printing Problems

This section describes likely causes of and possible solutions for problems that can occur when printing from a computer.

When you cannot print clearly

Problem	Causes	Solutions
The printed image is smudged.	Settings for thick paper have not been configured when printing on thick paper in the bypass tray.	**PCL 5e** On the printer driver's [Paper] tab, select [Bypass Tray] in the "Input Tray:" list. Then in the "Type:" list, select a proper paper type. **PCL 6/PostScript 3** On the printer driver's [Detailed Settings] tab, click [Paper] in "Menu:", and then select [Bypass Tray] in the "Input Tray:" list. Then in the "Paper Type:" list, select a proper paper type.
Printed images contain blots or are patchy.	The paper is damp.	Use paper that has been stored in the recommended temperature and humidity conditions. For details about the proper way to store paper, see p.47 "Paper Storage".
Printed images contain blots or are patchy.	The printer is not on a level surface.	The printer must be placed on a stable and level surface. Check the printer environment and select an appropriate location. For details about the printer's environment, see "Moving the Printer", Operating Instructions.
Printed images contain blots or are patchy.	The paper is creased, curled, or has blemishes.	Smooth out the wrinkles or replace the paper. For details about paper, see p.31 "Paper Specification".

Problem	Causes	Solutions
The printed image is faded over the entire page.	The paper is damp.	Use paper that has been stored in the recommended temperature and humidity conditions. For details about the proper way to store paper, see p.47 "Paper Storage".
The printed image is faded over the entire page.	The paper is unsuitable. Printing on coarse or treated paper might result in faint print image.	Use recommended paper. For details about recommended paper, see p.31 "Paper Specification".
The printed image is faded over the entire page.	If [On] is selected in the "Toner Saving:" list in the printer driver settings, the entire page will be faded when printed.	**PCL 5e** On the printer driver's [Print Quality] tab, select [Off] in the "Toner Saving" area. **PCL 6/PostScript 3** On the printer driver's [Detailed Settings] tab, click [Print Quality] in "Menu:", and then select [Off] in the "Toner Saving:" list.
Images smudge when rubbed. (Toner is not fixed.)	The specified paper type and the paper that is actually loaded might be different. For example, thick paper might be loaded but not specified as the paper type.	**PCL 5e** On the printer driver's [Paper] tab, select a proper paper type in the [Type:] box. **PCL 6/PostScript 3** On the printer driver's [Detailed Settings] tab, click [Paper] in "Menu:", and then select a proper paper type in the "Paper Type:" list.
The printed image is different from the image on the computer's display.	With certain functions, such as enlargement and reduction, the image layout might be different from that on the computer display.	**PCL 6** On the printer driver's [Detailed Settings] tab, click [Print Quality] in "Menu:", and then select [Raster] in the "Vector/Raster:" list.

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Problem	Causes	Solutions
The image is too dark or too light.	The correct paper type settings are not made.	Check the paper loaded on the paper tray or bypass tray matches the paper type set on the display panel. For details about paper type settings, see p.31 "Paper Specification".
The image is too dark or too light.	The paper is loaded reverse side up. Printing on non-print surfaces reduces print quality and can damage the printer's internal components.	Before printing on special paper, check its surface carefully. For details about special paper, see p.31 "Paper Specification" and p.46 "Unusable Paper".
Image is dirty.	Use of non-recommended toner can result in a loss of print quality and other problems.	Use genuine manufacturer toner. Contact your service representative.
Printed graphics do not match graphics on the screen.	If the printer driver is configured to use the graphics command, the graphics command from the printer is used to print.	If you want to print accurately, set the printer driver to print without using the graphics command. For details about settings for printer driver, see the printer driver Help.
Print result differs from the display.	A non-Windows OS is being used.	Check that the application supports the printer driver.
Print result differs from the display.	The printer is not selected for printing.	Use the printer driver of the printer and check that the printer is the specified printer. For details about how to open the printer driver settings screen, see p.28 "Displaying the Printing Preferences dialog box from the [Start] menu".
Print result differs from the display.	Data transmission failed or was canceled during printing.	Check whether there is failed or canceled data remaining. For details about how to identify the cause of the error, see p.96 "Checking the Error Log".

Problem	Causes	Solutions
Characters differ from the display.	The loaded paper is unsuitable.	Printing on recommended paper produces better resolution. For details about recommended paper, see p.31 "Paper Specification".
Image position differs from the display.	The page layout settings are not configured correctly.	Check the page layout settings configured using the application. For details about page layout settings, see the application's Help.
Image position differs from the display.	The correct page layout settings are not made.	**PCL 5e** On the printer driver's [Paper] tab, select [Print On] box, and then select the desired size. **PCL 6/PostScript 3** On the printer driver's [Detailed Settings] tab, click [Basic] in "Menu:", and then select the desired size in the "Print On:" list.
Lines of garbled or unwanted alphanumeric characters appear.	An incorrect printer language might have been selected.	Select the correct printer driver, and then print the file again.
Images are cut off, or excess is printed.	You may be using paper smaller than the size selected in the application.	Use the same size paper as that selected in the application. If you cannot load paper of the correct size, use the reduction function to reduce the image, and then print. For details about the reduction function, see the printer driver Help.
Photo images are grainy.	Some applications print at a lower resolution.	Use the application's or printer driver's settings to specify a higher resolution. For details about printer driver's settings, see the printer driver Help.

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Problem	Causes	Solutions
A solid line is printed as a dashed line or appears blurred.	Dither patterns do not match.	**PostScript 3** Change the dithering settings on the printer driver. For details about the dithering settings, see the printer driver Help.
Fine lines are fuzzy with inconsistent thickness, or do not appear.	Super fine lines have been specified in the application.	**PostScript 3** Change the dithering settings on the printer driver. For details about the dithering settings, see the printer driver Help. If the problem continues after you change the dithering settings, use the settings of the application in which the image was created to change the thickness of the lines.

When paper is not fed properly

Problem	Cause	Solution
Paper is not fed from the selected tray.	When you are using Windows, printer driver settings override those settings using the display panel.	**PCL 5** On the printer driver's [Paper] tab, select the desired input tray in the "Input Tray:" list. **PCL 6/PostScript 3** On the printer driver's [Detailed Settings] tab, click [Paper] in "Menu:", and then select the desired input tray in the "Input Tray:" list.
Images are printed at a slant.	The tray's side fences might not be locked.	Check that the side fences are locked. For details about how to set the side fences, see p.46 "Loading Paper".
Images are printed at a slant.	The paper is feeding in at a slant.	Load the paper correctly. For details about loading paper, see p.46 "Loading Paper".

Problem	Cause	Solution
Misfeeds occur frequently.	The number of sheets loaded exceeds the capacity of the printer.	Load paper only as high as the upper limit markings on the side fences of the paper tray, or the markings on the paper guides of the bypass tray.
Misfeeds occur frequently.	The paper tray's side fences are set too tightly.	Push the side fences lightly, and then reset them.
Misfeeds occur frequently.	The paper is damp.	Use paper that has been stored in the recommended temperature and humidity conditions. For details about the proper way to store paper, see p.47 "Paper Storage".
Misfeeds occur frequently.	The paper is too thick or too thin.	Use recommended paper. For details about recommended paper, see p.31 "Paper Specification".
Misfeeds occur frequently.	The paper is wrinkled or has been folded/creased.	• Use recommended paper. For details about recommended paper, see p.31 "Paper Specification". • Use paper that has been stored in the recommended temperature and humidity conditions. For details about the proper way to store paper, see p.47 "Paper Storage".
Misfeeds occur frequently.	Printed paper is being used.	Do not load sheets that have already been copied or printed by another printer.
Misfeeds occur frequently.	Sheets are sticking together.	Fan the sheets thoroughly before loading them. Alternatively, feed the sheets into the printer one at a time.
Sheets are feeding in together, resulting in jams.	Sheets are sticking together.	Fan the sheets thoroughly before loading them. Alternatively, feed the sheets into the printer one at a time.

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Problem	Cause	Solution
Printed paper becomes creased.	The paper is damp.	Use paper that has been stored in the recommended temperature and humidity conditions. For details about the proper way to store paper, see p.47 "Paper Storage".
Printed paper becomes creased.	The paper is too thin.	Use recommended paper. For details about recommended paper, see p.31 "Paper Specification".
Edges of sheets are creased.	The paper is damp.	Use paper that has been stored in the recommended temperature and humidity conditions. For details about the proper way to store paper, see p.47 "Paper Storage".
Edges of sheets are creased.	You are using non-recommended paper.	Use recommended paper. For details about recommended paper, see p.31 "Paper Specification".
Duplex printing is malfunctioning.	You have loaded thick paper heavier than 160 g/m^2 (60 lb. Cover).	Change the paper.
Duplex printing is malfunctioning.	You have selected a paper tray that is not set for duplex print.	Change the setting for "Apply 2 sided" in [System Settings] to enable duplex printing for the paper tray. For details about setting "Apply 2 sided", see "Tray Paper Settings", Operating Instructions.
Duplex printing is malfunctioning.	You have selected a paper type that cannot be used for duplex printing.	In [Tray Paper Settings], select a paper type that can be used for duplex printing. For details about the paper types that can be used, see p.58 "Printing on Both Sides of Sheets".

Problem	Cause	Solution
The image on the back side of duplex printing has mottled blank patches or is smudged.	Missing patches and smudges are caused by moisture leaking from the paper.	• Do not install the printer in areas that are susceptible to low temperature. • Use paper that has been stored in the recommended temperature and humidity conditions. For details about the proper way to store paper, see p.47 "Paper Storage". • Install the optional anti-humidity heater. For details about the anti-humidity heater, contact your service representative.
White stripes appear on the OHP.	Fragments of paper are stuck to the OHP.	Use a dry cloth to wipe any paper fragments off the back of the OHP.

Other printing problems

Problem	Causes	Solutions
It takes a long time to complete a print job.	"Sleep Mode" might be set.	The printer requires time to warm up if it has been in "Sleep Mode". In [System Settings], under [Timer Settings], select [Sleep Mode Timer], and then specify "Sleep Mode".
It takes a long time to complete a print job.	Photographs and other data intensive pages take a long time for the printer to process, so simply wait when printing such data.	If the Data In indicator is flashing, data has been received by the printer. Wait for a moment. Changing the following settings with the printer driver may help speed up printing: • Select [Speed] in "Print Priority" list. • Select a lower resolution. For details about how to change the settings, see the printer driver Help.

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Problem	Causes	Solutions
Images are printed in the wrong orientation.	The feed orientation you selected and the feed orientation selected in the printer driver's option setup might not be the same.	Set the printer's feed orientation and the printer driver's feed orientation accordingly. For details about the settings for the printer driver, see the printer driver Help.
Optional components connected to the printer are not recognized.	Bidirectional communication is not working.	Set up optional devices on the Properties of the printer. For details about how to set up optional devices, see the printer driver Help.
Combined printing, booklet printing, or Auto Reduce/ Enlarge printing does not come out as expected.	The application or printer driver settings are not configured correctly.	Make sure the application's paper size and orientation settings match those of the printer driver. If a different paper size and orientation are set, select the same size and orientation.
Some types of data, such as graphics data or data from certain applications, do not print.	The printer driver settings are not configured correctly.	**PCL 5e** On the printer driver's [Print Quality] tab, select [600 dpi] in the "Resolution" area. **PCL 6** • On the printer driver's [Detailed Settings] tab, click [Print Quality] in "Menu:", and then select [Quality] in the "Print Priority:" list. • On the printer driver's [Detailed Settings] tab, click [Print Quality] in "Menu:", and then select [Raster] in the "Vector/Raster:" list. **PostScript 3** On the printer driver's [Detailed Settings] tab, click [Print Quality] in "Menu:", and then select [Photographic] in the "Dithering:" list. For details about the printer driver settings, see the printer driver Help.

Problem	Causes	Solutions
Some characters are not printed or appear strange.	The printer driver settings are not configured correctly.	**PCL 5e** On the printer driver's [Print Quality] tab, select [600 dpi] in the "Resolution" area. **PCL 6** • On the printer driver's [Detailed Settings] tab, click [Print Quality] in "Menu:", and then select [Quality] in the "Print Priority:" list. • On the printer driver's [Detailed Settings] tab, click [Print Quality] in "Menu:", and then select [Raster] in the "Vector/Raster:" list. **PostScript 3** On the printer driver's [Detailed Settings] tab, click [Print Quality] in "Menu:", and then select [Text] in the "Dithering:" list. For details about the printer driver settings, see the printer driver Help.
Print speed or application relinquishing speed is slow.	The printer driver settings are not configured correctly.	**Only when using PCL 6** On the printer driver's [Detailed Settings] tab, click [Print Quality] in "Menu:", and then select [Speed] in the "Print Priority:" list. For details about the printer driver settings, see the printer driver Help. Quit any other applications.
Print ends mid-job.	An error might have occurred.	Check the printer's display panel to see if an error has occurred.
A print instruction was issued from the computer, but printing did not start.	User Authentication may have been set.	For details about User Authentication, see Security Guide.

3

Problem	Causes	Solutions
PDF files do not print out/ cannot perform PDF direct print.	PDF files are password-protected.	To print password-protected PDF files, enter the password in [PDF Menu] in [Printer Features], or on Web Image Monitor. For details about printing PDF files, see "PDF Menu", Operating Instructions, or Web Image Monitor Help.
PDF files do not print out/ cannot perform PDF direct print.	PDF files cannot be printed if they are print-disabled in PDF file security setting.	Change the PDF file security setting.
PDF files do not print out/ cannot perform PDF direct print.	High compression PDF files created using the printer's scanner function cannot be printed directly.	Open the application used to create the PDF, and then print the file using the application's driver. Re-save the file in normal (noncompressed) PDF format. Some types of High Compression PDF files are not supported. Contact your sales representative about the supported file types.
PDF direct print produces strange or malformed characters.	Fonts were not embedded.	Embed fonts in the PDF file you want to print, and then print.
"Resetting job..." appears and printing is suspended.	Memory is insufficient.	In [Printer Features], under [System], select [Memory Usage] to [Font Priority].
Printing did not start even though the specified print time has already passed.	[Jobs Not Printed As Machn. Was Off] was set to [Do not Print] in [Printer Features], but at the specified printing time, the main power switch was turned off, or the printer was in Low Power Mode.	Set [Jobs Not Printed As Machn. Was Off] to [Prt When Mach On] in [Printer Features].
Printing did not start even though the specified print time has already passed.	The time set on the printer or computer is incorrect.	Set the correct time on the printer or computer.

Problem	Causes	Solutions
Printing via wireless LAN is slow.	The number of jobs exceeds the capacity of the printer.	Reduce the number of jobs.
Printing via wireless LAN is slow.	- A communication error might have occurred. - Interference from other wireless LAN devices can reduce the communication speed. - If the printer is using a wireless LAN, radio waves may be interfering with the wireless communication. This may occur if there is a microwave oven, cordless telephone, industrial printer, scientific instrument, or medical instrument using the same frequency range near the device.	- Move the printer farther away from the wireless LAN device. - If there are active wireless LAN devices nearby, move the printer or disable those devices. - Turn off other printers or instruments that use the same frequency range, and then try printing again. If printing is successful, move the devices to a location where they do not interfere with the printer.

If the problem cannot be solved, contact your service representative.

3

Removing Jammed Paper

Remove the jammed paper by following the procedures stated in the animation that appears on the screen and the sticker or sheet inside the front cover. This section describes how to remove jammed paper if the procedure is not displayed on the screen.

⚠️CAUTION

- The inside of the machine could be very hot. Do not touch the parts with a label indicating the "hot surface." Otherwise, an injury might occur.

⚠️CAUTION

- Some of this machine's internal components get very hot. For this reason, take care when removing misfed paper. Not doing so could result in burns.

⚠️CAUTION

- Keep your hands clear of the booklet finisher tray when removing misfed paper, pulling out or pushing in the finisher's staple unit. You can trap and injure your fingers if you do not.

⚠️CAUTION

- When removing jammed paper, make sure not to trap or injure your fingers.

⭐ **Important**

- To prevent misfeeds, do not leave any torn scraps of paper inside the printer.

- Contact your service representative if misfeeds occur frequently.

- If the error message remains displayed even after you remove misfed paper, open and close the front cover.

- If the error message "Paper Misfeed (C)" is displayed, pay attention to the following:

  - When removing jammed paper, touch only those areas explicitly indicated in the manual.

  - Do not remove the fusing unit. Doing so will result in loss of print quality.

  - To remove paper that has not been fed into the fixing section correctly, remove the jammed paper through the underside of the fusing unit. If the jammed paper cannot be removed through the underside of the fusing unit, remove it from the top.

⬇️ **Note**

- Inside the finisher, or inside the front cover, there are stickers or sheets explaining how to remove misfed paper.

- If a detailed removal instruction appears on the right of the screen, follow it.

- You can also use the procedure indicated in the [Check Status] screen to remove jammed paper.

Locating Jammed Paper

If a misfeed happens, remove the misfed paper or original following the procedures stated on the sticker or sheet inside the finisher or front cover.

The letter displayed on the control panel indicates the location of the misfeed.
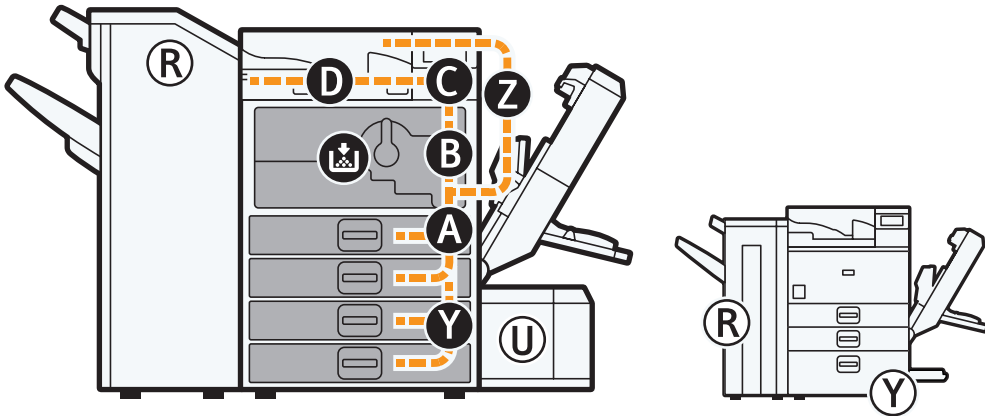
CQT681

1. **Press the key of the section from where you want to remove the jammed paper.**
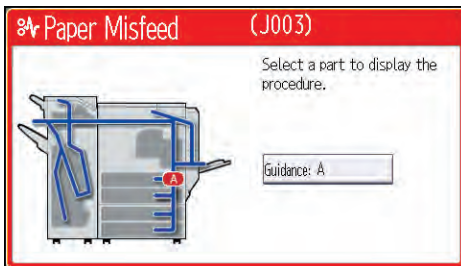
2. **After each step is complete, press [Next]. To go back to the previous step, press [Previous].**
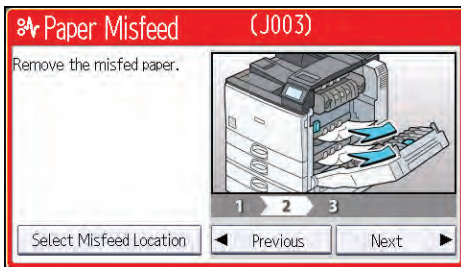
3. **When all jammed paper is removed, restore the printer to the original state.**

⬇Note

- More than one misfeed may be indicated. When this happens, check all the areas indicated.

- If there is no misfed paper in the first area you check, see the other areas that are indicated.

When R1–R5 Is Displayed for the 1000-Sheet Finisher

1
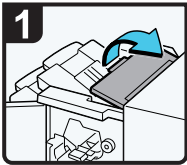
· Open the finisher upper cover.

2
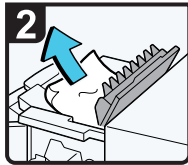
· Remove misfed paper.

· Close the finisher upper cover.

3

R1

· Open the finisher front cover.

4

① R1 ②
③ R2
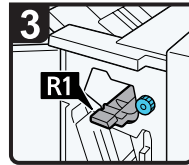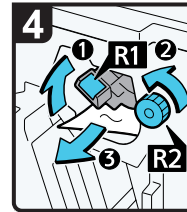
· Raise lever R1, and then turn knob R2 counterclockwise.

· Remove misfed paper.

5

R3 ①
②
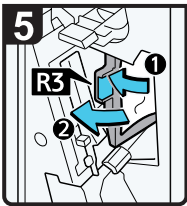
· If you cannot remove misfed paper, open lever R3 to the left, and then remove misfed paper.

· Return lever R3 to its original position.

6

②
① R4
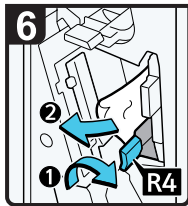
· Pull lever R4 to the right, and then remove misfed paper.

7

① ②
R5 ②
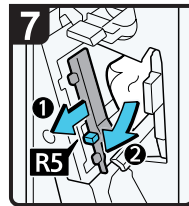
· Pull lever R5 and remove misfed paper.

· Close the finisher front cover.

CJH002

When R1–R4 Is Displayed for the 3000-sheet finisher
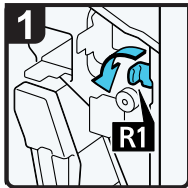
· Open the finisher front cover.

· Pull lever R1 to the left.
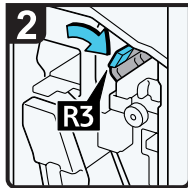
· Raise lever R3 to the right.
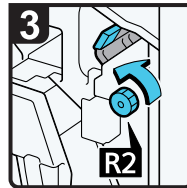
· Turn knob R2 counterclockwise.
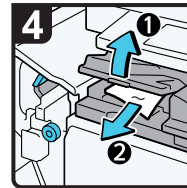
· Open the bridge unit cover (left), and then remove misfed paper.

· Close the bridge unit cover (left).

· Return lever R3 and R1 to their original positions.
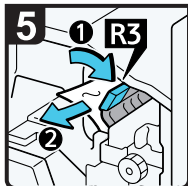
· If you cannot remove misfed paper, raise lever R3 to the right, and then remove it.

· Return lever R3 to its original position.
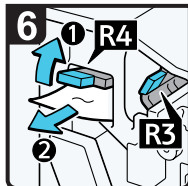
· Raise lever R4, and then remove misfed paper.

· Return lever R4 to its original position.

· Close the finisher front cover.

CJH006

3

When R5 - R8 Is Displayed for the 3000-sheet finisher
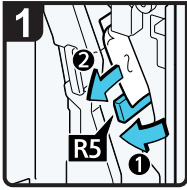
- Open the finisher front cover.
- Lower lever R5, and then remove misfed paper.
- Return lever R5 to its original position.
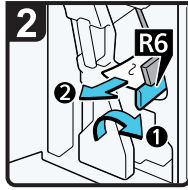
- If you cannot remove misfed paper, raise lever R6, and then remove it.
- Return lever R6 to its original position.
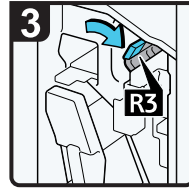
- Raise lever R3 to the right.
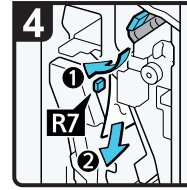
- Raise lever R7, and then remove misfed paper.
- Return lever R3 to its original position.
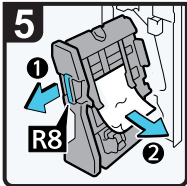
- Pull handle R8, and then pull out the staple unit.
- Remove misfed paper.
- Return the staple unit to its original position, and then close the finisher front cover.

CJH007

Removing Jammed Staples

If a staple jam occurs, remove the jammed staple by following the procedures stated in the animation that appears on the screen. This section describes how to remove jammed staples when the procedure is not displayed on the screen.

⚠️CAUTION

- Keep your hands clear of the booklet finisher tray when removing misfed paper, pulling out or pushing in the finisher's staple unit. You can trap and injure your fingers if you do not.

⭐**Important**

- Curled paper may cause staples to jam. To avoid this, turn paper over in the tray.
- When the finisher is installed, after removing jammed staples, staples will not be ejected the first few times you try to use the stapler.

⬇️**Note**

- Remove the jammed staples according to the finisher type. Check the type if you are unsure. For details about type of finisher, see "Guide to Functions of the Printer's Options", Operating Instructions.

1000-Sheet Finisher
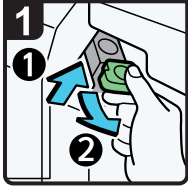
· Open the finisher front cover.

· Hold the lever, and then pull out the cartridge gently.
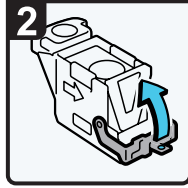
· Open the face plate of the cartridge.
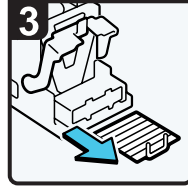
· Remove jammed staples.
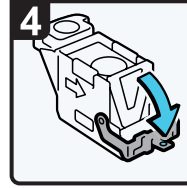
· Pull down the face plate of the cartridge until it clicks.

· Hold the lever while pushing in the cartridge until it clicks.

· Close the finisher front cover.

CNC005

3000-sheet Finisher

1
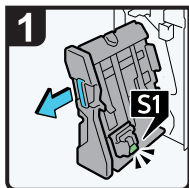
· Open the finisher front cover.

· Pull out the staple unit.

2

· Pull out the cartridge gently.

3

· Open the face plate of the cartridge.

4

· Remove jammed staples.

5
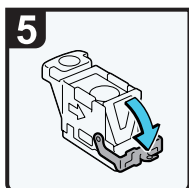
· Pull down the face plate until it clicks.

6
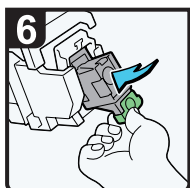
· Pull down the cartridge until it clicks.

· Return the staple unit to its original position, and then close the finisher front cover.

CJH014

Removing Punch Waste

If the punch receptacle is full, remove punch waste by following the procedures stated in the animation that appears on the screen.

Note

- While "⬚Hole Punch Receptacle is full." is displayed, you cannot use the Punch function.

- "⬚Hole Punch Receptacle is full." is displayed until the punch waste box is reinstalled.

- If the message is still displayed, reinstall the punch waste box.

- The message "⬚Hole Punch Receptacle is full." may appear even when the punch waste box is not yet full. If this happens, the position of the punch waste box (indicated by the arrow as shown) may be blocked by punch waste. Remove the punch waste.

    - 3000-sheet finisher:
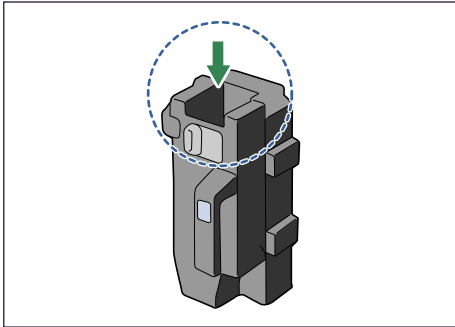
BEK131S

4. Replenishing and Replacing Consumables

This section explains how to replenish consumables and staples when they run out.

Adding Toner

This section explains precautions when adding toner when it has run out, and how to dispose of used toner.

⚠️ WARNING

- Do not incinerate toner (new or used) or toner containers. Doing so risks burns. Toner will ignite on contact with naked flame.

⚠️ WARNING

- Do not store toner (new or used) or toner containers anywhere near naked flames. Doing so risks fire and burns. Toner will ignite on contact with naked flame.

⚠️ WARNING

- Do not use the cleaner to suck spilled toner (including used toner). Sucked toner may cause firing or explosion due to electrical contact flickering inside the cleaner. However, it is possible to use the cleaner designed for dust explosion-proof purpose. If toner is spilled over the floor, sweep up spilled toner slowly and clean remainder with wet cloth.

⚠️ CAUTION

- Do not crush or squeeze toner containers. Doing so can cause toner spillage, possibly resulting in dirtying of skin, clothing, and floor, and accidental ingestion.

⚠️ CAUTION

- Store toner (new or used), toner containers, and components that have been in contact with toner out of reach of children.

⚠️ CAUTION

- If toner or used toner is inhaled, gargle with plenty of water and move into a fresh air environment. Consult a doctor if necessary.

> ⚠️ **CAUTION**
>
> - If toner or used toner gets into your eyes, flush immediately with large amounts of water. Consult a doctor if necessary.

> ⚠️ **CAUTION**
>
> - If toner or used toner is swallowed, dilute by drinking a large amount of water. Consult a doctor if necessary.

> ⚠️ **CAUTION**
>
> - When removing jammed paper or replacing toner, avoid getting toner (new or used) on your clothing. If toner comes into contact with your clothing, wash the stained area with cold water. Hot water will set the toner into the fabric and make removing the stain impossible.

> ⚠️ **CAUTION**
>
> - When removing jammed paper or replacing toner, avoid getting toner (new or used) on your skin. If toner comes into contact with your skin, wash the affected area thoroughly with soap and water.

⭐ **Important**

- Always replace the toner cartridge when a notification appears on the machine.

- Fault may occur if you use toner other than the recommended type.

- When adding toner, do not turn off the main power. Otherwise, settings will be lost.

- Store toner where it will not be exposed to direct sunlight, temperatures above 35 °C (95 °F), or high humidity.

- Store toner on a flat surface.

- Do not shake the toner cartridge with the opening face down after removing it. Residual toner may scatter.

- Do not repeatedly install and remove toner cartridges. This will result in toner leakage.

Replace the toner cartridge when the following message appears on the display. Follow the instruction on the screen regarding how to replace the toner cartridge.

"📇No toner. Replace Toner Cartridge."

When the following message appears, the toner has almost run out. Have a replacement toner cartridge at hand.

"📇Toner Cartridge is almost empty. Replace Toner Cartridge."

🔽 **Note**

- If 📇 appears when there is still toner in the cartridge, hold the cartridge with the opening face up, shake it well, and then reinstall it.

- You can check the name of the required toner and the replacement procedure using the [⤓Add Toner] screen.

- Press the [Check Status] key to check the contact number where you can order supplies. See p.71 "Checking Printer Status and Settings".

Disposing of Used Toner

The following describes what to do with used toner.

Toner cannot be re-used. Pack used toner containers in the container's box or a bag to prevent the toner from leaking out of the container when you dispose of it.

Bring the stored used container to your sales representative or service representative for recycling through our recycling system. If you discard it on your own, treat it as general plastic waste material.

Replacing Other Consumables

Refer to the maintenance guide provided with the new items for the replacement.

⚠️CAUTION

- The fusing unit becomes very hot. When installing a new fusing unit, turn off the printer and wait at least an hour after power off before replacing parts. Not allowing the printer to cool may result in burns.

⭐ **Important**

- When taking the development unit out of the box, be sure to hold the unit by the handle on the top of the unit. Do not touch any parts of the development unit.

- Exposure to light reduces development unit performance. Replace the unit as quickly as possible.

- Do not pull out the development unit quickly or with force as it may fall.

- Take care that nothing comes into contact with the photo conductor area of the development unit.

- Place no objects on the front or inner cover.

Maintenance Kit A

Replace the Maintenance Kit A when the following message appears on the display:

"Replacement of Maintenance Kit A is now necessary. Replace Maintenance Kit A"

When the following message appears on the display, the Maintenance Kit A should be replaced soon.

"Replace Maintenance Kit A. Press either the Check Status key or the remaining supply display to check information about supplies."

Maintenance Kit B

Replace the Maintenance Kit B when the following message appears on the display:

"Replacement of Maintenance Kit B is now necessary. Replace Maintenance Kit B"

When the following message appears on the display, the Maintenance Kit B should be replaced soon.

"Replace Maintenance Kit B. Press either the Check Status key or the remaining supply display to check information about supplies."

Adding Staples

⚠ CAUTION

- Keep your hands clear of the booklet finisher tray when removing misfed paper, pulling out or pushing in the finisher's staple unit. You can trap and injure your fingers if you do not.

⭐ **Important**

- **Stapling failures or jams may occur if you use a staple cartridge other than that recommended.**

Replace the staple cartridge when the following message appears on the display. Follow the instruction on the screen regarding how to replace the staple cartridge.

"Add staples"

⬇ **Note**

- If you cannot pull out the upper unit of the staple cartridge, there are staples remaining inside the cartridge. Use all the staples, and do not add more.

- Refill the stapler according to the finisher type. Check the type if you are unsure. For details about type of finisher, see "Consumables", Operating Instructions.

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- The product names of Windows XP are as follows:

    Microsoft® Windows® XP Professional Edition

    Microsoft® Windows® XP Home Edition

    Microsoft® Windows® XP Media Center Edition

    Microsoft® Windows® XP Tablet PC Edition

- The product names of Windows Vista are as follows:

    Microsoft® Windows Vista® Ultimate

    Microsoft® Windows Vista® Business

    Microsoft® Windows Vista® Home Premium

Microsoft® Windows Vista® Home Basic

Microsoft® Windows Vista® Enterprise

- The product names of Windows 7 are as follows:

Microsoft® Windows® 7 Home Premium

Microsoft® Windows® 7 Professional

Microsoft® Windows® 7 Ultimate

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- The product names of Windows Server 2003 are as follows:

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MEMO

Operating Instructions

Driver Installation Guide

TABLE OF CONTENTS

1. Introduction

This chapter explains the software included on this CD-ROM and a brief overview for the connection method.

Start Installer

To connect this printer to a client computer and print documents, the software included on the provided CD-ROM must be installed on the client computer.

The installer starts automatically when you insert the provided CD-ROM into the CD-ROM drive of a client computer running under Windows or Windows Server. You can then install the printer driver included on the CD-ROM.

The contents (display item) of the installer are as follows:

Quick Install

Install the PCL 6 printer driver, and configure the Standard TCP/IP port to establish a connection with a network printer. Quick Install is also available when the printer is connected with a client computer via parallel connection.

For details, see p.9 "Quick Install".

PCL Printer Drivers

Installs the PCL 6 and/or PCL 5e printer drivers.

For details about installing the driver, see p.11 "Installing the Printer Driver for a Network Connection" or p.25 "Installing the Printer Driver for a Local Connection".

PostScript 3 Printer Driver

Install the PostScript 3 printer driver.

For details about installing the driver, see p.11 "Installing the Printer Driver for a Network Connection" or p.25 "Installing the Printer Driver for a Local Connection".

Font Manager

This software enables you to use screen fonts.

For details about installing the software, see p.45 "Installing Font Manager".

Select Language

Change the interface language.

Browse This CD-ROM

Browse the contents of this CD-ROM.

Exit

Quit Installer.

↓Note

- Manage Printers permission is required to install the driver. Log on as an Administrators group member.

- Auto Run might not work automatically with certain OS settings. If this is the case, double-click "SETUP.EXE", located on the CD-ROM root directory, or click [Run SETUP.EXE] in the [AutoPlay] dialog box.

- If you want to cancel Auto Run, hold down the left [Shift] key while inserting the CD-ROM. Keep the [Shift] key held down until the computer stops reading the CD-ROM.

Software and Utilities Included on the CD-ROM

This section explains the software and utilities CD-ROM provided with this printer.

📌**Note**

- For the latest information on the corresponding operating system, see "Readme.txt" file in the DRIVERS folder.

- For the latest information on Windows terminal service, Citrix Presentation Server, and Citrix Xen App, see the manufacturer's Web site.

Printer Drivers

Printing requires installation of a printer driver for your operating system. The following drivers are included on the CD-ROM.

Operating System	Printer Drivers		
	PCL 5e	PCL 6	PostScript 3
Windows XP [*1]	OK	OK	OK
Windows Vista [*2]	OK	OK	OK
Windows 7 [*3]	OK	OK	OK
Windows Server 2003 [*4]	OK	OK	OK
Windows Server 2008 [*5]	OK	OK	OK
Mac OS X [*6]	—	—	OK

*Any printer drivers support both 32-bit and 64-bit Windows.

[*1] Microsoft Windows XP Professional Edition/Microsoft Windows XP Home Edition

[*2] Microsoft Windows Vista Ultimate/Microsoft Windows Vista Enterprise/Microsoft Windows Vista Business/ Microsoft Windows Vista Home Premium/Microsoft Windows Vista Home Basic

[*3] Microsoft Windows 7 Home Premium/Microsoft Windows 7 Professional/Microsoft Windows 7 Ultimate/ Microsoft Windows 7 Enterprise

[*4] Microsoft Windows Server 2003 Standard Edition/Microsoft Windows Server 2003 Enterprise Edition/ Microsoft Windows Server 2003 R2 Standard Edition/Microsoft Windows Server 2003 R2 Enterprise Edition

[*5] Microsoft Windows Server 2008 Standard/Microsoft Windows Server 2008 Enterprise/Microsoft Windows Server 2008 R2 Standard/Microsoft Windows Server 2008 R2 Enterprise

[*6] Mac OS X 10.4 or later (native mode). Any versions higher than Mac OS X 10.7 are not supported.

1

PCL printer drivers

Two kinds of PCL printer driver (PCL 5e and PCL 6) are included. These drivers allow your computer to communicate with this printer via a printer language.

Adobe® PostScript® printer driver

Adobe PostScript printer driver allows the computer to communicate with the printer using a printer language.

PPD files

PPD files allow the printer driver to enable specific printer functions using PostScript 3 printer language.

⬇️**Note**

- Some applications may require installation of the PCL 5e printer driver. In this case, you can install PCL 5e without having to install PCL 6.

- For details about installing the driver, see p.11 "Installing the Printer Driver for a Network Connection" or p.25 "Installing the Printer Driver for a Local Connection".

Supported languages

The languages supported in each printer driver are as follow:

English, German, French, Italian, Spanish, Dutch, Swedish, Norwegian, Danish, Finnish, Hungarian, Czech, Polish, Portuguese, Russian, Catalan, Turkish, Brazilian Portuguese, Greek.

⬇️**Note**

- The PCL 5e printer driver does not support Brazilian Portuguese and Greek. Use the English version of the driver.

- The PCL 6 and PostScript 3 printer drivers use the same interface language as the one specified by your operating system. However, the PostScript 3 printer driver will be displayed in English if your operating system uses one of the following languages: Finnish, Hungarian, Czech, Polish, Portuguese, Russian, Catalan, Turkish, Brazilian Portuguese, Greek.

Font Manager

For installing new screen fonts, or organizing and managing fonts already in the system.

File path

The software is included in the following folder on the CD-ROM:

`\FONTMAN\DISK1`

⬇️**Note**

- For details about installing the software, see p.45 "Installing Font Manager".

Confirming the Connection Method

This printer supports network and local connection.

Before installing the printer driver, check how the printer is connected. Follow the driver installation procedure that is appropriate to the connection method.

Network Connection

This printer can be used as a Windows printing port or network printer.

Using the Windows printing port

Network connections can be established through Ethernet and Wireless LAN.

Available ports are determined based on the combination of Windows operating system version and connection method used.

Windows XP, Windows Server 2003/2003 R2

Connection Method	Available Ports
• Ethernet • Wireless LAN	• Standard TCP/IP port • IPP port • LPR port • SmartDeviceMonitor for Client port

Windows Vista/7, Windows Server 2008/2008 R2

Connection Method	Available Ports
• Ethernet • Wireless LAN	• Standard TCP/IP port • IPP port • LPR port • WSD port • SmartDeviceMonitor for Client port

⬇ **Note**

- For details about how to install the printer driver for each type of port, see p.11 "Installing the Printer Driver for the Selected Port".

1

Using as a network printer

This printer can be used as a remote printer using the Windows or NetWare print server function.

Client OS	Using Server
• Windows XP • Windows Server 2003/2003 R2	• Windows XP print server • Windows Vista print server • Windows 7 print server • Windows Server 2003/2003 R2 print server • Windows Server 2008/2008 R2 print server • NetWare print server (using IPv4 only) • NetWare file server (using IPv4 only)
• Windows Vista • Windows 7 • Windows Server 2008/2008 R2	• Windows XP print server • Windows Vista print server • Windows 7 print server • Windows Server 2003/2003 R2 print server • Windows Server 2008/2008 R2 print server

⬇Note

- For details about how to install the printer driver to print server, see p.20 "Using as a Network Printer".

Local Connection

Local connections can be established via USB and parallel connections.

⬇Note

- For details about how to install the printer driver for each method of connections, see p.25 "Installing the Printer Driver for a Local Connection".

2. Quick Install

This chapter explains the "Quick Install" procedure. This installation method allows users to install the drivers easily, and requires minimal manual settings.

About Quick Install

Using Quick Install, the PCL 6 printer driver is installed under network environment, and the Standard TCP/IP port will be set.

When the printer is connected to a client computer via parallel connection, the printer port is set to [LPT1].

⭐ Important

- **Manage Printers permission is required to install the drivers. Log on as an Administrators group member.**

1. **Quit all applications. (Do not close this manual.)**
2. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

   If the [AutoPlay] dialog box appears, click [Run AUTORUN.EXE].
3. **Select an interface language, and then click [OK].**

   For details about the languages supported in the printer drivers, see p.6 "Supported languages".
4. **Click [Quick Install].**
5. **The software license agreement appears in the [License Agreement] dialog box. After reading the agreement, click [I accept the agreement.], and then click [Next].**
6. **Select the printer model you want to use in the [Select Printer] dialog box.**

   For network connection via TCP/IP, select the printer whose IP address is displayed in [Connect To].

   For parallel connection, select the printer whose printer port is displayed in [Connect To].
7. **Click [Install].**
8. **Configure the user code, default printer, and shared printer as necessary.**
9. **Click [Continue].**

   The installation starts.

   If the [User Account Control] dialog box appears, and then click [Yes] or [Continue].
10. **Click [Finish].**

    When you are prompted to restart your computer, restart it by following the instructions that appear.
11. **Click [Exit] in the first window of the installer, and then take out the CD-ROM.**

Note

- Quick Install is not available unless bidirectional communication between the printer and computer is enabled via parallel connection. For details about meeting the bidirectional communication conditions, see p.31 "Configuring Option Settings for the Printer".

2

3. Installing the Printer Driver for a Network Connection

This chapter describes the installation procedure of the printer drivers for network connection under Windows operating system.

Installing the Printer Driver for the Selected Port

This section describes the driver installation procedure for each printer port. See the installation procedure for the printer port you are using.

⭐ **Important**

- **Manage Printers permission is required to install the driver. Log on as an Administrators group member.**
- **To use the SmartDeviceMonitor for Client port, you must first download SmartDeviceMonitor for Client from the manufacturer's Web site and install it on your computer. Contact your local dealer for information on downloading SmartDeviceMonitor for Client. For details about SmartDeviceMonitor for Client, see "Software that You Can Download", Getting Started.**

⬇ **Note**

- If the [User Account Control] dialog box appears during the driver installation procedure, click [Yes] or [Continue].
- If the [Windows Security] dialog box appears during the driver installation procedure, click [Install this driver software anyway].
- A message appears if there is a newer version of the printer driver already installed. If there is, you cannot install the printer driver using Auto Run. If you still want to install the printer driver, use [Add Printer]. See p.33 "Messages Displayed When Installing the Printer Driver".

Port Type	Reference
Standard TCP/IP port	p.12 "Using the Standard TCP/IP port"
IPP port	p.12 "Using the IPP port"
LPR port	p.14 "Using the LPR port"
WSD port	p.15 "Using the WSD port"
SmartDeviceMonitor for Client port	p.17 "Using the SmartDeviceMonitor for Client port"

Using the Standard TCP/IP port

1. **Quit all applications. (Do not close this manual.)**

2. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

   If the [AutoPlay] dialog box appears, click [Run AUTORUN.EXE].

3. **Select an interface language, and then click [OK].**

   For details about the languages supported in the printer drivers, see p.6 "Supported languages".

4. **Click [PCL Printer Drivers] or [PostScript 3 Printer Driver].**

5. **The software license agreement appears in the [License Agreement] dialog box. After reading the agreement, click [I accept the agreement.], and then click [Next].**

   If installing the PostScript 3 printer driver, proceed to step 7.

6. **Select a printer driver you want to use, and then click [Next].**

7. **Select the check box of the manufacturer and printer model you want to use.**

8. **Double-click the printer name to display the printer settings.**

9. **Click [Port :], and then click [Add] in the [Change settings for 'Port'] box.**

10. **Click [Standard TCP/IP Port], and then click [OK].**

    If [Standard TCP/IP Port] does not appear, see Windows Help, and then configure the settings.

11. **Click [Next].**

12. **Enter the printer name or IP address, and then click [Next].**

    When the device type selection appears, select "RICOH Network Printer C model".

13. **Click [Finish].**

14. **Check that the port of the selected printer is displayed in [Port :].**

15. **Configure the user code, default printer, and shared printer as necessary.**

16. **Click [Continue].**

    The installation starts.

17. **Click [Finish].**

    Select one of the options to restart the computer either now or later, and then click [Finish].

Using the IPP port

⭐ **Important**

- To print via IPP-SSL, use the SmartDeviceMonitor for Client port.

- Installation of the certificate is especially necessary for users who want to print via IPP-SSL from Windows Vista/7 or Windows Server 2008/2008 R2. For details, consult your administrator.

- If a certificate authority issues a certificate that must be authenticated by an intermediate certificate authority, and the certificate is installed on this printer, an intermediate certificate must be installed on the client computer. Otherwise, validation by the certificate authority will not be performed correctly.

- If validation cannot be performed properly, a warning message informing you that installation is not possible might appear when you try to add a printer using IPP-SSL under Windows Vista/7 or Windows Server 2008/2008 R2. To enable authentication from the client computer, install the intermediate certificate on the client computer, and then reestablish connection.

- Intermediate certificates cannot be installed on this printer.

1. **Quit all applications. (Do not close this manual.)**
2. **On the [Start] menu, click [Devices and Printers].**
3. **Click [Add a printer].**
4. **Click [Add a network, wireless or Bluetooth printer].**
5. **Click [The printer that I want isn't listed].**
6. **In the [Select a shared printer by name] box, enter "http://(printer's IP address or host name)/printer (or ipp)" as the printer's address, and then click [Next].**
7. **Click [Have Disk...].**
8. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

   If the [AutoPlay] dialog box appears, click [Close].

9. **Click [Browse...], and then specify a location for the INF file.**

   If the CD-ROM drive is D, the source files of the printer driver are stored in the following locations:

   - PCL 5e

     32-bit driver D:\X86\DRIVERS\PCL5E\XP_VISTA\(Language)\DISK1

     64-bit driver D:\X64\DRIVERS\PCL5E\X64\(Language)\DISK1

   - PCL 6

     32-bit driver D:\X86\DRIVERS\PCL6\XP_VISTA\MUI\DISK1

     64-bit driver D:\X64\DRIVERS\PCL6\X64\MUI\DISK1

   - PostScript 3

     32-bit driver D:\X86\DRIVERS\PS\XP_VISTA\MUI\DISK1

     64-bit driver D:\X64\DRIVERS\PS\X64\MUI\DISK1

   For details about the languages supported in the printer drivers, see p.6 "Supported languages".

10. **Click [Open].**
11. **Click [OK] to close the [Install From Disk] window.**

12. **Select the manufacturer and model name of the printer you want to use, and then click [Next].**

    The installation starts.

13. **Follow the instructions that appear. Modify settings such as printer name and default printer configuration, as necessary. You can also print a test page.**

14. **Click [Finish].**

    If a check box for setting the printer as a default printer appears, configure as necessary.

3

Using the LPR port

1. **Quit all applications. (Do not close this manual.)**

2. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

    If the [AutoPlay] dialog box appears, click [Run AUTORUN.EXE].

3. **Select an interface language, and then click [OK].**

    For details about the languages supported in the printer drivers, see p.6 "Supported languages".

4. **Click [PCL Printer Drivers] or [PostScript 3 Printer Driver].**

5. **The software license agreement appears in the [License Agreement] dialog box. After reading the agreement, click [I accept the agreement.], and then click [Next].**

    If installing the PostScript 3 printer driver, proceed to step 7.

6. **Select a printer driver you want to use, and then click [Next].**

7. **Select the check box of the printer model you want to use.**

8. **Double-click the printer name to display the printer settings.**

9. **Click [Port :], and then click [Add] in the [Change settings for 'Port'] box.**

10. **Click [LPR Port], and then click [OK].**

    If [LPR Port] does not appear, see Windows Help and install it.

11. **Enter the printer name or IP address in the [Name or address of server providing lpd:] box.**

12. **Enter "lp" in the [Name of printer or print queue on that server:] box, and then click [OK].**

13. **Check that the port of the selected printer is displayed in [Port :].**

14. **Configure the user code, default printer, and shared printer as necessary.**

15. **Click [Continue].**

    The installation starts.

16. **Click [Finish].**

    Select one of the options to restart the computer either now or later, and then click [Finish].

Using the WSD port

⭐ **Important**

- The WSD port can be used under Windows Vista/7, or Windows Server 2008/2008 R2.

- You can connect to the printer only if both the printer and computer are on the same network segment, or "Network discovery" is enabled. For details, see Windows Help.

Windows Vista, Windows Server 2008

1. **Quit all applications. (Do not close this manual.)**

2. **On the [Start] menu, click [Network].**

3. **Right-click the printer's icon, and then click [Install].**

4. **Click [Locate and install driver software (recommended)].**

5. **Click [Browse my computer for driver software (advanced)].**

6. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

   If the [AutoPlay] dialog box appears, click [Close].

7. **Click [Browse...], and then specify the location of the INF file.**

   If the CD-ROM drive is D, the source files of the printer driver are stored in the following locations:

   - PCL 5e

     32-bit driver D:\X86\DRIVERS\PCL5E\XP_VISTA\(Language)\DISK1

     64-bit driver D:\X64\DRIVERS\PCL5E\X64\(Language)\DISK1

   - PCL 6

     32-bit driver D:\X86\DRIVERS\PCL6\XP_VISTA\MUI\DISK1

     64-bit driver D:\X64\DRIVERS\PCL6\X64\MUI\DISK1

   - PostScript 3

     32-bit driver D:\X86\DRIVERS\PS\XP_VISTA\MUI\DISK1

     64-bit driver D:\X64\DRIVERS\PS\X64\MUI\DISK1

   For details about the languages supported in the printer drivers, see p.6 "Supported languages".

8. **Click [Next].**

9. **Click [Close].**

   If installation is successful, the icon of the printer connected to the WSD port will appear in the window for configuring printers.

🔽 **Note**

- The port name that follows "WSD" uses random character strings. It cannot be changed freely.

3

- To stop the installation, click [Cancel] before the installation is complete. When re-installing the WSD Port, right-click the printer's icon in the [Network] window, and then click [Uninstall].

Windows 7, Windows Server 2008 R2

1. **Quit all applications. (Do not close this manual.)**
2. **On the [Start] menu, click [Computer].**
3. **Click [Network].**
4. **Right-click the printer's icon, and then click [Install].**
5. **On the [Start] menu, click [Devices and Printers].**
6. **Click [Add a printer].**
7. **Click [Add a local printer].**
8. **Check the [Use an existing port:] check box, and select WSD port.**
9. **Click [Next].**
10. **Click [Have Disk...].**
11. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

    If the [AutoPlay] dialog box appears, click [Close].
12. **Click [Browse...], and then specify the location of the INF file.**

    If the CD-ROM drive is D, the source files of the printer driver are stored in the following locations:

    - PCL 5e

      32-bit driver D:\X86\DRIVERS\PCL5E\XP_VISTA\(Language)\DISK1

      64-bit driver D:\X64\DRIVERS\PCL5E\X64\(Language)\DISK1

    - PCL 6

      32-bit driver D:\X86\DRIVERS\PCL6\XP_VISTA\MUI\DISK1

      64-bit driver D:\X64\DRIVERS\PCL6\X64\MUI\DISK1

    - PostScript 3

      32-bit driver D:\X86\DRIVERS\PS\XP_VISTA\MUI\DISK1

      64-bit driver D:\X64\DRIVERS\PS\X64\MUI\DISK1

    For details about the languages supported in the printer drivers, see p.6 "Supported languages".
13. **Click [Open].**
14. **Click [OK] to close the [Install From Disk] window.**
15. **Select the manufacturer and model name of the printer you want to use, and then click [Next].**
16. **Follow the instructions that appear. Modify settings such as printer name, default printer, and printer sharing configuration, as necessary. You can also print a test page.**

17. **Click [Finish].**

    If installation is successful, the icon of the printer connected to the WSD port will appear in the window for configuring printers.

Note

- To stop installation of the selected driver, click [Cancel] before the installation is complete. When re-installing the WSD Port, right-click the printer's icon in the [Network] window, and then click [Uninstall].

Using the SmartDeviceMonitor for Client port

To use this function, you must first download SmartDeviceMonitor for Client from the manufacturer's Web site and install it on your computer. Contact your local dealer for information on downloading SmartDeviceMonitor for Client.

1. **Quit all applications. (Do not close this manual.)**

2. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

    If the [AutoPlay] dialog box appears, click [Run AUTORUN.EXE].

3. **Select an interface language, and then click [OK].**

    For details about the languages supported in the printer drivers, see p.6 "Supported languages".

4. **Click [PCL Printer Drivers] or [PostScript 3 Printer Driver].**

5. **The software license agreement appears in the [License Agreement] dialog box. After reading the agreement, click [I accept the agreement.], and then click [Next].**

    If installing the PostScript 3 printer driver, proceed to step 7.

6. **Select a printer driver you want to use, and then click [Next].**

7. **Select the check box of the printer model you want to use.**

8. **Double-click the printer name to display the printer settings.**

9. **Click [Port :], and then click [Add] in the [Change settings for 'Port'] box.**

10. **Click [SmartDeviceMonitor], and then click [OK].**

11. **To configure port settings using TCP/IP, click [TCP/IP], and then click [Search].**

    To configure port settings using IPP, proceed to step 13.

12. **Select the printer you want to use, and then click [OK].**

    Only printer that respond to a broadcast from the computer appear. To use a printer not listed here, click [Specify Address], and then enter the IP address or host name of the printer.

    Proceed to step 18.

13. **To configure port settings using IPP, click [IPP].**

14. **In the [Printer URL] box, enter "http:// printer 's IP address/printer" as the printer 's address.**

   If the server authentication is issued, enter "https:// printer's IP address/printer" to enable SSL (a protocol for encrypted communication). Example IP address: 192.168.15.16

   http://192.168.15.16/printer

   https://192.168.15.16/printer

   You can enter "http:// printer's IP address/ipp" as the printer's address.

15. **Enter a name for identifying the printer in the [IPP Port Name] box. Use a name different from the one of any existing ports.**

   If a name is not specified here, the address entered in the [Printer URL] box becomes the IPP port name.

16. **Click [Detailed Settings] Settings to make necessary settings.**

   For details about the settings, see SmartDeviceMonitor for Client Help.

17. **Click [OK].**

18. **Check that the port of the selected printer is displayed in [Port :].**

19. **Configure the user code, default printer, and shared printer as necessary.**

20. **Click [Continue].**

   The installation starts.

21. **Click [Finish].**

   Select one of the options to restart the computer either now or later, and then click [Finish].

Changing the port settings for SmartDeviceMonitor for Client

Follow the procedure below to change the SmartDeviceMonitor for Client settings, such as TCP/IP protocol.

Windows XP, Windows Server 2003/2003 R2

1. **On the [Start] menu, click [Printers and Faxes].**

2. **Click the icon of the printer you want to use. On the [File] menu, click [Properties].**

3. **Click the [Ports] tab, and then click [Configure Port].**

   The [Port Configuration:] window appears.

Windows Vista, Windows Server 2008:

1. **On the [Start] menu, click [Control Panel].**

2. **Click [Printer].**

3. **Right-click the icon of the printer you want to use, and then click [Properties].**

4. **Click the [Ports] tab, and then click [Configure Port].**

   The [Port Configuration:] window appears.

Windows 7, Windows Server 2008 R2:

1. **On the [Start] menu, click [Devices and Printers].**

2. **Right-click the icon of the printer you want to use, and then click [Printer Properties].**

3. **Click the [Ports] tab, and then click [Configure Port].**

   The [Port Configuration:] window appears.

   ↓Note

   - User, proxy, and timeout settings can be configured for IPP.

   - For details about these settings, see SmartDeviceMonitor for Client Help.

Using as a Network Printer

This section describes the driver installation procedure for each print server. See the installation procedure for the print server you are using.

⭐**Important**

- **When using NetWare, an optional NetWare unit is required.**

⬇**Note**

- If the [User Account Control] dialog box appears during the driver installation procedure, click [Yes] or [Continue].
- If the [Windows Security] dialog box appears during the driver installation procedure, click [Install this driver software anyway].
- A message appears if there is a newer version of the printer driver already installed. If there is, you cannot install the printer driver using Auto Run. If you still want to install the printer driver, use [Add Printer]. See Messages Displayed When Installing the Printer Driver.

Using Windows Print Server

1. **Quit all applications. (Do not close this manual.)**
2. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

   If the [AutoPlay] dialog box appears, click [Run AUTORUN.EXE].
3. **Select an interface language, and then click [OK].**

   For details about the languages supported in the printer drivers, see p.6 "Supported languages".
4. **Click [PCL Printer Drivers] or [PostScript 3 Printer Driver].**
5. **The software license agreement appears in the [License Agreement] dialog box. After reading the agreement, click [I accept the agreement.], and then click [Next].**

   If installing the PostScript 3 printer driver, proceed to step 7.
6. **Select a printer driver you want to use, and then click [Next].**
7. **Select the check box of the printer model you want to use.**
8. **Double-click the printer name to display the printer settings.**
9. **Click [Port :], and then click [Add] in the [Change settings for 'Port'] box.**
10. **Click [Network Printer], and then click [OK].**
11. **Double-click the computer name you want to use as a print server in the [Browse for Printer] window.**
12. **Select the printer you want to use, and then click [OK].**
13. **Check that the port of the selected printer is displayed in [Port :].**

14. **Configure the user code, default printer, and shared printer as necessary.**

15. **Click [Continue].**

    The installation starts.

16. **Click [Finish].**

    Select one of the options to restart the computer either now or later, and then click [Finish].

Note

- If you print with a print server connected to the printer using the SmartDeviceMonitor for Client port, Recovery Printing and Parallel Printing cannot be used from the client computer.

- If you print under Windows Vista/7 or Windows Server 2008 print server, notification functions of SmartDeviceMonitor may not be used with the client computer.

Using NetWare Print Server

1. **Quit all applications. (Do not close this manual.)**

2. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

    If the [AutoPlay] dialog box appears, click [Run AUTORUN.EXE].

3. **Select an interface language, and then click [OK].**

    For details about the languages supported in the printer drivers, see p.6 "Supported languages".

4. **Click [PCL Printer Drivers] or [PostScript 3 Printer Driver].**

5. **The software license agreement appears in the [License Agreement] dialog box. After reading the agreement, click [I accept the agreement.], and then click [Next].**

    If installing the PostScript 3 printer driver, proceed to step 7.

6. **Select a printer driver you want to use, and then click [Next].**

7. **Select the check box of the printer model you want to use.**

8. **Double-click the printer name to display the printer settings.**

9. **Click [Port :], and then click [Add] in the [Change settings for 'Port'] box.**

10. **Click [Network Printer], and then click [OK].**

11. **Double-click the name of the NetWare file server on the network tree.**

    The created queue is displayed.

12. **Select the print queue, and then click [OK].**

13. **Check that the port of the selected printer is displayed in [Port :].**

14. **Click [Continue].**

    The installation starts.

15. **Click [Finish] in the [Select Program] dialog box.**

16. **After the installation is completed, select one of the options to restart the computer either now or later, and then click [Finish].**

    Restart the computer to complete installation.

17. **After restarting the computer, on the [Start] menu, select [Printers and Faxes].**

18. **Right-click the printer's icon, and then click [Properties].**

19. **Click the [NetWare Settings] tab.**

20. **Clear the [Form Feed] and [Enable Banner] check boxes.**

    Do not select these check boxes since they are automatically selected by the printer driver. If you select the check boxes, the printer may not print correctly.

21. **Click [OK].**

🔽**Note**

- The protocol is set to inactive as default. Enable the protocol on the control panel, using Web Image Monitor, SmartDeviceMonitor or telnet.

Notes When Using NetWare

Form Feed

Do not use NetWare to configure form feed. Form feed is controlled by the printer driver on Windows. If NetWare form feed is configured, the printer may not print properly.

Follow the procedure below to disable form feed according to the operating system used:

- Clear the [Form feed] check box on the [NetWare Settings] tab in the printer properties dialog box.

Banner Page

Do not use NetWare to configure banner page.

Follow the procedure below to disable banner page according to the operating system used:

- Clear the [Enable banner] check box on the [NetWare Settings] tab in the printer properties dialog box.

When using the PostScript 3 Printer Driver

Follow the procedure below to set up the PostScript 3 printer driver.

1. Open the printer window.
   - Windows XP, Windows Server 2003/2003 R2:

     On the [Start] menu, select [Printers and Faxes].
   - Windows Vista, Windows Server 2008:

     On the [Start] menu, select [Control Panel], and then click [Printers] in [Hardware and Sound] category.

- Windows 7, Windows Server 2008 R2:

     On the [Start] menu, select [Devices and Printers].

2. Open the printer properties dialog box.

     - Windows XP/Vista, Windows Server 2003/2008:

         Right-click the printer's icon, and then click [Properties].

     - Windows 7, Windows Server 2008 R2:

         Right-click the printer's icon, and then click [Printer properties].

3. Click the [Device Settings] tab.

4. Select [No] on the [Send CTRL-D Before Each Job:] and [Send CTRL-D After Each Job:], and then click [Apply].

5. Click [OK].

Printing after Resetting the Printer

Printer to print server connection requires 30 - 40 seconds to resume after the printer is reset. During this period, jobs may be accepted (depending on NetWare specifications) but not printed.

To print after resetting the printer as the remote printer, check on the print server that the remote printer is disconnected, or wait for two minutes before trying to print.

3

4. Installing the Printer Driver for a Local Connection

This chapter describes the installation procedure of the printer drivers for USB or parallel connection under Windows operating system.

USB Connection

This section explains how to install the printer drivers using USB.

Before installing, check that only the operating system is running on the computer and no print jobs are in progress.

If the printer driver has already been installed, and plug and play is enabled, the icon of the printer connected to the "USB" port is added to the [Printers], [Printers and Faxes], or [Devices and Printers] window.

If the printer driver is not installed, follow the plug-and-play instructions of the printer to install it from the CD-ROM provided with this printer.

⭐ **Important**

- **Manage Printers permission is required to install the driver. Log on as an Administrators group member.**

🔽 **Note**

- If the [User Account Control] dialog box appears in driver installation procedure, click [Yes] or [Continue].

- If the [Windows Security] dialog box appears in driver installation procedure, click [Install this driver software anyway].

- A message appears if there is a newer version of the printer driver already installed. If there is, you cannot install the printer driver using Auto Run. If you still want to install the printer driver, use [Add Printer]. See p.33 "Messages Displayed When Installing the Printer Driver".

- To disable Auto Run, press the left Shift key when inserting the CD-ROM into the drive and keep it pressed until the computer finishes reading from the CD-ROM.

Windows XP, Windows Server 2003/2003 R2

1. **Quit all applications. (Do not close this manual.)**
2. **Check that the power of the printer is off.**
3. **Connect the printer and computer using the USB cable.**

   Connect the USB cable firmly.

4. **Turn on the power of the printer.**

   Found New Hardware Wizard starts, and USB Printing Support is installed automatically.

5. **Select [No, not this time], and then click [Next].**

6. **Click [Install from a list or specific location [Advanced]], and then click [Next].**

7. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

   If Auto Run starts, click [Cancel] and then [Exit].

8. **Select the [Search removable media (floppy, CD-ROM...)] check box under [Search for the best driver in these locations.], and then click [Next].**

9. **Select the name of the printer whose driver you want to install.**

   Check the location where the source files of the printer driver is stored.

   If the CD-ROM drive is D, the source files are stored in the following locations:

   - PCL 5e

     32-bit driver D:\X86\DRIVERS\PCL5E\XP_VISTA\(Language)\DISK1

     64-bit driver D:\X64\DRIVERS\PCL5E\X64\(Language)\DISK1

   - PCL 6

     32-bit driver D:\X86\DRIVERS\PCL6\XP_VISTA\MUI\DISK1

     64-bit driver D:\X64\DRIVERS\PCL6\X64\MUI\DISK1

   - PostScript 3

     32-bit driver D:\X86\DRIVERS\PS\XP_VISTA\MUI\DISK1

     64-bit driver D:\X64\DRIVERS\PS\X64\MUI\DISK1

   For details about the languages supported in the printer drivers, see p.6 "Supported languages".

10. **Click [Next].**

    The installation starts.

11. **Click [Finish].**

    If the printer driver has already been installed and plug and play is enabled, the icon of the printer connected to the "USB001" port is added to the [Printers], [Printers and Faxes], or [Devices and Printers] window.

    The number after "USB" varies depending on the number of printers connected.

Windows Vista, Windows Server 2008

1. **Quit all applications. (Do not close this manual.)**

2. **Check that the power of the printer is off.**

3. **Connect the printer and computer using a USB cable.**

   Connect the USB cable firmly.

4. **Turn on the power of the printer.**

   Found New Hardware Wizard starts, and USB Printing Support is installed automatically.

5. **In the [Found New Hardware] window, click [Locate and install driver software (recommended)].**

6. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

   If the [AutoPlay] dialog box appears, click [Close].

7. **Select the name of the printer whose driver you want to install.**

   Check the location where the source files of the printer driver is stored.

   If the CD-ROM drive is D, the source files are stored in the following locations:

   - PCL 5e

     32-bit driver D:\X86\DRIVERS\PCL5E\XP_VISTA\(Language)\DISK1

     64-bit driver D:\X64\DRIVERS\PCL5E\X64\(Language)\DISK1

   - PCL 6

     32-bit driver D:\X86\DRIVERS\PCL6\XP_VISTA\MUI\DISK1

     64-bit driver D:\X64\DRIVERS\PCL6\X64\MUI\DISK1

   - PostScript 3

     32-bit driver D:\X86\DRIVERS\PS\XP_VISTA\MUI\DISK1

     64-bit driver D:\X64\DRIVERS\PS\X64\MUI\DISK1

   For details about the languages supported in the printer drivers, see p.6 "Supported languages".

8. **Click [Next].**

   The installation starts.

9. **Click [Close].**

   If the printer driver has already been installed and plug and play is enabled, the icon of the printer connected to the "USB001" port is added to the [Printers], [Printers and Faxes], or [Devices and Printers] window.

   The number after "USB" varies depending on the number of printers connected.

Windows 7, Windows Server 2008 R2

1. **Quit all applications. (Do not close this manual.)**

2. **Check that the power of the printer is off.**

3. **Connect the printer and computer using a USB cable.**

   Connect the USB cable firmly.

4. **Turn on the power of the printer.**

   Found New Hardware Wizard starts, and USB Printing Support is installed automatically.

5. **Click [Devices and Printers] from the [Start] menu.**

6. **Double-Click the icon of printer you want to use in the [Unspecified] category.**

7. **Click the [Hardware] tab.**

8. **Click [Properties].**

9. **Click the [General] tab.**

10. **Click [Change settings].**

11. **Click [Driver] tab.**

12. **Click [Update Driver...].**

13. **Click [Browse my computer for driver software].**

14. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

    If the [AutoPlay] dialog box appears, click [Close].

15. **Click [Browse], and then select the printer driver location.**

    If the CD-ROM drive is D, the source files of the printer driver are stored in the following locations:

    - PCL 5e

      32-bit driver D:\X86\DRIVERS\PCL5E\XP_VISTA\(Language)\DISK1

      64-bit driver D:\X64\DRIVERS\PCL5E\X64\(Language)\DISK1

    - PCL 6

      32-bit driver D:\X86\DRIVERS\PCL6\XP_VISTA\MUI\DISK1

      64-bit driver D:\X64\DRIVERS\PCL6\X64\MUI\DISK1

    - PostScript 3

      32-bit driver D:\X86\DRIVERS\PS\XP_VISTA\MUI\DISK1

      64-bit driver D:\X64\DRIVERS\PS\X64\MUI\DISK1

    For details about the languages supported in the printer drivers, see p.6 "Supported languages".

16. **Click [Next].**

    The installation starts.

17. **Click [Close].**

    If the printer driver has already been installed and plug and play is enabled, the icon of the printer connected to the "USB001" port is added to the [Printers], [Printers and Faxes], or [Devices and Printers] window.

    The number after "USB" varies depending on the number of printers connected.

Parallel Connection

To use a printer connected using a parallel interface, click [LPT1] when installing the printer driver.

⭐**Important**

- **Manage Printers permission is required to install the driver. Log on as an Administrators group member.**

↓**Note**

- If the [User Account Control] dialog box appears in driver installation procedure, click [Yes] or [Continue].

- If the [Windows Security] dialog box appears in driver installation procedure, click [Install this driver software anyway].

- A message appears if there is a newer version of the printer driver already installed. If there is, you cannot install the printer driver using Auto Run. If you still want to install the printer driver, use [Add Printer]. See p.33 "Messages Displayed When Installing the Printer Driver".

- To disable Auto Run, press the left Shift key when inserting the CD-ROM into the drive and keep it pressed until the computer finishes reading from the CD-ROM.

1. **Quit all applications. (Do not close this manual.)**

2. **Insert the provided CD-ROM into the computer's CD-ROM drive.**

   If the [AutoPlay] dialog box appears, click [Run AUTORUN.EXE].

3. **Select an interface language, and then click [OK].**

   For details about the languages supported in the printer drivers, see p.6 "Supported languages".

4. **Click [PCL Printer Drivers] or [PostScript 3 Printer Driver].**

5. **The software license agreement appears in the [License Agreement] dialog box. After reading the agreement, click [I accept the agreement.], and then click [Next].**

   If installing the PostScript 3 printer driver, proceed to step 7.

6. **Select a printer driver you want to use, and then click [Next].**

7. **Select the check box of the printer model you want to use.**

8. **Double-click the printer name to display the printer settings.**

9. **Click [Port :].**

10. **Select [LPT1:] in the [Change settings for 'Port'] drop-down list.**

11. **Configure the user code, default printer, and shared printer as necessary.**

12. **Click [Continue].**

    The installation starts.

13. **Click [Finish].**

Select one of the options to restart the computer either now or later, and then click [Finish].

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5. Configuring Option Settings for the Printer

This chapter explains the conditions for bidirectional communication with your computer and the printer, and also explains how to configure the printer's option settings manually.

Conditions for Bidirectional Communication

When bidirectional communication works correctly, your computer obtains information about option, paper size and paper feed direction settings from the printer automatically.

To support bidirectional communication, the following conditions must be met:

When connected with parallel cables

- The computer must support bidirectional communication.
- The interface cable must support bidirectional communication.
- The printer must be connected to the computer using the standard parallel cables and parallel connectors.

When connected with the network

- The Standard TCP/IP port must be used.
- In addition to the above, the TCP/IP protocol or the IPP protocol must be used. (When using the IPP protocol, the IPP port name must include the IP address.)

When connected with USB

- The printer must be connected to the computer's USB port using the USB interface cable.
- The computer must support bidirectional communication.
- [Enable bidirectional support] must be selected, and [Enable printer pooling] must not be selected on the [Ports] tab with the printer driver.

⬇️**Note**

- The PCL 6 and PostScript 3 printer drivers support bidirectional communication and automatic printer status updates.
- To obtain printer information automatically using the bidirectional communication function of the PCL 6 or PostScript 3 printer driver, you must select the [Automatically Update Printer Information] check box on the [Accessories] tab in the printer driver's properties window.
- The PCL 5e printer driver supports bidirectional communication. You can update the printer status manually.

If Bidirectional Communication is Disabled

When bidirectional communication is disabled, you have to set up option, paper size and paper feed direction settings on your computer manually. This section describes how to set up option, paper size and paper feed direction settings on your computer manually.

⭐Important

* **Manage Printers permission is required to change the printer properties. Log on as an Administrators group member.**

1. **Open the printer window.**

    * Windows XP, Windows Server 2003:

        On the [Start] menu, select [Printers and Faxes].

    * Windows Vista, Windows Server 2008:

        On the [Start] menu, select [Control Panel], and then click [Printers] in [Hardware and Sound] category.

    * Windows 7, Windows Server 2008 R2:

        On the [Start] menu, select [Devices and Printers].

2. **Open the printer properties dialog box.**

    * Windows XP/Vista, Windows Server 2003/2008:

        Right-click the printer's icon, and then click [Properties].

    * Windows 7, Windows Server 2008 R2:

        Right-click the printer's icon, and then click [Printer properties].

3. **Click the [Accessories] tab.**

    If options in the [Accessories] tab are disabled, bidirectional connection is enabled. In this case, no change is necessary for option settings.

4. **Select options installed from the [Options] area, and then make the necessary settings.**

5. **Click [Change Input Tray Settings...].**

6. **In [Input Tray:] select which trays to use, and then, in [Paper Size:] select the size of the paper that you want to load in each tray.**

    Click [Modify Input Tray/Paper Size] to apply the setting for each tray.

7. **Click [OK].**

8. **Click [OK] to close the printer properties window.**

🔽Note

* For details about making option settings for the printer using a Mac OS X, see p.40 "Configuring Option Settings for the Printer Under Mac OS X".

6. Troubleshooting

This chapter provides solutions for driver installation and USB connection problems.

Messages Displayed When Installing the Printer Driver

This section describes what to do if a message appears when installing the printer driver.

Message number 58 or 34 indicates that the printer driver cannot be installed using Auto Run. Install the printer driver using Add Printer Wizard.

Message number 58 appears if there is a newer version of the printer driver already installed.

1. **Open the printer window.**

    - Windows XP, Windows Server 2003/2003 R2:

        On the [Start] menu, select [Printers and Faxes].

    - Windows Vista, Windows Server 2008:

        On the [Start] menu, select [Control Panel], and then click [Printers] in [Hardware and Sound] category.

    - Windows 7, Windows Server 2008 R2:

        On the [Start] menu, select [Devices and Printers].

2. **Click [Add a printer].**

3. **Follow the instructions in Add Printer Wizard.**

    If the CD-ROM drive is D, the source files of the printer driver are stored in the following locations:

    - PCL 5e

        32-bit driver D:\X86\DRIVERS\PCL5E\XP_VISTA\(Language)\DISK1

        64-bit driver D:\X64\DRIVERS\PCL5E\X64\(Language)\DISK1

    - PCL 6

        32-bit driver D:\X86\DRIVERS\PCL6\XP_VISTA\MUI\DISK1

        64-bit driver D:\X64\DRIVERS\PCL6\X64\MUI\DISK1

    - PostScript 3

        32-bit driver D:\X86\DRIVERS\PS\XP_VISTA\MUI\DISK1

        64-bit driver D:\X64\DRIVERS\PS\X64\MUI\DISK1

    For details about the languages supported in the printer drivers, see p.6 "Supported languages".

4. **Specify a port.**

Note

- Available ports vary according to your Windows operating system or the type of interface. For details, see p.7 "Confirming the Connection Method".

If USB Connection Fails

This section describes how to troubleshoot a problem related to USB connections.

Problem	Causes	Solutions
The printer is not automatically recognized.	The USB cable is not connected properly.	Disconnect the USB cable, and then turn off the main power switch. Turn on the main power switch again. When the printer has fully booted up, reconnect the USB cable.
Windows has already configured the USB settings.	Check whether the computer has identified the printer as an unsupported device.	Open Windows' Device Manager, and then, under [Universal Serial Bus controllers], remove any conflicting devices. Conflicting devices have a [!] or [?] icon by them. Take care not to accidentally remove required devices. For details, see Windows Help.
The printer does not recognize the USB connection even when a USB cable is inserted.	If the USB cable is connected while the printer is off, the printer might not recognize the USB connection.	Press the operation switch, and then disconnect the USB cable. When the printer has returned to the ready condition, reconnect the USB cable.

6

6

7. Installing the Printer Driver Under Mac OS X

This chapter explains how to install and configure the printer drivers for use on the Mac OS X operating system.

Installing the PPD Files

To print using the printer specific features under Mac OS X, install the PPD files.

⭐ **Important**

- Mac OS X 10.4 or higher is required.
- You need an administrator name and a password (phrase). For details, consult your network administrator.
- For the latest information on the corresponding operating system, see the "Readme.txt" file in the DRIVERS folder.

1. **Quit all applications. (Do not close this manual.)**
2. **Insert the provided CD-ROM into the computer's CD-ROM drive.**
3. **Double-click the CD-ROM drive icon.**
4. **Double-click the [Mac OS X] folder.**
5. **Double-click the [(brand name)] folder.**
6. **Double-click the [Mac OS X 10.4] or [Mac OS X 10.5 or later] folder, depending on your operating system.**
7. **Double-click the [MacOSX PPD Installer] folder.**
8. **Double-click the package file icon.**
9. **Follow the instructions on the screen.**

↓ **Note**

- The PPD files will be automatically installed in the following location:
    - Mac OS X 10.4:

        \Library\Printers\PPDs\Contents\Resources\(language code ^{*1}).lproj

        *1 da=Danish, de=German, en=English, es=Spanish, fr=French, it=Italian, nl=Dutch, no=Norwegian, sv=Swedish
    - Mac OS X 10.5 – 10.7:

        \Library\Printers\PPDs\Contents\Resources\

Registering the Printer

To use the printer, the printer must be registered in the printer list.

Make sure the printer and computer are connected and turned on, and perform the following procedure.

For how to connect the printer to the computer, see "Connecting the Printer" HTML manual.

↓Note

- When printing with a USB connection to a Macintosh computer, the printer language does not change automatically. Use the control panel on this printer to change the printer language to [Auto Detect] or [PS] before printing.

- The operating procedure under Mac OS X differs depending on the version of the operating system. Consult the procedure described in this manual, and make the necessary settings according to the manual of each version.

USB Connection

★Important

- Make sure the computer and the printer are connected using the USB cable, and the power of the devices are turned on beforehand.

1. **Start System Preferences.**

2. **Click [Print & Fax] or [Print & Scan].**

3. **Click the [+] button.**

4. **Click [Default Browser] or [Default].**

5. **Select the printer that has "USB" indicated in the [Connection] or [Kind] column.**

6. **Select the printer you are using from the [Print Using:] pop-up menu.**

   If the printer you are using is not selected in [Print Using:], select its manufacturer, [Select a driver to use...], or [Select Printer Software...] in the pop-up menu, and then select the PPD file of the printer. For the location of the PPD files, see p.37 "Installing the PPD Files".

7. **Click [Add].**

   If the option settings need to be configured, click [Configure...] in the dialog box that appears, and then configure the option settings.

8. **Quit System Preferences.**

Network Connection

1. **Start System Preferences.**

2. **Click [Print & Fax] or [Print & Scan].**

3. **Click the [⁺] button.**

4. **Click [Default Browser] or [Default].**

5. **Select the printer that has "Bonjour" indicated in the [Connection] or [Kind] column.**

   If the printer name is not displayed, select the icon that corresponds to your network environment (TCP/IP, etc.).

6. **Select the printer you are using from the [Print Using:] pop-up menu.**

   If the printer you are using is not selected in [Print Using:], select its manufacturer, [Select a driver to use...], or [Select Printer Software...] in the pop-up menu, and then select the PPD file of the printer. For the location of the PPD files, see p.37 "Installing the PPD Files".

7. **Click [Add].**

   If the option settings need to be configured, click [Configure...] in the dialog box that appears, and then configure the option settings.

8. **Quit System Preferences.**

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Configuring Option Settings for the Printer Under Mac OS X

Mac OS X 10.4

1. **Start System Preferences.**
2. **Click [Print & Fax].**
3. **Select the printer you are using, and then click [Printer Setup...].**
4. **Select [Installable Options] in the pop-up menu, and then configure settings as needed.**
5. **Click [Apply Changes], and then close the [Printer Info] dialog box.**
6. **Quit System Preferences.**

Mac OS X 10.5–10.7

1. **Start System Preferences.**
2. **Click [Print & Fax] or [Print & Scan].**
3. **Select the printer you are using, and then click [Options & Supplies...].**
4. **Click [Driver], and then configure settings as needed.**
5. **Click [OK].**
6. **Quit System Preferences.**

⬇ Note

- If the option you want to select is not displayed, PPD files may not be set up correctly. To complete the setup, check the name of the PPD file displayed in the dialog box.

8. Updating or Deleting the Printer Driver

This chapter explains how to update or delete the printer driver.

You can download the most recent version of the printer driver from the manufacturer's Web site.

Updating the Printer Driver

⭐ **Important**

- Administrator permission is required to update or delete the driver in use. Log on as an Administrators group member.
- For driver updates, select a driver that is compatible with the printer and driver type you are using. An error may result if you select a driver that is not compatible with the printer and driver type.

⬇ **Note**

- If the [User Account Control] dialog box appears, click [Yes] or [Continue].
- If the [Windows Security] dialog box appears, click [Install this driver software anyway].

Windows Operating System

You can download the most recent version of the driver from the manufacturer's Web site. Download the latest driver, and then perform the following procedure.

1. **Open the printer window.**
   - Windows XP, Windows Server 2003:

     On the [Start] menu, select [Printers and Faxes].
   - Windows Vista, Windows Server 2008:

     On the [Start] menu, select [Control Panel], and then click [Printers] in [Hardware and Sound] category.
   - Windows 7, Windows Server 2008 R2:

     On the [Start] menu, select [Devices and Printers].

2. **Open the printer properties dialog box.**
   - Windows XP/Vista, Windows Server 2003/2008:

     Right-click the printer's icon, and then click [Properties].
   - Windows 7, Windows Server 2008 R2:

     Right-click the printer's icon, and then click [Printer properties].

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3. **Click the [Advanced] tab.**

4. **Click [New Driver...], and then click [Next].**

5. **Click [Have Disk...].**

6. **Click [Browse...], and then select the driver location.**

7. **Click [OK].**

8. **Select the printer model, and then click [Next].**

   The driver update starts.

9. **Click [Finish].**

10. **Click [OK] to close the printer properties window.**

11. **Restart the computer.**

Mac OS X

You can download the most recent version of ppd file from the manufacturer's Web site.

Delete the old version of the ppd file first, and then install the new ppd file. For details about how to delete the ppd file, see p.43 "Deleting the Printer Driver".

Deleting the Printer Driver

Windows Operating System

Windows XP, Windows Server 2003/2003 R2

1. On the [Start] menu, click [Printers and Faxes].
2. Right-click the icon of the printer you want to delete, and then click [Delete].
3. Click [Server Properties] on the [File] menu.
4. Click the [Drivers] tab.
5. Select the driver you want to delete, and then click [Remove].
6. Click [Yes].
7. Click [Close] to close the print server properties window.

Windows Vista, Windows Server 2008

1. On the [Start] menu, select [Control Panel], and then click [Printers] in [Hardware and Sound] category.
2. Right-click the icon of the printer you want to delete, and then click [Delete].
3. On the [File] menu, point to [Run as administrator], and then click [Server Properties...].
4. Click the [Drivers] tab.
5. Select the driver you want to delete, and then click [Remove...].
6. Select [Remove driver and driver package.], and then click [OK].
7. Click [Yes].
8. Click [Delete].
9. Click [OK].
10. Click [Close] to close the print server properties window.

Windows 7, Windows Server 2008 R2

1. On the [Start] menu, click [Devices and Printers].
2. Right-click the icon of the printer you want to delete, and then click [Remove Device].
3. Click [Yes].
4. Click any printer icon, and then click [Print server properties].

8

5. Click the [Drivers] tab.

6. Click the [Change Driver Settings] button if it is displayed.

7. Select the driver you want to delete, and then click [Remove...].

8. Select [Remove driver and driver package.], and then click [OK].

9. Click [Yes].

10. Click [Delete].

11. Click [OK].

12. Click [Close] to close the print server properties window.

Mac OS X

1. Start System Preferences.

2. Click [Print & Fax] or [Print & Scan].

3. Select the printer you want to delete, click the [⁻] button.

9. Appendix

Installing Font Manager

🟠 Important

- Manage Printers permission is required to install Font Manager. Log on as an Administrators group member.
- The operating systems compatible with Font Manager are Windows XP/Vista.

1. Quit all applications. (Do not close this manual.)
2. Insert the provided CD-ROM into the computer's CD-ROM drive.

   If the [AutoPlay] dialog box appears, click [Run AUTORUN.EXE].
3. Select an interface language, and then click [OK].
4. Click [Font Manager].
5. Follow the instructions on the display.

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   Microsoft® Windows® 7 Home Premium

   Microsoft® Windows® 7 Professional

   Microsoft® Windows® 7 Ultimate

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- The product names of Windows Server 2003 R2 are as follows:

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Microsoft® Windows Server® 2003 R2 Standard Edition

Microsoft® Windows Server® 2003 R2 Enterprise Edition

- The product names of Windows Server 2008 are as follows:

Microsoft® Windows Server® 2008 Standard

Microsoft® Windows Server® 2008 Enterprise

- The product names of Windows Server 2008 R2 are as follows:

Microsoft® Windows Server® 2008 R2 Standard

Microsoft® Windows Server® 2008 R2 Enterprise

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IPDS Printing Configuration Guide

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Manuals for the IPDS card

Refer to the manuals that are relevant to what you want to do with the IPDS card.

⭐ Important

- Adobe® Acrobat® Reader®/Adobe Reader must be installed in order to view the manuals as PDF files.

IPDS Supplement (IPDS.pdf)

Explains about how to configure the IPDS card for the machine, and about items selectable from the Web browser.

IPDS Printing Configuration Guide (IPDS_CONF.pdf) *English Only

Explains about the environment necessary for connecting the mainframe to the machine and performing IPDS printing.

IPDS Technical Reference 1 (IPDS_TEC1.pdf) *English Only

Explains about commands and functions for IPDS printing.

IPDS Technical Reference 2 (IPDS_TEC2.pdf)*English Only

Explains about IPDS commands.

⬇ Note

- For details about the necessary environment and how to install the IPDS card and machine, consult your sales or service representative. For details about the necessary environments and operation of the mainframe, contact IBM.

Notice

Important

Contents of this manual are subject to change without prior notice.

In no event will the company be liable for direct, indirect, special, incidental, or consequential damages as a result of handling or operating the machine.

How to Read This Manual

Symbols

This manual uses the following symbols:

⭐ **Important**

Indicates points to pay attention to when using the machine, and explanations of likely causes of paper misfeeds, damage to originals, or loss of data. Be sure to read these explanations.

⬇ **Note**

Indicates supplementary explanations of the machine's functions, and instructions on resolving user errors.

[ ]

Indicates the names of keys on the machine's display or control panels.

1. Getting Started

Book at a Glance

This book is designed to help you configure the Ethernet Attachment for your printer.

Server-to-Printer Attachments Described in this Book

This book describes the server-to-printer attachments described in the following table. Direct attachment of multiple machines to the printer, without the use of a print server, is also described for Windows systems.

Server Environment	Server-to-Printer Protocol	Data streams
AIX	TCP/IP	IPDS
System i	TCP/IP	IPDS
z/OS	TCP/IP	IPDS
Windows	TCP/IP	IPDS

🔽 **Note**

- To print IPDS, you will need to install InfoPrint Manager for AIX, InfoPrint Manager for Windows, PSF for z/OS or PSF for i5/OS and OS/400 on the host.

- IPDS must use the TCP/IP protocol.

Configuration Checklist

The information in this chapter applies to all users.

1. **Write down the NIC MAC address. The Ethernet MAC address is on the printer controller. If you are using TCP/IP, see the manual explaining the network functions provided by the supplier.**

2. **Power off the printer and connect the NIC to the LAN cable.**

3. **Power on the printer. Verify the connection to the LAN cable.**

4. **Configure your environment. Refer to one of the chapters in the following list.**

   Windows

   p.11 "InfoPrint Manager for Windows"

   System i

   p.15 "Configuring System i for an IPDS Printer"

   z/OS

   p.25 "Sharing the PSF/400 Printer on the Network"

   AIX

   p.40 "Sharing the Network Printers on z/OS"

Default Parameter Values

The following lists the default parameter values and other information for a NIC.

Parameter/Limit	Values	Affected Area
LPD port	TCP port 515	LPR printing
Raw port for printing	TCP port 2501 TCP port 9100	AIX System i
IPDS port	TCP port 5001	PSF for z/OS PSF for i5/OS and OS/400 InfoPrint Manager

2. InfoPrint Manager for Windows

Requirements - InfoPrint Manager for Windows

This machine supports the following version of InfoPrint Manager for Windows.

- InfoPrint Manager for Windows V2.2 or later.

🔽Note

- When you install the InfoPrint Manager server software, you automatically install the InfoPrint Manager Administration GUI and the InfoPrint Manager Operations GUI on the same system. You can also install either the InfoPrint Manager Administration GUI or the InfoPrint Manager Operations GUI on remote systems. The InfoPrint Manager Operations GUI provides a subset of the functions available in the InfoPrint Manager Administration GUI. This subset includes operator tasks.

Configuration Checklist - InfoPrint Manager for Windows

Use this chapter to configure InfoPrint Manager to print using your printer.

1. **If you have not already done so, install InfoPrint Manager.**
2. **Decide which type of destination you want to define in InfoPrint Manager for this printer. See p.12 "Choosing an InfoPrint Manager Destination Type".**
3. **Define the printer to InfoPrint Manager. See p.12 "Adding a PSF TCP/IP Printer".**
4. **Verify the configuration by submitting a print job.**

Choosing an InfoPrint Manager Destination Type

InfoPrint Manager provides various Destination Support Systems (DSSs). The type that is most appropriate for your environment is based on what data stream you want to print (IPDS, PCL, or PostScript). Use the following table to determine what type to use.

Data Stream From Application	Data Stream To Printer	InfoPrint Manager Destination
IPDS, PCL, PS, ASCII, line data, DBCS ASCII, PDF, AFP	IPDS	PSF TCP/IP Printer

Adding a PSF TCP/IP Printer

Create a PSF TCP/IP destination to define a printer that receives IPDS jobs using the TCP/IP protocol.

Before adding a PSF TCP/IP printer, complete the following worksheet:

Wizard Prompt	Description	Value
Name	The name for the actual destination object (8 character limit). This name is case-sensitive.	
Server	The InfoPrint Manager server that controls this actual destination.	
TCP/IP address	The dotted-decimal IP address used to access this printer.	

Wizard Prompt	Description	Value
TCP/IP port	The port used by the printer for communication. (Typically, port 5001 is used.)	
Logical destination	The logical destination that directs jobs to this actual destination. This name is case-sensitive.	__ Default __ Other:
Logical destination's server	The server that contains the logical destination. This name is case-sensitive.	
Queue	The queue for the target printer (actual destination). This name is case-sensitive.	__ Default __ Other:

1. **Launch the InfoPrint Manager Administration GUI.**

2. **On the menu bar, select [Printer] / [Create] / [PSF] / [TCP/IP] to start the Create Printer Wizard.**

3. **Provide the worksheet information to the wizard. For assistance, refer to the InfoPrint Manager Administration GUI online help.**

4. **If you did not enable the printer with the Create Printer Wizard, use the InfoPrint Manager Administration GUI to enable it.**

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3. Configuring System i for an IPDS Printer

Requirements - System i

This machine supports the following version of PSF for i5/OS and OS/400 (PSF/400).

- PSF for i5/OS and OS/400 (PSF/400) V5.4 or later.

🔻Note

- We recommend that you use the latest System i package and related software.

Printing AFP, IPDS, PDF, PCL, and PostScript Files

Use this chapter to configure the printer on System i as an IPDS printer.

The printer configured as IPDS will print only IPDS files. With the InfoPrint Server for System i, PostScript, PDF, and PCL data streams can be transformed to AFP and printed to the printer as IPDS.

- AFP files are transformed directly by Print Services Facility (PSF/400 – an integrated feature of OS/400), which then sends the transformed file to the printer.

- SCS files are transformed into IPDS by one of two conversion paths. The path recommended by IBM – a straight SCS to device-independent IPDS transform – is controlled by setting the IPDSPASTHR parameter to YES (see step 1 on p.22 "Configuring PSF/400 with CRTPSFCFG"). Setting IPDSPASTHR to YES provides the best performance because IPDS files are sent directly to the printer with no transform. If your SCS file requires any AFP processing, PSF/400 will automatically provide the requisite conversion.

Configuration Checklist - System i

- Authority Level Required

  All of the following configuration steps carried out on the System i may require "create" or "change" authority.

1. **Make sure the printer is set up.**

   For details about how to set up the printer, see p.9 "Configuration Checklist".

2. **Using the printer's control panel or Web Image Monitor, set up the printer for IPDS by setting the parameters and values shown in the following table.**

Menu	Item	Setting
IPDS	Emulation Mode	Native
IPDS	Font Substitution	Off

3. **Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See the manual explaining the network functions provided by the supplier.**

4. **If the printer and System i are not on the same LAN segment, verify that there is a route defined in the TCP/IP route list on the System i. If necessary, use the ADDTCPRTE command on the System i to create a route definition.**

5. **Create or verify the existence of a System i TCP/IP interface for Token Ring or Ethernet.**

   For details about System i TCP/IP interface, see p.18 "Configuring a System i TCP/IP Interface".

6. **Configure System i.**

   For details about how to configure System i, see p.21 "Configuring PSF/400 for IPDS".

7. **Vary the printer ON using the VFYCFG command.**

8. **Verify that TCP/IP has been started using the STRTCP command.**

9. **Test your configuration.**

   For details about how to test your configuration, see p.24 "Verifying the IPDS Configuration on System i".

10. **To share the printer on the network, verify that the necessary parameters have been set correctly.**

    For details about sharing the printer on the network, p.25 "Sharing the PSF/400 Printer on the Network".

◆Note

- If you have problems, see p.28 "Resolving System i Problems".

Configuring a System i TCP/IP Interface

⭐Important

- Do not enter the IP address of the printer or set the System i interface address to be the same as the printer IP address. Also, do not add the printer to the System i TCP/IP interface list.

Configuring the System i Interface with ADDTCPIFC

ADDTCPIFC is used to add a TCP/IP interface to System i. This step configures the System i for attachment to a TCP/IP network.

1. **At the System i command line, enter a command in the form:**

   ADDTCPIFC INTNETADR('9.99.15.188') LIND(ETHLAN) SUBNETMASK('255.255.255.0')

2. **A completed screen should look like the following:**

   ```
   System:  BLDD60
   Internet address . . . . . . . . . . . . :   9.99.15.188
   Subnet mask  . . . . . . . . . . . . . . :   255.255.255.0
   Line description . . . . . . . . . . . . :   ETHLAN
   Line type  . . . . . . . . . . . . . . . :   *ELAN
   Interface status . . . . . . . . . . . . :   Inactive
   Type of service  . . . . . . . . . . . . :   *NORMAL
   Maximum transmission unit  . . . . . . . :   *LIND
   Automatic start  . . . . . . . . . . . . :   *YES
   ```

3. **The following parameters are required:**

   - Internet Address

     Internet address of the System i Ethernet LAN adapter.

   - Subnet Mask

     The subnet mask for this System i TCP/IP interface (for example, 255.255.255.0).

   - Line description

     The name assigned to the System i line description. Each System i LAN adapter will have its own line description.

   ⬇Note

- Do not enter the IP address of the printer for Internet Address.

Configuring a TCP/IP Host Table Entry

Although optional, we recommend that you create a TCP/IP host table entry.

Add the System i name and the IP address of the LAN adapter to the "Host Table Entries". Also, add the hostname and IP address of the printer to the list. You can access the host table entries function by using the CFGTCP command, then selecting option 10 from the menu.

You can also add entries to your host table for both the hostname and the fully qualified network name for your system. The entry should match what you configured for host and domain name. For example, if your hostname is "RCHASM03" and your domain name is "RCHLAND.IBM.COM", your fully qualified network name is "RCHASM03.RCHLAND.IBM.COM". In your host entry table, enter both RCHASM03 and RCHASM03.RCHLAND.IBM.COM.

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Configuring TCP/IP Keep Alive

Although optional, we recommend that you set the TCP/IP Keep-Alive time to 1 minute. This is the minimum value that can be set; the default is 120 minutes (2 hours). Setting the value to 1 minute causes System i to detect a lost printer connection faster.

To change the keep alive time, enter the command CHGTCPA. Change the first entry as shown below:

```
TCP keep alive . . . . . . 1
```

🔸**Note**

- Please note that changing the TCP/IP Keep-Alive time changes all the System i settings.

Configuring PSF/400 for IPDS

To configure IPDS on System i, you use the following commands:

CRTDEVPRT

CRTPSFCFG (Optional)

Configuring PSF with CRTDEVPRT

This section describes how to set up a device description on System i.

1. **At the System i command line, enter a command in the form:**

   CRTDEVPRT DEVD(2705) DEVCLS(*LAN) TYPE(*IPDS) MODEL(0) LANATTACH(*IP) AFP(*YES)
   PORT(5001) FONT(11) FORMFEED(*AUTOCUT)

   RMTLOCNAME('128.9.12.134') USRDFNOBJ(AFP/NETWRKPRT *PSFCFG)

   TEXT('printer name')

2. **A completed screen looks like this:**

3. **Enter values for the following parameters:**

   - Device Description (DEVD)

     The device description or name.

   - Device Class(DEVCLS)

     Specify *LAN.

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- Device Type (TYPE)

  Specify *IPDS.

- Device Model (MODEL)

  Specify 0.

- LAN attachment (LANATTACH)

  Specify *IP.

- Port Number (PORT)

  Specify 5001, which is the printer's default port number. Use Web Image Monitor to set or view the IPDS port number.

- Font (FONT)

  Enter an appropriate value.

- Form Feed (FORMFEED)

  Specify *AUTOCUT.

- Activation timer (ACTTMR)

  This value specifies the number of seconds that PSF/400 waits for a printer to respond to an activation request. If only one system will be using the printer, use the default value (170 seconds). If more than one system will be using the printer, specify *NOMAX, which will cause PSF/400 to wait indefinitely for a response to an activation request.

- Remote Location (RMTLOCNAME)

  Enter the IP address or hostname of the printer.

- User-Defined Object (USRDFNOBJ)

  To use a PSF configuration object, specify its name and library here. The object type must be *PSFCFG. A single PSF configuration object may be referenced by multiple device descriptions, if required.

Configuring PSF/400 with CRTPSFCFG

The PSF configuration object created with this command is used by PSF/400 when printing IPDS files only if the object is specified with the USRDFNOBJ parameter in the printer device description.

To configure System i for IPDS printing:

1. **At the System i command line, enter a command in the form:**

   ```
   CRTPSFCFG PSFCFG(AFP/NETWRKPRT) IPDSPASTHR(*YES) RLSTMR(*SEC15)
   TEXT('printer name')
   ```

2. **A completed screen looks like this:**

3. **The following parameters are recommended:**

- PSF configuration (PSFCFG)

  The name used for this PSF configuration object. The name must match the user-defined object name (USRDFNOBJ) in the printer DEVD.

- IPDS pass through (IPDSPASTHR)

  To print SCS and IPDS files (which do not use AFP functions) with minimal processing, specify *YES. PSF/400 transforms SCS into IPDS before printing.

- Activate release timer (ACTRLSTMR)

  Specifies the point at which the release timer (RLSTMR) is activated. Set to *NORDYF.

- Release timer (RLSTMR)

  Specifies the amount of time to wait before a session or dialog is released, without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Verify that the IPDS TIMEOUT value on the printer is "0" or "OFF". Set the System i parameter to *SEC15.

  This releases the printer to service other jobs from other ports, 15 seconds after the last IPDS job has printed.

Verifying the IPDS Configuration on System i

To test IPDS printing, do the following:

1. **Vary on the line description if it is not already on.**

   `VRYCFG CFGOBJ (line) CFGTYPE (*LIN) STATUS(*ON)`

2. **To start TCP/IP, enter:**

   `STRTCP`

3. **Verify that the System i TCP/IP interface is active. Use the command:**

   `WRKTCPSTS`

   and then select option 1.

4. **Turn the printer on and wait until the printer's control panel displays READY.**

5. **To verify that the printer is connected to System i, ping the printer from a System i workstation with one of the following commands:**

   `PING ip_address'`

   or

   `PING hostname`

   where ip_address is the TCP/IP address of the remote system printer, and hostname is the hostname you defined for the printer, if any.

6. **If pings are successful, vary on the printer device description with the command:**

   `VRYCFG (printer-device) CFGTYPE(*DEV) STATUS(*ON)`

   If the pings are not successful, see p.28 "Resolving System i Problems".

7. **To use PSF/400 to send an IPDS file to the printer, enter:**

   `STRPRTWTR DEV (printer device)`

   If you have problems printing, do the following:

   • Print a network configuration page, see the manual explaining the network functions provided by the supplier.

   • Verify that the IPDS port number matches the port number in the device description.

   If you are still unable to print IPDS files, contact your service or sales representative.

Sharing the PSF/400 Printer on the Network

To support printer sharing, the printer automatically switches among all logical ports. Basically, the printer prints one job at a time, and chooses the next job from the highest priority port. If the client does not end a job, then the printer applies the timeout value set for the print port.

To change the "time out" value, update the timeout value on Web Image Monitor for the appropriate port.

For details about if sharing an IPDS printer between multiple host systems, see p.53 "Sharing the Printer with IPDS host systems (PSF/400 or z/OS)".

Sharing the printer with other non-IPDS host systems using MID

Configure the System i to use MID (Managed IPDS Dialog) in order for the printer to be shared between the IPDS System i system and other non-IPDS systems, such as desktop PCs. The following PSF configuration parameters must be set on the System i in order for it to support MID requests from the printer.

Here is a System i example with MID Enabled:

```
PSF configuration:
User resource library.....................: *JOBLIBL
IPDS pass through ........................: *NO
+
Activate release timer....................: *PRTNORDYF
Release timer............................: *SEC15
Restart timer............................: *IMMED
APPC and TCP/IP retry count...............: 15
Delay time between retries...............: 90
Auto Session Recovery....................: *YES
Acknowledge Fequency.....................: 100
Blank page...............................: *YES
Page size control........................: *NO
Resident fonts...........................: *YES
Resource retention.......................: *YES
Edge orient..............................: *NO
Use outline fonts........................: *NO
Remote Location:

Text description.........................:
Device resource library list ............: (List of names)
```

Sharing the printer with other IPDS host systems

Configure the System i without MID in order for the printer to be shared between multiple IPDS host systems. This configuration can also be used for sharing the printer with desktop PCs. The following PSF configuration does not grant MID requests from the printer.

Here is a System i example without MID:

```
Activate release timer.: *NORDYF
DISCINTV=25,
     Release timer.................: *SEC15
     Restart timer.................: *IMMED
```

To set up PSF/400 for shared printing without MID, set the following parameters:

Where Set	Parameter	Recommended Value	Description
CRTPSFCFG CHGPSFCFG	ACTRLSTMR	*NORDYF	Specifies the point at which the release timer (RLSTMR) is activated. Set to *NORDYF. This means that the release timer is activated when there are no spooled files in the printer's output queue with a status of RDY and the last page of the last spooled file processed has printed. *NORDYF is used so that all files with a status of RDY are printed before releasing the session (which does not terminate the writer, however).
CRTPSFCFG CHGPSFCFG	RLSTMR	*SEC15	Specifies the amount of time to wait before a session or dialog is released without terminating the writer. The ACTRLSTMR parameter specifies when this timer is to be activated. Set the parameter to a value at least equal to the TIMEOUT value on the printer. We recommend *SEC15.

Where Set	Parameter	Recommended Value	Description
CRTDEVPRT CHGDEVPRT	ACTTMR	*NOMAX	The value specifies the number of seconds that PSF/400 will wait for a printer to respond to an activation request. If only one system will be using the printer, use the default value (170 seconds). If more than one system will be using the printer, set the value to *NOMAX, which will cause PSF/400 to wait indefinitely for a response to an activation request.

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Resolving System i Problems

Use this section to resolve problems configuring System i on TCP/IP networks.

Printer Cannot be PINGed

If you have problems pinging the printer:

- Verify the configuration of System i, including the printer and any intervening devices such as routers and bridges.
- Verify that the System i line description is varied on and the printer is turned on and displays a status of READY.
- Verify that the System i TCP/IP interface is active.

If PSF/400 Terminates When Initialized

If PSF/400 terminates when you initialize it for IPDS printing and issues message PQT3603, check for the following error codes.

- 10 means an incorrect RMTLOCNAME has been specified for the printer.
- 15 means that PSF/400 timed out waiting for the printer's response. You should check the value you entered for Activation Timer when using CRTDEVPRT.
- Codes 20-39 indicate a general communications failure. Make sure all of the components in your network are operational, such as routers.
- Codes 40-59 indicate a logic error between PSF and the printer control unit.

Spooled Print File Remains in PND Status

Check the output queue with the command:

`WRKOUTQ OUTQ (queuename)`

This typically indicates that PSF/400 is waiting for a response from the printer.

This can be verified by displaying the QSPL subsystem, WRKACTJOB SBS (QSPL). If the status of the PDJ job for the printer is SELW, then PSF/400 is waiting for a response from the printer. Make sure that the printer is online and in READY status and that all network connections (for example, routers) between the System i and the printer are active.

Spooled Files Disappear Without Printing

To resolve this problem:

- Check that the correct printer queue name and correct IP address have been used.

- Ping the IP address. If the ping is successful, disconnect the network cable from the printer/print server, and ping the address again. If the ping is still successful, there is another printer with that IP address on the network.

Data is Being Clipped

To resolve this problem, you may want to set the PSC (Page Size Control) parameter to *YES in the CRTPSFCFG command.

Printer Powered Off While Writer is Active

The printer should not be powered off while the PSF writer is active. If this happens, you must stop and then restart the writer.

Optionally, you may specify *YES for Automatic session recovery in the PSF configuration object. When *YES is specified and the printer connection is lost (whether caused by accidentally powering off the printer or an unexpected network problem), PSF/400 will attempt to reconnect to the printer and resume printing at the last known point. You may have pages reprinted if the connection can be established. You can control the reprinting of pages by adjusting the value for the acknowledgment frequency parameter in the PSF configuration object.

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4. Configuring z/OS to Print IPDS Files

Requirements - z/OS

This machine supports the following version of PSF for z/OS.

- PSF for z/OS V4.1.0 or later.

Note

- To obtain the PTFs associated with these APARs, contact your service or sales representative.

4

Configuration Checklist - z/OS

Use this chapter to configure z/OS to print IPDS files on your network printer.

- Authority Level Required

  All of the following configuration steps carried out on z/OS require appropriate RACF authority.

1. **Using the printer's control panel, set up the printer for IPDS by setting the parameters and values shown in the following table.**

Menu	Item	Setting
IPDS	Emulation Mode	Native
IPDS	Font Substitution	Off

2. **Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask.**

   See the manual explaining the network functions provided by the supplier.

3. **Configure the host environment.**

   For details about host environment, see p.33 "Configuring PSF to Print IPDS Files".

4. **Verify the configuration.**

   For details about how to verify the configuration, see p.38 "Verifying a TCP/IP-Attached Printer on z/OS".

↓Note

- For details about how to share the printer, see p.40 "Sharing the Network Printers on z/OS".

- If you have problems, refer to p.42 "Handling z/OS Connectivity Problems".

Configuring PSF to Print IPDS Files

Data Requirements

You need the IP address of the printer.

Configuration Procedure

Configuring PSF to print IPDS files includes the following steps:

1. **Define the z/OS communications control unit to z/OS.**

   For details about how to define, see p.33 "Define the Communications Control Unit to z/OS".

2. **Modify the TCP/IP profile on your z/OS system, if necessary.**

   For details about how to modify, see p.34 "Modify the TCP/IP Profile in z/OS".

3. **Ping the printer.**

   For details about how to ping the printer, see p.34 "Verify the Printer Connection".

4. **Define the printer as a writer-controlled printer to JES.**

   For details about how to define, see p.35 "Define the Printer to JES".

5. **Define the printer to PSF with a PRINTDEV statement, including the IP address.**

   For details about how to define, see p.36 "Define the Printer to PSF".

Note

- This section does not provide all the information you need to install and configure TCP/IP on your z/OS system.

- The routing of information is determined on the basis of the IP address, and is performed by IP gateways. After the network is configured correctly, the z/OS host communicates directly with the TCP/IP-attached printer.

Define the Communications Control Unit to z/OS

If you have not already done so, use a hardware configuration definition (HCD) to define the communications control unit for the z/OS® host, such as the 3172 or the 3745 control unit, to z/OS.

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Modify the TCP/IP Profile in z/OS

The TCP/IP profile contains system configuration statements used to initialize the TCP/IP address space. The following statements in the TCP/IP profile; however, this example is not a complete profile.

Note

- If you change any of the values in the TCP/IP profile, restart TCP/IP to pick up the changes.

Sample Parameters in the TCP/IP Profile.

```
TCPIPCONFIG INTERVAL 10 SENDGARBAGE FALSE GATEWAY
; * Network  First hop   Linkname Packet size Subnet mask Subnet value
  9          *           BPCLAN 4096       0.255.255.0  0.99.12.0
  DEFAULTNET 9.99.12.254 BPCLAN   4096      0.255.255.0  0
```

This example is not a complete TCP/IP profile.

The statements require special considerations when you are printing from PSF on TCP/IP-attached printers:

- TCPIPCONFIG

  The TCPIPCONFIG statement defines the interval between keep-alive transmissions. PSF relies on TCP to detect when a connection with a TCP/IP-attached printer or an i-data 7913 IPDS™ Printer LAN Attachment is no longer usable. When no data has been exchanged between PSF and its connection partner, TCP sends keep-alive probes to the connection partner periodically.

  These periodic probes, called keep-alive transmissions, enable TCP to discover when a connection is no longer usable even if the connection partner is abruptly powered off or is no longer accessible through the network.

  The frequency of keep-alive transmissions is controlled by the INTERVAL parameter on the TCPIPCONFIG statement. The frequency applies to all TCP applications that direct TCP to send keep-alive transmissions. The default frequency is after about two hours of inactivity.

  For printing on TCP/IP-attached printers, we recommend that you specify a shorter interval than the default, such as 1 minute, for the interval between keep-alive transmissions.

  Also, if any target host requires that the keep-alive packet contain data, specify SENDGARBAGE TRUE. For example:

  ```
  TCPIPCONFIG INTERVAL 1 SENDGARBAGE FALSE GATEWAY
  ```

- GATEWAY

  The GATEWAY statement defines a static route to the printer.

Verify the Printer Connection

To verify that z/OS can establish a connection with the TCP/IP-attached printer, ping the printer from the z/OS system.

From a TSO session, enter the following command:

```
TSO PING ip_address
```

In a TSO session, enter the following command from the Interactive System Productivity Facility (ISPF) command menu.

`ping ip_address`

- ip_address

  Specifies the IP address or host name of the printer.

  Here are examples of a successful ping and an unsuccessful ping.

  Successful ping:

  `EZA0458I Ping V3R1: Pinging host 9.99.12.33 (Use ATTN to interrupt.)`

  `EZA0463I PING: Ping #1 response took 0.084 seconds.`

  `Successes so far = 1.`

  Unsuccessful ping:

  `EZA0458I Ping V3R1: Pinging host 9.99.12.33 (Use ATTN to interrupt.) EZA0464I`
  `PING: Ping #1 timed out`

Note

- If you have problems pinging a printer, see .

Define the Printer to JES

When a TCP/IP-attached printer is to be used with JES, it must be defined for spool printing mode with JES2 parameter.

- JES2 Printer Definitions:

  The following example shows the JES2 printer definition initialization member, located in the system PARMLIB.

  `FSS(FSS1),PROC=PSFPROC,HASPFSSM=HASPFSSM`

  `PRT1 FSS=FSS1,MODE=FSS,PRMODE=(LINE,PAGE,SOSI1),`

  `CLASS=C,UCS=0,SEP=YES,SEPDS=NO,CKPTPAGE=100,`

  `START=NO,MARK=YES,TRKCELL=YES`

- JES3 Printer Definitions:

  The following shows an example of a JES3 printer definition. This example is not executable, but it is intended to help the JES3 systems programmer define the printer to the z/OS host.

  `FSSDEF,TYPE=WTR,FSSNAME=FSS1,PNAME=PSFPROC,`

  `SYSTEM=SYS1,TERM=NO DEVICE,JNAME=PRTL1,`

  `JUNIT=(,SYS1,,OFF),FSSNAME=FSS1,`

  `MODE=FSS,PM=(LINE,PAGE,SOSI1),CHARS=(YES,GT12),DTYPE=PRT`

  `AFP1 CARRIAGE=(YES,A868),CKPNTPG=100,HEADER=YES,WC=(C)`

Define the Printer to PSF

Each TCP/IP-attached printer must be defined to PSF with a PRINTDEV statement in the PSF startup procedure.

The following proc shows a sample procedure, PSFPROC that you can modify to suit your installation. The PRINTDEV statement shows the required IPADDR keyword.

No network printer-specific writer procedure is currently supplied. You can, however, copy the APSWPROT sample from the APAR medium and modify it for the network printers.

```
//PSFPROC PROC
//***************** IBM NETWORK PRINTERS WRITER PROCEDURE ***************
//*
//*01* MODULE-NAME = PSFPROC
//*
//*01* DESCRIPTIVE-NAME = START PROCEDURE FOR PSF:
//*                TCP/IP ATTACHED IBM NETWORK PRINTERS
//*
//*01* NOTES = THE FULL NAME OF THE DEFAULT PAGEDEF IS
//*                P1A06462.
//*             THE FULL NAME OF THE DEFAULT FORMDEF IS
//*                F1A10110.
//*             THE FULL NAMES OF THE DEFAULT FONTS ARE
//*                X0GF10, X0GS10, X0TU10, AND X0GU10.
//*             THE FULL NAME OF THE SEPARATOR PAGE PAGEDEF IS
//*                P1V06483.
//*             THE FULL NAME OF THE SEPARATOR PAGE FONT IS
//*                X0GT15.
//*
//*
//*01* CHANGE-ACTIVITY :
//*
//**** END OF SPECIFICATIONS ***/
//STEP1   EXEC  PGM=APSPPIEP,REGION=4096K,TIME=1440,PARM=(,,,,TCPIP) */
//JOBHDR OUTPUT PAGEDEF=V06483,    /* JOB SEPARATOR PAGEDEF     */
//            FORMDEF=A10110,CHARS=GT15  /* JOB SEPARATOR FORMDEF  */
//JOBTLR OUTPUT PAGEDEF=V06483,    /* JOB SEPARATOR PAGEDEF     */
//            FORMDEF=A10110,CHARS=GT15  /* JOB SEPARATOR FORMDEF  */
//DSHDR  OUTPUT PAGEDEF=V06483,    /* DS  SEPARATOR PAGEDEF     */
//            FORMDEF=A10110,CHARS=GT15  /* DS  SEPARATOR FORMDEF  */
//MSGDS  OUTPUT PAGEDEF=A06462,    /* MESSAGE DATASET PAGEDEF   */
//            FORMDEF=A10110       /* MESSAGE DATASET FORMDEF   */
//PSEG01  DD   DSN=SYS1.PSEGLIB,   /* SYSTEM PAGE SEGMENTS      */
//            DISP=SHR
//OLAY01  DD   DSN=SYS1.OVERLIB,   /* SYSTEM MEDIUM OVERLAYS    */
//            DISP=SHR              /*                           */
//PDEF01  DD   DSN=SYS1.PDEFLIB,   /* SYSTEM PAGEDEFS           */
//            DISP=SHR
//FDEF01  DD   DSN=SYS1.FDEFLIB,   /* SYSTEM FORMDEFS           */
//            DISP=SHR


//* ***********************************************************    */
//*             PRINTDEV                                           */
//* ***********************************************************    */
//PRT1   CNTL
//PRT1   PRINTDEV FONTDD=*.FONT300,/* 300 PEL FONT LIBRARY DD  */
//            OVLYDD=*.OLAY01,     /* OVERLAY  LIBRARY DD       */
//            PSEGDD=*.PSEG01,     /* SEGMENT  LIBRARY DD       */
//            PDEFDD=*.PDEF01,     /* PAGEDEF  LIBRARY DD       */
//            FDEFDD=*.FDEF01,     /* FORMDEF  LIBRARY DD       */
//            JOBHDR=*.JOBHDR,     /* JOB HEADER SEPARATOR      */
//*                                /*   OUTPUT                  */
//            JOBTRLR=*.JOBTLR,    /* JOB TRAILER SEPARATOR     */
//*                                /*   OUTPUT                  */
//            DSHDR=*.DSHDR,       /* DATA SET HEADER           */
//*                                /*   SEPARATOR               */
//            MESSAGE=*.MSGDS,     /* MESSAGE DATA SET OUTPUT   */
//            PAGEDEF=A06462,      /* DEVICE PAGEDEF DEFAULT    */
//            FORMDEF=A10110,      /* DEVICE FORMDEF DEFAULT    */
//            CHARS=(GF10,         /* DEVICE                    */
//            GS10,TU10,GU10),     /* DEFAULT FONT SET          */
//            PIMSG=YES,           /* ACCUMULATE DATA SET       */
//*                                /*   MESSAGES                */
//            DATACK=BLOCK,        /* REPORT ALL DATA-CHECK     */
//*                                /*   ERRORS                  */
//            TRACE=YES,           /* CREATE INTERNAL TRACE     */
//            FAILURE=WCONNECT,    /* PSF ACTION ON PRINTER     */
//*                                /*   FAILURE                 */
//            TIMEOUT=REDRIVE,     /* PSF ACTION ON TIMEOUT     */
//            MGMTMODE=OUTAVAIL,   /* PRINTER MANAGEMENT MODE   */
//            DISCINTV=15,         /* DISCONNECT INTERVAL IN    */
//*                                /*   SECONDS                 */
//            IPADDR='xxx.xxx.xxx.xxx' /* IP ADDRESS FOR TCP/IP  */
//PRT1   ENDCNTL
```

⬇️**Note**

- To specify a TCP/IP address space name other than the default, TCPIP, code the following exec statement in the writer procedure:

```
//STEP01 EXEC PGM=APSPPIEP,
REGION=4096K,PARM=(,,,,tcpip_name)
```

- Where tcpip_name is the name of the TCP/IP address space. If this parameter is not coded, PSF uses the default name, "TCPIP".

- The IP address is the only required parameter. Other parameters may be set to facilitate printer sharing as described in p.40 "Sharing the Network Printers on z/OS".

  - IPADDR

    Specifies the IP address for the printer NIC, in dotted-decimal notation.

    The hostname can be specified in place of the dotted-decimal address.

Verifying a TCP/IP-Attached Printer on z/OS

To operate a TCP/IP-attached printer, you use JES operator commands.

Starting a TCP/IP-attached Printer

To start a TCP/IP-attached printer, do the following:

1. **Start TCP/IP.**

2. **Power on the printer.**

3. **Start the printer FSA.**

    - On JES2, the command is:

      `$Sprinter-name`

    - On JES3, the command is:

      `*CALL WTR,OUT=printer-name`

Stopping a TCP/IP-attached Printer

You can stop a TCP/IP-attached printer in several ways:

1. **The preferred method is to first stop the PSF FSA for the printer by entering the following command from the z/OS operator panel:**

    - JES2:

      `$Pprinter-name`

    - JES3:

      `*VARY,printer-name,OFF`

      `*CANCEL,printer-name`

    where printer-name specifies the name of the printer FSA.

2. **Then you can turn off power to the printer.**

    - To end the PSF FSA for the printer, use the JES commands. If you are unable to purge or cancel the printer by use of the JES commands, enter the following command:

      `MODIFY FSSname,FORCE,printer-name`

Resolving IPDS Printing Problems

If you have problems printing, do the following:

- Print a network configuration page, see the manual explaining the network functions provided by the supplier.

- Verify that the port number specified for the IPDS port matches either the port number specified in the Port number parameter in the printer inventory, or the port number specified in the PORT parameter in the PRINTDEV statement under the PSF start procedure. You can use Web Image Monitor to view or change the IPDS port number.

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Sharing the Network Printers on z/OS

For details about sharing an IPDS printer between multiple host systems, see p.53 "Sharing the Printer with IPDS host systems (PSF/400 or z/OS)".

The printer may be shared with PSF in one of two ways:

- Sharing the printer with other non-IPDS host systems using MID and the JES Spool.

- Sharing the printer with other IPDS host systems, without MID. This method also shares the printer with non-IPDS host systems.

Sharing the printer with other IPDS host systems, without MID JES Spool Printer Sharing

JES spool printer sharing is valid for TCP/IP attached network printers. A session with the printer is maintained while there is output on the JES spool and the printer is available. When there is no more output on the spool and the disconnect interval expires, PSF ends the session with the printer. This allows any other IPDS host, such as System i to share this printer. PSF attempts to restart the session when there is more work on the spool for the printer. After the session is restarted, PSF must reload the resources required for the print jobs. When using this method of network printer sharing, PSF cannot determine if another printer driver is active.

You can request this method of network printer sharing by specifying the following parameters in the PSF Startup Proc.

```
MGMTMODE=OUTAVAIL
```

```
FAILURE=WCONNECT
```

```
TIMEOUT=REDRIVE
```

```
DISCINTV=nn
```

- MGMTMODE

  Set this parameter to "OUTAVAIL". "OUTAVAIL" requests that PSF start a communications session with the printer only when output is available on the JES spool.

- FAILURE

  Specifies the action PSF is to take after a printer failure or a TCP/IP network failure. If FAILURE=WCONNECT and the printer is connected to another host when PSF attempts to establish a connection on TCP/IP, PSF continuously retries (up to the limit specified by CONNINTV) until the printer becomes available. If FAILURE=STOP, PSF must be restarted by an operator command.

- TIMEOUT

  Specifies the action that PSF is to take after a timeout when no output is available on JES. The DISCINTV parameter specifies the timeout interval. TIMEOUT=REDRIVE requests that PSF redrive

the printer FSA using the value of the MGMTMODE parameter. TIMEOUT=STOP requests that PSF stop the printer FSA, which can then be restarted only by an operator command.

- DISCINTV

  Specifies the disconnect interval in seconds. The value can range from zero to 86400. We suggest you set the value to "15". When no output is available from JES for this time period, PSF ends the session with the network printer. If the value is set to zero, PSF does not end the session because of lack of output, and other IPDS hosts will not be able to share the printer.

Handling z/OS Connectivity Problems

If you encounter problems when pinging a network printer from z/OS, here is how to resolve them.

Ping is Not Successful

If the ping is not successful, verify the following:

- The printer is powered on.
- The IP address is unique in the TCP/IP network.

If the IP address of the printer is not unique, see your network administrator to resolve the IP address problem.

If problems remain, consult your TCP/IP network administrator about a possible network problem.

Ping is Successful

A successful ping usually indicates that the z/OS system can communicate with the printer; however, you might receive a successful ping even though the IP address of the TCP/IP-attached printer is a duplicate of another IP address.

If PSF is unable to establish a network connection with the TCP/IP-attached printer or if PSF output for this printer prints elsewhere, follow these steps to determine whether the IP address of the printer is unique:

1. **Turn the printer off.**

2. **Wait at least 5 minutes for TCP/IP to clear the Address Resolution Protocol (ARP) tables. (If your installation specified a longer interval on the ARPAGE configuration statement in the TCP/IP profile, you may need to wait longer.)**

3. **Enter the ping command again from the z/OS system.**

🔸 Note

- If you receive a successful response to the ping command, there is a duplicate IP address. Consult your TCP/IP network administrator.

5. InfoPrint Manager for AIX

Requirements - InfoPrint Manager for AIX

This machine supports the following version of InfoPrint Manager for AIX.

- InfoPrint Manager for AIX V4.2 or later.

Configuration Checklist - InfoPrint Manager for AIX

1. Set TCP/IP addresses for the printer, such as an IP address, gateway address, or subnet mask. See the manual explaining the network functions provided by the supplier.

2. Define the printer to InfoPrint Manager as described in the next section, **p.45 "Defining Printers to InfoPrint Manager"**.

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Defining Printers to InfoPrint Manager

The configuration procedure to use depends on what data stream you want to send:

- To send IPDS to the printer, configure InfoPrint Manager for a PSF TCP/IPattached printer. See p. 45 "Configuring Network Printers as PSF TCP/IP-Attached Printer".

Configuring Network Printers as PSF TCP/IP-Attached Printer

Create a PSF TCP/IP destination to define a printer that receives IPDS jobs using the TCP/IP protocol.

Before configuring network printers, complete the following worksheet:

Wizard Prompt	Description	Value
Name	The name for the actual destination object (8 character limit). This name is case-sensitive.	
Server	The InfoPrint Manager server that controls this actual destination.	
Model	The printer model.	
TCP/IP address	The dotted-decimal IP address used to access this printer.	
TCP/IP port	The port used by the printer for communication. (Typically, port 5001 is used.)	
Logical destination	The logical destination that directs jobs to this actual destination. This name is case-sensitive.	__ Default __ Other:
Logical destination's server	The server that contains the logical destination. This name is case-sensitive.	

5

Wizard Prompt	Description	Value
Queue	The queue for the target printer (actual destination). This name is case-sensitive.	__ Default __ Other:

1. **On the menu bar, select Printer / Create / PSF– TCP/IP to start the Create Printer Wizard.**

2. **Provide the worksheet information to the wizard. For assistance, refer to the InfoPrint Manager Administration GUI online help.**

3. **If you did not enable the printer with the Create Printer Wizard, use the InfoPrint Manager Administration GUI to enable it.**

Adding an AIX Printer

Create an AIX printer to represent a printer that will accept the data stream that comes out of the printer driver without transforming it. For example, to send the output of a PostScript driver to a PostScript printer.

Before adding an AIX printer, complete the following worksheet:

Wizard Prompt	Description	Value
Name	The name for the actual destination object (8 character limit). This name is case-sensitive.	
Server	The server that controls this actual destination. The server name is the same as the name of the host system where the server is installed. This name is case-sensitive.	
Model	Select the printer model from the pull-down list in the InfoPrint Manager Administration GUI. If the printer you are working with is not in the pull-down list, enter the name as it appears on the printer.	

Wizard Prompt	Description	Value
SNMP TCP/IP address	The dotted-decimal IP address used to access this printer. This value is used only for SNMP printers.	
Device	The name of the printer	Specify the printer queue name that was created beforehand with AIX.
Printer Command	The command that InfoPrint Manager issues to send a job to this printer.	uusr/lib/lpd/pio/etc/ pioibmnpm <the value you listed for server above> or SNMPTC/IP address
Data stream	The data stream expected by the printer (for example, PCL5 or PPDS).	
Logical destination	The logical destination that directs jobs to this actual destination. The name is case-sensitive.	__ Default __ Other:
Logical destination's server	The server that contains the logical destination. Note . The name is case-sensitive.	
Queue	The queue for the target printer (actual destination). The name is case-sensitive.	__ Default __ Other:

To create this type of printer, use the Create Printer Wizard in the InfoPrint Administration GUI.

1. **On the menu bar, click [Printers] / [Create] / [AIX].**

2. **Referring to the work sheet above, provide the information as prompted by the wizard.**

   For assistance, refer to the online help.

3. **If you did not enable the printer with the Create Printer Wizard, use the InfoPrint Manager Administration GUI to enable it.**

6. Handling Network Problems

Introduction

Use this chapter as a guide for finding and resolving printer and NIC printing problems on TCP/IP networks.

The following types of problems are described here:

- Hardware
- Connectivity
- Formatting
- Printing

Network Setup

Before doing anything else to try to resolve problems, you should verify that you have entered the correct configuration data.

🔽 Note

- For details about network configuration, see the manual explaining the network functions provided by the supplier.

Hardware Problems

When printing problems occur, the first task is to check the physical condition of the printer and related hardware.

Hardware Problems Introduction

The hardware is where diagnosis of printer problems begins. The hardware includes the following elements:

- The printer itself
- The physical connection of the hardware to the network
- The cabling system
- The network interface

Resolving Hardware Problems

To determine whether a problem is a hardware problem or not, check the following:

- Verify that power is going to the printer by checking the printer's control panel.

- Verify that the printer is connected to the network.

- Verify that the printer is Ready.

Connectivity Problems

The network/transport level of a network provides the capability of routing packets from one device to another device on the network or to a different network on an internetwork system.

If you have trouble connecting with the network, refer to the following:

- Verify that there is no duplicate IP address on the network by:

    - Disconnecting the printer from the network.

    - Using the Ping command to try to communicate with the IP address of the printer.

- Connect the printer to the network and ping the printer to verify that there is a connection to the network.

- Printing problems may occur if the subnet mask has not been set correctly. Verify that the subnet mask is correct either by printing a network configuration page or checking with the network administrator.

- A related problem is that the gateway address may be incorrect. Verify the gateway address from the network configuration page.

- Verify that the printer is configured to accept print jobs from your client system by checking the "Accept IP Jobs From" heading in the IP section on the network configuration page. The IP addresses from which jobs are accepted can be set on [Access Control] in Web Image Monitor.

Ethernet Connectivity Problems

The Ethernet adapter supports Auto-negotiation and fixed settings for speed and duplex. The IEEE standard does not provide the ability to auto-detect the speed or duplex settings of the connected partner (a hub or switch) in a number of configurations. In these cases, the following conditions may occur:

- The Link light falsely appears on the printer adapter. No communication is established.

- The Link light appears and communication is established, but communication may be very slow due to collisions or lost packets.

The table below identifies various printer and switch or hub configuration settings. OK indicates that a good Link is established and normal communications should occur. These are the only supported configurations. NG indicates that a Link is established, but a speed or duplex mismatch occurs. The

mismatched configuration cannot be detected by the printer. Communications may or may not work. If communications appear to work, data transfers may be slow due to collisions and lost packets. These configurations are particularly bad because they cannot be detected by either partner. Administrators must be aware of these situations and avoid these configurations. The cells marked as "No Connection" are detectable invalid configurations and no link is established.

Printer Setting	Ethernet Switch or Hub Setting				
	Auto	10 HD	10 FD	100 HD	100 FD
Auto Select	OK (100 Full) (1000 Full)	OK (10 Half)	NG (10 Half / Full) duplex mismatch	OK (100 Half)	NG (100 Half / Full) duplex mismatch
10Mbps Half Duplex	OK (10 Half)	OK (10 Half)	NG (10 Half / Full) duplex mismatch	NG, Link light is false. Speed mismatch, no communicatio n	NG, Link light is false. Speed mismatch, no communicatio n
10Mbps Full Duplex	OK (10 Full)	NG (10 Full / Half) duplex mismatch	OK (10 Full)	NG, Link light is false. Speed mismatch, no communicatio n	NG, Link light is false. Speed mismatch, no communicatio n
100Mbps Half Duplex	OK (100 Half)	No connection	No connection	OK (100 Half)	NG (100 Half / Full) duplex mismatch
100Mbps Full Duplex	OK (100 Full)	No connection	No connection	NG (100 Full / Half) duplex mismatch	OK (100 Full)

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♦Note

- To run the 10/100/1000 Ethernet Adapter at 1000 MB/sec, you must select the Auto/Auto setting.

Formatting Problems

One possible problem is the value of the Personality item for the TCP/IP port.

The Personality value is set for each TCP/IP port using the Data stream item on Web Image Monitor. The possible values are [Auto] (default value), [PCL], and [PS]. If the Personality value is set to [PCL] or [PS], all data coming in through this port will be interpreted as that data stream (for example, PostScript data received when the Personality value is set to [PCL] will not print correctly). Ensure that the Personality value is set to [Auto] if more than one data stream will be received through this port.

7. Appendix

Sharing the Printer with IPDS host systems (PSF/400 or z/OS)

- The printer accepts jobs from multiple logical ports (such as TCP/IP LPR, Port 2501, or IPDS). The printer automatically chooses the next job to print from the highest priority port that has a job ready to print. The printer chooses the next job when the client closes the port that was used for the previous job. If the client does not close the port, the printer automatically closes it after a period of time called the timeout interval. For details, see the Web Image Monitor Help.

- Unlike PostScript and PCL, the IPDS data stream is tightly controlled by the host system. For proper operation when printing IPDS, the host system must terminate the TCP/IP connection. Host system output writers post an error if the printer closes the port. Therefore, for printing IPDS, the printer must be configured for an infinite timeout, and the host system is configured to close the connection after the output queue is empty for some period of time.

- The drawback of this method is that the IPDS host system must retransmit downloaded PSF resources each time a new connection with the printer is established. This issue can be corrected by using a feature called MID (Managed IPDS Dialog). MID allows the TCP/IP connection to remain active and it allows the printer to retain the IPDS resources while freeing the printer to process PostScript and PCL jobs from other ports. Only z/OS and the System I host systems support MID. (It is not supported by AIX or InfoPrint Manager).

- For more information, see p.25 "Sharing the printer with other non-IPDS host systems using MID" for z/OS.

- MID is a negotiated sequence between the printer and the host system. The printer requests the suspension of IPDS activity. At an appropriate time the host system grants the request. When suspended, the IPDS TCP/IP connection between the host and the printer remains open, and the downloaded IPDS resources are retained by the printer. When the printer receives the grant it is free to process PostScript and PCL jobs from other ports. IPDS activity resumes when the host system has another IPDS job to print.

- The MID feature should not be used if multiple IPDS host systems send jobs to the same printer because the first IPDS host system that gains access to the printer will block the other IPDS host systems from obtaining an IPDS TCP/IP connection to the printer.

7

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INDEX

MEMO

Operating Instructions

IPDS Supplement

For safe and correct use, be sure to read the Safety Information in "Read This First" before using the machine.

TABLE OF CONTENTS

Manuals for the IPDS card

Refer to the manuals that are relevant to what you want to do with the IPDS card.

⭐ Important

- Adobe® Acrobat® Reader®/Adobe Reader must be installed in order to view the manuals as PDF files.

IPDS Supplement (IPDS.pdf)

Explains how to configure the IPDS card for the machine. It also explains about items selectable from the Web browser.

IPDS Printing Configuration Guide (IPDS_CONF.pdf) *English Only

Explains about the environment necessary for connecting the mainframe to the machine and performing IPDS printing.

IPDS Technical Reference 1 (IPDS_TEC1.pdf) *English Only

Explains about commands and functions for IPDS printing.

IPDS Technical Reference 2 (IPDS_TEC2.pdf)*English Only

Explains about IPDS commands.

⬇ Note

- For details about the necessary environment and how to install the IPDS card and machine, consult your sales or service representative. For details about the necessary environments and operation of the mainframe, contact IBM.

Notice

Important

Contents of this manual are subject to change without prior notice.

In no event will the company be liable for direct, indirect, special, incidental, or consequential damages as a result of handling or operating the machine.

How to Read This Manual

Symbols

This manual uses the following symbols:

⭐ **Important**

Indicates points to pay attention to when using the machine, and explanations of likely causes of paper misfeeds, damage to originals, or loss of data. Be sure to read these explanations.

⬇ **Note**

Indicates supplementary explanations of the machine's functions, and instructions on resolving user errors.

[ ]

Indicates the names of keys on the machine's display or control panels.

1. Getting Started

About IPDS

IPDS (Intelligent Printer Data Stream) is a page printing format for IBM mainframe and client computers. This machine can perform IPDS printing if the IPDS card is installed.

2. Using Web Image Monitor

List of the Setting Items

If you install the IPDS card to the machine, following Web Image Monitor items can be viewed or modified depending on the selected mode on the Web browser.

Select one of the following modes to log on Web Image Monitor:

- User mode: logged on as a user
- Administrator mode: logged on as an administrator

⬇Note

- IPDS cannot use the delete reservation function of Web Image Monitor. After you login to administrator mode in Web Image Monitor, even if you select a currently printing IPDS job at the Current/Waiting Jobs and then click [Delete Reservation], nothing happens.
- For details about Web Image Monitor, see the manual explaining the network functions provided by the supplier or Web Image Monitor Help.

Configuration

Printer

Menu	User mode	Administrator mode
Basic Settings	Read	Read/Modify
IPDS Form List	Read	Read/Modify
Reset IPDS Resources	None	Read/Modify

⬇Note

- "IPDS Menu" will appear in Basic Settings.
- "Reset IPDS Resources" appears only when the HDD unit is installed.

Network

Menu	User mode	Administrator mode
IPv4	Read	Read/Modify

🔽Note

• "IPDS" and "IPDS Port Number" will be displayed.

Security

Menu	User mode	Administrator mode
Network Security	None	Read/Modify

🔽Note

• "IPDS" will be displayed.

3. Accessing User Tools

User Tools Settings

When the IPDS card is installed, IPDS print settings become available and will appear on the control panel.

List / Test Print

IPDS Font List

Prints a list of IPDS-supported fonts.

🔽 Note

- The layout of the IPDS Font List produced by the test print is fixed to A4 or $8^1/_2 \times 11$ (letter) size. We recommend you load A4 or $8^1/_2 \times 11$ (letter) size paper (plain or recycled) in one of the paper trays.

- For details about printing lists, see the manual explaining how to print lists provided by the supplier.

System

Reset IPDS Resources

Delete all IPDS resources that saved on its hard disk.

🔽 Note

- Only the Machine Administrator can reset IPDS resources.

IPDS Menu

Tray Form

Specifies an IPDS form for each paper tray.

- Tray 1
- Tray 2
- Tray 3
- Tray 4
- LCT
- Bypass Tray

For each paper tray, select the form you want to allocate to it.

Emulation Mode

Specifies the emulation mode.

Default: [**Native**]

- Native

- 4028

Print Mode

Specifies the print mode.

Default: [**Enhanced**]

- Standard

- Enhanced

Default Code Page

Specifies the default code page.

Default: [**037**]

- 037 : US, Canada, Netherlands, Portugal

- 038 : US English ASCII

- 260 : Canadian French

- 273 : Austrian/German

- 274 : Belgium

- 276 : Canadian French

- 277 : Danish/Norwegian

- 278 : Finnish/Swedish

- 280 : Italian

- 281 : Japanese

- 284 : Spanish

- 285 : UK English

- 286 : Austrian/German (alternate)

- 287 : Danish/Norwegian (alternate)

- 288 : Finnish/Swedish (alternate)

- 290 : Japanese/Katakana

- 297 : French

- 420 : Arabic

- 423 : Greek

- 424 : Hebrew

- 500 : Belgium, Switzerland/International

- 870 : Latin 2 Multilingual

- 871 : Icelandic

- 875 : Greek

- 880 : Cyrillic

- 892 : OCR - A

- 893 : OCR - B

- 905 : Turkish

- 1025 : Cyrillic

- 1026 : Turkish

The following code pages include the Euro character:

- 1140 : US, Canada, Netherlands, Brazil, Portugal

- 1141 : Austrian/German

- 1142 : Danish/Norwegian

- 1143 : Finnish/Swedish

- 1144 : Italian

- 1145 : Spanish

- 1146 : UK English

- 1147 : French

- 1148 : Belgium, Switzerland/International

- 1149 : Icelandic

Default FGID

Specifies the default FGID (Font Typeface Global Identifier), which identifies the printer's default resident font.

Default: **[416]** (Courier Roman Medium 10).

To display a list of the fonts and FGIDs that the printer supports, print out the list of IPDS resident fonts. For details about printing lists, see the manual explaining how to print lists provided by the supplier.

- 3 : OCR B

- 11 : Courier 10

- 12 : Prestige Pica

- 18 : Courier Italic 10

- 19 : OCR A

- 46 : Courier Bold 10
- 85 : Courier 12
- 86 : Prestige Elite
- 92 : Courier Italic 12
- 111 : Prestige Elite Bold
- 112 : Prestige Elite Italic
- 159 : Boldface
- 164 : Prestige PSM Roman Medium
- 203 : Gothic Text
- 221 : Prestige 15
- 223 : Courier 15
- 254 : Courier.17 ss
- 256 : Prestige 17
- 281 : Letter Gothic
- 283 : Gothic Text
- 290 : Gothic Text
- 304 : Katakana Gothic
- 305 : OCR A
- 306 : OCR B
- 318 : Prestige Bold
- 319 : Prestige Italic
- 400 : Letter Gothic
- 404 : Letter Gothic Bold
- 416 : Courier Roman Medium 10
- 420 : Courier Roman Bold
- 424 : Courier Italic Medium
- 428 : Courier Italic Bold
- 432 : Prestige
- 2304 : Helvetica Roman Medium
- 2305 : Helvetica Roman Bold
- 2306 : Helvetica Italic Medium
- 2307 : Helvetica Italic Bold
- 2308 : Times New Roman Medium

- 2309 : Times New Roman Bold

- 2310 : Times New Roman Italic Medium

- 2311 : Times New Roman Italic Bold

- 5687 : Times Roman

- 5707 : Times Roman Bold

- 5815 : Times Roman Italic

- 5835 : Times Roman Bold Italic

- 20224 : Boldface

Characters Per Inch

Specifies the number of characters per inch (pitch) for the default font. Valid values are 5.0 to 30.0 in units of one tenth of an inch.

Default: **[10.0]**

Valid Printable Area Check

Specifies whether or not to report the Position check error (NACK 08C1..00) to the host, when valid printable area is checked

Default: **[On]**

- On

  The printer checks for pixels that fall outside the intersection of the logical and physical pages. If there are pixels outside the area and error reporting has been set using the "IPDS Exception Handling Control" command, the printer reports an error to the host.

- Off

  The printer does not report pixels outside the valid printable area.

Edge to Edge

Turns "Edge to Edge" printing on or off.

Default: **[Off]**

- On

  The printer allows printing up to the physical page size.

- Off

  The printer maintains a border of 2 mm (0.078 inches) on the leading edge, but prints to all other page borders.

⬇ Note

- To prevent toner from accumulating inside the printer, we recommend leaving [Edge to Edge] set to [Off] for IPDS, and setting it to [On] only when necessary.

- The "Edge to Edge" IPDS Menu item affects IPDS data only.

- When using IPDS, the "Edge to Edge" setting on System menu will be invalid.

Font Substitution

Turns font substitution on or off.

Default: [**Off**]

- On

  If a job requests a font that is not loaded on the printer, the printer uses a substitute font.

- Off

  If a job requests a font that is not loaded on the printer, the printer generates an IPDS NACK (Negative Acknowledgement) message and the host holds the job.

Caching

Specifies whether or not to use caching for repeated overlays.

Default: [**Off**]

- On

  The printer uses caching, which provides better performance for jobs with repeated overlays, but uses more memory.

- Off

  The printer does not use caching, which requires less memory but provides less performance for jobs with repeated overlays.

🔽Note

- Overlay caching is recommended for repeated overlays. Overlay caching does not improve performance with non-overlay IPDS data or overlays that are used only once or infrequently.

Font Capture

Sets Font Capture processing.

Default: [**On**]

- On

  The printer saves downloaded font resources on its hard disk drive for use beyond the duration of the current power cycle. The IPDS host must provide the "Activate Resource" command with the correct resource identifiers before downloading the font resource to be captured.

- Off

  The printer stores downloaded font resources for the duration of one power cycle only.

🔽Note

- This menu appears only when the HDD unit is installed.

Resolution

Specifies the resolution reported to the host in the "IPDS XOA-OPC" command for raster coded fonts and IM1 image support. The [Resolution] menu item also helps determine whether or not a

printer-resident raster font is used. For example, 240 dpi raster fonts are activated at the [240 dpi] setting, not at [300 dpi] or [600 dpi]. The [Resolution] setting does not affect outline fonts, nor does it determine which raster fonts can be downloaded to the printer as temporary activation fonts.

Default: [**Auto**]

- Auto

  Reports to the host that the printer supports raster fonts of any dpi value and IM1 images.

  "Resident" or "Captured" raster fonts of other resolutions are not activated unless a matching "Font Resolution" and "Metric Technology Triplet" is provided with the activation request.

- 240 dpi

  Reports to the host that the printer supports 240 dpi raster fonts and IM1 images.

  "Resident" or "Captured" raster fonts of other resolutions are not activated unless a matching "Font Resolution" and "Metric Technology Triplet" is provided with the activation request.

- 300 dpi

  Reports to the host that the printer supports 300 dpi raster fonts and IM1 images.

  "Resident" or "Captured" raster fonts of other resolutions are not activated unless a matching "Font Resolution" and "Metric Technology Triplet" is provided with the activation request.

- 600 dpi

  Reports to the host that the printer supports 600 dpi raster fonts and IM1 images.

  "Resident" or "Captured" raster fonts of other resolutions are not activated unless a matching "Font Resolution" and "Metric Technology Triplet" is provided with the activation request.

⬇ **Note**

- If you select [Standard] for the [Print Mode] setting, the resolution changes to [300 dpi].
- To set the IPDS resolution to [240 dpi], [600 dpi], or [Auto], you must first set [Print Mode] to [Enhanced]. Enhanced print mode produces optimal print quality, but can slow down the printing of complex jobs.

Graphic Character String

Specifies the Graphic Character String (Graphic Character Sizing) processing method.

Default: [**Auto**]

- Auto

  Applies the value specified by the [Emulation Mode] item ([Native] or [4028]).

- Character Scale

  Applies 4028 IPDS Emulation. Prints graphics and text characters by scaling the characters in a currently activated font. Character cell size is defined in the GOCA data stream. Not available for DBCS.

- Font Activation

Applies Native IPDS Emulation. Prints graphics and text characters using a currently activated font at the font's activation size, without scaling. GOCA data stream Character cell size information is ignored.

Bar Code

Specifies the barcode level protocol.

Default: [**Auto**]

- Auto

    Applies the value specified by the [Emulation Mode] item ([Native] or [4028]).

- 4028

    Applies 4028 IPDS Emulation.

- Native

    Applies Native IPDS Emulation.

Box Draw

Specifies the Box Draw processing.

Default: [**Off**]

- On

    Uses special outline fonts to draw Symbol Set box characters. Select [On] to fill gaps caused by special raster fonts that contain extended length box characters (as found in older applications, for example).

- Off

    Uses Symbol Set outline font characters to draw boxes as the font-defined characters.

Color Simulation

Allows you to select how color specification controls are processed on a monochromatic printer.

Default: [**Fidelity**]

- Fidelity

    The printer accepts all color specification controls and simulates unique colors with shades of gray.

- Legacy

    The printer accepts all color specification controls, but performs only limited color simulation using black.

Text Color Simulation

Specifies how text color specification controls are processed on a monochrome laser printer.

Default: [**On**]

- On

The printer accepts all text color specification controls and simulates the unique colors with shades of gray.

- Off

The printer accepts all text color specification controls, but performs only limited color simulation using black.

Note

- This menu item is available only if [Color Simulation] mode is set to [Fidelity].

Suppress Staple Count Nacks

Selects whether or not to notify the user when stapling errors occur.

Default: [**Off**]

- On
- Off

Note

- This menu appears only when using the machine with finisher.

Suppress Punch Nacks

Selects whether or not to notify the user when punching errors occur.

Default: [**Off**]

- On
- Off

Tray Mapping

Maps the media source (input tray) to an ID the host uses for the media source.

- Tray 1

  Default: [**Auto**]

  - Auto
  - IPDS Tray

- Tray 2

  Default: [**Auto**]

  - Auto
  - IPDS Tray

- Tray 3

  Default: [**Auto**]

  - Auto
  - IPDS Tray

- Tray 4

  Default: [**Auto**]

  - Auto

  - IPDS Tray

- LCT

  Default: [**Auto**]

  - Auto

  - IPDS Tray

- Bypass Tray

  Default: [**Auto**]

  - Auto

  - IPDS Tray

↓Note

- If [IPDS Tray] is selected, enter the tray parameter replacement value for each paper tray, using up to 254 digits.

Corner Staple Angle

Selects [Vertical] or [Slant] for the angle of stapling.

Default: [**Vertical**]

- Vertical

  Staples vertically.

- Slant

  Staples diagonally.

Offset

Specifies whether or not the output is offset (jogged).

Default: [**On**]

- On

  Output is offset (jogged) when requested by the job.

- Off

  Output is never offset (jogged).

↓Note

- This menu appears only when using the machine with finisher.

Default Punch Pattern

Specifies the default number of holes to punch if the punch unit provides a selection (for example, two or four holes).

Note

- [Tray Form] and [Tray Mapping] appear differently depending on the machine type.

- [Tray Form] allocates the form specified using Web Image Monitor's [IPDS Form List] to the installed tray. For details about IPDS Form List, see the Web Image Monitor Help.

- Tray commands of [Tray Form] differ depending on the machine you want to use. For details about selectable tray commands, see "Load Copy Control", IPDS Technical Reference 2.

- For details about the control panel settings, see the manual explaining how to specify the control panel settings, provided by the supplier.

3

3

4. Appendix

Precautions

Limitations

PCL fonts are not accessible via AFP/IPDS, nor can PCL access AFP/IPDS fonts.

PostScript® fonts are not accessible via AFP/IPDS, nor can PostScript access AFP/IPDS fonts.

The mainframe or host computer will not be notified of errors that happen before this machine establishes connection with them.

About AFP/IPDS Fonts

The AFP/IPDS Single Byte Character Set (SBCS) font is stored on the hard disk drive.

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MEMO

IPDS Technical Reference 1

TABLE OF CONTENTS

2. Summary of IPDS Commands

3. IPDS Command Set

4. Exception Reporting, Sense Data, and Recovery

5. Code Page and Font Identification

6. Fonts

7. Appendix

Manuals for the IPDS card

Refer to the manuals that are relevant to what you want to do with the IPDS card.

⭐ Important

- Adobe® Acrobat® Reader®/Adobe Reader must be installed in order to view the manuals as PDF files.

IPDS Supplement (IPDS.pdf)

Explains how to configure the IPDS card for the machine. It also explains about items selectable from the Web browser.

IPDS Printing Configuration Guide (IPDS_CONF.pdf) *English Only

Explains about the environment necessary for connecting the mainframe to the machine and performing IPDS printing.

IPDS Technical Reference 1 (IPDS_TEC1.pdf) *English Only

Explains about commands and functions for IPDS printing.

IPDS Technical Reference 2 (IPDS_TEC2.pdf)*English Only

Explains about IPDS commands.

⬇ Note

- For details about the necessary environment and how to install the IPDS card and machine, consult your sales or service representative. For details about the necessary environments and operation of the mainframe, contact IBM.

Notice

Important

Contents of this manual are subject to change without prior notice.

In no event will the company be liable for direct, indirect, special, incidental, or consequential damages as a result of handling or operating the machine.

How to Read This Manual

Symbols

This manual uses the following symbols:

Important

Indicates points to pay attention to when using the machine, and explanations of likely causes of paper misfeeds, damage to originals, or loss of data. Be sure to read these explanations.

Note

Indicates supplementary explanations of the machine's functions, and instructions on resolving user errors.

[ ]

Indicates the names of keys on the machine's display or control panels.

About This Book

This book provides technical reference information about how printers support the IPDS data stream.

Audience

This publication is intended for the system programmers, application programmers, and systems engineers who are familiar with data streams and are writing or modifying programs to operate your printer with the IPDS data stream.

Terminology

Paper Input and Output Receptacles

Input receptacles are called trays. Output receptacles are called stackers or bins.

Related Publications

This book refers to the following:

- PostScript Language Reference Manual, second edition, by Adobe Systems, Inc.
- PCL 5 Printer Language Technical Reference Manual by Hewlett-Packard Company
- PCL 5 Comparison Guide by Hewlett-Packard Company
- Printer Job Language Technical Reference Manual by Hewlett-Packard Company

⬇ Note

- For details on the IPDS Architecture, see the Intelligent Printer Data Stream Reference, S544-3417.

About IPDS

This chapter introduces the Intelligent Printer Data Stream (IPDS) and describes some of the capabilities of IPDS.

IPDS lets you print pages containing an unlimited mix of different types of data: high-quality text, images, vector graphics, and bar codes.

You can send IPDS data to printers attached to the IBM Application System/400 (AS/400) intelligent work stations, local area networks, IBM 3270-family controllers, Ethernet, and spooled systems. In some of these environments, you can create applications to directly control IPDS printers such as this printer. For more information about IPDS as a component of printing subsystems, refer to Intelligent Printer Data Stream Reference.

IBM provides a variety of host software products with components that generate IPDS commands for this printer or other IPDS printers. These software products vary in their use of IPDS functions. Some of the software products available are:

- OS/400 Version 5.4 or later
- Graphical Data Display Manager (GDDM) Version 2.3 or later
- Print Service Facility (PSF for z/OS) Version 4.1.0 or later
- Print Service Facility (PSF for i5/OS and OS/400) Version 5.4 or later
- InfoPrint Manager for AIX Version 4.2 or later
- InfoPrint Manager for Windows Version 2.2 or later
- InfoPrint Process Director for Linux Version 1.3.1 or later
- InfoPrint Process Director for AIX Version 1.3.1 or later

⬇ Note

- The capabilities of the printer depend on the host software and the IPDS functions that the software enables.

Capabilities of IPDS

A printer controlled by IPDS has a number of advantages over conventional printers. With IPDS you can:

- Use the printer's all-points-addressable printing to print text, graphics, images, or bar codes at any point on a page or that is within the printers printable area.

- Print text in a variety of type styles and switch fonts within a printed page.

- Use both images and vector graphics (explained later in this chapter) to print line drawings, pie charts, bar charts, graphics, logos, tables, and signatures.

- Combine text with images and graphics on the same page (creating what is known as a composite document).

- Electronically store and later print forms and letterheads that are always printed in the same predetermined type style.

- Electronically store and later print text where the type style printed is the same as that used in the rest of the text.

- Print any of 16 different kinds of bar codes in many sizes and with a number of variations.

- Print either portrait (upright, letter orientation) or landscape (printing "on the side", with the page wider than it is tall).

- Print on either one side or both sides of the paper (with duplex option).

Printing a Letter

IPDS lets you print a letter in just one step. In conventional printing, you must load letterhead paper into your printer, print the text of your letter, and then manually sign the letter.
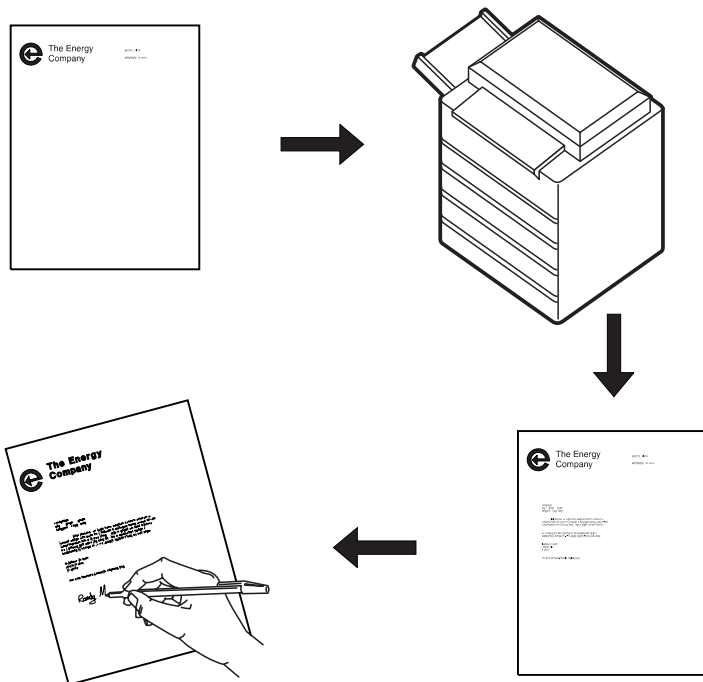
Using IPDS, you can temporarily store your letterhead and signature in the printer's memory and then merge the letterhead, text, and signature with additional data to form a complete letter. You can also include graphics, such as a line chart or bar chart, in your letter, creating a composite document.
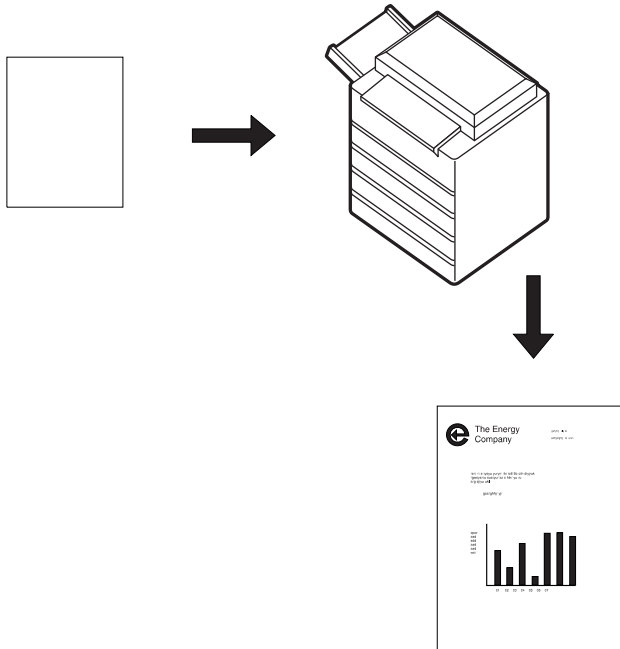
An IPDS-driven printer offers flexibility. For example, you can highlight a list of items by printing the list in a different type style from the rest of the text; or you can print your letterhead in one font and your text in another font.

You can electronically store your letterhead so it is always printed in the same type style. This printing concept is discussed in p.12 "Using Overlays".

You can store your printed signature block so it is printed in the type style used in the rest of the letter or memo. That way the signature block's type style matches the letter in which it appears, no matter how many different fonts you use for different kinds of letters. This printing concept is discussed in p.13 "Using Page Segments".

You can include bar charts or line graphs in your letter. Such graphic material can be generated through either the Image function or the Graphics function. See p.14 "Using Images and Graphics".

Using Overlays

Overlays are stored constructs (text, graphics, images, and bar codes), often in complex configurations, with all the instructions needed to print. An overlay always prints in the type style used when it was stored and can be positioned anywhere on the page.

Overlays are useful for letterheads and for forms, as shown below.

Electronically Stored Form Overlay

Variable Page Data

POWER
ANY TOWN AMERICA

Name-Service Address		Service Period	
		From	
		To	
Account No.			
Rate	Meter Readings		Mult.	K.W.H. Used	Amount	
	Present	Previous				
City		State		Franchise	Total Tax	

John Jones
1225 Stone Street
Ant Town, State
65432

10/02/85

11/01/85

0130-7817-2

| 10 | 1054 | 1944 | 10 | 1:100 | 61.85 |

2.27 · .12 · 2.49

64.35

Merge
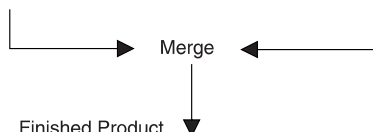
Finished Product

POWER
ANY TOWN AMERICA

Name-Service Address		Service Period	
John Jones	From	10/02/85
1225 Stone Street	To	11/01/85
Ant Town, State		
65432		
Account No. 0130-7817-2			
Rate	Meter Readings	Mult.	K.W.H. Used	Amount
	Present	Previous			
10	1054	1944	10	1:100	61.85
City	State	Franchise	Total Tax
	2.27	.12	2.49
			64.35

Using Page Segments

Page segments are similar to overlays, except that the construct is stored without specific instructions for type styles and position on the page. Page segments are printed in the type style in use at print time. You can place a page segment anywhere on the page.

One way to use a page segment is as text under a signature, as shown below.

Variable Page Data

Stored Page Segment

MEMO ONE

TO: J.D. SWIFT
SALES DEPARTMENT

I AM IMPRESSED WITH YOUR
STEADY INCREASE IN SALES

LET'S GET TOGETHER AND
DISCUSS SOME STRATEGY.

CALL MY SECRETARY FOR
AN APPOINTMENT.

Fred Jones

FRED JONES
PRESIDENT

Fred Jones

FRED JONES
PRESIDENT

MEMO TWO

From:

Fred Jones

FRED JONES
PRESIDENT

To: All Employees

Beginning this Friday
our work week will end
at 3 pm. Enjoy this
extra leisure time.

Using Images and Graphics

Graphic material - charts, engineering drawings, and line drawings - can be sent to the printer as IM Images, IO Images, or Graphics. In all-points-addressable printing by the printer, a page can consist of 300 points per inch, 7.8 million printable points, each one of which is individually addressable. These addressable points are called picture elements or pixels.

IM and IO Images

Images are figures on the page created by explicitly specifying each pixel in the figure. There is one bit of image data per pixel, so a large quantity of data is needed to create an image.

IM images are uncompressed raster data images. A raster pattern is composed of a series of pixels arranged in scan lines.

IO images are compressed or uncompressed raster data images. Compression generally reduces the amount of data sent to the printer and should significantly save transmission time. IO images may be arbitrarily scaled and corrected for resolution differences between the scanner and the printer.

Graphics

Graphics are line drawings created from separate lines, arcs, and markers. With vector graphics, only control information such as the end points of a line are sent to the printer. This process lets you create complex figures with a minimum of data.

For details on graphics commands, see IBM Data Stream and Object Architectures Graphics Object Content Architecture (GOCA) Reference, SC31-6804. For details on IO image commands, see IBM Data Stream and Object Architectures Image Object Content Architecture (IOCA) Reference, SC31-6805.

Using Bar Codes

Bar code data is encoded information that is recognized by optical scanning devices.

The printer can print the bar code types as shown below in many sizes and variations, such as with or without the human-readable characters.

123456	A - 0 0 - 2 9 - D	1234567
3 of 9 Alphanumeric	USS Codabar	EAN-8
123456789012	123456789	12345
EAN-13	Interleaved 2 of 5	Industrial 2 of 5

1234567890	1234567890
Matrix 2 of 5	MSI

1 12345678901 2	02345600005
UPC Version A See Note.	UPC Version E See Note.

Note: Also can have 2-digit and 5-digit supplemental the same as EAN 13 below.

3 4 5 6 7	3 4
12345678901234567	12345678901234
EAN-13 with 5-Digit Supplemental	EAN-13 with 2-Digit Supplemental

POSTNET	012 **CODE 128**

Printing in Duplex Mode

The printer can print on one or both sides of the paper. All of the printer's IPDS capabilities are provided in either mode.

Duplex printing is controlled through the IPDS Load Copy Control (LCC) command.

1. IPDS Overview

About the IPDS Feature

The Intelligent Printer Data Stream (IPDS) is a structured field data stream designed to manage and control All Points Addressable (APA) printers. APA is a printing concept that allows users to position text, images, graphics, and overlays at any defined point on a printed page.

IPDS allows both data and commands to be streamed to the printer via channels, controllers or any type of networking link which supports the transparent transmission of data to print processes that are resident in the device.

Commands within the data stream also allow the "Host" process to control the media handling capabilities of the device, select source drawers, jog output and other operations dealing with paper. In addition, the commands provide the means for managing the downloading of fonts and other stored resources such as overlays and page segments that are required at presentation time to construct the printed page. Finally, the commands provide the means for returning error information and performing recovery actions. The source IPDS architecture document is the Intelligent Printer Data Stream Reference.

The machine supports the following IPDS Architecture command sets.

- Device Control (DC1)
- Text (TX1 with PTOCA PT1, PT2 and PT3)
- IM Image (IM1 with IMD1)
- IO Image (IO1 with IOCA FS10 + 8-bit Grayscale via halftoning), FS11, FS40, FS42 and FS45)
- Graphics (GR1 with GOCA DR/2V0)
- Page Segments (PS1)
- Object Container (OC1)
- Overlay (OL1)
- Loaded Font (LF1 and LF3)
- Bar Code (BC1 with BCD1)

IPDS Operating States

If the host sends a command inappropriate for the printer state, the printer returns an error code identifying the error and follows Exception Handling Control processing.

Home State

The following actions can force the printer to home state, regardless of the current state of the printer:

1. The Set Home State (SHS) command

2. The Execute Order Anystate--Discard Buffered Data (XOA/DBD) command

3. The printer's transmission of a NACK to the host

4. The Arctic link-level Clear command

5. Any non-IPDS print order in NDS (New Display System)

6. An NDS Reset order

7. An NDS System Status Available No Mode order

All these actions will also force the printer to an IPDS command boundary if it is not already on one. To interpret SHS or XOA/DBD, the printer and the host must already be in agreement as to where the IPDS command boundaries are.

Deactivation of fonts with the DF command occurs in Home State.

Overlay State

Overlays can be nested to a depth of 6 as indicated in the STM Overlay Command-Set Vector, see "Overlay Command Set", IPDS Technical Reference 2.

Font State

An operating state for downloading single-byte Coded Font patterns, Font Character Sets, and Code Pages.

IPDS Command Format

All IPDS commands are encoded in the following patterns:

Offset	Range	Meaning	Error Code
0-1	X'0005' X'7FFF'	LENGTH	X'0202..02'
2-3		COMMAND	X'8001..00'
	X'D601'	Manage IPDS Dialog	
	X'D603'	No Operation	
	X'D60F'	Load Font Index	
	X'D619'	Load Font Character Set Control	
	X'D61A'	Load Code Page Control	
	X'D61B'	Load Code Page	
	X'D61D'	Load Equivalence	
	X'D61F'	Load Font Control	
	X'D62D'	Write Text	
	X'D62E'	Activate Resource	
	X'D62F'	Load Font	
	X'D633'	Execute Order Anystate	
	X'D634'	Presentation Fidelity Control	
	X'D63C'	Write Object Container Control	

Offset	Range	Meaning	Error Code
2-3	X'D63D'	Write Image Control	
	X'D63E'	Write Image Control 2	
	X'D63F'	Load Font Equivalence	
	X'D64C'	Write Object Container	
	X'D64D'	Write Image	
	X'D64E'	Write Image 2	
	X'D64F'	Deactivate Font	
	X'D65B'	Deactivate Data-Object-Font Component	
	X'D65C'	Deactivate Data Object Resource	
	X'D65D'	End	
	X'D65F'	Begin Page Segment	
	X'D66C'	Data Object Resource Equivalence	
	X'D66D'	Logical Page Position	
	X'D66F'	Deactivate Page Segment	
	X'D67C'	Include Data Object	
	X'D67D'	Include Overlay	
	X'D67F'	Include Page Segment	
	X'D680'	Write Bar Code Control	

Offset	Range	Meaning	Error Code
2-3	X'D681'	Write Bar Code	
	X'D684'	Write Graphics Control	
	X'D685'	Write Graphics	
	X'D68F'	Execute Order Homestate	
	X'D697'	Set Home State	
	X'D69F'	Load Copy Control	
	X'D6AF'	Begin Page	
	X'D6BF'	End Page	
	X'D6CF'	Logical Page Descriptor	
	X'D6DF'	Begin Overlay	
	X'D6E4'	Sense Type and Model	
	X'D6EF'	Deactivate Overlay	
4		FLAGS (Active when Bit value = 1)	X'0204..02'
	Bit 0 0/1	Acknowledgement Required (ARQ)	
	Bit 1 0/1	Correlation Number Present	
	Bit 2 0/1	Acknowledgement Continuation	
	Bit 3-6 000	Reserved	
	Bit 7 0/1	Persistent NACK (DSC non-SNA ONLY, otherwise Reserved)	
5-6	X'0000'-X'FFFF'	CORRELATION ID	

Offset	Range	Meaning	Error Code
7		DATA - The specific operands, parameters and/or data fields as appropriate for the given command.	

Reserved Bytes

Throughout the command descriptions in the following chapters, some data fields, bytes, and bits are specified as reserved.

When the description for a reserved field, byte, or bit specifies "should be zero," the printer does not check the contents of the bytes or bits. The reserved data should be set to zero, because they could be defined in future changes to the printer. However, non zero values do not cause an error and are ignored by the printer.

When the description for a reserved field, byte, or bit specifies it "must be zero," the printer checks the contents of the bytes or bits and will return error status to the host if the field contains a non zero value.

Flag Byte

Bit 7 is the Persistent NACK bit for 3270 Non-SNA DSC (Data Stream Compatibility) Mode NACKs. This bit has no meaning in other attachment environments.

Valid values for the Acknowledge Reply Flag byte are described in the Intelligent Printer Data Stream Reference.

Correlation ID (CID)

The correlation ID (CID) is an identifier of a specific instance of an IPDS command.

It is used to correlate errors with the command that generated them.

It is not possible to correlate all errors with particular IPDS commands. Mechanism errors (for example, out of paper position checks and unpopulated character positions in resident fonts) are never correlated.

Therefore, it is possible for some NACKs to be returned without correlation numbers even if all downstream commands had correlation numbers.

Error Processing

The machine supports Page Continuation Action error processing. See Intelligent Printer Data Stream Reference for details.

The printer stops if there is a probability that it is not parsing commands correctly.

This means that, regardless of the setting of the Exception Handling Control (EHC) the printer will stop processing, send a NACK, and enter home state immediately if one of the following conditions occurs:

1. The command length is less than 5 (No correlation number present).

2. The command length is less than 7 (Correlation number present).

3. The command length is greater than 32767.

4. The command does not have X'D6' as the first byte of the command code.

5. The command does have X'D6' as the first byte but is otherwise unrecognized.

6. A resource download is interrupted, resulting in a purge of the partial resource object.

The maximum numbers of queued asynchronous and synchronous errors are as followed.

- One for ARCTIC and NDS DSC mode

- Seven for NDS LU1 mode

- Seven for TCP/IP mode

Intervention required and equipment check exception types will be reported for NDS and TCP/IP interface type.

Exception Highlight Support

If a position exception occurs and the "position-check highlight" flag (XOAEHC byte 2, bit 6) is on (B'1'), or if a Page Continuation Action (PCA) is taken for a position check, the approximate location of each unique occurrence of the position check will be highlighted with a Print-Error-Marker (PEM). Other exceptions detected in page state, or a derivative of page state, or when printing a medium overlay, which have a PCA defined, are also indicated by a PEM when the PCA is taken.

A PEM is a distinguishing mark which is placed in close proximity to the area on the page where the exception has occurred.

- The PEM for Position Check processing is a solid rectangular mark, placed in close proximity to the area on the page where the exception occurred. For the exception detected, the associated code (08C100) will be located at the top of the logical page, starting in the left hand corner.

- The PEM for PCA processing is a hollow rectangular mark enclosing a +, placed in close proximity to the area on the page where the exception has occurred, if the location can be accurately specified. For the exception detected, the associated code (040B00) will be located at the top of the logical page, starting in the left hand corner.

- Multiple exception code highlighting is limited to only the codes that will fit across the top of the logical page (10).
- PEM Size: 600 Pixel (80 by 80)

If error exception handling is set to allow printing of an undefined character, the undefined character will appear as:

- A Space if it is unprintable.
- The Character itself if printable.

Page and Copy Counters

Page and Copy Counter information is reported using the 18-byte counter format described in Intelligent Printer Data Stream Reference, section "Acknowledge Reply". The following counters are supported:

- Received Page
- Committed Page
- Committed Copy
- Operator Viewing Page
- Operator Viewing Copy
- Jam Recovery Page
- Jam Recovery Copy
- Stacked Page
- Stacked Copy

For Action Code 22, counters are adjusted as follows:

- Received Page - Actual Received Count
- Committed Page - Mapped to Stacked Page
- Committed Copy - Mapped to Stacked Copy
- Operator Viewing Page Counter - Mapped to Stacked Page Counter
- Operator Viewing Copy Counter - Mapped to Stacked Copy Counter
- Jam Recovery Page Counter - Mapped to Stacked Page Counter
- Jam Recovery Copy Counter - Mapped to Stacked Copy Counter
- Stacked Page Counter - Last value
- Stacked Copy Counter - Last Value

Data Types

The machine supports four different types of data that may be used to create an output page. These are: text, graphics, images, and bar codes. The printed page can include any combination of these data types.

Blocks of graphics, bar code or image data are presented as a single unit to the printer. The printer enters the appropriate "Block" State (graphics block, image block, bar code block) to create the entire data group for that block of data.

Page segments and Overlays are any combinations of text, graphics, bar codes and images. The printer can store these segments and overlays for later use as the page is created.

Text

Presentation Text is the data type used to present lines of character information on a logical page.

The information to be presented is represented as a string of graphic character IDs and X'2B' control sequences that are sent to the printer in the Write Text command (See "Write Text", IPDS Technical Reference 2). The initial conditions governing the presentation of the data are established via control parameters that are sent to the printer in the Logical Page Description command (See "Logical Page Descriptor", IPDS Technical Reference 2).

The source architecture document for Text is Presentation Text Object Content Architecture Reference.

Image

Image is the data type used to present rectangular arrays of raster data in an Image block area on a page.

This data may have been created originally by a scanning process or generated by a computer program. The machine supports the IM Image Function Set (See "IM Image Command Set", IPDS Technical Reference 2). and the IO Image Function Set (See "IO Image Command Set", IPDS Technical Reference 2).

The IM Image Function Set has a syntax and functional content that is based on AFPDS image arrays and cells. The IO Image Function Set has a syntax and functional content based on the IOCA architecture for image data (See Image Object Content Architecture Reference).

The raster data to be presented is represented as a sequence of scan lines 'm' lines deep by 'n' picture elements (pixels) wide. In IO image data, there may be more than one bit per pixel if the image data is grayscale encoded. The format of the data and the recording algorithms used to encode the image array are sent to the printer as control parameters of the Write Image Control 2 command that prepares the printer for processing image data. The data itself is sent in the Write Image 2 command.

Graphics

Graphics is the data type used to present line art picture drawings in a graphics block area on a page.

The information to be presented is represented by a sequence of primitive drawing orders that are used by the device to construct arcs, lines, fillets, character strings, markers and other elements that define the drawing. These primitive orders, in turn, are grouped into one or more drawing segments that are executed to present the picture.

The Write Graphics Control command (See "Graphics Command Set", IPDS Technical Reference 2) is sent to the printer to establish the clipping window control parameters and initial drawing conditions to be used in presenting the picture data. The picture segments are sent to the printer as data in zero or more Write Graphics commands of the architecture.

The graphics drawing orders are summarized in "Drawing Orders", IPDS Technical Reference 2. The source architecture document for graphics data is the Graphics Object Content Architecture Reference.

Bar Code

Bar Code is the data type used to present machine-scannable bar code symbols in a bar code block area on a page.

The Write Bar Code Control command (See "Bar Code Command Set", IPDS Technical Reference 2) is sent to the printer to establish the bar code pattern parameters to be used in presentation. Data for the bar code symbols is sent to the printer in zero or more Write Bar Code commands.

Coordinate System

Xm, Ym Coordinate System (Medium Presentation Space)

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The Xm, Ym coordinate system is the medium presentation space coordinate system. The origin of this system (Xm=0, Ym=0) can be set by the IPDS XOH Set Media Origin command to any of the four corners of the media. If this command is not sent to the printer the origin is the top-left corner (viewed from the center). In this case, positive Xm values begin at the origin and increase along the top edge from left to right. Positive Ym values begin at the origin and increase along the left side from top to bottom. Top is defined as the short edge which leads into the printer. See Intelligent Printer Data Stream Reference for a description of the Xm, Ym Coordinate System and default media origin for envelopes.

Xp, Yp Coordinate System (Logical Page Presentation Space)

Identifying the Size of the Logical Page or Overlay

The size of the logical page or overlay presentation space is set during a printer initialization using the "IPDS Initialization Defaults" or by the host program when it sends a Logical Page Descriptor command.

Overlays are logical pages and are handled as such by the printer with the following special considerations:

1. Overlays are positioned in relationship to the logical page presentation space origin (Xp=0, Yp=0) when they are merged with the Include Overlay command.

2. Overlays are positioned in relationship to the origin of the medium presentation space (Xm=0, Ym=0) when they are merged with the Merge Overlay keyword in a copy control record.

🔖 Reference

- For details about the "IPDS Initialization Defaults", see p.39 "IPDS Initialization Defaults".

I, B Coordinates System (Text)

The +I and +B directions for the logical page or overlay are specified in degrees of rotation in relationship to the +Xp direction on the logical page.

The printer sets the +I and +B directions during the initialization through the "IPDS Initialization Defaults". The host program can change the +I and +B directions through the Logical Page Descriptor command (See Intelligent Printer Data Stream Reference).

The host program can also change the +I and +B directions as it builds a page or overlay through text controls in the print data sent by a Write Text command (See "Write Text", IPDS Technical Reference 2).

↓Note

- Setting the orientations of the +I and +B axes also implicitly sets their origins as one of the four corners of the logical page or overlay.

📖Reference

- For details about the "IPDS Initialization Defaults", see p.39 "IPDS Initialization Defaults".

Other Text Positioning Terms

Some other terms that relate to text positioning and fonts include:

Text Orientation

The combination of the inline sequence direction (the direction which characters are added to a line) and the baseline sequence direction (the direction which lines are added to a page or overlay) identify the text orientation for a page. The inline sequence direction can be 0, 90, 180 or 270 degrees. The machine supports baseline sequence directions that are always rotated plus or minus 90 degrees from the inline sequence direction. Therefore, there are eight text orientations for printing pages or overlays.

Printing Baseline

An imaginary line that extends across the page or overlay in the positive inline sequence direction (+I), between pixels, and beginning from the baseline sequence printing coordinate (Bc). (Sometimes shown as baseline as in the font terms baseline offset and baseline extent.)

In languages with a right to left or left to right reading order (for example, English), the printing baseline is the imaginary line on which the main body of the character appears to rest. Descenders (the "tails" of lower case g, j, p, q, and y characters) usually extend below the printing baseline.

In languages with a top to bottom reading order (for example, Kanji), the printing baseline is an imaginary vertical line that passes through the center of the character.

Each font index record contains a Font Inline Sequence field. The field value specifies a relationship between the inline sequence direction and the font rotation (the character pattern rotation for the font). The printer uses the font index record to identify how to place characters on the printing baseline for a page or overlay. The characters are placed in the combination of the inline sequence direction (the printing direction) and the font rotation.

The Baseline Offset value is another field in the font index record. This value locates the printing baseline relationship to a specified character box reference edge.

Notation Conventions

Some field values (or ranges of values) are specified assuming a unit of measure of 14400 L-units per 10 inches (5670 L-units per 10 centimeters). To determine supported values for a unit of measure of 2400 L-units per 10 inches (945 L-units per 10 centimeters) use the following steps.

1. Convert the specified value from hex (2's complement) to decimal.

2. Divide the + or - decimal number by 6.

3. Round to the nearest integer.

4. Convert the + or - decimal value back to hex (2's complement).

For example, if the specified value is X'8000' the following steps would be performed.

1. 8000(H) = -32768(D)

2. -32768/6 = -5461.333

3. -5461(D) = EAAB(H)

Color Simulation

This printer provides "limited color simulation" by either simulating with generated grayscales or substituting "black" in special cases.

- Data objects whose colors are simulated with "grayscale":
    - PTOCA (characters, underscores, overscores, text rules)
    - GOCA (characters, lines, arcs, image, solid-area fill, pattern fill)
    - IM1/IOCA (bi-level image)
    - Object Areas (Pages, Overlays, BCOCA and IOCA)
- Data objects whose colors are simulated with "black":
    - GOCA Markers
    - BCOCA Bar Code Symbols and HRI
- Full Color Image is not supported on this printer since the transformation to grayscale would be very costly from a performance perspective. Host utilities are available to convert full color images to bi-level images for printing on monochrome printers.
- Grayscale Image (8 bits/pixel) is supported on this printer, however for very large images unacceptable performance degradation may result, due to the dithering process to produce bi-level image.

Simulation Modes Supported

There are two color simulation modes that may be supported:

- Legacy Mode (Substituting "black" or Pattern Creation)
- Fidelity Mode (Simulation with Grayscale)

The machine supports both the Legacy Mode and the Fidelity Mode of color simulation.

The Legacy Mode is provided to support customer legacy applications where simulation with grayscale would produce unacceptable results. There are console configuration menus to allow customers to select what level of color simulation best meets their needs. There are also console configuration menus to allow customers to select whether or not Color PTOCA (text) Objects should be simulated with grayscale or rendered with black. Rendering all PTOCA objects with black may be desirable, especially when small fonts are utilized.

Color Simulation Processes and Algorithms

To allow printing of documents containing color specifications, the specified colors in the document should be simulated in a consistent and predictable manner.

Color simulation occurs independently at the object level.

- Named Colors

    Convert Named Color to RGB Process Color using the following table.

This table defines the valid color values used to specify named colors in PTOCA, GOCA, BCOCA, IOCA and IM objects. The table also specifies the RGB values for each named color, assuming that each component is specified with 8 bits and that the component intensity range 0 to 1 is mapped to the binary value range 0 to 255. For a definition of the supported colors for individual objects refer to the appropriate OCA specifications, since some objects only support a subset of the colors.

Range	Named Color	Red (R)	Green (G)	Blue (B)
X'0000' or X'FF00'	Printer Default (Black)	0	0	0
X'0001' or X'FF01'	Blue	0	0	255
X'0002' or X'FF02'	Red	255	0	0
X'0003' or X'FF03'	Pink (magenta)	255	0	255
X'0004' or X'FF04'	Green	0	255	
X'0005' or X'FF05'	Turquoise (cyan)	0	255	255
X'0006' or X'FF06'	Yellow	255	255	0
X'0007'	White	255	255	255
X'0008'	Black	0	0	0
X'0009'	Dark Blue	0	0	170
X'000A	Orange	255	128	0
X'000B'	Purple	170	0	170
X'000C'	Dark Green	0	146	0
X'000D'	Dark Turquoise	0	147	170
X'000E'	Mustard	196	160	32

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Range	Named Color	Red (R)	Green (G)	Blue (B)
X'000F'	Gray	131	131	131
X'0010'	Brown	144	48	0
X'FF07'	Printer Default (Black)	0	0	0
X'FF08'	Color of Medium (Reset)			

– Simulate RGB Process Color with Grayscale

- Full-process Colors. To maintain output consistency across different printer families, process colors to be simulated are converted to grayscale intensities based on color "luminance" (Y). A luminance of 0 is defined to be black and a luminance of 1 is defined to be white. CIE luminance (Y) is derived using the following "architected" equations:

  RGB Color Space:

  > Where Y=0 is black, Y=1 is white
  >
  > $Y = 0.212(R) + 0.701(G) + 0.087(B)$
  >
  > assuming 0 R,G,B 1

  Where R, G and B represent the non-gamma-corrected (linear) red, green and blue components.

  CIELab Color Space:

  > CIELab space is the exception where the current implementation directly utilizes Lightness (L).
  >
  > $L = L$
  >
  > assuming 0 L 100

  CMYK Color Space:

  > Where Y=0 is black, Y=1 is white
  >
  > $Y = 1 - min(1,(0.212C+0.701M+0.087Y+K))$
  >
  > assuming 0 C,M,Y,K 1

  Where the function min (a,b) selects the smaller of (a,b).

- Highlight Colors

  Color Mapping Tables (CMT) are not supported, therefore mapping to process color is not provided.

- Highlight colors are mapped to black with the % coverage applied to produce a gray level.

Logical Page and Object Area Coloring

Color Specification

The Color Specification triplet is used to specify the foreground color of the logical page or object area before any object data is placed on the logical page or object area.

Offset	Range	Meaning	Error Code
0	X'0E'-X'10'	TRIPLET LENGTH	X'020E..01'
1	X'4E'	COLOR SPECIFICATION TRIPLET	
2	X'00'	RESERVED	
3		COLOR SPACE (Note 1)	X'020E..02'
	X'01'	RGB - Limited Simulated Color Support	
	X'04'	CMYK - Limited Simulated Color Support	
	X'06'	Highlight - Limited Simulated Color Support	
	X'08'	CIELAB - Limited Simulated Color Support	
	X'40'	Standard OCA - Limited Simulated Color Support	
4-7	X'00000000'	RESERVED	

Offset	Range	Meaning	Error Code
8		1ST COLOR COMPONENT BITS	X'020E..05'
	X'01' - X'08'	(RGB, CMYK, CIELAB)	
	X'10'	(Standard OCA, Highlight)	
9		2ND COLOR COMPONENT BITS	X'020E..05'
	X'00' - X'08'	(RGB, CMYK, Highlight, CIELAB)	
10		3RD COLOR COMPONENT BITS	X'020E..05'
	X'00' - X'08'	(RGB, CMYK, CIELAB)	
11		4TH COLOR COMPONENT BITS	X'020E..05'
	X'00' - X'08'	(CMYK)	

Offset	Range	Meaning	Error Code
12-15		COLOR VALUE	X'020E..03'
		RGB Color Space	X'020E..04'
	X'nn'	Red Intensity	
	X'nn'	Green Intensity	
	X'nn'	Blue Intensity	
		CMYK Color Space	
	X'nn'	Cyan Intensity	
	X'nn'	Magenta Intensity	
	X'nn'	Yellow Intensity	
	X'nn'	Black Intensity	
		Highlight Color Space	
	X'nnnn'	Highlight Color Number	
	X'nn'	Percent Coverage	
	X'nn'	Percent Shading	
		CIELAB Color Space	
	X'nn'	Luminance (L)	
	X'nn'	Chrominance Difference (a)	

Offset	Range	Meaning	Error Code
12-15	X'nn'	Chrominance Difference (b)	
		Standard OCA Color Space	
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue	
	X'0002' or X'FF02'	Red	
	X'0003' or X'FF03'	Pink	
	X'0004' or X'FF04'	Green	
	X'0005' or X'FF05'	Turquoise	
	X'0006' or X'FF06'	Yellow	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0009'	Dark Blue	
	X'000A'	Orange	
	X'000B'	Purple	
	X'000C'	Dark Green	
	X'000D'	Dark Turquoise	
	X'000E'	Mustard	
	X'000F'	Gray	
	X'0010'	Brown	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	

Presentation Space Reset Mixing

The Presentation Space Reset Mixing triplet is used to specify whether or not a logical page or object area is reset to the color of medium before any object data is placed on the logical page or object area.

Offset	Range	Meaning	Error Code
0	X'03'	TRIPLET LENGTH	X'020E..01'
1	X'70'	PRESENTATION SPACE RESET MIXING TRIPLET	
2	Bit 0 0	MIXING FLAGS Do not reset to color of the logical page to color of medium.	
	Bit 0 1	Reset to color of the logical page to color of medium.	
	Bits 1-7 0000000	Reserved	

2. Summary of IPDS Commands

IPDS Initialization Defaults

This chapter lists the IPDS commands that can be used with the printer. For more information about how to use these commands, see the Intelligent Printer Data Stream Reference.

Printer commands listed on the following pages are the valid values as identified in Intelligent Printer Data Stream Reference unless otherwise noted. Where the IPDS architecture allows choices, those choices are indicated.

When you set the printer power switch to the On (|) position, various IPDS data stream parameters are set to their initialization default values. These values are used for control parameters when:

- The command stream specifies that the printer default should be used,
- No explicit values are specified in the command stream sent to the printer, or
- Previously transmitted values are lost and initial machine settings are reestablished at POR time.

These values remain in effect until overridden by specific data stream commands from the host application program. The following list of values remain in effect until explicitly overridden by the following IPDS commands:

- Load Copy Control
- Load Font Equivalence
- Logical Page Descriptor
- Logical Page Position
- XOA Exception Handling Control
- XOH Select Input Media Source
- XOH Set Media Origin
- XOH Set Media Size
- Text Control Sequences (STO, SIM, SIA, SBI, SCFL, STC, DIR, and DBR)

Meaning	Default Value
L-Units Base Value	X'00' (10 inches)
L-Units per Base	X'3840' (14400 per 10 inches)
Input Media Source	Determined by the printer's control panel, Forms Device Setting
Media Origin	X'00' (top-left)

Meaning	Default Value
Width of the Physical Page	Derived from X-Extent of Medium Presentation Space
Length of the Physical Page	Derived from Y-Extent of Medium Presentation Space
Width of the Logical Page in L-Units (X p-Extent)	Derived from X-Extent of Medium Presentation Space
Length of the Logical Page in L-Units (Y p-Extent)	Derived from Y-Extent of Medium Presentation Space
Ordered Data Flags	X'00' (Unordered page, block, and text flags)
Inline Sequence	X'0000' (0 degrees)
Baseline Sequence	X'2D00' (90 degrees)
Initial I Print Coordinate	X'0000'
Initial B Print Coordinate	X'00C0' (192 L-Units below the logical page origin) Text printing on the first line requires the Current B Text Position to be large enough to accommodate the height of the current font.
Xm-Coordinate page origin	X'000000' Logical page X-displacement from the physical page origin (0 in)
Ym-Coordinate page origin	X'000000' Logical page Y-displacement from the physical page origin (0 in)
Initial Inline Margin in L-Units	X'0000'
Inter-character Adjustment	X'0000'
Baseline Increment	X'00F0' (240 L-Units)
Text Color	Black
Code Page ID	From configuration settings

Meaning	Default Value
Font Type	Font selection from configuration settings. The default font may be changed to another font which supports the selected Code Page. For printer generated bar codes with human readable information (HRI), the default font is OCR-B (UPC and EAN bar code types) or OCR-A (other bar code types with HRI).
Exception Handling Control	X'C10101' Report undefined characters, position checks, and all other exceptions. Do not take Alternate Exception Action. Terminate, print page, and go to home state. No highlighting of position checks.
Number of Copy Groups	X'01'
X-Extent of Medium Presentation Space	Determined by Configuration
Y-Extent of Medium Presentation Space	Determined by Configuration
X Coordinate (logical page origin)	X'0000'
Y Coordinate (logical page origin)	X'0000'
Xp-Extent of Logical Page	Derived from X-Extent of Medium Presentation Space
Yp-Extent of Logical Page	Derived from Y-Extent of Medium Presentation Space
Code Page Global ID (CPGID)	Determined by Configuration
Font Global ID (FGID)	Determined by Configuration
Font Width (FW)	Determined by Configuration
Copy Group Definition Length	X'04' (The default copy group definition is four bytes long.)
Number of Identical Copies	X'01' (The printer prints one copy of each page.)
Keyword Entry	X'C100' (The printer prints simplex, no text suppression, no overlays.)

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Page Printer Initialization Sequence

Before printing begins, the host may determine characteristics of the printer and its resources and may specify certain parameters related to subsequent printing.

Following is a typical sequence of initialization commands.

- Sense Type and Model (STM) with ARQ
- XOH Obtain Printer Characteristics (OPC) with ARQ
- Set Home State (SHS)
- Logical Page Descriptor (LPD)
- Logical Page Position (LPP)
- Load Copy Control (LCC)
- Load Font Equivalence (LFE) with ARQ

3. IPDS Command Set

About IPDS Command Set

For details about following IPDS command sets, see IPDS Technical Reference 2.

- Device Control Command Set
- Presentation Text Command Set
- IM Image Command Set
- IO Image Command Set
- Graphics Command Set
- Bar Code Command Set
- Overlay Command Set
- Page Segment Command Set
- Object Container Command Set
- Loaded Font Command Set

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4. Exception Reporting, Sense Data, and Recovery

About Exception Reporting, Sense Data, and Recovery

This chapter supplies information about Acknowledge Reply, which the IPDS uses for exception reporting.

The chapter begins with general information followed by tables of the exception reporting codes for the printer. The tables contain details about the specific exceptions. The chapter concludes with a section on printer counter adjustments.

😃 Note

- When you have questions about codes from the printer, use this chapter instead of the exception-reporting chapter in the Intelligent Printer Data Stream Reference. Although the two chapters are similar, this chapter contains only those exception codes that the printer returns.

General Reply Rules

IPDS uses the Acknowledge Reply command to return both positive and negative replies to the host.

Positive messages are Acknowledge Replies. The negative messages (exception messages) are NACKs and are sent as sense-byte information in the special data area. For more information about Acknowledge Replies, see "Device Control Command Set", IPDS Technical Reference 2.

The following general rules apply to printer replies:

- The printer reports a data-stream exception with a NACK. Only one exception can be returned in each NACK.

- The printer sends an ACK or a NACK in response to an Acknowledgement Required (ARQ) flag. If there is an exception, the printer sends a NACK without receiving an ARQ.

- If the printer receives a command requesting an acknowledgement, it expects the host to wait for the acknowledgement before sending more commands.

- Any data received after an exception is reported is discarded until all queued NACKs have been either sent to the host or cleared by an appropriate linklevel command. An exception on a command can be reported before receiving the entire command data. When an Alternate Exception Action (AEA) or Page Continuation Action (PCA) is not to be taken, the next data received should be part of a new command. Otherwise, an 8001..00 exception may result. The printer might not discard the remaining bytes in a command with an error when reported. Therefore, the next data received should be the start of a new command. As a result, begin the host

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data re-transmission only after a synchronizing command (such as XOH Print Buffered Data or XOA Discard Buffered Data) is successfully acknowledged. A terminating condition causes the first NACK to be reported. The next NACK is reported when the next five bytes of data are received. This is usually an IPDS command header. Reporting a NACK discards all data currently received. The process of receiving five bytes and sending a NACK repeats until the NACK queue is exhausted or cleared by the appropriate link-level command.

- An ACK indicates that the data stream was checked and that commands were transformed into the printer's internal command language, with the following exceptions: – Asynchronous-position exceptions and undefined character exceptions are not detected until print time. – The data stream is not checked when IPDS is being saved for future use, as in overlays and page segments, and when more than one copy group is specified in a Load Copy Control (LCC) command. An exception in an overlay or page segment is reported synchronously with the End Page (EP) command on the page it is used. An exception in a saved copy group is reported synchronously after the EP command; that is, in the next command after the EP.

- The XOA Exception-Handling Control (EHC) order tells the printer how to handle exceptions. More information about the EHC order follows.

Exception-Handling Control (EHC)

The EHC order lets you control the three exception-handling functions listed below. Brief descriptions of the functions follow this listing.

- Exception Reporting. You can record three types of exception conditions and related exception information and have them reported at specified times using NACKs.

- Alternate Exception Actions (AEA). You can specify whether the printer is to take Alternate Exception Actions (AEAs), which prescribe actions to take when the printer is given an IPDS command or parameters it does not support.

- Exception-Presentation Processing. The exception-presentation processing function has two parts:

  - Page Continuation Actions (PCA). You can specify whether to end or continue processing a page that has an exception.

  - Exception Page Print. You can specify whether the printer is to print or discard a page that was terminated.

Exception Reporting

Use the exception-reporting bits in the Exception-Handling Control (EHC) record to control the recording and reporting of three classes of exceptions:

- Undefined characters

- Position exceptions

- All other exceptions that have AEAs.

When you instruct the printer to record a given class of exception, it always records exceptions that fit in that class. If you instruct the printer not to record a given class of exception, the printer still records such exceptions if the printer was told not to take the AEA.

Classes of Data Stream Exceptions

All printer data stream exceptions are returned in 24 bytes of detailed sense information in the special data area of the NACK. The exception-code identifier consists of three bytes: 0, 1, and 19. Byte 0 specifies the exception class; bytes 1 and 19 identify the particular exception.

The six classes of data-stream exceptions are:

- Command Reject
- Intervention Required
- Equipment Check
- Data Check
- Specification Check
- IO Images
- Bar Codes
- Graphics
- General
- Conditions Requiring Host Notification.

For details, see p.51 "Exception-Reporting Codes".

Sense Byte Information

The following list gives details of the information in each sense byte.

Byte(s)	Meaning
0	Defines the exception class for the specific exception. It is the first byte of each 3-byte exception ID.
1	Together with sense byte 19, byte 1 defines the specific exception within an exception class. It is the second byte of each 3-byte exception ID.
2	Contains exception-recovery action codes that specify the required actions for the exception conditions. For details, see p.48 "Action Codes in Sense Byte 2".

Byte(s)	Meaning
3	Reserved
4 through 18	Describe the specific cause in three separate formats: • Format 0 Provides details about all data stream exceptions other than data check positioning exceptions. • Format 2 Provides details about device exceptions, including intervention-required exceptions, equipment-check exceptions, and conditions requiring host notification. • Format 7 Provides details about data check positioning exceptions. For details about formats, see p.49 "Formats 0, 1, and 2 for Sense Bytes 4-18 and 20-23".
19	Together with sense byte 1, byte 19 defines the specific exception within an exception class. It is the third byte of each 3-byte exception ID.
20 through 23	Contain additional information about the state of the printer when it senses an exception.

Action Codes in Sense Byte 2

The action codes in sense byte 2 classify the exception to assist host-exception recovery and allow printing to continue. The action codes listed are the only ones returned by the printer.

Action Code (in hex)	Exception-Recovery Action
01 Data Stream Exception	A syntax error exists in the IPDS data stream. The specific recovery actions depend on the specific exception (sense bytes 0, 1, and 19 in the tables of printer exception codes) and host support requirements. Data stream exceptions occur on the page or resource just before the received page counter.
08 Paper Jam	The printer detects a paper jam. Retransmit all pages and associated resources (overlays, page segments, and fonts) that have not passed the printer-defined jam recovery point.

Action Code (in hex)	Exception-Recovery Action
09 Data-Related Print Exception	A sheet cannot be printed because of something within the data stream. The data might be too complex, too dense, or the media source selected might be incompatible with the media destination selected. The printer has discarded all buffered pages and modified the page and copy counters.
0C Resource Storage Exception	The printer cannot accept a page or resource (overlay, page segment, or font) because the storage area is full. Delete all resources not necessary to continue printing and retransmit the page in progress. If this action fails, the recovery action depends on host support requirements.
15 Cancel	The printer operator requests that the current job be canceled. Cancel the job containing the page at the host-defined canceling point.
1A Re-drive Buffered Pages	The printer may not be in Ready State, may need paper or toner, or may have a full exit tray. Take the appropriate recovery action for the exception code and retransmit all pages and associated resources that have not been committed for printing.
1D Printer Characteristics Changed	At least one of the printer characteristics that is reported in the reply to an XOH OPC command has changed. The host should issue an XOH OPC command to obtain the new printer characteristics.
1E Asynchronous Out-of-Storage Exception	A resource or a page that is not currently being received at the Received Page ID caused an out-of-storage exception. The printer has discarded all buffered pages and reset the page and copy counters. The page on which this exception was discovered will not print. The host must issue an XOH PBD to ensure that the page and copy counters are accurately adjusted. After the XOH PBD has returned an ACK, the page in error is the page just before the Committed Page Counter. Cancel the printed data containing the page just before the Committed Page ID.
22 Printer Communications Inoperative	A printer condition exists from which the printer cannot recover without operator intervention. End the communication and the session.

Formats 0, 1, and 2 for Sense Bytes 4-18 and 20-23

Sense bytes 4 through 18 and 20 through 23 describe the cause of each exception condition. (Sense byte 19 is byte 3 of the exception code.) These descriptions are presented in three separate formats, which are explained below.

Format 0

Format 0 provides detailed information for all data stream exceptions except data check positioning exceptions. This format applies to all data check, specification-check, and command-reject exceptions, except for exceptions X'08C1..00', X'020A..05', and X'0411..00'.

Byte(s)	Meaning
4	Data exception, X'DE'
5	Format Identifier, X'00'
6,7	Count of occurrences of the exception (the printer provides an approximate count of occurrences of some exceptions)
8,9	ID of overlay that has an exception
10,11	ID of page segment that has an exception
12,13	Command in process when exception found
14,15	Object Identifier (other than overlay or page segment that has an exception, such as a font exception)
16,17	Identifies a part within an object that has the exception, such as " font"
18	Reserved
20-23	Page Identifier for the page that has the exception

Format 1

Format 1 provides detailed information for both data check positioning exceptions. This format applies only to data check exceptions X'08C1..00', X'020A..05', and X'0411..00'.

Byte(s)	Meaning
4	Data exception, X'DE'
5	Format Identifier, X'01'
6, 7	Count of occurrences of the exception (the printer provides an approximate count of occurrences of some exceptions)
8, 18	Reserved
20-23	Page Identifier for the page that has the exception

Format 2

Format 2 provides detailed information for all device exceptions. This format applies to all intervention-required and equipment-check exceptions and for conditions requiring host notification.

Byte(s)	Meaning
4	System Reference Code, X'BF'
5	Format Identifier, X'02'
6-23	Format Identifier, X'02'

Exception-Reporting Codes

The following tables describe all printer exception codes that are returned to the host in the special data area of a NACK.

Each exception code is identified by three bytes: byte 0, byte 1, and byte 19. The first table lists the names of the exception classes which are returned in byte 0. The subsequent tables give detailed information about each of the groups listed in the first table.

🔽**Note**

- The printer provides an approximate count of occurrences of some exceptions.

Exception Classes

Sense Byte 0	Exception Class and Description
X'80'	Command Reject—the printer cannot recognize a received command.
X'50'	Equipment Check with Intervention Required—the printer detects a condition caused by hardware failure or hardware limitations, and manual intervention at the printer is required.
X'40'	Intervention Required—the printer detects a condition that requires manual intervention, such as "out of paper".
X'20'	Reserved
X'10'	Equipment Check—the printer detects an equipment malfunction or hardware error.

Sense Byte 0	Exception Class and Description
X'08'	Data Check—the printer detects a position exception or an undefined character exception.
X'05'	Specification Check - IO Images—the printer detects an invalid or unsupported data value in an IO image command.
X'04'	Specification Check - Bar Codes—the printer detects an invalid or unsupported data value in a bar code command.
X'03'	Specification Check - Graphics—the printer detects an invalid or unsupported data value in a graphics command.
X'02'	Specification Check - General—the printer detects an invalid or unsupported data value in a received command.
X'01'	Conditions Requiring Host Notification—the printer detects a condition that requires action by the host.

Tables of Printer Exception Codes

The following tables list specific exception classes and are arranged in three columns. The first column lists the 3-byte ID given in sense bytes 0, 1, and 19. The second column gives a description of each exception. The third column lists the action code given in sense byte 2.

Typically, when an exception has a defined AEA, the PCA is the AEA. Also, no PCA is taken when the command is received in Home state or Font state.

In each table, the exceptions are listed in ascending numeric order.

◆Note

- The term architecturally valid refers to the range of values permitted by the IPDS architecture. An "invalid" value denotes one outside the range defined by the architecture. "Supported" values are those that the printer accepts. Therefore, "unsupported" values may be valid by architecture but not in the printer implementation.

  - The machine supports 24 Byte Sense data (See "Sense Type and Model", IPDS Technical Reference 2).

  - The machine supports AEA and PCA error processing. See Intelligent Printer Data Stream Reference for details on Sense byte information and error processing.

- The maximum number of queued asynchronous and synchronous errors is 1 for Twinax and Coax DSC mode and 7 for Coax LU1 mode and TCP/IP mode.

- The cause of the exception and the Alternate Exception Action (AEA) are the same as specified in Intelligent Printer Data Stream Reference unless otherwise noted.

TCP/IP Sense Data

Intervention Required Sense Data

Exception ID	Meaning	Action Code
X'4000..00'	Printer not ready	3
X'4001..00'	Out of paper	3
X'4002..00'	Output bin full	3
X'4004..00'	Out of toner	3
X'4031..00'	Paper Length Check	3
X'4033..00'	Paper Width Check	3
X'407C..00'	Out of Staples	3
X'407C..01'	Staple jam	3
X'407C..03'	Punch waste bin full	3
X'40E6..00'	Cover open	3

IPDS Exceptions Reported

Command Reject Exceptions

Exception ID	Meaning	Action Code
X'8001..00'	Invalid IPDS command code	01
X'8002..00'	Invalid IPDS command sequence	01
X'8004..00'	Data received after ARQ	01
X'80E0..00'	Invalid IPDS command length	01

Equipment Check with Intervention Required

Exception ID	Meaning	Action Code
50F8..00	Media Source X'nn' is not available (has been disabled).	01

Intervention Required Exceptions

Exception ID	Meaning	Action Code
X'4000..00'	Printer is not ready: • The printer is in a not-ready state. • Alternate Exception Action: none. • Page Continuation Action: none.	1A
X'4001..00'	Printer is out of paper: • The printer is out of paper, and paper was not added within specified amount of time. • Alternate Exception Action: none. • Page Continuation Action: none.	1A
X'4002..00'	The printer's exit tray is full: • The printer's exit tray is full and it was not emptied within a specified amount of time. • Alternate Exception Action: none. • Page Continuation Action: none.	1A

Exception ID	Meaning	Action Code
X'4004..00'	Printer is out of toner: • The printer is out of toner, and toner was not added within a specified amount of time. • Alternate Exception Action: none. • Page Continuation Action: none.	1A
X'4031..00'	Paper Length Check • The printer has detected a paper-length check, and it has not been corrected by the operator after a specified amount of time. • Alternate Exception Action: none. • Page Continuation Action: none.	1A
X'4033..00'	Paper Width Check • The printer has detected a paper-width check, and it has not been corrected by the operator after a specified amount of time. • Alternate Exception Action: none. • Page Continuation Action: none.	1A
X'407C..00'	Out of Staples	1A
X'407C..01'	Staple jam	08
X'407C..03'	Punch waste bin full	1A

Exception ID	Meaning	Action Code
X'40E5..00'	Paper jam recovery needed: • A paper jam has occurred and has not been cleared within a specified amount of time. Any lost pages must be resent. • Alternate Exception Action: none. • Page Continuation Action: none.	08
X'40E6..00'	Cover open	03
X'40E8..nn'	Supported but not installed media source ID	1A

Equipment Check Exceptions

Exception ID	Meaning	Action Code
X'10F1..00'	Permanent hardware exception: • A permanent hardware failure exists. • The microcode detected either a logic exception from which the printer could not recover or a condition that should not have occurred. • Alternate Exception Action: none. • Page Continuation Action: none.	22

Data Check Exceptions

Exception ID	Meaning	Action Code
X'0821..00'	Undefined character	01
X'0860..00'	Numeric representation precision check	01
X'08C1..00'	Numeric representation precision check	01

IO-Image Specification Exceptions

Exception ID	Meaning	Action Code
X'0500..01'	Invalid or unsupported IO Image SDF code	01
X'0500..03'	Invalid or unsupported IO Image SDF	01
X'0500..04'	Invalid IO Image SDF value	01
X'0570..0F'	IO Image Begin Segment out of sequence	01
X'0571..0F'	IO Image End Segment out of sequence	01
X'0591..0F'	IO Image Begin Image Content out of sequence	01
X'0592..0F'	IO Image Data SDF out of sequence	01
X'0593..0F'	IO Image End Image Content out of sequence	01
X'0594..01'	Inconsistent Image Size Parameter value and Image data	01
X'0594..0F'	IO Image Size Parameter missing or out of sequence	01

Exception ID	Meaning	Action Code
X'0594..11'	IO Image Size cannot be determined	01
X'0595..0F'	IO Image Encoding Parameter out of sequence	01
X'0595..10'	IO Image Encoding Parameter unsupported Value	01
X'0595..11'	IO Image Decompression error	01
X'0596..0F'	IO Image Data Element Size Parameter out of Sequence	01
X'0596..10'	IO Image Data Element Size Parameter unsupported value	01
X'0596..11'	IO Image Data Element Size Parameter and Image Encoding Parameter inconsistent	01
X'0597..0F'	IO Image Look Up Table ID Parameter out of sequence	01
X'0597..10'	IO Image Look Up Table ID Parameter unsupported Value	01
X'05A9..02'	IO Image data outside the Image Presentation Space	01

Bar Code Specification Exceptions

Exception ID	Meaning	Action Code
X'0403..00'	Invalid or unsupported bar code type	01
X'0404..00'	Unsupported local-font ID or font not available	01
X'0405..00'	Invalid or unsupported bar code color	01

Exception ID	Meaning	Action Code
X'0406..00'	Invalid or unsupported module width	01
X'0407..00'	Invalid or unsupported element height	01
X'0408..00'	Invalid or unsupported height multiplier	01
X'0409..00'	Invalid or unsupported wide-to-narrow ratio	01
X'040A..00'	Invalid or unsupported symbol origin	01
X'040B..00'	Invalid or unsupported bar code modifier	01
X'040C..00'	Invalid or unsupported bar code data length	01
X'040E..00'	Check-digit calculation exception	01
X'040F..00'	Unsupported 2D bar code size	01
X'040F..01'	Invalid structured append sequence indicator	01
X'040F..02'	Structured append sequence indicator too large	01
X'040F..03'	Mismatched structured append information	01
X'040F..04'	Invalid number of structured append symbols	01
X'040F..05'	Invalid symbol mode value	01
X'040F..06'	Invalid data symbol characters per row value	01
X'040F..07'	Invalid desired number of row values	01

Exception ID	Meaning	Action Code
X'040F..08'	Too much data for a PDF417 bar code	01
X'040F..09'	Invalid security level value	01
X'040F..0A'	Incompatible combination of Data Matrix parameters	01
X'040F..0B'	Invalid structured append file identification value	01
X'040F..0C'	Invalid Macro PDF417 Control Block length value	01
X'040F..0D'	Invalid Macro PDF417 Control Block data	01
X'040F..0E'	Invalid QR Code EBCDIC Code Page value	01
X'040F..0F'	Invalid QR Code Version value	01
X'040F..10'	Invalid QR Code Error Correction-level value	01
X'040F..11'	Incompatible combination of QR Code Special-function flags	01
X'0410..00'	Invalid or unsupported human-readable interpretation location	01
X'0411..00'	Attempt to print portion of symbol outside block or VPA	01

Graphics Specification Exceptions

Exception ID	Meaning	Action Code
X'0300..01'	Unallocated or unsupported graphics order or command code	01
X'0300..02'	Reserved byte exception or invalid attribute set	01

Exception ID	Meaning	Action Code
X'0300..03'	Incorrect drawing order length	01
X'0300..04'	Invalid attribute value	01
X'0300..08'	Truncated order exception	01
X'0300..0C'	Segment prolog exception	01
X'0300..0E'	Unsupported attribute value	01
X'0300..21'	Invalid or unsupported default	01
X'0334..00'	Character angle value not supported	01
X'033E..00'	Invalid End Prolog	01
X'0360..00'	Area bracket exception	01
X'0368..00'	Begin Area received incorrectly	01
X'0368..01'	Area truncated exception	01
X'0368..02'	Supported order invalid in area	01
X'0368..03'	Pattern Symbol Set not supported	01
X'0368..04'	Undefined pattern symbol	01
X'0370..01'	Unsupported Begin Segment Introducer segment flag	01
X'0370..82'	Invalid Begin Segment Introducer segment flag	01
X'0370..C1'	Invalid Begin Segment Introducer length	01
X'0370..C5'	Insufficient Segment Data	01
X'0392..00'	Graphics image order sequence exception	01
X'0392..01'	Image data discrepancy	01

Exception ID	Meaning	Action Code
X'0393..00'	Graphics image bracket exception	01
X'0393..01'	Incorrect number of Image Data drawing orders	01
X'03C2..00'	Marker Symbol Set not supported	01
X'03C2..01'	Undefined marker code	01
X'03C3..00'	Font not available	01
X'03C3..01'	Undefined graphics character code	01
X'03C6..01'	Arc drawing check	01
X'03D1..00'	Truncated graphics image exception	01
X'03D1..01'	Invalid order in graphics image	01
X'03D1..02'	Graphics image format not supported	01
X'03D1..03'	Image width greater than maximum supported	01
X'03D1..04'	Image height greater than maximum supported	01
X'03E1..00'	Relative line outside coordinate space	01

General Specification Exceptions

Exception ID	Meaning	Action Code
X'0200..01'	Embedded Control Sequence Code Exception	01
X'0202..01'	End Suppression (ESU) text-control exception	01

Exception ID	Meaning	Action Code
X'0202..02'	Invalid or unsupported IPDS command length	01
X'0202..05'	Invalid data self-defining-field length	01
X'0203..02'	IPDS Command Header Length too small	01
X'0203..05'	Invalid or unsupported block orientation	01
X'0204..01'	EP command encountered	01
X'0204..02'	Invalid use of Acknowledgement Continuation Bit	01
X'0204..05'	Invalid or unsupported area-position reference system	01
X'0205..01'	Invalid spanning sequence	01
X'0205..05'	Invalid or unsupported self-defining-field unit base	01
X'0206..01'	Invalid Begin Suppression (BSU)	01
X'0206..05'	Invalid or unsupported self-defining field L-units	01
X'0207..05'	Invalid or unsupported self-defining-field extents or Graphic Window values inconsistent	01
X'0208..05'	Invalid or unsupported mapping option	01
X'0209..05'	Invalid or unsupported axis offsets	01
X'020B..05'	Invalid self-defining-field identifier	01

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Exception ID	Meaning	Action Code
X'020E..02'	Invalid or unsupported Color Space	01
X'020E..03'	Invalid or unsupported Color value	01
X'020E..05'	Invalid or unsupported number of bits for a color component	01
X'020F..01'	Invalid or unsupported Set Text Orientation (STO)	01
X'0210..01'	Invalid or unsupported Set Inline Margin (SIM)	01
X'0211..01'	Invalid or unsupported Set Baseline increment (SBI)	01
X'0212..01'	Invalid or unsupported inter-character adjustment	01
X'0213..01'	Invalid or unsupported Absolute Move Baseline (AMB)	01
X'0214..01'	Invalid or unsupported Absolute Move Inline (AMI)	01
X'0214..02'	The font resource to be deactivated is not found	01
X'0215..01'	Invalid or unsupported Relative Move Inline (RMI)	01
X'0215..02'	Invalid or unsupported DF command font or font-section ID	01
X'0216..01'	Invalid or unsupported Relative Move Baseline (RMB)	01
X'0217..01'	Invalid or unsupported Set Variable-Space Increment (SVI)	01
X'0217..02'	Invalid or unsupported DF command deletion type	01

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Exception ID	Meaning	Action Code
X'0218..02'	Invalid, unsupported, or unavailable font ID	01
X'0219..01'	Invalid or Unsupported value for Repeat String (RPS) repeat length	01
X'0219..02'	Multiple occurrences of the same LFE font-equivalence number	01
X'021A..01'	Repeat String (RPS) or Transparent Data (TRN) exception	01
X'021B..01'	Repeat String (RPS) target-string length exception	01
X'021B..02'	Invalid or unsupported Load Font Control unit base for L-units	01
X'021C..01'	Invalid escape sequence	01
X'021C..02'	Invalid LFC command byte-count value	01
X'021D..02'	Invalid or unsupported the Load Font Equivalence global font ID	01
X'021E..01'	Invalid WT text-control length	01
X'021F..01'	Repeat String (RPS) length exception	01
X'021F..02'	Mismatch of LFE command font Host-Assigned IDs	01
X'0220..02'	Invalid Load Font Control (Byte 36 value)	01
X'0221..02'	Invalid or unsupported Load Font Control font-index format	01
X'0222..02'	Invalid or unsupported Load Font Control data pattern format	01

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Exception ID	Meaning	Action Code
X'0223..02'	Invalid or unsupported Load Font Control font-type bits	01
X'0226..02'	Invalid or unsupported LSS or LFC X-box size	01
X'0227..02'	Invalid or unsupported LSS or LFC Y-box size	01
X'022A..02'	Invalid or unsupported Load Font Control L-Units per unit base in the X-direction	01
X'022B..02'	Invalid or unsupported Load Font Control L-Units per unit base in the Y-direction	01
X'022D..02'	Invalid or unsupported Load Font Control character-data alignment	01
X'022E..02'	Insufficient font data received	01
X'0231..01'	Invalid or unsupported Load Copy Control number of copies	01
X'0232..01'	Invalid or unsupported Load Copy Control Keyword in copy-group entry	01
X'0232..02'	Excess font data received	01
X'0234..01'	Invalid or unsupported Load Copy Control entry-byte count	01
X'0236..01'	Invalid or unsupported Load Copy Control simplex/duplex parameter	01
X'0237..01'	Invalid or Unsupported LCC N-up Parameter	01
X'0237..03'	Invalid or Unsupported LCC Media Destination Parameter	01

Exception ID	Meaning	Action Code
X'0237..04'	Incompatible Media Source and Media Destination	01
X'0237..05'	Mixture of Media Source or Destination IDs in a duplex copy-subgroup pair	01
X'0238..01'	Maximum supported number of Overlays per LCC copy-group exceeded	01
X'0239..01'	Maximum supported number of Suppressions per LCC copy-group exceeded	01
X'0239..02'	Load Font Control font Host-Assigned ID already assigned	01
X'023A..02'	Maximum number of Fonts allowed by printer exceeded	01
X'023C..02'	Invalid or unsupported value within Load Font Index command	01
X'023E..02'	Invalid Load Font Control character-pattern address	01
X'023F..02'	STO-SCFL-LFE mismatch	01
X'0240..02'	Invalid or unsupported value for Font Inline Sequence	01
X'0242..01'	WIC pixel count is less than the minimum required	01
X'0243..01'	WIC command pixel count is greater than the maximum supported value	01
X'0243..02'	Invalid double-byte font-section identifier	01
X'0244..01'	WIC command scan count is less than the minimum required	01

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Exception ID	Meaning	Action Code
X'0245..01'	WIC command scan count is greater than the maximum supported value	01
X'0246..01'	Invalid WIC source image format	01
X'0246..02'	Invalid parameter for the Load Font Index command	01
X'0247..01'	Invalid or unsupported Write Image Control magnification factor	01
X'0247..02'	Invalid or unsupported Load Font Equivalence font-inline sequence	01
X'0248..01'	Invalid or unsupported Write Image Control scan-line direction	01
X'0249..01'	Invalid scan-line-sequence direction in the WIC command	01
X'024A..01'	Invalid or unsupported Write Image Control image block location	01
X'0253..01'	Invalid or unsupported Write Image Control image color	01
X'0254..41'	Invalid Finishing Fidelity Triplet Length	01
X'0254..42'	Invalid Finishing Fidelity Triplet Continue value	01
X'0254..43'	Invalid Finishing Fidelity Triplet Report value	01
X'0254..51'	Invalid Text Fidelity Triplet Length	01

Exception ID	Meaning	Action Code
X'0254..52'	Invalid Text Fidelity Triplet Continue value	01
X'0254..53'	Invalid Text Fidelity Triplet Report value	01
X'0258..03'	Invalid or unsupported text color	01
X'0260..02'	Invalid or unsupported Load Page Descriptor Xp and I L-units per unit base	01
X'0261..02'	Invalid L-Units (Yp) Value in the LPD command	01
X'0262..02'	Invalid or unsupported Load Page Descriptor Xp-extent	01
X'0263..02'	Invalid or unsupported Load Page Descriptor Yp-extent	01
X'0264..02'	Invalid or unsupported Load Page Descriptor unit base	01
X'0268..02'	Invalid or unsupported Load page Descriptor	01
X'0269..02'	Invalid baseline-sequence direction in the LPD command	01
X'026A..01'	Insufficient source image data	01
X'026A..02'	Invalid or unsupported LPD initial I print coordinate	01
X'026B..01'	Excess source image data received	01
X'026B..02'	Invalid or unsupported LPD initial B print coordinate	01
X'026F..02'	Invalid XOH-SMO Media Origin	01

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Exception ID	Meaning	Action Code
X'0270..02'	Invalid or unsupported XOH Set Media Size L-units per unit base	01
X'0272..02'	Invalid or unsupported XOH Set Media Size Xm-extent	01
X'0273..02'	Invalid or unsupported XOH Set Media Size Ym-extent	01
X'0274..02'	Invalid or unsupported XOH Set Media Size unit base	01
X'0277..01'	Group Termination Exception	01
X'027A..01'	Invalid triplet length value in a group triplet	01
X'027B..01'	Incorrect number of triplet data bytes in a group triplet	01
X'027C..01'	Incompatible finishing operations	01
X'027C..02'	Too many or too few sheets for a finishing operation	01
X'027C..03'	Invalid or unsupported finishing operation type	01
X'027C..04'	Invalid or unsupported finishing operation reference corner and edge	01
X'027C..05'	Unsupported finishing operation count	01
X'027C..06'	Invalid or unsupported finishing operation axis offset	01
X'027C..07'	Invalid or unsupported number of finishing positions	01
X'027C..09'	Finishing operation incompatible with physical media or media destination	06

Exception ID	Meaning	Action Code
X'027C..0A'	Incompatible media destination change in a group to be finished	06
X'0280..02'	Invalid or unsupported rule width	06
X'0282..02'	Invalid or unsupported rule length	01
X'0285..01'	Invalid or unsupported Delete Overlay command overlay ID	01
X'0287..02'	Invalid or unsupported Load Font Control unit base for Pixel-units	01
X'0288..02'	Invalid or unsupported Load Font Control Pixel-units per unit base in the X-direction	01
X'0289..02'	Invalid or unsupported Load Font Control Pixel-units per unit base in the Y-direction	01
X'028A..01'	Invalid or unsupported Delete Page Segment command page segment Host-Assigned ID	01
X'028A..02'	Invalid or unsupported Load Font Control Relative-Metric Multiplying Factor	01
X'028F..01'	Invalid or unsupported AR command parameter values	01
X'028F..02'	AR activation command failed	01
X'028F..03'	Invalid Resource ID triplet length	01
X'028F..04'	Invalid or unsupported resolution or metric-technology value	01

4

Exception ID	Meaning	Action Code
X'028F..10'	Invalid or unsupported value in a Metric Adjustment triplet	01
X'028F..11'	Baseline adjustment value too large or too small	01
X'0290..01'	Invalid or unsupported Overlay ID	01
X'0291..01'	BO overlay ID already loaded	01
X'0291..02'	Invalid or unsupported XOA Request Resource list entry	01
X'0292..01'	Overlay ID not loaded	01
X'0293..01'	Recursive overlay invocation	01
X'0294..01'	Invalid or unsupported page segment Host-Assigned ID	01
X'0295..01'	Page segment Host-Assigned ID already loaded	01
X'0295..02'	Invalid or unsupported XOH Page Counters Control page-counter update	01
X'0296..01'	Page segment Host-Assigned ID not loaded	01
X'0297..01'	Overlay nesting limit exceeded	01
X'0298..01'	Invalid or unsupported suppression number	01
X'0298..03'	Invalid or unsupported Temporary Baseline Move text control	01
X'029A..01'	Invalid overstrike character increment	01
X'02A4..01'	Page boundary in the X-direction cannot be presented by the printer	01

Exception ID	Meaning	Action Code
X'02A5..01'	Page boundary in the Y-direction cannot be presented by the printer	01
X'02AC..01'	Insufficient Main Storage to print the Sheet	09
X'02AD..01'	Invalid or unsupported Load Page Position command	01
X'02AE..01'	Invalid or unsupported parameter in an IO command	01
X'02AF..01'	Insufficient storage to print the sheet	0C
X'02AF..01'	Asynchronous Insufficient storage to print the sheet	1E
X'02B0..00'	LCPC Code Page HAID already in use	01
X'02B0..01'	Invalid LCPC Code Page HAID	01
X'02B0..02'	Invalid or Unsupported LCPC Encoding Scheme	01
X'02B0..04'	Too much or too little code page data	01
X'02B0..05'	Invalid or Unsupported LCPC Byte count	01
X'02B0..07'	Code points out of order in LCP command	01
X'02B0..0A'	LFCSC HAID already assigned	01
X'02B0..0B'	Invalid LFCSC HAID	01
X'02B0..0C'	Invalid or Unsupported LFCSC pattern technology ID	01
X'02B0..0E'	Invalid or Unsupported LFCSC Byte count	01

4

Exception ID	Meaning	Action Code
X'02B0..0F'	Invalid or Unsupported LFCSC Map size	01
X'02B1..01'	Invalid or Unsupported LF Character ID format	01
X'02B1..02'	Invalid LF technology specific ID offset	01
X'02B1..03'	Invalid LF technology specific ID length	01
X'02B1..04'	GCGIDs out of order in a Font Character Set	01
X'02B1..08'	Invalid LF technology specific object length	01
X'02B1..09'	LF checksum mismatch	01
X'02B1..0A'	Invalid Name Length in LF3 technology specific object	01
X'02B1..0B'	Invalid data within a LF3 technology specific object	01
X'02B2..01'	Parent character set not activated	01
X'02B2..02'	Font character set extension not valid with pattern technology	01
X'02B2..03'	Mismatched character ID format in a LF command	01
X'02B2..04'	Mismatched MICR printing flag in a LFCSC command	01
X'02C0..01'	Mixture of Xm-axis duplex and Ym-axis duplex copy groups	01
X'02C0..02'	Mixture of N-up copy subgroups in a LCC command	01
X'02C0..03'	More than one N-up keyword specified in a copy subgroup	01

Exception ID	Meaning	Action Code
X'02C0..04'	Duplexing and N-up not supported together	01
X'02C0..05'	N-up partitioning not supported with envelope media	01
X'02C1..01'	Maximum number of simplex or duplex keywords in an LCC command	01
X'02C1..02'	Internal value not unique in an LE command	01
X'02C2..01'	Odd number of duplex copy groups in an LCC command	01
X'02C2..02'	More than one Media Source or Destination Keyword specified in a copy subgroup	01
X'02C3..01'	Mixture of simplex and duplex parameters in an LCC command	01
X'02C4..01'	Unequal copy counts in an LCC command	01
X'02C5..01	Unable to delete resource (needed on duplex side)	01
X'02C5..02'	Physical media not compatible with duplex printing	01
X'02C6..01'	Unable to deactivate a component of an activated coded font	01
X'02C6..02'	Invalid mapping type in an LE command	01
X'02C8..01'	An unsupported Input Media Source ID was specified	01
X'02C8..02'	Invalid or unsupported internal value or external value in an Load Equivalence command	01

4

Exception ID	Meaning	Action Code
X'02FF..02'	Exceptions detected but not queued	01

Host Notification Exceptions

Exception ID	Meaning	Action Code
X'0100..00'	Normal Printer Restart (Printer IMLed or IPDS Dialog Resources Deleted)	0D
X'0101..00'	Media Size or Input Media Source ID Changed	1D
X'0180..00'	Request to end IPDS Dialog	05
X'018F..00'	Error Printer Restart (Printer IMLed)	0D
X'01E4..00'	Cancel Key Pressed	15

Page Counter Adjustments

To identify which page or pages to send to the printer after an exception occurs, the host program must determine the position of the sheets in the paper path.

Count fields in the ACK command identify the state of a virtual paper path that includes a count of the number of pages received, the number of pages past the jam-recovery point, and the number of pages stacked.

The printer tracks the following:

- Received Page Counter
- Committed Page Counter
- Committed Copy Counter
- Stacked Page Counter
- Stacked Copy Counter

All other counters are mapped to the Stacked Page Counter (for pages) and the Stacked Copy Counter (for copies).

The following rules define how the counters are updated:

- After power is switched on, all counter values equal X'0000'.

- When a counter containing X'FFFF' increments, the counter wraps to X'0000'.

- The counters are updated as shown in the following table as each condition is detected.

- The Copy Counters are incremented when more than one copy of a page is printed. When all copies have passed a station, the Copy Counter is then reset to zero and the Page Counter is incremented.

The Copy Counters are not reset to zero during exception recovery.

Condition (in hex)	Counters	Counter Adjustments
Action Codes 08 22	Received Page Counter	Set to Jam Recovery Page Counter
	Committed Page Counter	Set to Jam Recovery Page Counter
	Committed Copy Counter	Set to Jam Recovery Page Counter
	Operator Viewing Page Counter	Set to Jam Recovery Page Counter
	Operator Viewing Copy Counter	Set to Jam Recovery Page Counter
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	Set to Jam Recovery Page Counter
	Stacked Copy Counter	Set to Jam Recovery Copy Counter
Action Codes 15 1A 1D	Received Page Counter	Set to Committed Page Counter
	Committed Page Counter	No change
	Committed Copy Counter	No change
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change

4

Condition (in hex)	Counters	Counter Adjustments
Action Code 0C	Received Page Counter	No change
	Committed Page Counter	No change
	Committed Copy Counter	No change
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change
Action Code 01	Received Page Counter	No change
	Committed Page Counter	No change
	Committed Copy Counter	No change
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change

Condition (in hex)	Counters	Counter Adjustments
Action Code 1E	Received Page Counter	Set to Committed Page Counter
	Committed Page Counter	No change
	Committed Copy Counter	No change
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change
All other action codes	Received Page Counter	No change
	Committed Page Counter	No change
	Committed Copy Counter	No change
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change

4

Condition (in hex)	Counters	Counter Adjustments
Command XOA - Discard Buffered Data	Received Page Counter	Set to Committed Page Counter
	Committed Page Counter	No change
	Committed Copy Counter	No change
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change
Normal Counter Wrap (on a Per-Counter Basis)	Received Page Counter	Reset to 0
	Committed Page Counter	Reset to 0
	Committed Copy Counter	Reset to 0
	Operator Viewing Page Counter	Reset to 0
	Operator Viewing Copy Counter	Reset to 0
	Jam Recovery Page Counter	Reset to 0
	Jam Recovery Copy Counter	Reset to 0
	Stacked Page Counter	Reset to 0
	Stacked Copy Counter	Reset to 0

Condition (in hex)	Counters	Counter Adjustments
Command XOH - Page Counters Control	Received Page Counter	For details about XOH PCC command, see "Device Control Command Set", IPDS Technical Reference 2.
	Committed Page Counter	
	Committed Copy Counter	
	Operator Viewing Page Counter	
	Operator Viewing Copy Counter	
	Jam Recovery Page Counter	
	Jam Recovery Copy Counter	
	Stacked Page Counter	
	Stacked Copy Counter	

◆Note

- Should not be incremented for page in error (that is, any partial page is discarded).

- The Received Page Counter should be incremented if a partial or complete page is printed.

- For Action Code X'1E', the host should issue an XOH Print Buffered Data command with the ARQ bit on and a unique correlation ID (to ensure that the Acknowledge Reply matches the Print Buffer Data [PBD] command) to cause the Committed Page/Copy Counter to reflect the page in error.

Page and Copy Counter Adjustments for Data-Stream Exceptions

The following are counter adjustments for simplex copy groups.

Condition (in hex)	Counters	Counter Adjustments
Action Code 01 and the page is printed	Received Page Counter	Does not reflect the page in which the error occurs.
	Committed Page Counter	No change
	Committed Copy Counter	Reflects any committed copies resulting from prior error-free copy groups.
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change
Action Code 01 and the page is not printed	Received Page Counter	Reflects the page in which the error occurs, only if the error occurred on the last copy group.
	Committed Page Counter	No change
	Committed Copy Counter	Reflects any committed copies resulting from prior error-free copy groups or from the copy group in error.
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change

The following are counter adjustments for duplex copy groups.

Condition (in hex)	Counters	Counter Adjustments
Action Code 01 on the front side and the page is printed	Received Page Counter	Reflects the page in which the error occurs (the front side) only if the error occurred on the other in a copy group other than the first copy group.
	Committed Page Counter	No change
	Committed Copy Counter	Reflects any committed copies resulting from prior error-free copy group pairs.
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change
Action Code 01 on back side and the page is not printed	Received Page Counter	Does not reflect the page in the error occurs (the back side) it does reflect the front side.
	Committed Page Counter	No change
	Committed Copy Counter	Reflects any committed copies resulting from prior error-free copy group pairs.
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change

4

Condition (in hex)	Counters	Counter Adjustments
Action Code 01 on the front side and the page is not printed	Received Page Counter	Reflects the page in which the error occurs (front side).
	Committed Page Counter	No change
	Committed Copy Counter	Reflects any committed copies resulting from prior error-free copy group pairs.
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change
Action Code 01 on the back side and the page is printed	Received Page Counter	Reflects the page in which the error occurs (back side) only if the error occurred on the last copy group. Reflects front side.
	Committed Page Counter	No change
	Committed Copy Counter	Reflects any committed copies resulting from prior error-free copy group pairs or from the copy group in error.
	Operator Viewing Page Counter	No change
	Operator Viewing Copy Counter	No change
	Jam Recovery Page Counter	No change
	Jam Recovery Copy Counter	No change
	Stacked Page Counter	No change
	Stacked Copy Counter	No change

5. Code Page and Font Identification

About Code Page and Font Identification

The machine supports both raster and outline technology fonts: Single and Double byte. The resident single-byte LF1 "raster" fonts are generated using outline font technology (IBM AFP Font Collection): the IBM Core Interchange Font Set, the IBM Coordinated Font Set and the 4028 Compatibility Font Set.

The valid combinations of GCSGID/CPGID, GCSGID/FGID/FW, or GCSGID/ CPGID/FGID/FW are too numerous to list here. They can be obtained by the host using the Any state command "XOA Request Resource List", IPDS Technical Reference 2 with the appropriate Resource Type and RIDF.

They can also be determined by using the information under p.95 "Resident IPDS Fonts" with the criteria described in the following sections:

⬇ Note

- The machine supports Download and Capture of Font Resources. There is Date/Time stamp information to help identify versions of font resources. p.89 "Coded Font" includes the Date/Time stamps for the resident fonts.

- The machine will report DBCS raster font (and any captured raster fonts) using the RRL command when the IPDS Resolution (op panel) setting is Independence Mode. If the IPDS Resolution (op panel) setting is an Acceptance Mode, only those raster fonts with resolutions that match the current Acceptance mode resolution setting (240 or 300 or 600 DPI), will be reported via RRL.

RRL RT'06' Code Page (CPGID)

Values are listed in p.93 "Font Terms", p.95 "Resident IPDS Fonts", and p.97 "XOA-RRL Replies for Font Character Sets", and will be reported via XOA-RRL RT 06 RIDF 03.

RRL RT'12' Specific Code Pages (GCSGID/CPGID)

Valid combinations are listed in p.93 "Font Terms", p.97 "XOA-RRL Replies for Font Character Sets", and p.97 "XOA-RRL Replies for Font Character Sets", and will be reported via XOA-RRL RT 12 RIDF 03.

RRL RT'11' Graphic Character Sets (GCSGID SUB/SUPERSETS)

Valid combinations are listed in p.97 "XOA-RRL Replies for Font Character Sets" (GCSGID Subsets for the Strategic Font Set 2) and will be reported via XOA-RRL RT 11 RIDF 03.

RRL RT'07' Font Character Sets (GCSGID/FGID/FW)

- Valid combinations for the IBM Core Interchange Set are listed inp.90 "Code Page" (IBM Core Interchange Resident Scalable Font Set), and will be reported via XOARRL RT 07 RIDF 03.

  - Scalable Font Width (FW) will be reported as 0 to the host PSF. This indicates that any width/scale-factor is valid.

  - p.92 "Operating System/400 Terms" (GCSGID Subsets for IBM Core Interchange Fonts) shows the subset GCSGIDs for each of the listed superset GCSGIDs in p.90 "Code Page" (IBM Core Interchange Resident Scalable Font Set). These subset GCSGIDs are valid combinations for the associated superset GCSGIDs in the GCSGID/ FGID/FW, but will not be added to the RRL 0703 response unless required by the host PSF's.

- Valid combinations for the IBM Coordinated Set are listed in p.97 "XOA-RRL Replies for Font Character Sets" (Resident PSC Strategic Scalable Font Set 2) and will be reported via XOA-RRL RT 07 RIDF 03.

  - Scalable Font Width (FW) will be reported as 0 to the host PSF. This indicates that any width/scale-factor is valid.

  - p.97 "XOA-RRL Replies for Font Character Sets" (GCSGID Subsets for the Strategic Font Set 2) shows the subset GCSGIDs for each of the listed superset GCSGIDs in p.96 "IBM Core Interchange Resident Scalable Font Set (IPDS only)" (Resident PSC Strategic Scalable Font Set 2). These subset GCSGIDs are valid combination entries for the associated superset GCSGIDs in the GCSGID/FGID/FW, but will not be added to the RRL 0703 response unless required by the host PSF's.

- Valid combinations for the 4028 Compatibility Set require p.94 "Font and Code Page Selection" (FGID/FW) and p.95 "Resident IPDS Fonts" (GCSGID), and will be reported via XOA-RRL RT 07 RIDF 03.

  - The FW's for these fonts are non-zero, because they represent fixed-width fonts.

  - The Alternate FGIDs are valid values for GCSGID/FGID/FW combinations.

  - Native Mode - These fonts (which are representing 4028 raster fonts) don't have a GCSGID of their own, so the GCSGID used is from the associated Code Pages (CPGIDs).The GCSGIDs are obtained by finding the Code Page(s) in p.95 "Resident IPDS Fonts" that matches the Code Page(s) listed for a given FGID/FW entry in p.94 "Font and Code Page Selection". The GCSGID for each of the Code Pages listed with an FGID is a valid combination entry. Since these fonts don't have a superset GCSGID, there is no subset condition. So each of these unique GCSGID/FGID/FW combinations will be added to the XOA-RRL 0703 report to the host PSF.

  - 4028 Emulation Mode - These fonts (which are representing 4028 raster fonts) don't have a GCSGID of their own, so the GCSGID used is 0.

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RRL RT'01'/'03'/'10' RIDF'03' (GCSGID/CPGID/FGID/FW = GRID)

- Valid combinations for the IBM Core Interchange Set require p.90 "Code Page" (IBM Core Interchange Resident Scalable Font Set) (superset GCSGID/FGID/FW), p.92 "Operating System/400 Terms" (GCSGID Subsets for IBM Core Interchange Fonts) (GCSGID subsets) and p. 93 "Font Terms" (GCSGID/ CPGID), and will be reported via XOA-RRL RT 01 RIDF 03 (also RT 10 RIDF 03). In all GRIDs, the GCSGID chosen will belong to the Code Page, as this is almost always the subset of the outline font GCSGID.

  - Scalable Font Width (FW) will be reported as 0 to the host PSF. This indicates that any width/ scale-factor is valid.

  - CPGIDs and GCSGIDs are listed in p.93 "Font Terms". For each pair, determine which FGIDs in p.90 "Code Page" (IBM Core Interchange Resident Scalable Font Set) which contains the p.93 "Font Terms" GCSGID as a subset. An example is that there would be 51 GRID combinations for the Times New Roman Medium font...FGID is always 2308, FW is always 0, and there are 51 unique CPGID/GCSGID pairs in Table p.93 "Font Terms" which are subsets of the superset GCSGID 1269.

- Valid combinations for the IBM Coordinated Set require p.119 "IBM Coordinated Font Set (IPDS)" (Resident PSC Strategic Scalable Font Set 2) (superset GCSGID/FGID/FW), p.121 "IBM Coordinated Font Set Code Page Set" (GCSGID Subsets for the Strategic Font Set 2) (GCSGID subsets) and p.106 "IBM Core Interchange Resident Code Page Set" and p.121 "IBM Coordinated Font Set Code Page Set" (GCSGID/CPGID), and will be reported via XOA-RRL RT 01 RIDF 03 (also RT 10 RIDF 03). In all GRIDs, the GCSGID chosen will belong to the Code Page, as this is almost always the subset of the outline font GCSGID.

  - Scalable Font Width (FW) will be reported as 0 to the host PSF. This indicates that any width/ scale-factor is valid.

  - CPGIDs and GCSGIDs are listed in p.93 "Font Terms" and p.97 "XOA-RRL Replies for Font Character Sets". For each pair, determine which FGIDs in p.96 "IBM Core Interchange Resident Scalable Font Set (IPDS only)" (Resident PSC Strategic Scalable Font Set 2) can combine with them. This is done by finding the superset GCSGID in p.97 "XOA-RRL Replies for Font Character Sets" (GCSGID Subsets for the Strategic Font Set 2) which contains the p. 93 "Font Terms" GCSGID as a subset. An example is that there would be 41 GRID combinations for the Letter Gothic font...FGID is always 400, FW is always 0, and there are 41 unique CPGID/GCSGID pairs in p.93 "Font Terms" and p.97 "XOA-RRL Replies for Font Character Sets". which are subsets of the superset GCSGID 2039.

- Valid combinations for the 4028 Compatibility Set require p.94 "Font and Code Page Selection" (FGID/FW) and p.95 "Resident IPDS Fonts" (GCSGID/CPGID), and will be reported via XOA-RRL RT 01 RIDF 03. In all GRIDs, the GCSGID chosen will belong to the Code Page, as this is almost always the subset of the outline font GCSGID.

  - The FW's for these fonts are non-zero, because they represent fixed-width fonts.

  - The Alternate FGIDs are valid values for FGID/FW combinations.

- The GCSGID/CPGID pairs for each font are obtained by finding the Code Page(s) in p.95 "Resident IPDS Fonts" that match the Code Page(s) listed for a given FGID/FW pair in p.94 "Font and Code Page Selection".

6. Fonts

IBM Font Structure

In IBM AFP terminology, a font has three components. They are:

- Coded font
- Character set
- Code page

```
                    ┌─────────────────────────┐
                    │       Coded Font        │
                    └─────────────────────────┘
                      │                     │
┌──────────────────────────┐   ┌──────────────────────────┐
│ Character Set            │   │ Code Page                │
│  • Characters            │   │  • Characters IDs        │
│  • Character properties  │   │  • Code points           │
│  • Printing attributes   │   │                          │
└──────────────────────────┘   └──────────────────────────┘
```
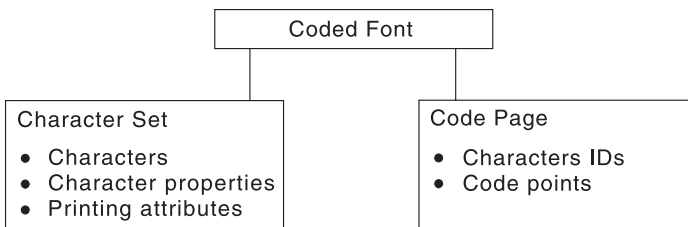
↓Note

- These terms have different meanings in Operating System/400 (OS/400). See p.92 "Operating System/400 Terms" for what these terms mean in OS/400.

Coded Font

In IBM font structure, a coded font translates your request for type (for example, text you previously entered at a computer terminal) into characters for printing.

A coded font consists of two parts:

- References to specific character sets
- References to specific code pages

A character must be included in the specified character set and listed on the specified code page before it can be printed.

A coded font associates a specific code page with a specific character set. A coded font contains one code-page and one character-set pair.

Character Set

In IBM font structure, a character set corresponds to the definition of a font; it contains the characters of a single type family, typeface, and type size. In addition, a character set specifies character properties and printing attributes.

```
                         ┌─────────────────────────┐
                         │      Character Set       │
                         └─────────────────────────┘
         ┌───────────────────────┼───────────────────────┐
┌─────────────────┐  ┌─────────────────────┐  ┌─────────────────────────┐
│ Characters      │  │ Character Properties│  │ Printing Attributes     │
│                 │  │  • Baseline         │  │  • Character rotation   │
│                 │  │  • Position         │  │  • Maximum ascender     │
│                 │  │  • Character ID     │  │  • Point size           │
└─────────────────┘  └─────────────────────┘  └─────────────────────────┘
```
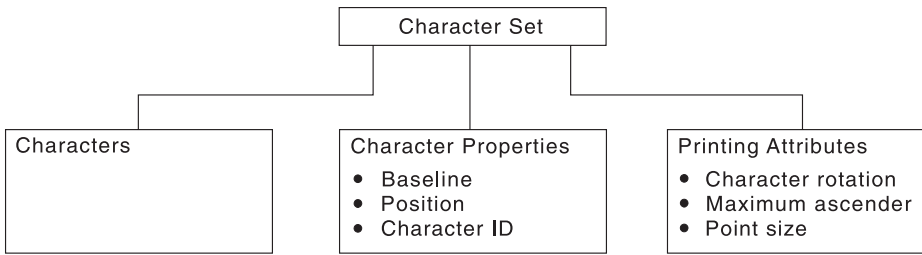
Characters

Characters are the letters, numerals, punctuation marks, or other symbols of a font.

Character properties

Character properties detail how a character is positioned relative to the characters around it. Some character properties include the following:

- The baseline of a character, showing its general alignment

- The dimensions of space in which the character is printed

- The position of the character within that space

- The identifier of the character (the character ID)

One of the character properties is the character ID (or graphic character ID). Each character is assigned a character ID; for example, the character A (uppercase A) is assigned the character ID LA020000.

The purpose of a character ID is to distinguish the character from similar characters. For example, the following characters look similar; however, they are different and are assigned different character IDs:

Minus sign (-): Character ID SA000000

Hyphen (-): Character ID SP100000

Em dash (—): Character ID SM900000

For a list of character IDs and the graphic character each represents, refer to "ABOUT TYPE: IBM's Technical Reference for Core Interchange Digitized Type".

Printing attributes

The printing attributes define how the character set will be printed. Some printing attributes include rotation of characters, maximum ascender, and point size.

Code Page

A code page is a set of symbols that can be printed by your printer. These symbols can be letters, numbers, or graphic elements such as lines or patterns. The symbols may be grouped to be specific to a country, language, or special symbol set. By supporting different code pages, the printer can support different language requirements.

No particular typeface is assumed for any particular code page. The typeface is defined as a font by the assignment of size, weight, and posture.

Character IDs and Code Points

In IBM font structure, a code page maps each character of text to the characters in a character set. The following figure shows how a code page maps text to the characters in a character set. As you enter your text at a computer terminal, each keyboard character is translated into a code point. When the text is printed, each code point is matched to a character ID on the code page you specified. The character ID then is matched to the image (raster pattern) of the character in the character set you specified. The image in the character set is the image that is printed in your text. To be a valid code page for a particular character set, all character IDs in the code page must be included in that character set.
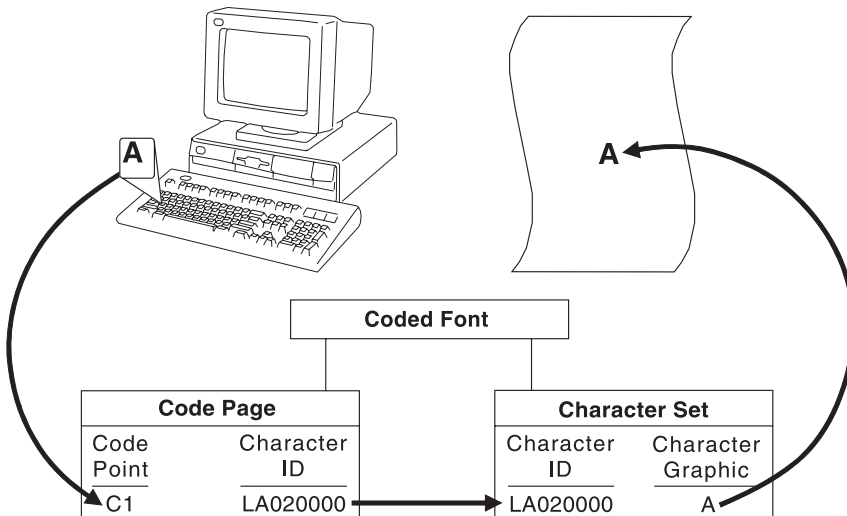
Every code page has 256 positions, or code points, that represent potential characters. Each of the code points is normally identified by its bit configuration in hexadecimal, with two hex characters per byte. The range of values is hex 00 through hex FF, or 256 values. The code page determines which character prints for each of the printable code points.

A character ID is an 8-byte standard identifier for a character regardless of its type family. For example, all uppercase "A" have the same character ID (LA020000). Character IDs also are called graphic character identifiers (GCIDs).

Binary: 11000001

Decimal: 193

Hexadecimal: C1

The following figure shows an example of a part of a code page. When the printer receives hexadecimal code point C1 for the code page shown (code page 00037 Version 1), it prints an uppercase A (character ID LA020000). Baselines for each character on the example code page show the general alignment of characters.

Different Code Pages

Code pages accommodate various national languages by using characters and special symbols appropriate to the language. Code pages can have identical character IDs assigned to different code points.

For example, the character é (lowercase e accent acute, character ID LE110000) has the following code point assignment in two different code pages:

- Hexadecimal code point 51 in code page 00037 Version 1
- Hexadecimal code point 5A in code page 00280 Version 1

Operating System/400 Terms

Table 158 lists the IBM AFP font terminology and describes how it is used with the OS/400 printing interfaces.

AFP Term	OS/400 AFP Implementation	OS/400 Print File Term
Coded font	*FNTRSC object with CDEFNT attribute	Coded font
Character set	*FNTRSC object with FNTCHRSET attribute	Font
Code page	*FNTRSC object with CDEPAG attribute	Character ID (CHRID)

↓Note

- This is not the character ID that identifies individual characters within an AFP character set. This is a control object that identifies a code page by two numbers representing a character set ID and a code page ID.

Font Terms

A font is a complete set of characters in a particular typeface, type size, and code page.

The following terms help define a font:

Character Set

A set of numeric, alphabetic, or graphic characters with their assigned code points.

Code Page

A table of alphanumeric characters and graphic characters each of which is assigned a 1-byte value (a code point). These values define which characters will print.

Code Page Global ID (CPGID)

Identifies a specific set of code points assigned to a specific list of graphic character IDs.

Font Global ID (FGID)

Specifies a value for selecting a font. IBM fonts have a preassigned FGID value.

Graphic Character Set Global ID (GCSGID)

Identifies the list of graphic character IDs included in the code page.

Spacing

Also called font width or escapement. Spacing is the distance from the start of a character to the start of the next character. Font spacing can be defined by spacing type:

- Fixed-pitch fonts – All characters in a fixed-pitch font have the same spacing, which is specified as the number of characters per inch.

- Typographic fonts – Typographic fonts are identified as Typo.

Most documents are easier to read if the widths of the characters vary, that is, if a W is printed wider than an I. Typographic fonts have this variability. These fonts are sized by height, not width.

Seventy-two points equals approximately one inch. Therefore, a 10-point font is 10/72 inch high.

Type height includes some white space above and below the printed character for adequate minimum spacing between the lines of type.

Text is most readable when character spacing ranges from 8 to 12 points. For example, the text in this document is 10 point.

⊕Note

- For typographic fonts, it is recommended that the first and last print positions on each line be left blank.

    - Proportionally spaced machine (PSM) fonts – Proportionally spaced machine fonts are identified by PSM or PS. PSM fonts are a compromise between the variability of typographic sizes and the simple uniformity of fixed pitch. With PSM fonts, the widths of the characters vary. For example, a lowercase "i" has a different width than an uppercase W. However, a specific character in one font will be the same width in another font. For example, a W in one

6

PSM font is the same width as the W in every other PSM font. Therefore, it is possible to have only one character-width table that applies to every PSM font.

Posture

Refers to a character's incline, or tilt. Roman posture is upright. Italic posture is inclined to the right.

Type Size

Also called point size. Specifies the overall height of the font, measured in printer's points. A point is 1/72 inch. For example, a 12-point font is 1/6 inch high.

Typeface

Also called type style. Specifies the shape and design of each letter of the alphabet. A complete alphabet of letter designs makes up one typeface.

Weight

Refers to the thickness of the strokes that make up the characters of a font, as in a bold font weight.

Font and Code Page Selection

Printers with an IPDS feature receive IPDS commands to specify fonts. The IPDS command set can select any font or code page supported by the printer. See the printer User's Guide for a list of the IPDS fonts supported. However, host software may restrict the actual fonts or code pages that can be selected. This includes typographic and nontypographic fonts in all pitches, point sizes, and widths. The information provided to the printer to select a font is called a GRID (Global Resource Identifier). The GRID consists of the following (See p.93 "Font Terms" for a description of these terms):

- FGID (Font Global Identifier)
- GCSGID (Graphic Character Set Global Identifier)
- CPGID (Code Page Global Identifier)
- Font Width

For typographic fonts with the same FGID, specify the FONT WIDTH parameter to the printer. The printer needs the font width parameter to identify the font in order to specify the point size. The FONT WIDTH parameter is described in detail in the IPDS section.

You can select the code page and code page version from a configuration setting. Refer to your printer's User's Guide for instructions on changing code page and code page version configuration settings. Some system software does not allow you to change code pages by software and uses the printer default code page for printing. The printer factory default character set is 0697 and the code page is 00037 version 1.

This may require you to change the printer code page to match the system software.

Note

- When using an application that does not allow selection of font width, use the alternate FGID when available to access typographic fonts.

Resident IPDS Fonts

Printer will support outline fonts from both the IBM Core Interchange Font Set and the IBM Coordinated Font Set as resident fonts. In addition, selections of these fonts are grouped into the 4028 Compatibility Font set. This set is used to represent the 4028 base internal raster fonts for limited compatibility. The font technologies used in the printer are:

```
IBM Core Interchange - Type 1 Outlines
IBM Coordinated - Type 1 Outlines
4028 Compatibility - Type 1 Outlines
3820 ROM Font Compatibility - Raster
```

Resident Font Activation Methods

Fonts resident within the Printer may be activated using the following IPDS commands. Note that some fonts have restrictions on allowable font activation methods.

Load Font Equivalence

The Load Font Equivalence (LFE) command maps font local identifiers, specified within text, graphics or bar code data, to font Host Assigned IDs (HAIDs) and Global Resource IDs (GRIDs).

If the GRID specified in the LFE command matches a GRID contained in the printer, the font is activated.

Activate Resource (Load Resource Equivalence)

The Activate Resource (AR) command (previously known as Load Resource Equivalence) maps Host Assigned IDs to global names of another format. The format for the global name is identified by a resource type and resource ID combination.

If the Printer has a resource that matches the global name in the AR command, that resource is activated.

The following combinations of Resource Type and Resource ID Format are supported by the Printer.

Resource Type	RT Hex	Resource ID Format	RIDF Hex
Single Byte Coded Raster Font	X'01'	IBM GRID	X'03'
Single Byte Coded Raster Font	X'01'	MVS Host Unalterable	X'06'
Double Byte Coded Font Section	X'03'	IBM GRID	X'03'
Double Byte Coded Font Section	X'03'	MVS Host Unalterable	X'06'

Resource Type	RT Hex	Resource ID Format	RIDF Hex
Code Page	X'06'	IBM GRID	X'03'
Font Character Set	X'07'	IBM GRID	X'03'
Single Byte Coded Font Index	X'08'	IBM GRID	X'03'
Single Byte Coded Font Index	X'08'	MVS Host Unalterable	X'06'
Double Byte Coded Font Index	X'09'	IBM GRID	X'03'
Double Byte Coded Font Index	X'09'	MVS Host Unalterable	X'06'
Coded Font	X'10'	IBM GRID	X'03'
Coded Font	X'10'	Coded Font Format	X'07'

IBM Core Interchange Resident Scalable Font Set (IPDS only)

The IBM Core Interchange fonts as shown in Table 159 will be supported as resident fonts in the following language groups:

- Latin 1/2/3/4/5
- Symbols
- Arabic
- Cyrillic Greek
- Hebrew
- Thai
- Lao
- Katakana

p.97 "XOA-RRL Replies for Font Character Sets" (IBM Core Interchange Resident Scalable Font Set) lists the typefaces resident in the Printer and includes the valid FGID and code pages for each font. The Date Stamp on the character sets with GCSGIDs of 1269, 1275, 1300, 1264, and 1265 is 94350, and the Time Stamp used is 00:00:00.00. The Date Stamp on the character sets with a GCSGID of 1355 is 98152 and the Time Stamp used is 00:00:00.00. The Date Stamp used on the remaining character sets is 02185, and the Time Stamp used is 00:00:01.00.

p.105 "GCSGID Subsets" provides a mapping of the valid subsets of the GCSGIDs listed for the IBM Core Interchange fonts.

XOA-RRL Replies for Font Character Sets

The resident set as shown in Table 159 will support a font character set of any valid font width when queried as an individual font character set.

When queried for a list of font character sets, the resident character sets will be reported with a font width of zero. A font width of zero indicates that the font is scalable.

Valid combinations of the CPGIDs, GCSGIDs, FGIDs and Font Widths for the resident fonts are defined in p.85 "About Code Page and Font Identification".

IBM Core Interchange Resident Scalable Font Set

Typeface	FGID	GCSGID	Font Width	Code Pages
Latin 1/2/3/4/5 with Euro and Vietnamese				
Times New Roman Medium	2308	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Times New Roman Bold	2309	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Times New Roman Italic Medium	2310	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Times New Roman Italic Bold	2311	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Helvetica Roman Medium	2304	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Helvetica Roman Bold	2305	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Helvetica Italic Medium	2306	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Helvetica Italic Bold	2307	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".

Typeface	FGID	GCSGID	Font Width	Code Pages
Courier Roman Medium	416	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Roman Bold	420	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Italic Medium	424	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Italic Bold	428	1503	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Symbols with Euro				
Times New Roman Medium	2308	1191	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Times New Roman Bold	2309	1191	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Helvetica Roman Medium	2304	1191	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Helvetica Roman Bold	2305	1191	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Roman Medium	416	1191	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Roman Bold	420	1191	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
APL2				
APL2	307	1364	Scalable	293, 310, 910

Typeface	FGID	GCSGID	Font Width	Code Pages
APL2 Bold	322	1364	Scalable	293, 310, 910
Cyrillic Greek with Euro				
Times New Roman Medium	2308	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Times New Roman Bold	2309	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Times New Roman Italic Medium	2310	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Times New Roman Italic Bold	2311	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Helvetica Roman Medium	2304	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Helvetica Roman Bold	2305	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Helvetica Italic Medium	2306	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Helvetica Italic Bold	2307	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Roman Medium	416	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Roman Bold	420	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".

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Typeface	FGID	GCSGID	Font Width	Code Pages
Courier Italic Medium	424	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Italic Bold	428	1504	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Arabic with Euro				
ITC Boutros Setting Medium	2308	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
ITC Boutros Setting Bold	2309	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
ITC Boutros Setting Italic Medium	2310	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
ITC Boutros Setting Italic Bold	2311	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
ITC Boutros Modern Rokaa Medium	2304	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
ITC Boutros Modern Rokaa Bold	2305	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
ITC Boutros Modern Rokaa Italic Medium	2306	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
ITC Boutros Modern Rokaa Italic Bold	2307	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".

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Typeface	FGID	GCSGID	Font Width	Code Pages
Boutros Typing Medium	416	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Boutros Typing Bold	420	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Boutros Typing Italic Medium	424	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Boutros Typing Italic Bold	428	1506	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Hebrew with Euro				
Narkissim Medium	2308	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Narkissim Bold	2309	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Narkissim Italic Medium	2310	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Narkissim Italic Bold	2311	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Narkiss Tam Medium	2304	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Narkiss Tam Bold	2305	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".

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Typeface	FGID	GCSGID	Font Width	Code Pages
Narkiss Tam Italic Medium	2306	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Narkiss Tam Italic Bold	2307	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Shalom Medium	416	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Shalom Bold	420	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Shalom Italic Medium	424	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Shalom Italic Bold	428	1362	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Thai				
Burirum Medium	2308	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Burirum Bold	2309	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Burirum Italic Medium	2310	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Burirum Italic Bold	2311	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".

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Typeface	FGID	GCSGID	Font Width	Code Pages
Thonburi Medium	2304	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Thonburi Bold	2305	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Thonburi Italic Medium	2306	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Thonburi Italic Bold	2307	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Thai Medium	416	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Thai Bold	420	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Thai Italic Medium	424	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Thai Italic Bold	428	1505	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Lao				
Kaewfah Medium	2308	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Kaewfah Bold	2309	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".

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Typeface	FGID	GCSGID	Font Width	Code Pages
Kaewfah Italic Medium	2310	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Kaewfah Italic Bold	2311	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Pusuwan Medium	2304	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Pusuwan Bold	2305	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Pusuwan Italic Medium	2306	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Pusuwan Italic Bold	2307	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Lao Medium	416	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Lao Bold	420	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Lao Italic Medium	424	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Courier Lao Italic Bold	428	1341	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Katakana				
Katakana Gothic	304	1306	Scalable	290, 897, 1027, 1041, 1139

GCSGID Subsets

The following table provides a mapping of the valid subsets of the GCSGIDs listed for the IBM Core Interchange fonts.

GCSGID Subsets for IBM Core Interchange Fonts

GCSGID	Valid GCSGID Subsets
1269	0101, 0103, 0119, 0251, 0265, 0269, 0273, 0277, 0281, 0285, 0288, 0289, 0293, 0297, 0301, 0305, 0309, 0313, 0317, 0321, 0325, 0329, 0337, 0341, 0611, 0697, 0919, 0959, 0965, 0980, 0982, 0983, 0987, 0990, 0991, 0993, 0995, 1111, 1132, 1133, 1145, 1146, 1149, 1152, 1166, 1167, 1174, 1188, 1189, 1198, 1220, 1232, 1233, 1237, 1256, 1258, 1259, 1260, 1261, 1268, 1286, 1301, 1302, 2039
1355	1269, 2041
2041	0695, 0988, 1243, 1353, 1412, 2039
1275	0340, 0630, 0909, 1191, 1257
1264	0235, 0994, 1154, 1162, 1177, 1244
1265	0941, 0687, 0986, 0992, 1147, 1199, 1217, 1218
1300	0218, 0925, 0960, 0981, 0985, 0996, 0998, 1150, 1190, 1231, 1235, 1249, 1251, 1276, 1401
1279	1102, 1395, 1396
1304	380, 963, 1113
1306	332, 1122, 1164, 1172, 1187
1364	1304, 1330, 1340
1362	1265, 1356, 1357, 1358, 1360
1502	969
1503	1305, 1336, 1346, 1347, 1355, 1375, 1377, 1378, 1380, 1391, 1392, 1393, 1394, 1397, 1410, 1414, 1418, 1421
1504	1300, 1331, 1338, 1371, 1373, 1381, 1383, 1385, 1387, 1388, 1390, 1411, 1413, 1441

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GCSGID	Valid GCSGID Subsets
1505	1279
1506	1264, 1461, 1463, 1464, 1465

IBM Core Interchange Resident Code Page Set

The following lists the code pages used with the IBM Core Interchange Resident Fonts. Not all code Pages apply to each font; this is determined by the character set. Please correlate the GCSGIDs found in the following lists with the correct IBM Core Interchange Font GCSGID superset in p.105 "GCSGID Subsets" to determine which code pages apply to a particular font family.

IBM Core Interchange Resident Code Page Set

Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)	Language Supported
Latin 1 Country Extended Code Pages		
37	697	US English, Canadian English, Canadian French, Dutch, Brazilian Portuguese, Portuguese
273	697	Austrian, German
274	697	Belgian
275	697	Brazilian
277	697	Danish, Norwegian
278	697	Finnish, Swedish
280	697	Italian
281	697	Japanese
282	697	Portuguese
284	697	Castilian Spanish, Latin American, Spanish
285	697	UK English
297	697	French, Catalan

Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)	Language Supported
500	697	Multinational, Belgium French, Belgium, Dutch, Swiss French, Swiss, German, Swiss Italian
871	697	Icelandic
1140	695	US English, Canadian English, Canadian French, Dutch, Brazilian Portuguese, Portuguese ECECP
1141	695	Austrian, German ECECP
1142	695	Danish, Norwegian ECECP
1143	695	Finnish, Swedish ECECP
1144	695	Italian ECECP
1145	695	Castilian Spanish, Latin American, Spanish ECECP
1146	695	UK English ECECP
1147	695	French, Catalan ECECP
1148	695	Multinational ECECP, Belgium, French, Belgium Dutch, Swiss, French, Swiss German, Swiss Italian
1149	695	Icelandic ECECP
Latin 1 EBCDIC Publishing Code Pages		
361	1145	Multinational, Belgium French, Belgium, Dutch, Swiss French, Swiss, German, Swiss Italian
382	1145	German
383	1145	Belgian
384	1145	Brazilian Portuguese
385	1145	Canadian French
386	1145	Danish, Norwegian

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Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)	Language Supported
387	1145	Finnish, Swedish
388	1145	French, Catalan
389	1145	Italian
390	1145	Japanese
391	1145	Portuguese
392	1145	Castilian Spanish
393	1145	Latin American Spanish
394	1145	UK English
395	1145	US English, Canadian English
Latin 1 ASCII Code Pages		
437	919	Multinational, US English, UK English, Dutch, German, Finnish, French, Italian, Spanish, Swedish
850	980	Multinational PC
858	988	Multinational PC with Euro
860	990	Portuguese (Primary = 850)
861	991	Icelandic (Primary = 850)
863	993	Canadian French (Primary = 850)
865	995	Nordic (Primary = 850)
1004	1146	IBM PC Desktop Publishing
819	697	ISO Latin 1
1252	1412	Windows Latin 1
1112	1305	Baltic, Multi EBCDIC
1257	1421	Windows, Baltic Rim
Latin 2/3/4/5 EBCDIC and ASCII Code Pages		

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Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)	Language Supported
852	982	Croatian, Czech, East German, Hungarian, Polish, Romanian, Slovak, Slovenian
852	1377	Croatian, Czech, East German, Hungarian, Polish, Romanian, Slovak, Slovenian with Euro
870	959	Latin 2 Multilingual
912	959	Latin 2 ISO/ ANSI 8 Bit
1153	1375	Latin 2 Multilingual with Euro
1250	1410	Windows Latin 2
853	983	Latin 3 Multilingual PC
905	1286	Latin 3 Multilingual
913	1286	Latin 3 Multilingual
1069	1256	Latin 4 EBCDIC
914	1256	Latin 4 ISO/ASCII
857	987	Latin 5 Turkey PC
857	1380	Latin 5 Turkey PC with Euro
1155	1378	EBCDIC Turkey with Euro
857	987	Latin 5 PC
920	1152	Latin 5 ISO/ANSI 8 Bit
1026	1152	Latin 5
1254	1414	Windows, Turkish
1157	1391	EBCDIC Estonia with Euro
922	1347	Estonia, PC
902	1392	8-bit Estonia with Euro
1156	1393	EBCDIC Baltic Multilingual with Euro

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Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)	Language Supported
921	1346	PC Baltic Multilingual
901	1394	PC Baltic Multilingual with Euro
Latin 9 EBCDIC and ASCII Code Pages		
923	1353	Latin 9
924	1353	Latin 9 EBCDIC
Vietnamese		
1130	1336	Vietnamese EBCDIC
1164	1397	Vietnamese EBCDIC with Euro
1129	1336	Vietnamese ISO-8
1163	1397	Vietnamese ISO-8 with Euro
1258	1418	Windows Vietnamese
Thailand		
838	1279	Thailand
889	1102	Thailand
874	1279	Thailand, PC
1160	1395	Thailand, EBCDIC with Euro
1161	1395	Thailand, PC with Euro
1162	1396	Windows Thailand
Lao		
1132	1341	Lao EBCDIC
1133	1341	Lao ISO-8
Latin EBCDIC DCF Code Pages		
1002	1132	DCF Release 2 Compatibility
1003	1133	US Text Subset

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Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)	Language Supported
1068	1259	Text with Numeric Spacing
1039	1258	GML List Symbols
Cyrillic and Greek EBCDIC and ASCII Code Pages		
880	960	Cyrillic Multilingual (Primary = 1025)
915	1150	Cyrillic ISO/ASCII 8 Bit
855	985	Cyrillic PC
866	996	Cyrillic #2 PC
1025	1150	Cyrillic Multilingual
1251	1411	Windows, Cyrillic
423	218	Greek 183 (Primary = 875)
813	925	Greek ISO/ASCII 8 Bit
813	1371	Greek ISO/ASCII 8 Bit with Euro
851	981	Greek PC (Primary = 869)
869	998	Greek PC
869	1373	Greek PC with Euro
875	925	Greek
875	1371	Greek with Euro
1039	1258	GML List Symbols
1253	1413	Windows, Greek
1253	1381	EBCDIC Cyrillic Multi. with Euro
808	1385	PC, Cyrillic, Russian with Euro
1131	1338	PC, Cyrillic, Belo Russian
849	1387	PC, Cyrillic, Belo Russian with Euro

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Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)	Language Supported
808	1385	PC, Cyrillic, Russian with Euro
1158	1388	EBCDIC Cyrillic, Ukraine with Euro
1125	1331	PC, Cyrillic, Ukrainian
848	1390	PC, Cyrillic, Ukrainian with Euro
872	1383	Cyrillic PC with Euro
1166	1441	EBCDIC Cyrillic Multi. with Euro
Arabic EBCDIC and ASCII Code Pages		
420	235	Arabic Bilingual
420	1461	Arabic Bilingual with Euro
864	994	Arabic PC
864	1463	Arabic PC with Euro
1008	1162	Arabic ISO/ASCII 8 Bit
1008	1464	Arabic ISO/ASCII 8 Bit with Euro
1029	1154	Arabic Extended ISO/ASCII 8 Bit
1046	1177	Arabic Extended ISO/ASCII 8 Bit
1046	1465	Arabic Extended ISO/ASCII 8 Bit with Euro
1039	1258	GML List Symbols
Hebrew EBCDIC and ASCII Code Pages		
916	941	Hebrew ISO/ASCII 8 Bit
1028	941	Hebrew Publishing
424	941	Hebrew
424	1356	Hebrew with Euro
803	1147	Hebrew Character Set A (Primary = 424)

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Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)	Language Supported
803	1357	Hebrew Character Set A (Primary = 424) with Euro
856	986	Hebrew PC (Primary = 862)
856	1358	Hebrew PC (Primary = 862) with Euro
862	992	Hebrew PC
867	1360	Israel with Euro
1039	1258	GML List Symbols
Symbols		
259	340	Symbols, Set 7
899	340	Symbols, Set 7 ASCII
1087	1257	Symbols, Adobe
1038	1257	Symbols, Adobe ASCII
1091	1191	Symbols, Modified Set 7
1092	1191	Symbols, Modified Set 7 ASCII
363	630	Symbols, Set 8
829	909	Math Symbols
1039	1258	GML List Symbols
Katakana		
1027	1172	Japanese Latin Extended
290	332	Japan Katakana
290	1172	Host/PC Japanese Katakana Extended
897	1164	Japan PC #1
1041	1187	Japanese Extended PC

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Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)	Language Supported
1139	1122	Japan Alphanumeric Katakana
APL2		
293	1340	APL USA
310	963	Graphic Escape APL/TN
910	1330	APL ASCII

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4028 Compatibility Resident Font Set

The following lists the typefaces resident in the Printer and includes the valid FGID and code pages for each font. The Date Stamp on most of these character sets is 94350, and the Time Stamp used is 00000000.

The Date Stamp on FGIDs 76 and 159(20224) is 96036. The Date Stamp on FGID 164 is 96039 with a Time Stamp 08225100 for all GCSGIDs except 695, where the Data Stamp is 98124 and the Time Stamp is 13491500. The Date Stamp on FGID 701 is 96309 with a Time Stamp of 08230800 for all GCSGIDs except 695, where the Date Stamp is 98124 and the Time Stamp is 13492000. Fonts listed with an "Alt FGID", are used as a substitute for the requested "Alt FGID".

The Printer will substitute Times New Roman (from the IBM Core Interchange Set) for the Times Roman fonts listed in Table 162. The Courier fonts will also come from the IBM Core Interchange Set. All the remaining listed fonts will be from the IBM Coordinated Font Set (See p.119 "IBM Coordinated Font Set (IPDS)" (Resident PSC Strategic Scalable Font Set 2)).

See p.117 "4028 Compatibility Resident Code Page Set" for an explanation of the groups used in the "Code Pages" column.

⬇Note

- Prestige fonts used with code pages with a CPGID of 259 are mapped to the Courier Roman Medium Symbols font (FGID 416 GCSGID 1275) as shown in Table 159. When the printer is in Box-Draw mode, any font which does not indicate CPGID 259 support will print with the Roman Medium Symbols font in a point size of 10 (12 pitch) when used with Code Page 259. This emulates 4028 behavior.

- Courier FGIDs 11 and 85 and Prestige FGIDs 12 and 86 now support Code Page 259 (when Box-Draw mode is on) to the extent these were supported in the 4028. In this mode, CPGID 1091 is substituted for CPGID 259 in order to print box-draw characters that line up with each other. The registered CPGID 259 does not have such characters, and is used when not in Box-Draw mode.

- To match the 4028 and 3116 printed font sizes, the FGIDs 254, 256, 281, and 290 are scaled anamorphically (internal to the Printer) as follows:

FGID	Vertical × Horizontal Scale Factors (points)
254	7.8 vpt × 7.0 hpt
256	7.8 vpt × 7.0 hpt
281	7.0 vpt × 6.0 hpt
290	5.0 vpt × 4.5 hpt

4028 Compatibility Resident Font Set

Typeface	FGID	Alt FGID	Pitch	Point Size	Font width	Code Pages
Boldface	159		Proportional	12	120	A, B
Prestige PSM Roman Medium	164		Proportional	12	120	A, B
Courier	11		10	12	144	259, A, B
Courier	85		12	10	120	259, A, B
Courier	223		15	8	96	A, B
Courier.17ss	254		17.1	7.8	84	A, B
Courier Bold	46		10	12	144	A, B
Courier Bold	108		12	10	120	A, B
Courier Italic	92		12	10	120	A, B
Letter Gothic	281		20	7	72	A, B
OCR A	19		10	12	144	892
OCR B	3		10	12	144	893
Prestige Pica	12		10	12	144	259, A, B
Prestige Elite	86		12	10	120	259, A, B
Prestige	221		15	7.8	96	A, B
Prestige	256		17.1	8.5	84	A, B
Prestige PSM	164		Proportional	12	120	A, B
Prestige Elite Bold	111		12	10	120	A, B
Prestige Elite Italic	112		12	10	120	A, B
Times Roman	5687	760	Typo	6	40	A
Times Roman	5687	751	Typo	8	53	A

Typeface	FGID	Alt FGID	Pitch	Point Size	Font width	Code Pages
Times Roman	5687	1051	Typo	10	67	A
Times Roman	5687	1351	Typo	12	80	A
Times Roman Bold	5707	1053	Typo	10	67	A
Times Roman Bold	5707	761	Typo	12	80	A
Times Roman Bold	5707	762	Typo	14	93	A
Times Roman Bold	5707	1803	Typo	18	120	A
Times Roman Bold	5707	2103	Typo	24	160	A
Times Roman Italic	5815	1056	Typo	10	67	A
Times Roman Italic	5815	763	Typo	12	80	A
Times Roman Bold Italic	5835	764	Typo	10	67	A
Times Roman Bold Italic	5835	765	Typo	12	80	A
Gothic Text (311x)	203		13.3	9	108	A, B
Gothic Text (311x)	283		20	6	72	A, B
Gothic Text (311x)	290		26.7	5	54	A, B

4028 Compatibility Resident Code Page Set

The following lists provides an explanation of the groups as used in the Code Pages column of p.115 "4028 Compatibility Resident Font Set".

4028 Compatibility Resident Code Page Set

Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)
Group A	
037, 273, 274, 277, 278, 280, 281, 284, 285, 297, 500, 871	697

Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)
1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149	695
038, 367	103
260	341
276	277
286	317
287	321
288	325
1002	1132
437	919
850	980
858	988
1003 (Addition to 4028 font support. Not supported by 4028.)	1133
Group B	
256 (Replaced by 500)	337
289 (Replaced by 500, but missing obsolete "Peseta" character)	329
Miscellaneous	
310	963
259	340
892	968
893	969
1303 (Used internally for resident Code 128 barcode font and postal bar code font support)	n/a

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IBM Coordinated Font Set (IPDS)

"Resident PSC Strategic Scalable Font Set 2" lists the scalable IBM Coordinated font set typefaces resident in the Printer and includes the valid FGID and code pages for each font.

Where the IBM Core Interchange code pages are referenced in p.106 "IBM Core Interchange Resident Code Page Set", only the Latin 1 Country Extended, Latin 1 EBCDIC Publishing, Latin 1 ASCII and Latin EBCDIC DCF code pages are supported.

GCSGID Subsets

The following lists provides an a mapping of the valid subsets of the GCSGIDs listed for the PSC Strategic Font Set 2.

Resident PSC Strategic Scalable Font Set 2

Typeface	FGID	GCSGID	Font Width	Code Pages
APL	307	1304	Scalable	293, 310, 910
APL Bold	322	1304	Scalable	293, 310, 910
Boldface	20224	2039	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Boldface (Euro)	20224	2041	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Gothic Text	304	2039	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Gothic Text (Euro)	304	2041	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Letter Gothic	400	2039	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Letter Gothic (Euro)	400	2041	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".

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Typeface	FGID	GCSGID	Font Width	Code Pages
Letter Gothic Bold	404	2039	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Letter Gothic Bold (Euro)	404	2041	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
OCR A	305	968	Scalable	876, 892
OCR B	306	969	Scalable	877, 893
OCR B (Euro)	306	1502	Scalable	877, 893
Prestige	432	2039	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Prestige (Euro)	432	2041	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Prestige Bold	318	2039	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Prestige Bold (Euro)	318	2041	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Prestige Italic	319	2039	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Prestige Italic (Euro)	319	2041	Scalable	See p.106 "IBM Core Interchange Resident Code Page Set".
Katakana Gothic	304	1306	Scalable	290, 897, 1027, 1041

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IBM Coordinated Font Set Code Page Set

The following lists provides the GCSGIDs and CPGIDs for the individual Code Pages listed in the Code Pages column of p.119 "IBM Coordinated Font Set (IPDS)" (Resident PSC Strategic Scalable Font Set 2).

IBM Coordinated Font Set Code Page Set

Code Page Global ID (CPGID)	Graphic Character Set ID (GCSGID)
293	380
310	963
910	1113
876, 892	968
877, 893	969
877, 893	1502
290, 1027	1172
897	1164
1041	1187

GCSGID Subsets for the Strategic Font Set 2

GCSGID	Valid GCSGID Subsets
1304	0380, 0963, 1113
2039	0101, 0103, 0119, 0251, 0265, 0269, 0273, 0277, 0281, 0285, 0288, 0289, 0293, 0297, 0301, 0305, 0309, 0313, 0317, 0321, 0325, 0329, 0337, 0341, 0611, 0697, 0919, 0980, 0990, 0991, 0993, 0995, 1132, 1133, 1145, 1146, 1149, 1198, 1220, 1258, 1259, 1260
1306	0332, 1164, 1172, 1187
2041	0695, 0988, 1243, 1353, 1412, 2039

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IPDS Default Font

Factory Setting

The factory setting for the default font is Courier Roman Medium 10 pitch (12 point) using code page 037, version 1. The GRID for the default font is: FGID=416, GCSGID=697, CPGID=037, FontWidth=144 (CPI setting is 10.0). The default font may be changed by the operator using the printer's control panel. It will reset to the Factory Setting upon each IML. It can be reset to the Factory Setting by doing a Cold Reset to the printer.

The default font can be set for Single Byte fonts. It does not contain Double Byte Font Character Sets or Code Pages.

Selectable IPDS Default Font

To change the default font requires the use of the printer's control panel. The printer's control panel will present menu choices for selecting the various parts of the font.

The operator may select the default font using any or all of the Code Page (CPGID), Font (FGID), and Characters Per Inch (CPI) parameters. The available parameters will be listed in Groups to help identify valid/invalid combinations. An invalid combination will be resolved inside the printer because the printer must have a valid default font. However, the parameter adjustment will not be visible at the printer's control panel display. Detailed information listing the valid combinations and how to select them will be available with the printer.

The selection is based upon a hierarchy: Code Page is highest, Font is next, and Font Width (CPI) is the lowest. Should an invalid combination be selected, the Code Page will override Font and CPI, and Font will override CPI.

There are 5 Groups, A-E, into which all the fonts, code pages, and widths fall. All combinations defined within a Group are valid. When internal modification is necessary, the following rules apply:

- An invalid/unsupported CPGID becomes Code Page 037 (Group A).
- An invalid/unsupported Font Width (CPI) becomes 10.0 CPI (which will translate to 12 points).
- For a Group A CPGID, an invalid/unsupported FGID becomes 416 Courier Roman Medium.
- For a Group B CPGID, the FGID is automatically 304 Gothic Katakana.
- For a Group C CPGID, the FGID is automatically 305 OCR A. Font Width is 10.0 CPI.
- For a Group D CPGID, the FGID is automatically 306 OCR B. Font Width is 10.0 CPI.
- For a Group E CPGID, an invalid/unsupported FGID becomes 416 Courier Roman Medium.

⬇ **Note**

- The 4028 compatibility fonts are a new addition to the printer's control panel selection. This is necessary because some of these FGIDs are anamorphically scaled, and therefore cannot be correctly reproduced with just an AFP FGID and a CPI value.

These fonts are handled specially in that all of these FGIDs (except 5687, 5707, 5815, 5835) ignore the printer's control panel CPI value, because the FGID fully describes the font. In the case of the 4 typographic FGIDs, there are valid discreet sizes associated with them. If the correct CPI values are not used, the printer will default to the nearest discrete size value. Tie goes to the smaller value.

Selectable Code Pages

The following code pages are selectable by the operator:

Code-Page/Group	Code Page Description
500 A	Belgium, Switzerland / International

Code-Page/Group	Code Page Description
037 A	US, Canada, Netherlands, Portugal
038 A	US English ASCII
260 A	Canadian French
273 A	Austrian / German
274 A	Belgium
276 A	Canadian French (94 character set)
277 A	Danish / Norwegian
278 A	Finnish / Swedish
280 A	Italian
281 A	Japanese
284 A	Spanish
285 A	UK English
286 A	Austrian / German (Alternate)
287 A	Danish / Norwegian (Alternate)
288 A	Finnish / Swedish (Alternate)
297 A	French
871 A	Icelandic
1140 A	US, Canada, Netherlands, Portugal (Euro)
1141 A	Austrian, German (Euro)
1142 A	Danish Norwegian (Euro)
1143 A	Finnish, Swedish (Euro)
1144 A	Italian (Euro)
1145 A	Spanish (Euro)
1146 A	UK English (Euro)
1147 A	Catalan French (Euro)

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Code-Page/Group	Code Page Description
1148 A	Multinational (Euro)
1149 A	Icelandic (Euro)
290 B	Japanese / Katakana
892 C	OCR - A
893 D	OCR - B
420 E	Arabic
423 E	Greek
424 E	Hebrew
870 E	Latin 2 Multilingual
875 E	Greek
880 E	Cyrillic
905 E	Turkish
1025 E	Cyrillic (primary)
1026 E	Turkish (primary)

Selectable Fonts

The following fonts (FGID) are selectable by the operator:

FGID/Group	FGID Description
2304 A, E	Helvetica Roman/ITC Boutros Modern Rokaa/Narkiss Tam - Medium
2305 A, E	Helvetica Roman/ITC Boutros Modern Rokaa/Narkiss Tam - Bold
2306 A, E	Helvetica Roman/ITC Boutros Modern Rokaa/Narkiss Tam - Italic Medium
2307 A, E	Helvetica Roman/ITC Boutros Modern Rokaa/Narkiss Tam - Italic Bold

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FGID/Group	FGID Description
2308 A, E	Times New Roman/ITC Boutros Setting Rokaa/Narkissim - Medium
2309 A, E	Times New Roman/ITC Boutros Setting Rokaa/Narkissim - Bold
2310 A, E	Times New Roman/ITC Boutros Setting Rokaa/Narkissim - Italic Medium
2311 A, E	Times New Roman/ITC Boutros Setting Rokaa/Narkissim - Italic Bold
416 A, E	Courier Roman/Boutros Typing/Shalom - Medium
420 A, E	Courier Roman/Boutros Typing/Shalom - Bold
424 A, E	Courier Roman/Boutros Typing/Shalom - Italic Medium
428 A, E	Courier Roman/Boutros Typing/Shalom - Italic Bold
20224 A	Boldface
304 A	Gothic Text
400 A	Letter Gothic
404 A	Letter Gothic Bold
432 A	Prestige
318 A	Prestige Bold
319 A	Prestige Italic
304 B	Katakana Gothic
305 C	OCR A
306 D	OCR B

4028 Selectable Fonts

The following 4028 fonts (FGID) are also selectable by the operator:

FGID/Group	FGID Description
159 A	Boldface (Proportional Space 12 pt., based on 10 CPI)

FGID/Group	FGID Description
11 A	Courier 10.0 CPI
85 A	Courier 12.0 CPI
223 A	Courier 15.0 CPI
254 A	Courier 17.1 CPI
46 A	Courier Bold 10.0 CPI
18 A	Courier Italic 10.0 CPI
92 A	Courier Italic 12.0 CPI
203 A	Gothic Text 13.3 CPI
283 A	Gothic Text 20.0 CPI
290 A	Gothic Text 26.7 CPI
281 A	Letter Gothic 20 CPI
19 C	OCR A
03 D	OCR B
12 A	Prestige Pica 10.0 CPI
86 A	Prestige Elite 12.0 CPI
221 A	Prestige Elite 15.0 CPI
256 A	Prestige Elite 17.1 CPI
111 A	Prestige Elite Bold 12.0 CPI
112 A	Prestige Elite Italic 12.0 CPI
5687 A	Times Roman Typographic 6, 8, 10, 12 pt
5707 A	Times Roman Typographic Bold 10, 12, 14, 18, 24 pt
5815 A	Times Roman Typographic Italic 10, 12 pt
5835 A	Times Roman Typographic Bold Italic 10, 12 pt

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Selectable Font Widths

The following Font Widths (CPI) are selectable by the operator:

Group	Range in characters per inch
A, B, E	5.0 CPI - 30.0 CPI, in increments of 0.1 CPI.
C, D	10.0 CPI.

4028 Fixed Width	Ignored. Handled internally because the FGID defines the size.
5687 6 pt	20.0 CPI
5687 8 pt	15.1 CPI
5687 10 pt	11.9 CPI
5687 12 pt	10.0 CPI
5707 10 pt	11.9 CPI
5707 12 pt	10.0 CPI
5707 14 pt	8.6 CPI
5707 18 pt	6.7 CPI
5707 24 pt	5.0 CPI
5815 10 pt	11.9 CPI
5815 12 pt	10.0 CPI
5835 10 pt	11.9 CPI
5835 12 pt	10.0 CPI

Normally, IPDS Font Width is in terms of 1440ths of an inch (for example, 144, 120). However, printer's control panel Font Width selection is more easily understood (and more universally used) as Characters Per Inch. So the values will range from 5.0 cpi (Font Width 288) to 30.0 cpi (Font Width 48) in increments of 0.1 cpi.

The resulting cpi will be translated internally to the nearest integer font width value. Since CPI is inherently a reciprocal, 0.1 cpi increments will be a non-linear font width progression. This should not prove a serious problem since default fonts for IPDS are not the primary selection path.

An extra note is that font widths for fixed width fonts are calculated differently than for typographic fonts.

The vertical point size is the real common ground. So to get a 12 point size, a fixed width font will use a font width of 144; 10 cpi. A typographic font will use a font width of 80. To keep compatible sizes this is also translated from 10 cpi. The FGID defines which range to use. For further details, refer to the LFE and/or AR command sections of the IPDS architecture spec.

IPDS Bar Code Printing

To support the BCOCA tower for printing of bar codes, the OCR-A and OCR-B fonts and their corresponding code pages (892 and 893) must be resident in the printer. These are supported as shown in p.115 "4028 Compatibility Resident Font Set".

Code page 1303 is also resident to be used for printing code 128 bar codes.

IPDS Font Bolding

The Printer will accept the IPDS Load Font Equivalence command and support the bold and double strike bits for both resident Type 1 and loaded raster fonts. No other bits within the LFE flags byte are supported.

The bold/double strike attributes are handled the same way within the printer. The function is provided by printing a text block multiple times, each time shifted an appropriate amount. Since the attributes are tied to the font LID and not the font resource, the font resource is not affected.

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7. Appendix

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IPDS Technical Reference 2

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11. Appendix

Manuals for the IPDS card

Refer to the manuals that are relevant to what you want to do with the IPDS card.

★ Important

- Adobe® Acrobat® Reader®/Adobe Reader must be installed in order to view the manuals as PDF files.

IPDS Supplement (IPDS.pdf)

Explains how to configure the IPDS card for the machine. It also explains about items selectable from the Web browser.

IPDS Printing Configuration Guide (IPDS_CONF.pdf) *English Only

Explains about the environment necessary for connecting the mainframe to the machine and performing IPDS printing.

IPDS Technical Reference 1 (IPDS_TEC1.pdf) *English Only

Explains about commands and functions for IPDS printing.

IPDS Technical Reference 2 (IPDS_TEC2.pdf)*English Only

Explains about IPDS commands.

⬇ Note

- For details about the necessary environment and how to install the IPDS card and machine, consult your sales or service representative. For details about the necessary environments and operation of the mainframe, contact IBM.

Notice

Important

Contents of this manual are subject to change without prior notice.

In no event will the company be liable for direct, indirect, special, incidental, or consequential damages as a result of handling or operating the machine.

How to Read This Manual

Symbols

This manual uses the following symbols:

⭐ Important

Indicates points to pay attention to when using the machine, and explanations of likely causes of paper misfeeds, damage to originals, or loss of data. Be sure to read these explanations.

⬇ Note

Indicates supplementary explanations of the machine's functions, and instructions on resolving user errors.

[ ]

Indicates the names of keys on the machine's display or control panels.

About This Book

This book provides technical reference information about how printers support the IPDS data stream.

Audience

This publication is intended for the system programmers, application programmers, and systems engineers who are familiar with data streams and are writing or modifying programs to operate your printer with the IPDS data stream.

Terminology

Paper Input and Output Receptacles

Input receptacles are called trays. Output receptacles are called stackers or bins.

Related Publications

This book refers to the following:

- PostScript Language Reference Manual, second edition, by Adobe Systems, Inc.
- PCL 5 Printer Language Technical Reference Manual by Hewlett-Packard Company
- PCL 5 Comparison Guide by Hewlett-Packard Company
- Printer Job Language Technical Reference Manual by Hewlett-Packard Company

⬇ Note

- For details on the IPDS Architecture, see the Intelligent Printer Data Stream Reference, S544-3417.

1. Device Control Command Set

About Device Control Command Set

Device Control commands control basic device operations, error reporting and recovery, and the construction of logical pages on the physical medium.

Before the host program sends the Begin Page command to begin defining a page to be printed, it should establish the printing environment in which the page is to be printed.

The following Device Control commands are described in this section:

Acknowledgement Reply

The Acknowledge Reply returns device status, sense data, and other information the host program requests. The printer sends an acknowledgement when it finds either of the following:

- A data stream or device error that requires the printer to return a negative acknowledgement (NACK).
- The Acknowledgement Required (ARQ) flag bit in the command the printer receives is set to 1.

The Acknowledge Reply is returned to the host in the standard IPDS command format although it goes from the printer to the host. See Intelligent Printer Data Stream Reference for details.

The following table lists Bit Codes for IPDS command stream flags for Acknowledge Reply.

Bit Code	Meaning
Bit 0	Reserved
Bit 1	Correlation Number Present
Bit 2	Acknowledgement Continuation
Bits 3-6	Reserved
Bit 7	The Persistent NACK bit is for Non-SNA DSC Mode NACKs only. This bit has no meaning in other attachment environments.

🔸 **Note**

- When a command is received with Bit 1 set, the Acknowledge Reply will be returned with this bit set, indicating that a two byte "Correlation Number" follows.
- The Correlation Number, a two byte identifier, is returned if available for:
  - Synchronous NACKs
  - Response to information request commands
  - Acknowledgement requested (Flag byte bit 0 = 1)
- The Special Data area of the Acknowledgement Reply contains:
  - Error sense bytes when reporting an exception
  - Response to the following information request commands:
    - Sense Type and Model
    - XOH Obtain Printer Characteristics
    - XOA Request Resource List

Offset	Range	Meaning	Error Code
0		ACKNOWLEDGEMENT TYPE: A one byte field that identifies the type of acknowledgement record and contents (if any) of the Special Data area.	
	X'40'	None	
	X'41'	Sense Type and Model	
	X'44'	Request Resource List	
	X'46'	Obtain Printer Characteristics	
	X'C0'	Sense Bytes	
1-2	X'0000' - X'FFFF'	Received Page Counter* * Incremented when the End Page processing is completed.	
3-4	X'0000'- X'FFFF'	Committed Page Counter* * Incremented by the number of pages on a sheet when the last copy of the sheet is stacked.	
5-6	X'0000'- X'FFFF'	Committed Copy Counter* * Incremented by the number of pages on a sheet when the sheet is stacked.	
7-8	X'0000'- X'FFFF'	Operator Viewing Page Counter* * Incremented by the number of pages on a sheet when the last copy of the sheet is stacked.	
9-10	X'0000'- X'FFFF'	Operator Viewing Copy Counter* *Incremented by the number of pages on a sheet when the sheet is stacked.	
11-12	X'0000'- X'FFFF'	Jam Recovery Page Counter* *Incremented by the number of pages on a sheet when the last copy of the sheet is stacked.	
13-14	X'0000'- X'FFFF'	Jam Recovery Copy Counter* *Incremented by the number of pages on a sheet when the sheet is stacked.	

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Offset	Range	Meaning	Error Code
15-16	X'0000'-X'FFFF'	Stacked Page Counter* *Incremented by the number of pages on a sheet when the last copy of the sheet is stacked.	
17-18	X'0000'-X'FFFF'	Stacked Copy Counter* *Incremented by the number of pages on a sheet when the sheet is stacked.	
19-n		SPECIAL DATA AREA: This area contains zero or more bytes of additional data as requested by the host program defined by the Acknowledgement Type.	

Activate Resource

This command maps a 6-byte Host Assigned Resource ID (HAID/FIS/Section) to a resident Resource ID of the format specified in the Resource ID Format parameter (Byte 6). The Resource ID formats which are supported may be determined using the XOH OPC command (See p.72 "XOH Obtain Printer Characteristics").

An AR mapping (HAID to Resource ID mapping) remains in effect until:

- an XOH Erase Residual Font Data command or Deactivate Font (See p.23 "Deactivate Font") command is received (the mapping is removed and font deactivated)

- the printer performs an IML (the mapping is removed)

If a Deactivate Font command is received for a single byte font, the font identified by the HAID is deactivated (made unavailable for use by the host), but all other current font mappings remain in effect until one of the actions described in the preceding paragraph occurs. If a Deactivate Font command is received which specifies all single byte fonts, all font mappings are removed as those fonts are deactivated.

The maximum of Activate Resource ID mappings that may be received is limited only by the available memory.

Note

- IPDS architecture describes the mapping and activation of resident resources as two conceptually separate processes. The printer, however, implements mapping and activation as one inseparable process. Un-map and de-activate are also inseparable operations. Thus, a Deactivate Font command directed at a mapped and activated resident font, both un-maps and de-activates the specified font(s).

Offset	Range	Meaning	Error Code
0-1		ENTRY LENGTH	X'028F.. 01'
	X'0002'	Null entry	
	X'000C'	Specifying without an equivalence	
	X'000E'	Valid for RT=X'06' with RIDF=X'03'	
	X'000E'-0 08D'	Valid for RT=X'42' with RIDF=X'09'	
	X'0010'	Valid for RT=X'06' or X'07' with RIDF=X'03'	
	X'0012'	Valid for RT=X'41' with RIDF=X'0A'	
	X'0014'	Valid for RT=X'01', X'08', X'09', X'10' with RIDF=X'03'	
	X'001E'	Valid for RT=X'01', X'08', X'09', X'10' with RIDF=X'07'	
	X'00B8'	Valid for RT=X'01' or X'08' with RIDF=X'06'	
2		RESOURCE TYPE (RT)	X'028F.. 01'
	X'01'	Single byte LF1 coded font	
	X'03'	Double-byte LF1–type coded font sections	
	X'06'	Code Page	
	X'07'	Font Character Set	
	X'08'	Single byte font index	
	X'09'	Double-byte LF1–type coded font section indexes	
	X'10'	Coded Font	
	X'40'	Data object resource	
	X'41'	Data-object font	
	X'42'	Data-object font component	
3-4	X'0001'-X'7EFF'	HOST ASSIGNED ID	X'028F.. 01'
5	X'41'-X'FE'	Ignored for RT=X'01', X'06', X'07', X'08' and X'10'	

Offset	Range	Meaning	Error Code
6		RESOURCE ID FORMAT (RIDF)	X'028F.. 01'
	X'03'	IBM Registered Global Resource ID parts	
	X'06'	MVS host unalterable remote font environment	
	X'07'	Coded font	
	X'09'	Object-OID	
	X'0A'	Data-object font	
7-8		FONT INLINE SEQUENCE	X'028F.. 01'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
		That the Font Inline Sequence is ignored for RT=X'06' and X'07'.	
		For outline fonts with RT=X'10', FIS is used to select the character metrics for a specific writing mode.	
9-10	X'0000'	Reserved	
11		RESOURCE CLASS FLAGS	
	Bit 0 0/1	Public/Private (Resource Capture)	
	Bit 1 0	Retired	
	Bit 2 0/1	Ignored (Reset)	
	Bit 3 0/1	AR NACK Enabled	
	Bit 4 0/1	Outline Font Substitution	
	Bits 5-7 0	Reserved	
Bytes 12-n		RESOURCE ID and triplets	X'028F.. 01'

Note

- Zero or more additional entries, analogous to bytes 0 - n above.

Resource ID example with RIDF = GRID

Offset	Range	Meaning	Error Code
12-13		GRAPHIC CHARACTER SET GLOBAL ID	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	GCSGID	
	X'FFFF'	All characters with assigned code points in the associated code page	
14-15		CODE PAGE GLOBAL ID	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	CPGID	
	X'FFFF'	Default Code Page (Configuration Settings)	
16-17		FONT GLOBAL ID	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	FGID	
	X'FFFF'	Default FGID (Configuration Settings)	
18-19		FONT WIDTH	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	FW	
	X'FFFF'	Default FW (Configuration Settings)	

Resource ID example with RIDF = MVS Host Unalterable Remote Font Environment

Offset	Range	Meaning	Error Code
12-13		CRC	
14-21		Ignored (MVS Host System ID)	
22-27		Ignored (VOLSER of Host library)	
28-71		Ignored (DSNAME of Host library)	
72-77		Date Stamp	
78-85		Time Stamp	
94-95		GRAPHIC CHARACTER SET GLOBAL ID	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	GCSGID	
	X'FFFF'	All characters with assigned code points in the associated code page	
96-97		CODE PAGE GLOBAL ID	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	CPGID	
	X'FFFF'	Default Code Page (Configuration Settings)	
98-99		CRC	
100-107		Ignored (MVS Host System ID)	
108-113		Ignored (VOLSER of Host library)	
114-157		Ignored (DSNAME of Host library)	

Offset	Range	Meaning	Error Code
158-163		Date Stamp	
164-171		Time Stamp	
172-179		Ignored (Host Library Member Name)	
180-181		FONT GLOBAL ID	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	FGID	
	X'FFFF'	Default FGID (Configuration Settings)	
182-183		FONT WIDTH	X'028F.. 02'
	X'0000'	X'0000' No value supplied	
	X'0001' - X'FFFE'	FW	
	X'FFFF'	Default FW (Configuration Settings)	

Resource ID example with RIDF = Coded Font

Offset	Range	Meaning	Error Code
12-13		FONT CHARACTER SET HAID	
	X'0000'	No value supplied	
	X'0001' - X'7FFF'	FCS HAID	
14-15		CODE PAGE HAID	
	X'0000'	No value supplied	
	X'0001' - X'7FFF'	CP HAID	

Offset	Range	Meaning	Error Code
16-17		GRAPHIC CHARACTER SET GLOBAL ID	
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	GCSGID	
	X'FFFF'	All characters with assigned code points	
18-19		CODE PAGE GLOBAL ID	
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	CPGID	
	X'FFFF'	Default Code Page (Configuration Settings)	
20-21		FONT GLOBAL ID	
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	FGID	
	X'FFFF'	Default FGID (Configuration Settings)	
22-23		FONT WIDTH	
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	FW	
	X'FFFF'	Default FW (Configuration Settings)	
24		PATTERN TECHNOLOGY ID	
	X'00'	No value supplied	
	X'1E'	Composite technology	
	X'1F'	Adobe Type-1 PFB	
25		Reserved	

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Offset	Range	Meaning	Error Code
26-27		VERTICAL SCALE FACTOR	
	X'0000'	No value supplied	
	X'0001' - X'7FFF'	VSF in 1440th of an inch	
28-29		HORIZONTAL SCALE FACTOR	
	X'0000'	No value supplied	
	X'0001' - X'7FFF'	HSF in 1440th of an inch	

Resource ID example with RIDF = Object-OID

Offset	Range	Meaning	Error Code
12		IDENTIFIER	
	X'06'	Short Form OID	
13		OID LENGTH	
	X'00' - X'7F'		
2 to end		Unique OID	
	Any Value		

Resource ID example with RIDF = Data-object font

Offset	Range	Meaning	Error Code
12-13		Base Font HAID	
	X'0001' - X'7EFF'	TrueType/OpenType font or TrueType/OpenType collection	

Offset	Range	Meaning	Error Code
14-15		CODE PAGE HAID	
	X'0000'	No Value supplied	
	X'0001' - X'7EFF'	CP HAID	
16-17		TTC Font Index	
	X'0000' - X'FFFF'	Font Identifier	
2 to end		Triplets (One or more of the following triplets)	
	X'02'	Fully Qualified Name triplet	
	X'50'	Encoded Scheme ID triplet	
	X'8B'	Data-Object Font Descriptor triplet	
	X'8D'	Linked Font triplet	

Begin Page

This command is only valid in home state and causes the printer to enter page state. See the Intelligent Printer Data Stream Reference for details.

Note

- At Begin Page processing time a test for media source and destination compatibility will be performed. If it is determined that the processing of this page with the media source and media destination specified is incompatible an exception X'0237..04' will be reported.

Deactivate Font

The Deactivate Font command carries one to six bytes of data used by the host to deactivate one or more coded fonts, coded font indexes, font character sets, or code pages.

Offset	Range	Meaning	Error Code
0		DEACTIVATION TYPE	X'0217..02'
	X'11'	Deactivate one single-byte LF1 Coded Font and related indexes	X'02C5..01'
	X'12'	Deactivate one single-byte font index	X'02C6..01'
	X'1E'	Deactivate all single-byte LF1 Coded Fonts and all indexes	
	X'1F'	Deactivate all single-byte LF1 Coded Fonts and all indexes (same as above)	
	X'20'	Deactivate double-byte LF1 Coded Font section and related indexes	
	X'21'	Deactivate double-byte LF1 Coded Font section, all higher sections and all related indexes	
	X'22'	Deactivate a font index for a doublebyte Coded Font section	
	X'2F'	Deactivate all double-byte LF1 Coded Fonts and all related indexes	
	X'30'	Deactivate one Code Page	
	X'3F'	Deactivate all Code Pages	
	X'40'	Deactivate one Font Character Set	
	X'4F'	Deactivate all Font Character Sets	
	X'50'	Deactivate one LF1 or LF3 Coded Font	
	X'51'	Deactivate one LF1 or LF3 Coded Font and all associated components	
	X'5D'	Deactivate all resident Coded Fonts and all associated components	
	X'5E'	Deactivate all Coded Fonts	
	X'5F'	Deactivate all Coded Fonts and all associated components	
	X'60'	Deactivate a data-object font	
	X'6E'	Deactivate all data-object fonts	

Offset	Range	Meaning	Error Code
1-2	X'0001' - X'7EFF'	HOST ASSIGNED ID (Deactivation Types X'11', X'12', X'20', X'21', X'22', X'30', X'40', X'50' and X'51')	X'0214..02' X'0215..02' X'02C5..01' X'02C6..01'
3		SECTION ID	
	X'00'	Single-byte font	
	X'41' - X'FD'	Double-byte font (Deactivation types X'20', X'21' and X'22')	
4-5		FONT INLINE SEQUENCE (Deactivation Type X'12' and X'22')	
	X'0000'	0 degrees	X'0240..02'
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	

End

The End command is the ending control for a series of Write Image, Write Image 2, Write Graphics, Write Bar Code, Load Code Page, or Load Font commands. This command marks either the end of an image object, a graphics object, a bar code object, or the end of a downloaded font sequence. See the Intelligent Printer Data Stream Reference, S544-3417, for more details.

End Page

The End Page (EP) command causes the printer to return to home state from page state, page segment state, or overlay state and thus marks the end of a page, a page segment, or an overlay. The EP command is an implicit command to schedule that page for printing if the command is being used to exit page state; all data for that page is available to the printer. Zero or more data bytes can be transmitted but are ignored. See the Intelligent Printer Data Stream Reference, S544-3417, for more details.

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Load Copy Control

A copy control record 2 to 32760 bytes long specifies how the printer is to modify and print logical pages in one or more copy subgroup definitions. Each copy subgroup definition can be from 2 to 254 bytes long (divisible by 2). The maximum number of key-words that the host program can specify in a copy subgroup definition is:

- X'80nn' specify 1 time
- X'90nn' specify 1 time
- X'91nn' specify 1 time
- X'C1nn' specify 1 time
- X'C2nn' specify 1 time
- X'D1nn' specify 1 to 126 times
- X'E1nn' specify 1 to 126 times
- X'E4nn' specify 1 to 63 times
- X'E5nn' specify 1 to 63 times

↓Note

- Actual tray capacity is determined by media weight.
- The machine supports media source tray numbering. Media source values in the LCC support tables represent the default settings when the printer is initially installed. The printer's control panel menu mode is provided to allow customers to specify the source tray numbers to meet requirements of legacy applications. Example: customer might want to address the Manual Tray as tray 4 instead of the tray 100 (default).
- For the tray in which "envelope" has been specified as the paper type, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8040', X'8041', etc. If a different paper type is specified for the tray, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8000', X'8001', etc. In regards to the bypass tray and default tray, even if you specify "envelope" as the paper type, the tray value will not be changed.
- To ascertain which machine type your model corresponds to, see "Machine Types", Read This First.

Offset	Range	Meaning	Error Code
0	X'02' - X'FE'	COPY SUBGROUP DEFINITION LENGTH	
1	X'01' - X'FF'	NUMBER OF IDENTICAL COPIES	X'0231..01'

Offset	Range	Meaning	Error Code
2-n		COPY MODIFICATION KEYWORDS	X'0232..01'
		Media Source (Reference Notes)	
	X'8000'	Tray 1	X'02C2..02'
	X'8001'	Tray 2	X'02C8..01'
	X'8002'	Tray 3	
	X'8003'	Tray 4	
	X'8002'	Tray 3 (LCT)	
		Large capacity tray (LCT) [1]	
	X'8003'	Tray 1 + Tray 2 + Tray 3 (LCT) + Large capacity tray (LCT)	
	X'8004'	Tray 1 + Tray 2 + Tray 3 + Tray 4 + Large capacity tray (LCT)	
	X'8063'	Bypass tray	
	X'80FF'	Default tray	
		Media Destination (Byte Pairs)	
		Standard tray [1]	
	X'9101'	Standard tray	
	X'9103'	Standard tray + 1000-sheet finisher	
	X'9103'	Standard tray + 3000-sheet finisher	
	X'9101'	Finisher shift tray	
	X'9102'	Finisher upper tray	

*1   Available values vary depending on the installed option.

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Media Source and Destination Support Matrices

The following tables are provided to document Media Source and Destination support. This information is provided to ensure better overall understanding of the media handling characteristics. For more details on the actual X and Y media extents see p.72 "Printable Area Self-Defining Field".

Media Source and Destination Support Matrices

◯= Duplex SEF / △ = Duplex LEF / ● = SEF / ▲ = LEF

	Tray 1 Capacity: 550	Tray 2 Capacity: 550	Tray 3 Capacity: 550	Tray 4 Capacity: 550	Tray 3 Capacity: 2000	Large capacity tray (LCT) Capacity: 1200	Bypass tray Capacity: 100
A3 (297 × 420 mm)	◯	◯	◯	◯			◯
A4 (210 × 297 mm)	◯ △	◯ △	◯ △	◯ △	△	△	◯ △
A5 (210 × 148 mm)	△	△	△	△			◯ △
A6 (105 × 148 mm)							◯
B4 (257 × 364 mm)	◯	◯	◯	◯			◯
B5 (182 × 257 mm)	◯ △	◯ △	◯ △	◯ △		△	◯ △
B6 (128 × 182 mm)							◯
DLT (11 × 17 in.)	◯	◯	◯	◯			◯
Legal (8.5 × 14 in.)	◯	◯	◯	◯			◯

	Tray 1 Capacity: 550	Tray 2 Capacity: 550	Tray 3 Capacity: 550	Tray 4 Capacity: 550	Tray 3 Capacity: 2000	Large capacity tray (LCT) Capacity: 1200	Bypass tray Capacity: 100
Foolscap (8.5 × 13 in.)	○	○	○	○			○
Letter (8.5 × 11 in.)	○ △	○ △	○ △	○ △	△	△	○ △
GovernmentLG (8.25 × 14 in.)	○	○	○	○			○
Folio (8.25 × 13 in.)	○	○	○	○			○
F/GL (8 × 13 in.)	○	○	○	○			○
G LT (8 × 10.5 in.)	○ △	○ △	○ △	○ △			○ △
Eng Quatro (8 × 10 in.)	○	○	○	○			○ △
Executive (7.25 × 10.5 in.)	○ △	○ △	○ △	○ △			○ △
HalfLetter (5.5 × 8.5 in.)							○
Com10 (4.125 × 9.5 in.)	▲	▲	▲	▲			● ▲
Monarch (3.875 × 7.5 in.)							● ▲
C5 (162 × 229 mm)	▲	▲	▲	▲			● ▲

	Tray 1 Capacity: 550	Tray 2 Capacity: 550	Tray 3 Capacity: 550	Tray 4 Capacity: 550	Tray 3 Capacity: 2000	Large capacity tray (LCT) Capacity: 1200	Bypass tray Capacity: 100
C6 (114 × 162 mm)							● ▲
DL Env (110 × 220 mm)	▲	▲	▲	▲			● ▲
12 × 18 in.							●
11 × 15 in.	○	○	○	○			○
11 × 14 in.	○	○	○	○			○
10 × 15 in.	○	○	○	○			○
10 × 14 in.	○	○	○	○			○
Custom Sizes	*1	*1	*1	*1			*2

*1   182.0 × 148.0 mm to 297.0 × 432.0 mm

*2   90.0 × 148.0 mm to 305.0 × 600.0 mm

A = Standard tray Capacity: 500

B = 1000-sheet finisher Capacity: 250 (Finisher upper tray) / 1000 (Finisher shift tray)

C = 3000-sheet finisher Capacity: 250 (Finisher upper tray) / 3000 (Finisher shift tray)

Y = Yes / N = No

	A	B	C
A3 (297 × 420mm) SEF	Y	Y	Y
A4 (210 × 297mm) SEF / LEF	Y	Y	Y

	A	B	C
A5 (210 × 148mm) SEF / LEF	Y	Y	Y
A6 (105 × 148mm) SEF	Y	• Finisher upper tray: Y • Finisher shift tray: N	Y
B4 (257 × 364 mm) SEF	Y	Y	Y
B5 (182 × 257mm) SEF / LEF	Y	Y	Y
B6 (128 × 182mm) SEF	Y	• Finisher upper tray: Y • Finisher shift tray: N	Y
DLT (11 × 17 in.)	Y	Y	Y
Legal (8.5 × 14in.) SEF	Y	Y	Y
Foolscap (8.5 × 13in.) SEF	Y	Y	Y
Letter (8.5 × 11in.) SEF / LEF	Y	Y	Y

	A	B	C
GovernmentLG (8.25 × 14 in.) SEF	Y	Y	Y
Folio (8.25 × 13in.) SEF	Y	Y	Y
F/GL (8 × 13in.) SEF	Y	Y	Y
G LT (8 × 10.5 in.) SEF / LEF	Y	Y	Y
Eng Quatro (8 × 10 in.) SEF / LEF	Y	Y	Y
Executive (7.25 × 10.5in.) SEF / LEF	Y	Y	Y
HalfLetter (5.5 × 8.5in.) SEF	Y	Y	Y
Com10 (4.125 × 9.5in.) SEF / LEF	Y	N	• Finisher upper tray: N • Finisher shift tray: N (SEF) / Y (LEF)
Monarch (3.875 × 7.5in.) SEF / LEF	Y	N	• Finisher upper tray: N • Finisher shift tray: N (SEF) / Y (LEF)

	A	B	C
C5 (162 × 229mm) SEF / LEF	Y	N	• Finisher upper tray: N • Finisher shift tray: N (SEF) / Y (LEF)
C6 (114 × 162mm) SEF / LEF	Y	N	• Finisher upper tray: N • Finisher shift tray: N (SEF) / Y (LEF)
DL Env (110 × 220mm) SEF / LEF	Y	N	• Finisher upper tray: N • Finisher shift tray: N (SEF) / Y (LEF)
12 × 18 in. SEF	Y	Y	Y
11 × 15 in. SEF	Y	Y	Y
11 × 14 in. SEF	Y	Y	Y
10 × 15 in. SEF	Y	Y	Y
10 × 14 in. SEF	Y	Y	Y
Custom Sizes	*1	*2	*3

*1   90.0 × 148.0 mm to 305.0 × 600.0 mm

*2   100.0 × 148.0 mm to 305.0 × 460.0 mm

*3   100.0 × 148.0 mm to 305.0 × 600.0 mm

Load Font Equivalence

The font equivalence record is a list of 0 to 254 font equivalence entries (each entry is 16 bytes). The font equivalence record permits the host program to equate a Local-Font ID (specified in text control p. 125 "Set Coded Font Local", p.184 "Bar Code Data Descriptor", p.182 "Write Bar Code Control", or graphics order "Character Set", IPDS Technical Reference 1) with:

- Font Host Assigned ID (HAID)

- The Font Inline Sequence or character rotation table to be used when processing characters

- Global Resource ID (GRID) for resident fonts. The GRID is made up of the following components:

    - GCSGID Graphic Character Set Global ID

    - CPGID Code Page Global ID

    - FGID Font Global ID

    - FW Font width in 1/1440 inch units

If a GRID is specified in bytes 5-12, the entry is requesting the activation of a coded font and assigning a HAID to it. The printer uses the information provided in the GRID to locate the component parts of the coded font. First, the GCSGID and FGID values are used to find the font character set, and GCSGID and CPGID are used to find the code page. In some cases, the printer will locate the code page using just the CPGID value. If the character set and code page are not found in the above manner, information in the GRID will be used together with the Font Inline Sequence value (Bytes 3-4) to locate a single-byte fully described font and font index.

The set of supported GCSGID/CPGID/FGID/FW (GRID) combinations (described in "Code Page and Font Identification", IPDS Technical Reference 1) is available to the host PSF by means of the XOA-RRL command. For typographic and scalable fonts, a Font Width (FW) must be specified in order to uniquely select a point size, unless FW=0 or X'FFFF', in which case the printer's control panel [Characters Per Inch] setting is used ([Characters Per Inch] on the IPDS Menu).

Exception X'021D..02' is reported back if a non-zero GRID is requested with parts that are not supported in the printer, except in the case of GCSGID subset substitution or LFE Bold Attribute substitution.

For outline coded fonts, the FW value is used to derive a scale factor as follows:

- For typographic and proportionally spaced fonts, both horizontal and vertical scale factors are 3 (FW).

- For fixed pitch, uniform character increment fonts, both horizontal and vertical scale factors are derived using the following algorithm (fractions are truncated):

    V_Scale = H_Scale = 1000 [1] FW/SPACE

    In this case SPACE is the value of the Space Character increment in relative units.

[1] 4028-type font substitution is provided as the printer's control panel feature. It is independent of the device emulation mode setting (native or 4028). Default is No Font Substitution.

Offset	Range	Meaning	Error Code
0	X'00' - X'FE'	LOCAL-FONT ID	X'0219..02'
	X'FF'	Reserved	X'0218..02'
1-2	X'0001' - X'7EFF'	FONT HOST ASSIGNED ID	X'0218..02' X'021F..02'
3-4		FONT INLINE SEQUENCE	X'0247..02'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
5-6		GCSGID	
	X'0000'	No value assigned (Note 2)	
	X'0001' - X'FFFE'	Graphic Character Set Global ID	
	X'FFFF'	All characters with assigned code points in the associated code page	
7-8		CPGID	X'021D..02'
	X'0000'	No value assigned (Note 2)	
	X'0001' - X'FFFE'	Code Page Global ID	
	X'FFFF'	Printer Default (Configuration Setting)	

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Offset	Range	Meaning	Error Code
9-10		FGID	X'021D.. 02'
	X'0000'	No value assigned (Note 2)	
	X'0001' - X'FFFE'	Font Global ID	
	X'FFFF'	Printer Default (Configuration Setting)	
11-12		FW	
	X'0000'	No value assigned (Note 2)	
	X'0001' - X'7FFF'	Font Width (Ignored for Fixed Pitch Fonts)	
	X'FFFF'	Printer Default as specified by Configuration Settings	
13	X'00'	Reserved	
14		FONT ATTRIBUTES (Note 3)	
	Bit 0 0/1	Ignored (Symbol Sets)	
	Bits 1-2 00	Reserved	
	Bit 3 0/1	Ignored (Double High)	
	Bit 4 0/1	Ignored (Italics)	
	Bit 5 0/1	Ignored (Double Strike)	
	Bit 6 0/1	Bold = 1	
	Bit 7 0/1	Ignored (Double Wide)	
15	X'00'	Reserved	
16-n		Additional LFE ENTRIES	X'023A.. 02'

Note

- For LF1 coded fonts, FIS specifies the font index table for character rotation. For LF3 coded fonts, FIS is used to select the metrics for a specific writing mode.

- Global Resource IDs (bytes 5-12) apply to printer resident fonts only. If these fields are all X'0000', then an activation is not done. If GCSGID and/or FW are 0 or X'FFFF':

- CPGID (non-zero) defines the CPGID/GCSGID

- FGID (non-zero) defines the FGID/FW (Non-Typographic)

- FGID (non-zero) and the printer's control panel CPI defines the FGID/FW (Typographic)

- When the chosen font and attribute combination is restricted by a licensing agreement the font attributes may be executed by substitution or other means. If an appropriate font is not available, the attribute may not occur. Also, with font substitution, the available characteristics may change. Combinations of attributes may not be available. Font attributes will not be applied to host downloaded fonts.

Logical Page Descriptor

Before the printer can present a page of data it must know the following:

- The units in which distances have been measured
- The boundaries of the logical page
- Initialization values for control parameters (Margins, Line spacing...)

The controls established in a Logical Page Descriptor command remain in effect until the next Logical Page Descriptor is received unless superseded by explicit controls in other commands (See p.117 "Write Text"). In any case, the latest LPD control values are restored with each Begin Page or Begin Overlay command.

The LPD command is valid with 24, 28, 34, 36, 38, 40, 41 or 43 bytes. The printer accepts the LPD command using any of these valid lengths.

Offset	Range	Meaning	Error Code
0		UNIT-BASE (Measurement Units)	X'0264..02'
	X'00'	10 in.	
	X'01'	10 centimeters	
1		Reserved	
2-3		Xp AND I L-units PER UNIT-BASE	X'0260..02'
	X'3840'	14400 L-units per 10 in.	
	X'1626'	5670 L-units per 10 centimeters	
	X'0960'	2400 L-units per 10 in.	
	X'03B1'	945 L-units per 10 centimeters	
4-5		Yp AND B L-units PER UNIT-BASE	X'0261..02'
	X'3840'	14400 L-units per 10 in.	
	X'1626'	5670 L-units per 10 centimeters	
	X'0960'	2400 L-units per 10 in.	
	X'03B1'	945 L-Units per 10 centimeters	
6		Reserved	

Offset	Range	Meaning	Error Code
7-9	X'000001' - X'007FFF'	Xp-EXTENT OF LOGICAL PAGE (Width) See "Notation Conventions", IPDS Technical Reference 1.	X'0262..02'
10		Reserved	
11-13	X'000001' - X'007FFF'	Yp-EXTENT OF LOGICAL PAGE (Height) See "Notation Conventions", IPDS Technical Reference 1.	X'0263..02'
14		Reserved	
15		Ignored (Ordered Data)	
16-23		Reserved	
24-25		I-AXIS ORIENTATION	X'0268..02'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
	X'FFFF'	Printer Default	
26-27		B-AXIS ORIENTATION	X'0269..02'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
	X'FFFF'	Printer Default See p.133 "Set Text Orientation" for valid combinations of I-axis and B-axis orientations.	
28-29	X'0000' - X'7FFF'	INITIAL I PRINT COORDINATE See "Notation Conventions", IPDS Technical Reference 1.	X'026A..02'

1

Offset	Range	Meaning	Error Code
30-31	X'0000' - X'7FFF'	INITIAL B PRINT COORDINATE See "Notation Conventions", IPDS Technical Reference 1.	X'026B..02'
32-33	X'0000' - X'7FFF'	INLINE MARGIN See "Notation Conventions", IPDS Technical Reference 1.	X'0210..01'
	X'FFFF'	Printer Default	
34-35	X'0000' - X'7FFF'	INTERCHARACTER ADJUSTMENT (+) See "Notation Conventions", IPDS Technical Reference 1.	X'0212..01'
	X'FFFF'	Printer Default	
36-37		Reserved	
38-39	X'0000' - X'7FFF'	BASELINE INCREMENT See "Notation Conventions", IPDS Technical Reference 1.	X'0211..01'
	X'FFFF'	Printer Default	
40	X'00' - X'FE'	LOCAL FONT ID	
	X'FF'	Printer Default	

Offset	Range	Meaning	Error Code
41-42		TEXT COLOR	X'0258..0 3'
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0008'	Black	
	X'0010'	Brown - Limited Simulated Color Support	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	
	X'FFFF'	Printer Default (Black)	

Offset	Range	Meaning	Error Code
43-end		LPD Triplets • Color Specification Triplet. This optional triplet can be placed at the end of the LPD command to specify the foreground color of the object area, before any object data is placed on the object area. Any number of LPD triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Color Simulation", IPDS Technical Reference 1. • Presentation Space Reset Mixing Triplet. This optional triplet can be placed at the end of the LPD command to specify whether or not an object area is reset to the color of medium before any object data is placed on the object area. Any number of LPD triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Presentation Space Reset Mixing", IDPS Technical Reference 1.	

Logical Page Position

This command defines the position on the physical sheet of paper where the logical page is to be placed.

Offset	Range	Meaning	Error Code
0	X'00'	RESERVED	
1-3	X'FF8000' - X'007FFF'	Xm OFFSET of the LOGICAL PAGE ORIGIN in L-Units See "Notation Conventions", IPDS Technical Reference 1.	X'02A4..01' X'02AD..01'
4		PAGE PLACEMENT	
	X'00'	Default placement	
	X'10'	Partition 1, front side	
	X'11'	Partition 1, back side	
	X'20'	Partition 2, front side	
	X'21'	Partition 2, back side	
	X'30'	Partition 3, front side	
	X'31'	Partition 3, back side	
	X'40'	Partition 4, front side	
	X'41'	Partition 4, back side	
5-7	X'FF8000' - X'007FFF'	Ym OFFSET of the LOGICAL PAGE ORIGIN in L-Units See "Notation Conventions", IPDS Technical Reference 1.	X'02A5..01' X'02AD..01'

Offset	Range	Meaning	Error Code
8-9		PAGE ORIENTATION	
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees Explicit placement is supported.	

Presentation Fidelity Control

The Presentation Fidelity Control (PFC) command is only valid in home state and specifies the fidelity requirements for certain presentation functions. The desired fidelity for each supported presentation function can be specified with a triplet on the PFC command. The activate flag can be used to reset all fidelity controls to their default settings before activating the settings specified in the PFC triplets. A PFC command with no triplets and with the activate flag set to B'0' resets all fidelity controls to their default settings.

Offset	Range	Meaning	Error Code
0	X'00'	RESERVED	
1		FLAGS	
	Bit 0	ACTIVATE	
	0	Reset to default fidelity controls and activate PFC triplets	
	1		
	Bits 1-7	Reserved	
	0000000 0000000		
2-3	X'0000'	Reserved	
4-n		Triplets (Zero or more optional PFC triplets)	X'0254..05'
		X'86' Text Fidelity Control	
		X'88' Finishing Fidelity Control	

Text Fidelity Control

The Text Fidelity triplet specifies the exception continuation and reporting rules when an unrecognized or unsupported text control sequence is encountered.

Offset	Range	Meaning	Error Code
0	X'07'	LENGTH	X'0254..51'
1	X'86'	Text Fidelity Triplet ID	

Offset	Range	Meaning	Error Code
2		CONTINUE	X'0254..52'
	X'01'	Stop on Exception ID X'0200..01'	
	X'02'	Continue Processing Write Text Data	
3	X'00'	Reserved	
4		REPORT	X'0254..53'
	X'01'	Report X'0200..01' Exception	
	X'02'	Do Not Report X'0200..01' Exception	
5-6	X'0000'	Reserved	

Finishing Fidelity Control

The Finishing Fidelity triplet specifies the exception continuation and reporting rules for finishing exceptions. This fidelity control applies when a request for a specific finishing operation cannot be satisfied.

Offset	Range	Meaning	Error Code
0	X'07'	LENGTH	X'0254..51'
1	X'86'	Text Fidelity Triplet ID	
2		CONTINUE	X'0254..52'
	X'01'	Stop at first finishing exception	
	X'02'	Continue without the finishing operation	
3	X'00'	Reserved	
4		REPORT	X'0254..53'
	X'01'	Report Finishing Exceptions	
	X'02'	Do Not Report Finishing Exceptions	
5-6	X'0000'	Reserved	

Sense Type and Model

Causes the printer to place into the Special Data Area of the Acknowledge Reply (See p.10 "Acknowledgement Reply") a record containing type and model information and the functions the printer supports.

This command is effectively a NOP if the ARQ bit is NOT ON in the command header.

Sense Type and Model

Offset	Range	Meaning
0	X'FF'	Convention
1-2		Product Code
	X'2707'	This machine
	X'4028'	4028 Emulation (4028)
3		Model
	X'01'	This machine
	X'00'	4028 Emulation (Simplex)
	X'12'	4028 Emulation (Duplex)
4-5	X'0000'	Reserved

Device-Control Command Set

Offset	Range	Meaning
0-1	X'nnnn'	VECTOR LENGTH
2-3	X'C4C3'	DEVICE CONTROL Command-Set ID
4-5	X'FF10'	DC1 Subset ID
6-7	X'6001'	MULTIPLE COPY and COPY-SUBGROUP support in LCC
8-9	X'6002'	Media-source-selection support in LCC
10-11	X'6003'	Media-destination-selection support in LCC
12-13	X'6101'	Explicit Page Placement and Orientation Support
14-15	X'6201'	LOGICAL PAGE AND OBJECT AREA COLORING support

Offset	Range	Meaning
16-17	X'7008'	Set Presentation Environment
18-19	X'702E'	ACTIVATE RESOURCE Command support
20-21	X'7034'	PRINT FIDELITY Command support
22-23	X'706B'	ICMR command support
24-25	X'8008'	XOA Order MARK FORM
26-27	X'800A'	XOA Order ALTERNATE OFFSET STACKER
28-29	X'80F2'	XOA Order DISCARD BUFFERED DATA
30-31	X'80F4'	XOA Order REQUEST RESOURCE LIST
32-33	X'80F6'	XOA Order EXCEPTION HANDLING CONTROL
34-35	X'80F8'	XOA Order PRINT QUALITY CONTROL
36-37	X'9001'	XOH Order PRINT BUFFERED DATA
38-39	X'9003'	XOH Order SPECIFY GROUP OPERATION
40-41	X'9004'	XOH Order DEFINE GROUP BOUNDARY
42-43	X'9005'	XOH Order ERASE RESIDUAL PRINT DATA
44-45	X'9007'	XOH Order ERASE RESIDUAL FONT DATA
46-47	X'900D'	XOH Order STACK RECEIVED PAGES
48-49	X'9013'	XOH Order EJECT to FRONT FACING
50-51	X'9015'	XOH Order SELECT INPUT MEDIA SOURCE
52-53	X'9016'	XOH Order SET MEDIA ORIGIN
54-55	X'9017'	XOH Order SET MEDIA SIZE
56-57	X'e000'	CMRs can be captured
58-59	X'e001'	Host-activated link color conversion CMRs supported
60-61	X'e004'	Host-activated indexed CMRs supported
62-63	X'e102'	Pass-thru audit color conversion CMRs supported
64-65	X'F001'	END PERSISTENT NACK Without Leaving IPDS

Offset	Range	Meaning
66-67	X'F200'	OBJECT DATE AND TIME STAMP TRIPLETS SUPPORTED
68-69	X'F201'	ACTIVATION (AR) FAILED NACK SUPPORTED
70-71	X'F202'	Font resolution and metric technology triplets supported
72-73	X'F203'	Metric adjustment triplets supported in AR commands
74-75	X'F204'	Data-object font support
76-77	X'F205'	Color Mgmt Triplet Support
78-79	X'F206'	Device Appearance Triplet support in SPE cmd
80-81	X'F601'	Position check highlighting support in XOA EHC
82-83	X'F602'	Independent exception page print in XOA-EHC Independent Exception Page Print is only present in Native mode, not 4028 Emulation mode.
84-85	X'F804'	SIMPLEX and DUPLEX 4-UP supported in LCC
86-87	X'FB00'	All architected units of measure
88-89	X'FC00'	All function listed for IS/3 is supported

Presentation Text Command Set

Offset	Range	Meaning
0-1	X'000C'	VECTOR LENGTH
2-3	X'D7E3'	PRESENTATION TEXT Command Set - TX1 Subset
4-5	X'FF30'	PT3 Data
6-7	X'1001'	UNORDERED TEXT
8-9	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
10-11	X'50FF'	8 TEXT ORIENTATIONS supported

IM Image Command Set

Offset	Range	Meaning
0-1	X'000C'	VECTOR LENGTH
2-3	X'C9D4'	IM IMAGE Command Set - IM1 Subset
4-5	X'FF10'	IMD1 Data
6-7	X'1001'	UNORDERED IMAGE BLOCKS
8-9	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
10-11	X'A004'	ALL 4 ORIENTATIONS Supported

IO Image Command Set (IOCA FS10)

Offset	Range	Meaning
0-1	X'0022'	VECTOR LENGTH
2-3	X'C9D6'	IO Image Command Set
4-5	X'FF10'	IO/1 Level
6-7	X'1001'	Unordered Image Blocks
8-9	X'1202'	IO Image Objects Downloaded Resources in Home State
10-11	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
12-13	X'5001'	MMR Compression algorithm supported
14-15	X'5003'	Uncompressed Image supported
16-17	X'5006'	RL4 Compression supported
18-19	X'5081'	G3 Facsimile Coding Scheme (CCITT G3MR)

Offset	Range	Meaning
20-21	X'5082'	G4 Facsimile Coding Scheme (CCITT G4MMR)
22-23	X'5101'	Bit ordering supported
24-25	X'5204'	Unpadded RIDIC Recording Algorithm supported
26-27	X'5505'	Multiple Image Content Supported
28-29	X'A004'	All four orientations supported
30-31	X'F300'	Replicate and Trim mapping supported
32-33	X'F301'	Scale-to-fill mapping supported

↓Note

- The Replicate and Trim Mapping Control Option is not supported when IPDS Print Mode = STD (Standard 300 dpi).

IO Image Command Set (IOCA FS11)

Offset	Range	Meaning
0-1	X'0028'	VECTOR LENGTH
2-3	X'C9D6'	IO Image Command Set
4-5	X'FF11'	IO/1 Level
6-7	X'1001'	Unordered Image Blocks
8-9	X'1202'	IO Image Objects Downloaded Resources in Home State
10-11	X'4020'	LIMITED SIMULATED COLOR SUPPORTED
12-13	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
14-15	X'4003'	COLOR of MEDIUM SUPPORTED MULTIPLE-COLOR SUPPORTED
16-17	X'4401'	Extended IOCA Bi-level Image Color supported
18-19	X'5001'	MMR Compression algorithm supported

Offset	Range	Meaning
20-21	X'5003'	Uncompressed Image supported
22-23	X'5008'	ABIC Compression supported
24-25	X'500A'	Concatenated ABIC
26-27	X'5082'	G4 Facsimile Coding Scheme (CCITT G4MMR)
28-29	X'5083'	ISO/ITU-TSS JPEG supported
30-31	X'5101'	Bit ordering supported
32-33	X'5204'	Unpadded RIDIC Recording Algorithm supported
34-35	X'5505'	Multiple Image Content supported
36-37	X'A004'	All four orientations supported
38-39	X'F301'	Scale-to-fill mapping supported

IO Image Command Set (IOCA FS40)

Offset	Range	Meaning
0-1	X'0026'	VECTOR LENGTH
2-3	X'C9D6'	IO Image Command Set
4-5	X'FF40'	IO/1 Level
6-7	X'1001'	Unordered Image Blocks
8-9	X'1202'	IO Image Objects Downloaded Resources in Home State
10-11	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
12-13	X'4401'	Extended IOCA Bi-level Image Color supported
14-15	X'4402'	Extended IOCA Tile-Set Color support
16-17	X'5001'	MMR Compression algorithm supported
18-19	X'5003'	Uncompressed Image supported

Offset	Range	Meaning
20-21	X'5008'	ABIC Compression supported
22-23	X'5080'	G3 Facsimile Coding Scheme (CCITT G3MH)
24-25	X'5081'	G3 Facsimile Coding Scheme (CCITT G3MR)
26-27	X'5082'	G4 Facsimile Coding Scheme (CCITT G4MMR)
28-29	X'5101'	Bit ordering supported
30-31	X'5204'	Unpadded RIDIC Recording Algorithm supported
32-33	X'5505'	Multiple image Content supported
34-35	X'A004'	All four orientations supported
36-37	X'F301'	Scale-to-fill mapping supported

IO Image Command Set (IOCA FS42)

Offset	Range	Meaning
0-1	X'0024'	VECTOR LENGTH
2-3	X'C9D6'	IO Image Command Set
4-5	X'FF42'	IO/1 Level
6-7	X'1001'	Unordered Image Blocks
8-9	X'1202'	IO Image Objects Downloaded Resources in Home State
10-11	X'4022'	COLOR of MEDIUM SUPPORTED
12-13	X'4401'	Extended IOCA Bi-level Image Color SDF supported
14-15	X'4402'	Extended IOCA Tile-Set Color support
16-17	X'5001'	MMR Compression algorithm supported
18-19	X'5003'	Uncompressed Image supported
20-21	X'5008'	ABIC Compression supported
22-23	X'5020'	Solid Fill Rectangle
24-25	X'5082'	G4 Facsimile Coding Scheme (CCITT G4MMR)

Offset	Range	Meaning
26-27	X'5101'	Bit ordering supported
28-29	X'5204'	Unpadded RIDIC Recording Algorithm supported
30-31	X'5505'	Multiple image content supported
32-33	X'A004'	All four orientations supported
34-35	X'F301'	Scale-to-fill mapping supported

IO Image Command Set (IOCA FS45)

Offset	Range	Meaning
0-1	X'001C'	VECTOR LENGTH
2-3	X'C9D6'	IO Image Command Set
4-5	X'FF45'	IO/1 Level
6-7	X'1001'	Unordered Image Blocks
8-9	X'1202'	IO Image Objects Downloaded Resources in Home State
10-11	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
12-13	X'4401'	Extended IOCA Bi-level Image Color supported
14-15	X'4402'	Extended IOCA Tile-Set Color support
16-17	X'5101'	Bit ordering supported
18-19	X'5204'	Unpadded RIDIC Recording Algorithm supported
20-21	X'5505'	Multiple image Content supported
22-23	X'A004'	All four orientations supported
24-25	X'F301'	Scale-to-fill mapping supported

Graphics Command Set

Offset	Range	Meaning
0-1	X'001A'	VECTOR LENGTH
2-3	X'E5C7'	GRAPHICS Command Set - GR1 Subset
4-5	X'FF30'	GRS3 Data
6-7	X'1001'	UNORDERED GRAPHICS BLOCKS
8-9	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
10-11	X'4100'	Set Process Color Supported
12-13	X'4101'	GOCA Box Drawing Supported
14-15	X'4102'	Partial Arc Drawing Supported
16-17	X'4106'	Set Fractional Line Width Supported
18-19	X'4108'	Normal line width default
20-21	X'4109'	Process Color default
22-23	X'4112'	Clockwise partial arc
24-25	X'A004'	All 4 orientations supported

Page Segment Command Set

Offset	Range	Meaning
0-1	X'0008'	VECTOR LENGTH
2-3	X'D7E2'	PAGE SEGMENT Command Set
4-5	X'FF10'	PS1 Subset
6-7	X'1101'	EXTENDED PAGE SEGMENT SUPPORT (32K)

Overlay Command Set

Offset	Range	Meaning
0-1	X'000C'	VECTOR LENGTH
2-3	X'D6D3'	OVERLAY Command Set
4-5	X'FF10'	OL1 Subset
6-7	X'1506'	OVERLAY NESTING = 6 Levels
8-9	X'1102'	EXTENDED OVERLAY SUPPORT (32K)
10-11	X'A004'	page-overlay-rotation support; all 4 orientations

Loaded Font Command Set (LF1) - Single Byte

Offset	Range	Meaning
0-1	X'0010'	VECTOR LENGTH
2-3	X'C3C6'	LOADED FONT Command Set
4-5	X'FF10'	LF1 subset - fully described font + font index
6-7	X'A004'	4 CHARACTER ROTATIONS (LFI command)
8-9	X'B002'	LFI UNDERSCORE Width and Position USED
10-11	X'C005'	BOUNDED BOX RASTER FONT TECHNOLOGY
12-13	X'C100'	FIXED METRICS
14-15	X'C101'	RELATIVE METRICS

Loaded Font Command Set (LF1) - Double Byte

Offset	Range	Meaning
0-1	X'0012'	VECTOR LENGTH
2-3	X'C3C6'	LOADED FONT Command Set
4-5	X'FF10'	LF1 subset - fully described font + font index
6-7	X'A004'	4 CHARACTER ROTATIONS (LFI command)
8-9	X'B001'	Double-Byte coded fonts supported

Offset	Range	Meaning
10-11	X'B002'	LFI UNDERSCORE Width and Position USED
12-13	X'C005'	BOUNDED BOX RASTER FONT TECHNOLOGY
14-15	X'C100'	FIXED METRICS
16-17	X'C101'	RELATIVE METRICS

Loaded Font Command Set (LF3) - Single Byte

Offset	Range	Meaning
0-1	X'0014'	VECTOR LENGTH
2-3	X'C3C6'	LOADED FONT Command Set
4-5	X'FF30'	LF3 subset - code page + font character set
6-7	X'A004'	4 CHARACTER ROTATIONS (LFI command)
8-9	X'B002'	LFI UNDERSCORE Width and Position USED
10-11	X'B003'	GRID PARTS REQUIRED IN LFC, LFCSC and LCPC COMMANDS
12-13	X'B004'	Default Character Parameters in LCPC Supported
14-15	X'B005'	Extended (Unicode mapping) code page support
16-17	X'C01F'	ADOBE TYPE-1 PFB OUTLINE FONT TECHNOLOGY
18-19	X'C101'	RELATIVE METRICS

Loaded Font Command Set (LF3) - Double Byte

Offset	Range	Meaning
0-1	X'0018'	VECTOR LENGTH
2-3	X'C3C6'	LOADED FONT Command Set
4-5	X'FF30'	LF3 subset - code page + font character set
6-7	X'A004'	4 CHARACTER ROTATIONS (LFI command)
8-9	X'B001'	Double-Byte coded fonts supported
10-11	X'B002'	LFI UNDERSCORE Width and Position USED

1

Offset	Range	Meaning
12-13	X'B003'	GRID PARTS REQUIRED IN LFC, LFCSC and LCPC COMMANDS
14-15	X'B004'	Default Character Parameters in LCPC Supported
16-17	X'B005'	Extended (Unicode mapping) code page support
18-19	X'C01E'	CID-keyed OUTLINE FONT TECHNOLOGY
20-21	X'C01F'	ADOBE TYPE-1 PFB OUTLINE FONT TECHNOLOGY
22-23	X'C101'	RELATIVE METRICS

Bar Code Command Set

Offset	Range	Meaning
0-1	X'000C'	VECTOR LENGTH
2-3	X'C2C3'	BAR CODE Command Set - BC1 Subset
4-5	X'FF20'	BCD2 Data
6-7	X'1001'	UNORDERED BAR CODE BLOCKS
8-9	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
10-11	X'A004'	All four orientations supported

↓Note

- See p.189 "Bar Code Type and Modifier Description and Values" for a list of supported Bar Code Types.

Object Container Command Set

Offset	Range	Meaning
0-1	X'000C'	VECTOR LENGTH
2-3	X'D6C3'	Object Container Command set - OC1 Subset
4-5	X'0000'	No levels defined

Offset	Range	Meaning
6-7	X'1201'	Data-object resource support
8-9	X'F301'	Scale-to-fill mapping supported
10-11	X'5800'	Image resolution triplet supported

Execute Order Any State (XOA)

This command identifies a set of subcommands which take effect immediately, regardless of the current printer operating state.

Each Execute Order Any state command consists of a two-byte order code followed by zero or more bytes of parameters.

XOA Mark Form

The MF order causes the printer to place two rectangular blocks of job separation marks on the current or the next sheet. One block is printed on the leading edge of the sheet and one block is printed on the trailing edge of the sheet.

If the MF order is included in a page that is part of a Load Copy Control copy group (See p.28 "Load Copy Control") all the copies of the page will have a job separator mark included.

Offset	Range	Meaning	Error Code
0-1	X'0800'	MARK FORM	

XOA Exception Handling Control

The Exception-Handling Control command allows the host to control how the printer reports and processes exceptions. A data-stream exception exists when the printer detects an invalid or unsupported command, control, or parameter value.

Offset	Range	Meaning	Error Code
0-1	X'F600'	EXCEPTION HANDLING CONTROL (EHC)	

Offset	Range	Meaning	Error Code
2		EXCEPTION REPORTING	
	Bit 0: 0	Do not Report Undefined Character Check	
	Bit 0: 1	Report Undefined Character Check	
	Bit 1: 0	Do not Report Page Position Check	
	Bit 1: 1	Report Page Position Check	
	Bits 2-5: 00	Reserved	
	Bit 6: 0	Do not Highlight Position Checks	
	Bit 6: 1	Highlight Position Checks (08C1..00 and 0411..00)	
	Bit 7: 0	Do not Report All other Exceptions with AEA's	
	Bit 7: 1	Report All other Exceptions with AEA's	
3		ALTERNATE EXCEPTION ACTIONS	
	Bits 0-6: 0	Reserved	
	Bit 7: 0	Take AEA (if defined)	
	Bit 7: 1	Don't take AEA	
4		EXCEPTION PRESENTATION PROCESSING	
	Bits 0-5: 0	Reserved	
	Bit 6: 0	No Page Continuation	
	Bit 6: 1	Page Continuation Action (Independent Exception Page Print Supported) Discard Page	
	Bit 7: 0	Print to point of Exception	
	Bit 7: 1	(Process limits may apply) Independent Exception Page Print is only present in Native mode, not 4028 Emulation mode.	

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XOA Request Resource List

This order causes the Resource List (See "Resource List Reply") to be placed in the Special Data Area of the Acknowledge Reply (See p.10 "Acknowledgement Reply") requested with this order. If the ARQ flag was not set for this XOA subcommand, it is treated as a NOP.

A Resource List Reply may consist of multiple entries. If the Resource List Reply contains an entry that does not fit in the space available in the Special Data Area of Acknowledge Reply, the printer will follow either the acknowledge continuation method or the RRL-continuation method, depending on the host, as described in Intelligent Printer Data Stream Reference.

Offset	Range	Meaning	Error Code
0-1	X'F400'	REQUEST RESOURCE LIST (RRL)	
2		QUERY TYPE	X'0291..02'
	X'05'	Resource Activation Status	
	X'00' or X'FF'	General Resource Status	
3-4	X'0000'- X'FFFF'	ENTRY CONTINUATION Indicator	
5	X'03'-X'xx'	ENTRY LENGTH Multiple-entry queries are not supported. Byte 5 indicates the length of the command.	X'0291..02'

Offset	Range	Meaning	Error Code
6		RESOURCE TYPE	X'0291..02'
	X'01'	Single Byte Coded Fonts	
	X'02'	Double-byte LF1–type Coded Fonts	
	X'03'	Double-byte LF1–type Coded Font Sections	
	X'04'	Page Segments	
	X'05'	Overlays	
	X'06'	Device Version Code Pages	
	X'07'	Font Character Sets	
	X'08'	Single-byte coded-font indexes	
	X'09'	Double-byte LF1–type Coded Font Section Indexes	
	X'10'	Coded Fonts (treated as RT 01)	
	X'11'	Graphic Character Sets supported in a font character set	
	X'12'	Specific Code Pages	
	X'41'	Data-object font	
	X'42'	Data-object font component	
	X'40'	Data Object Resource	
	X'FF'	All Resources	
7		RESOURCE ID FORMAT	X'0291..02'
	X'00'	Host-Assigned Resource ID	
	X'03'	IBM Registered Global Resource ID parts	
	X'09'	Object-OID	
8-n		RESOURCE IDENTIFIER	

- Multiple-entry queries are not supported. Byte 5 indicates the length of the command.
- If the entire resource list does not fit in the Special Data area of the Acknowledge Reply, continuation is necessary. The printer indicates continuation using the acknowledgement

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continuation bit in the flag byte of the Acknowledge Reply. If the host requests Acknowledgement continuation by sending a command with ARQ bit and the Continuation bit set, the printer will complete the RRL reply using Acknowledgement continuation. If the host requests RRL continuation (by sending an RRL command with non-zero value in bytes 3 and 4) the printer will use conventional RRL continuation to finish the reply. If the host requests both RRL and ACK continuation, the printer will default to RRL continuation.

- Bytes 8 and 9 are ignored when the resource type is ALL.

- Exception ID 0291..02 in bytes 6 and 7 are for invalid values. If either value is unsupported, then the query is not understood and the reply is a single entry that sets the resource type to zero, echoes other values, and sets the resource size to zero (not present).

Resource List Reply

Offset	Range	Meaning	Error Code
0	X'FF	UNORDERED LIST	
1	X'01'	END of LIST	
	X'04' - X'nn'	LENGTH of this ENTRY	

Offset	Range	Meaning	Error Code
2		RESOURCE TYPE	
	X'00'	Resource Size=0. The queried Resource Type,ID Format, or ID is unknown, unsupported, or inconsistent	
	X'01'	Single Byte Coded Font	
	X'02'	Double Byte Coded Fonts	
	X'03'	Double Byte Coded-font Sections	
	X'04'	Page Segment	
	X'05'	Overlay	
	X'06'	Device Version Code Pages	
	X'07'	Font Character Sets	
	X'08'	Single Byte Coded Font Index	
	X'09'	Double Byte Coded-font Section Indexes	
	X'11'	Graphic Character Sets supported in a font character set	
	X'12'	Specific Code Pages	
	X'41'	Data-object font	
	X'42'	Data-object font component	
	X'FF'	All Resources	
3		RESOURCE ID FORMAT	
	X'00'	Host-Assigned Resource ID	
	X'03'	IBM Registered Global Resource ID parts	
4		RESOURCE SIZE Indicator	
	X'00'	Resource not present	
	X'01'	Resource present	
5-6	X'xxxx'	Resource ID	

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- Bytes 2-6 repeat for each resource type.

- A query for a HARID that maps to a GCSGID/CPGID/FGID/FW combination which is not supported in the current configuration will result in a negative response (Reply Byte 4 = 0).

- For details about a description of the supported GCSGID/CPGID/FGID/FW combinations, see "Code Page and Font Identification", IPDS Technical Reference 1.

XOA Alternate Offset Stacker (AOS)

The AOS order command signals the printer to jog the current sheet. If copies of the current sheet are stacked in more than one media destination, the jogging will occur in each selected media destination, if the media destination supports offset stacking.

Offset	Range	Meaning	Error Code
0-1	X'0A00'	Alternate Offset Stacker	

Media Jogging Support Matrices

Y = Yes / N = No

	1000-sheet finisher: Finisher shit tray	3000-sheet finisher Capacity: Finisher shift tray
A3 (297 × 420mm) SEF	Y	Y
A4 (210 × 297mm) SEF / LEF	Y	Y
A5 (210 × 148mm) SEF / LEF	Y	Y (SEF) / N (LEF)
A6 (105 × 148mm) SEF	N	Y

	1000-sheet finisher: Finisher shit tray	3000-sheet finisher Capacity: Finisher shift tray
B4 (257 × 364 mm) SEF	Y	Y
B5 (182 × 257mm) SEF / LEF	Y	Y
B6 (128 × 182mm) SEF	N	N
DLT (11 × 17 in.) SEF	Y	Y
Legal (8.5 × 14in.) SEF	Y	Y
Foolscap (8.5 × 13in.) SEF	Y	Y
Letter (8.5 × 11in.) SEF / LEF	Y	Y
GovernmentLG (8.25 × 14 in.) SEF	Y	Y
Folio (8.25 × 13in.) SEF	Y	Y

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	1000-sheet finisher: Finisher shit tray	3000-sheet finisher Capacity: Finisher shift tray
F/GL (8 × 13in.) SEF	Y	Y
G LT (8 × 13in.) SEF / LEF	Y	Y
Eng Quatro (8 × 10 in.) SEF / LEF	Y	Y
Executive (7.25 × 10.5in.) SEF / LEF	Y	Y
HalfLetter (5.5 × 8.5in.) SEF / LEF	Y	Y
Com10 (4.125 × 9.5in.) SEF / LEF	N	N
Monarch (3.875 × 7.5in.) SEF / LEF	N	N
C5 (162 × 229mm) SEF / LEF	N	N
C6 (114 × 162mm) SEF / LEF	N	N

	1000-sheet finisher: Finisher shit tray	3000-sheet finisher Capacity: Finisher shift tray
DL Env (110 × 220mm) SEF / LEF	N	N
12 × 18 in. SEF	Y	Y
11 × 15 in. SEF	Y	Y
11 × 14 in. SEF	Y	Y
10 × 15 in. SEF	Y	Y
10 × 14 in. SEF	Y	Y
Custom Sizes	-	148.0 × 148.0 mm to 305.0 × 600.0 mm

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Execute Order Home State (XOH)

Each Execute Order Homestate command consists of a two-byte order code followed by zero or more bytes of parameters.

XOH Obtain Printer Characteristics

This order causes a set of self-defined fields describing printer characteristics to be placed in the Special Data Area of the requested Acknowledge Reply and is identified with an acknowledgement type of X'46'. If the ARQ flag was not set on the XOH command containing this order, then this order is equivalent to a No Operation.

Offset	Range	Meaning	Error Code
0-1	X'F300'	OPC Order Code	

Printable Area Self-Defining Field

- The printer provides two modes that determine the specification of the Xm Offset, Ym Offset, Xm Extent and Ym Extent of the Printable Area.

    - Restricted (No Print Border) (Guaranteed Print Legibility) (Default)

    - Unrestricted (Edge-to-Edge Addressability)

- The Xm Extent and Ym Extent of the Printable Area parameters documented in the following table are representative of the standard printer source media configuration. These extents can be modified as a result of receiving a XOHSMO command, as described in p.103 "XOH Set Media Origin".

- Actual tray capacities are determined media weight. The capacities in the following table are the maximum allowable.

- The machine supports media source tray numbering. Media source values in the printer's control panel OPC support tables represent the default settings when the printer is initially installed. An the menu mode is provided to allow customers to specify the source tray numbers to meet requirements of legacy applications. Example: customer might want to address the Manual Tray as tray 4 instead of the tray 100 (default).

↓Note

- For the tray in which "envelope" has been specified as the paper type, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8040', X'8041', etc. If a different paper type is specified for the tray, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8000', X'8001', etc. In regards to the bypass

tray and default tray, even if you specify "envelope" as the paper type, the tray value will not be changed.

Offset	Range	Meaning
0-1		LENGTH of this Self-Defining Field
	X'0018' or	Machine with NO Media OID
	X'0024' or	Machine with Single Media OID
	X'0025' or	Machine with Double Media OID
	X'0026' or	Machine with Triple Media OID
	X'0027' or	Machine with Quadruple Media OID
	X'nnnn'	Machine with Media Name
2-3	X'0001'	PRINTABLE AREA Self-Defining Field ID
4		INPUT MEDIA SOURCE
	X'00'	Tray 1
	X'01'	Tray 2
	X'02'	Tray 3
	X'03'	Tray 4
	X'02'	Tray 3 (LCT)
		Large capacity tray (LCT) [1]
	X'03'	Tray 1 + Tray 2 + Tray 3 (LCT) + Large capacity tray (LCT)
	X'04'	Tray 1 + Tray 2 + Tray 3 + Tray 4 + Large capacity tray (LCT)
	X'63'	Bypass tray
	X'FF'	Default tray
	X'00'	Reserved
6	X'00'	UNIT BASE 10 in.
7	X'00'	Reserved
8-9	X'3840'	L-units per UNIT BASE

Offset	Range	Meaning
10-11	X'0001' - X'xxxx'	WIDTH of the Medium Presentation Space in L-units (determined by configuration)
12-13	X'0001' - X'xxxx'	LENGTH of the Medium Presentation Space in L-units (determined by configuration)
14-15		Xm OFFSET of the Printable Area in L-Units
	X'00E3'	Restricted (4mm)
	X'0000'	Unrestricted (0mm)
16-17		Ym OFFSET of the Printable Area in L-units
	X'00E3'	Restricted (4mm)
	X'0000'	Unrestricted (0mm) For A4 media there is special processing with respect to reporting the Xm OFFSET and subsequentially the Xm EXTENT of the printable area. The 4028 printer used an offset of 3.386 mm for A4 paper (short edge) instead of 4 mm. This was done as a customer satisfaction issue to allow a printable area 8 in. wide.

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Offset	Range	Meaning
18-19 (Restricted: No Print Border)		Xm EXTENT of the Printable Area in L-units
		Paper
	X'1D2A'	Statement (5.185 in.)
	X'2702'	Executive (6.935 in.)
	X'2B3A'	8in. × 10in. (7.685 in.)
	X'2E0A'	Letter (8.185 in.)
	X'30DA'	Letter Tabstock (8.685 in.)
	X'2B3A'	8in. × 13in. (7.685 in.)
	X'2CA2'	8.25in. × 13in. (7.935 in.)
	X'2E0A'	8.5 × 13 in. (8.185 in.)
	X'2E0A'	Legal (8.185 in.)
	X'367A'	10in. × 14in. (9.685 in.)
	X'367A'	10in. × 15in. (9.685 in.)
	X'3C1A'	11in. × 14in. (10.685 in.)
	X'3C1A'	11in. × 15in. (10.685 in.)
	X'3C1A'	Ledger (10.685 in.)
	X'41BA'	12in. × 18in. (11.685 in.)
	X'157B'	A6 (97 mm)
	X'1A93'	B6 (120 mm)
	X'1F1D'	A5 (140.5 mm)
	X'23E0'	170 × 210mm (162 mm)
	X'2689'	182 × 210mm (174 mm)
	X'2CBC'	210 × 340mm (202 mm)

Offset	Range	Meaning
18-19 (Restricted: No Print Border)	X'2688'	B5 (JIS) (174 mm)
	X'2CBC'	A4 (202 mm)
	X'2F86'	A4 Tabstock (214.6 mm)
	X'3724'	B4 (ISO) (249 mm)
	X'395C'	8 Kai (259 mm)
	X'296A'	16 Kai (187 mm)
	X'4000'	A3 (289 mm)
	X'145F' - X'474F'	Custom (92 mm to 322 mm)
		Transparencies/Labels
	X'2E0A'	Letter (8.185 in.)
	X'2CBC'	A4 (202 mm)

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Offset	Range	Meaning
18-19 (Unrestricted: Edge-to-Edge Addressability)		Xm EXTENT of the Printable Area in L-units
		Paper
	X'1EF0'	Statement (5.5 in.)
	X'28C8'	Executive (7.25 in.)
	X'2D00'	8in. $\times$ 10in. (8 in.)
	X'2FD0'	Letter (8.5 in.)
	X'32A0'	Letter Tabstock (9 in.)
	X'2D00'	8in. $\times$ 13in. (8 in.)
	X'2E68'	8.25in. $\times$ 13in. (8.25 in.)
	X'2FD0'	8.5in. $\times$ 13in. (8.5 in.)
	X'2FD0'	Legal (8.5 in.)
	X'3840'	10in. $\times$ 14in. (10 in.)
	X'3840'	10in. $\times$ 15in. (10 in.)
	X'3DE0'	11in. $\times$ 14in. (11 in.)
	X'3DE0'	11in. $\times$ 15in. (11 in.)
	X'3DE0'	Ledger (11 in.)
	X'4380'	12in. $\times$ 18in. (12 in.)
	X'1741'	A6 (105 mm)
	X'1C59'	B6 (128 mm)
	X'20E3'	A5 (148.5 mm)
	X'25A6'	170 $\times$ 210mm (170 mm)
	X'284E'	182 $\times$ 210mm (182 mm)
	X'2E82'	210 $\times$ 340mm (210 mm)

Offset	Range	Meaning
18-19 (Unrestricted: Edge-to-Edge Address ability)	X'284E'	B5 (JIS) (182 mm)
	X'2E82'	A4 (210 mm)
	X'314C'	A4 Tabstock (222.6 mm
	X'38EA'	B4 (ISO) (257 mm)
	X'3B21'	8 Kai (267 mm)
	X'2B30'	16 Kai (195 mm)
	X'41C6'	A3 (297 mm)
	X'1625' - X'4914'	Custom (100 mm to 330 mm)
		Transparencies/Labels
	X'2FD0'	Letter (8.5 in.)
	X'2E82'	A4 (210 mm)

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Offset	Range	Meaning
20-21 (Restricted: No Print Border)		Ym EXTENT of the Printable Area in L-units
		Paper
	X'2E0A'	Statement (8.185 in.)
	X'394A'	Executive (10.185 in.)
	X'367A'	8in. × 10in. (9.685 in.)
	X'394A'	8in. × 10.5in. (10.185 in.)
	X'3C1A'	Letter (10.685 in.)
	X'3C1A'	Letter Tabstock (10.685 in.)
	X'475A'	8in. × 13in. (12.685 in.)
	X'475A'	8.25in. × 13in. (12.685 in.)
	X'475A'	8.5in. × 13in. (12.685 in.)
	X'4CFA'	Legal (13.685 in.)
	X'4CFA'	10in. × 14in. (13.685 in.)
	X'529A'	10in. × 15in. (14.685 in.)
	X'4CFA'	11in. × 14in. (13.685 in.)
	X'529A'	11in. × 15in. (14.685 in.)
	X'5DDA'	Ledger (16.685 in.)
	X'637A'	12in. × 18in. (17.685 in.)
	X'1F1D'	A6 (140.5 mm)
	X'2689'	B6 (174 mm)
	X'2CBC'	A5 (202 mm)
	X'2CBC'	170 × 210mm (202 mm)
	X'2CBC'	182 × 210mm (202 mm)
	X'4986'	210 × 340mm (332 mm)

Offset	Range	Meaning
20-21 (Restricted: No Print Border)	X'3724'	B5 (JIS) (249 mm)
	X'4000	A4 (289 mm)
	X'4000'	A4 Tabstock (289 mm)
	X'4ED6'	B4 (ISO) (356 mm)
	X'5499'	8 Kai (382 mm)
	X'395C'	16 Kai (259 mm)
	X'5B3D'	A3 (412 mm)
	X'1D02 - 63A8'	Custom (131 mm to 450 mm)
		Transparencies/Labels
	X'3C1A'	Letter (10.685 in.)
	X'4000'	A4 (289 mm)

Offset	Range	Meaning
20-21(Unrestricted: Edge-to-Edge Addressability)		Ym EXTENT of the Printable Area in L-units
		Paper
	X'2FD0'	Statement (8.5 in.)
	X'3B10'	Executive (10.5 in.)
	X'3840'	8in. $\times$ 10in. (10 in.)
	X'3DE0'	Letter (11 in.)
	X'3DE0'	Letter Tabstock (11 in.)
	X'4920'	8in. $\times$ 13in. (13 in.)
	X'4920'	8.25in. $\times$ 13in. (13 in.)
	X'4920'	8.5in. $\times$ 13in. (13 in.)
	X'4EC0'	Legal (14 in.)
	X'4EC0'	10in. $\times$ 14in. (14 in.)
	X'5460'	10in. $\times$ 15in. (15 in.)
	X'4EC0'	11in. $\times$ 14in. (14 in.)
	X'5460'	11in. $\times$ 15in. (15 in.)
	X'5FA0'	Ledger (17 in.)
	X'20C7'	12in. $\times$ 18in. (18 in.)
	X'20E3'	A6 (148.5 mm)
	X'284E'	B6 (182 mm)
	X'2E82'	A5 (210 mm)
	X'2E82'	170 $\times$ 210mm (210 mm)
	X'2E82'	182 $\times$ 210mm (210 mm)
	X'4B4C'	210 $\times$ 340mm (340 mm)

Offset	Range	Meaning
20-21(Unrestricted: Edge-to-Edge Address ability)	X'38EA'	B5 (JIS) (257 mm)
	X'41C6'	A4 (297 mm)
	X'41C6'	A4 Tabstock (297 mm)
	X'509C'	B4 (ISO) (364 mm)
	X'565F'	8 Kai (390 mm)
	X'3B21'	16 Kai (267 mm)
	X'5D03'	A3 (420 mm)
	X'1EC8 - 656D'	Custom (139 mm to 458 mm)
		Transparencies/Labels
	X'3DE0'	Letter (11 in.)
	X'41C6'	A4 (297 mm)
22-23		INPUT MEDIA SOURCE CHARACTERISTICS
	Bit 0: 0/1	0 = No Duplex; 1 = Duplex
	Bits 1-2: 10	10 = Cut Sheet Media
	Bit 3: 1	0 = Tray Not Available; 1 = Tray Available
	Bit 4: 0	0 = Reserved
	Bit 5: 0/1	0 = No Envelopes; 1 = Auto or Manual Envelope Feature
	Bit 6: 0/1	0 = Auto Media Feed; 1 = Manual Media Feed
	Bit 7: 0	0 = No Computer Output on Microfilm (COM)
	Bit 8: 0	0 = No Carrier Strips (Ignored for Cut Sheet Media)
	Bit 9: 0/1	0 = Not an Inserter Bin; 1 = Inserter Bin
	Bits 10-15:all 0	Reserved

Offset	Range	Meaning
24-25		Input Media ID LENGTH (Note 3)
	X'000C' or	Machine with Single OID byte
	X'000D' or	Machine with Double OID byte
	X'000E' or	Machine with Triple OID byte
	X'000F'	Machine with Quadruple OID byte
26		INPUT MEDIA ID Type
	X'10'	MO:DCA Input Media Type OID
27	X'06'	OID Encoding
28		OID LENGTH
	X'07' or	Machine with Single OID byte
	X'08' or	Machine with Double OID bytes
	X'09' or	Machine with Triple OID bytes
	X'0A'	Machine with Quadruple OID bytes
29-34	X'2B1200 040301'	Input Media ID (Common Part)

Offset	Range	Meaning
35-36		Input Media ID (Media Specific Part)
		Paper
	X'45'	Statement (69)
	X'41'	Executive (65)
	X'8120'	8in. × 10in. (160)
	X'32'	Letter (50)
	X'33'	Letter Colored (51)
	X'34'	Letter Transparent (52)
	X'8111'	Letter Tabstock (9×11) (145)
	No OID Returned	8in. × 13in.
	No OID Returned	8.25in. × 13in.
	X'3F'	8.5in. × 13in. (63)
	X'3C'	Legal (60)
	X'3D'	Legal Colored (61)
	No OID Returned	10in. × 14in.
	No OID Returned	10in. × 15in.
	No OID Returned	11in. × 14in.
	No OID Returned	11in. × 15in.
	X'43'	Ledger (67)

Offset	Range	Meaning
35-36	X'9B'	12in. × 18in. (155)
	No OID Returned	A6
	No OID Returned	B6
	X'14'	A5 (20)
	X'15'	A5 Colored (21)
	No OID Returned	170 × 210mm\
	No OID Returned	182 × 210mm
	No OID Returned	210 × 340mm
	X'2B'	B5 (JIS) (43)
	X'00'	A4 (0)
	X'01'	A4 Colored (1)
	X'02'	A4 Transparent (2)
	X'07'	A4 Tabstock (7)
	X'1E'	B4 (ISO) (30)
	X'1F'	B4 Colored (ISO) (31)
	No OID Returned	8 Kai
	No OID Returned	16 Kai
	X'0A'	A3 (10)
	X'0B'	A3 Colored (11)
	No OID Returned	Custom

Offset	Range	Meaning
37-38	X'0004' - X'0013'	Input Media ID LENGTH (Note 4)
Byte 39		Input Media ID TYPE
	X'00'	User Defined Name
40-end		Input Media ID (Form Name)
	X'4C6574 746572'(i e. Letter)	(1 to 16 Byte Form Name)

* 1   Available values vary depending on the installed option.

- In the OPC Acknowledge Reply, the Printable Area SDF repeats for every installed Media Source. Therefore, since printers are capable of supporting multiple installed input trays, multiple Printable Area SDF's may be returned in a single XOH-OPC Acknowledge Reply.

- The Input Media Source Characteristics (Bit 0), of the Printable Area SDF indicates the duplex ability of a given media source. See "Media Source and Destination Support Matrices", for specific details on media duplex ability.

- Input Media ID type X'06' - Media OID is only returned if a particular media has a registered MO:DCA Media Type OID.

- Input Media ID type X'00' - User Defined Name is only returned if the user defines a Form, assigns a Form Name to the Form and associates that Form with a given Input Media Source tray.

Image and Coded Font Resolution Self-Defining Field

Offset	Range	Meaning
0-1	X'000A'	LENGTH of this Self-Defining Field
2-3	X'0003'	IMAGE and CODED FONT RESOLUTION Self-Defining Field
4	X'00'	UNIT BASE 10 inches
5		FONT RESOLUTIONS
	X'00'	Resolution Acceptance Mode (Only value in bytes 6-9)
	X'FF'	Resolution Independence Mode (Bytes 6-9 specify highest resolution) (240 DPI or 300 DPI or 600 DPI)

Offset	Range	Meaning
6-7		X PIXELS per Unit Base
	X'0960'	2400 pixels/10 inches
	X'0BB8'	3000 pixels/10 inches
	X'1770'	6000 pixels/10 inches
8-9		Y PIXELS per Unit Base
	X'0960'	2400 pixels/10 inches
	X'0BB8'	3000 pixels/10 inches
	X'1770'	6000 pixels/10 inches

- Value for byte 5 is controlled by the [Resolution] setting in the IPDS menu. Byte 5 will indicate Resolution Acceptance mode X'00' if the IPDS Resolution setting is 240, 300 or 600 DPI. Byte 5 will indicate Resolution Independence mode X'FF' if the IPDS Resolution setting is Auto.

- Values for bytes 6-9 are controlled by the setting of byte 5 (Font Resolutions). If byte 5 indicates Resolution Acceptance mode X'00', bytes 6-9 reflect the [Resolution] setting in the IPDS menu. If byte 5 indicates Resolution Independence mode X'FF', bytes 6-9 reflect the [Print Mode] setting in the IPDS menu. Note that the resolutions specified also apply to GOCA image if the image resolution specified in the GDD command is X'0000', indicating that no explicit GOCA image resolution was specified.

- If the [Print Mode] = STD (Standard 300 DPI), then the [Resolution] setting is ignored. Byte 5 will indicate Resolution Acceptance mode X'00' and bytes 6- 9 will reflect the IPDS Print Mode setting (300 DPI).

- For the printer to specify IPDS Resolution support of 240, 600, or AUTO, the IPDS Print Mode must be set to Enhanced (PRINT MODE = ENH on the IPDS Menu). In enhanced print mode, complex (full page) image jobs may not yield optimal print performance due to the increased print fidelity required to accurately render 240 and 600 DPI print objects.

Storage Pools Self-Defining Field - Single Byte

Offset	Range	Meaning
0-1	X'0033'	VECTOR LENGTH
2-3	X'0004'	STORAGE POOLS Self-Defining Field
4	X'2F'	LENGTH of each Storage Pool Self-Defining Field

Offset	Range	Meaning
5	X'01'	Triplet ID
6	X'00'	STORAGE POOL ID
7-10	X'nnnnnnnn'	Storage pool varies based on installed memory and features
11-14	X'00000000'	Reserved
15-16	X'0011'	PAGE GRAPHICS Data
17-18	X'0012'	PAGE IMAGE Data
19-20	X'0013'	PAGE TEXT Data
21-22	X'0014'	PAGE BAR CODE Data
23-24	X'0021'	OVERLAY GRAPHICS Data
25-26	X'0022'	OVERLAY IMAGE Data
27-28	X'0023'	OVERLAY TEXT Data
29-30	X'0024'	OVERLAY BAR CODE Data
31-32	X'0031'	PAGE SEGMENT GRAPHICS Data
33-34	X'0032'	PAGE SEGMENT IMAGE Data
35-36	X'0033'	PAGE SEGMENT TEXT Data
37-38	X'0034'	PAGE SEGMENT BAR CODE Data
39-40	X'0040'	Single-Byte CODED FONT Index Tables
41-42	X'0041'	Single-Byte CODED FONT Descriptors
43-44	X'0042'	Single-Byte CODED FONT Patterns
45-46	X'0050'	CODE PAGES
47-48	X'0060'	FONT CHARACTER SETS
49-50	X'0070'	CODED FONTS

Storage Pools Self-Defining Field - Double Byte

Offset	Range	Meaning
0-1	X'0039'	VECTOR LENGTH
2-3	X'0004'	STORAGE POOLS Self-Defining Field
4	X'35'	LENGTH of each Storage Pool Self-Defining Field
5	X'01'	Triplet ID
6	X'00'	STORAGE POOL ID
7-10	X'nnnnnnnn'	Storage pool varies based on installed memory and features
11-14	X'00000000'	Reserved
15-16	X'0011'	PAGE GRAPHICS Data
17-18	X'0012'	PAGE IMAGE Data
19-20	X'0013'	PAGE TEXT Data
21-22	X'0014'	PAGE BAR CODE Data
23-24	X'0021'	OVERLAY GRAPHICS Data
25-26	X'0022'	OVERLAY IMAGE Data
27-28	X'0023'	OVERLAY TEXT Data
29-30	X'0024'	OVERLAY BAR CODE Data
31-32	X'0031'	PAGE SEGMENT GRAPHICS Data
33-34	X'0032'	PAGE SEGMENT IMAGE Data
35-36	X'0033'	PAGE SEGMENT TEXT Data
37-38	X'0034'	PAGE SEGMENT BAR CODE Data
39-40	X'0040'	Single-Byte CODED FONT Index Tables
41-42	X'0041'	Single-Byte CODED FONT Descriptors
43-44	X'0042'	Single-Byte CODED FONT Patterns

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Offset	Range	Meaning
45-46	X'0048'	Double-Byte CODED FONT Index Tables
47-48	X'0049'	Double-Byte CODED FONT Descriptors
49-50	X'004A'	Double-Byte CODED FONT Patterns
51-52	X'0050'	CODE PAGES
53-54	X'0060'	FONT CHARACTER SETS
55-56	X'0070'	CODED FONTS

Color Support Self-Defining Field

Offset	Range	Meaning
0-1	X'0006'	LENGTH of this Self-Defining Field
2-3	X'0005'	COLOR SUPPORT Self-Defining Field
4-5	X'0008'	BLACK

Installed Features Self-Defining Field

Since printers are capable of supporting multiple features, multiple configuration combinations are possible. All installable features are described below.

Offset	Range	Meaning
0-1	X'000C' or X'000E'	LENGTH of this Self Defining Field
2-3	X'0006'	INSTALLED FEATURES Self Defining Field
4-5	X'0100'	DUPLEX
6-7	X'0300'	CUT SHEET Output
8-9	X'0600'	OFFSET STACKER
10-11	X'0700'	Envelopes
12-13	X'0800'	MICR (If MICR Enabled)

Available Features Self-Defining Field

Since printers are capable of supporting multiple features, multiple configuration combinations are possible. All available features are described below.

Offset	Range	Meaning
0-1	X'000C' or X'000E'	LENGTH of this Self Defining Field
2-3	X'0007'	AVAILABLE FEATURES Self Defining Field
4-5	X'0100'	DUPLEX
6-7	X'0300'	CUT SHEET Output
8-9	X'0600'	OFFSET STACKER
10-11	X'0700'	Envelope
12-13	X'0800'	MICR (If MICR Enabled)

RRL Resource Type and ID Format Self-Defining Field - Single Byte

Offset	Range	Meaning
0-1	X'0022'	VECTOR LENGTH
2-3	X'000A'	RRL RESOURCE TYPE Self RRL query combinations that receive a non-zero Resource Type reply (See p.64 "XOA Request Resource List")
4-5	X'0100'	Single-Byte Coded Fonts as Host Assigned Resource ID
6-7	X'0103'	Single-Byte Coded Fonts as IBM Global Resource ID
8-9	X'0400'	Page Segments as Host Assigned Resource ID
10-11	X'0500'	Overlays as Host Assigned Resource ID
12-13	X'0600'	Device Version Code Pages as Host Assigned Resource ID
14-15	X'0603'	Device Version Code Pages as IBM Global Resource ID
16-17	X'0700'	Font Character Set as Host Assigned Resource ID
18-19	X'0703'	Font Character Set as IBM Global Resource ID

Offset	Range	Meaning
20-21	X'0800'	Single-Byte Coded Font Index as Host Assigned Resource ID
22-23	X'1000'	Coded Fonts as Host Assigned Resource ID
24-25	X'1003'	Coded Fonts as IBM Global Resource ID
26-27	X'1103'	Graphic Character Sets/Subsets as IBM Global Resource ID
28-29	X'1200'	Specific Code Pages as Host Assigned Resource ID
30-31	X'1203'	Specific Code Pages as IBM Global Resource ID
32-33	X'FF00'	All Resources as Host Assigned Resource ID

RRL Resource Type and ID Format Self-Defining Field - Double Byte

Offset	Range	Meaning
0-1	X'0034'	VECTOR LENGTH
2-3	X'000A'	RRL RESOURCE TYPE Self RRL query combinations that receive a non-zero Resource Type reply (See p.64 "XOA Request Resource List")
4-5	X'0100'	Single-Byte Coded Fonts as Host Assigned Resource ID
6-7	X'0103'	Single-Byte Coded Fonts as IBM Global Resource ID
8-9	X'0200'	Double-Byte Coded LF1 Fonts as Host Assigned Resource ID
10-11	X'0203'	Double-Byte Coded LF1 Fonts as IBM Global Resource ID
12-13	X'0300'	Double-Byte Coded LF1 Font Sect as Host Assigned Resource ID
14-15	X'0400'	Page Segments as Host Assigned Resource ID
16-17	X'0500'	Overlays as Host Assigned Resource ID
18-19	X'0600	Device Version Code Pages as Host Assigned Resource ID
20-21	X'0603'	Device Version Code Pages as IBM Global Resource ID
22-23	X'0700'	Font Character Set as Host Assigned Resource ID
24-25	X'0703'	Font Character Set as IBM Global Resource ID

Offset	Range	Meaning
26-27	X'0800'	Single-Byte Coded Font Index as Host Assigned Resource ID
28-29	X'0900'	Double-Byte Coded Font Sect Index as Host Assigned Resource ID
30-31	X'1000'	Coded Fonts as Host Assigned Resource ID
32-33	X'1003'	Coded Fonts as IBM Global Resource ID
34-35	X'1103'	Graphic Character Sets/Subsets as IBM Global Resource ID
36-37	X'1200'	Specific Code Pages as Host Assigned Resource ID
38-39	X'1203'	Specific Code Pages as IBM Global Resource ID
40-41	X'4000'	Data object resource as Host Assigned Resource ID
42-43	X'4009'	Data object resource with Object-OID Format
44-45	X'4100'	Data-object Font as Host Assigned Resource ID
46-47	X'4200'	Data-object Font Components as Host Assigned Resource ID
48-49	X'4209'	Data-object Font Components with Object- OID Format
50-51	X'FF00'	All Resources as Host Assigned Resource ID

Activate Resource RT and ID Format Self-Defining Field - Single Byte

Offset	Range	Meaning
0-1	X'0014'	VECTOR LENGTH
2-3	X'000B'	RRL RESOURCE TYPE Self RRL query combinations that receive a non-zero Resource Type reply (See p.64 "XOA Request Resource List")
4-5	X'0103'	Single-Byte Coded LF1 Fonts with IBM Global Resource IDs
6-7	X'0106'	Single-Byte Coded LF1 Fonts with MVS Host Unalterable Remote Font Environment
8-9	X'0603'	Code Pages with IBM Global Resource IDs
10-11	X'0703'	Font Character Sets with IBM Global Resource IDs

Offset	Range	Meaning
12-13	X'0803'	Single-Byte Coded LF1 Font Index as IBM Global Resource ID
14-15	X'0806'	Single-Byte Coded LF1 Fonts Index as MVS Host Unalterable
16-17	X'1003'	Single-Byte/Double-Byte Coded Fonts with IBM Global Resource IDs
18-19	X'1007'	Single-Byte/Double-Byte Coded Fonts with Coded Font Format

Activate Resource RT and ID Format Self-Defining Field - Double Byte

Offset	Range	Meaning
0-1	X'0022'	VECTOR LENGTH
2-3	X'000B'	RRL RESOURCE TYPE Self RRL query combinations that receive a non-zero Resource Type reply (See p.64 "XOA Request Resource List")
4-5	X'0103'	Single-Byte Coded LF1 Fonts with IBM Global Resource IDs
6-7	X'0106'	Single-Byte Coded LF1 Fonts with MVS Host Unalterable Remote Font Environment
8-9	X'0303'	Double-Byte Coded LF1 Font Secs with IBM Global Resource IDs
10-11	X'0306'	Double-Byte Coded LF1 Font Secs with MVS Host Unalterable Remote Font Environment
12-13	X'0603'	Code Pages with IBM Global Resource IDs
14-15	X'0703'	Font Character Sets with IBM Global Resource IDs
16-17	X'0803'	Single-Byte Coded LF1 Fonts Index as IBM Global Resource ID
18-19	X'0806'	Single-Byte Coded LF1 Font Index as MVS Host Unalterable
20-21	X'0903'	Double-Byte Coded LF1 Font Secs Index with IBM Global Resource ID
22-23	X'0906'	Double-Byte Coded LF1 Font Secs with MVS Host Unalterable RMTFE
24-25	X'1003'	Single-Byte/Double-Byte Coded Fonts with IBM Global Resource IDs
26-27	X'1007'	Single-Byte/Double-Byte Coded Fonts with Coded Font Format
28-29	X'4009'	Data object resource with Object-OID Format

Offset	Range	Meaning
30-31	X'410A'	Data-object Font with Data-object Font Format
32-33	X'4209'	Data-object Font Components with Object- OID Format

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Bar Code Type Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0013'	VECTOR LENGTH
2-3	X'000E'	BAR CODE TYPE Self Defining Field
4	X'0D'	CODABAR Modifier Byte Options X'01' and X'02'
5	X'11'	CODE 128 Modifier Byte Option X'02'
6	X'18'	POSTNET Modifier Byte Options X'00' - X'03'
7	X'1A'	RM4SCC Modifier Byte Option X'00'
8	X'1B'	Japan Postal Bar code Modifier Byte Options X'00' and '01'
9	X'1C'	Data Matrix 2D Bar Code Modifier Byte Option X'00'
10	X'1D'	MaxiCode 2D Bar Code Modifier Byte Option X'00'
11	X'1E'	PDF417 2D Bar Code Modifier Byte Options X'00' and X'01'
12	X'1F'	Australia Post Bar Code Modifier Byte Options X'01' - X'08'
13	X'9A'	Rm4scc Modifier byte option X'01'
14	X'20'	QR Code 2D Bar Code Modifier Byte Option X'02'
15	X'21'	Code 93 Modifier Byte Option X'00'
16	X'91'	Code 128 Modifier Byte Option X'03'
17	X'98'	POSTNET (PLANET) Modifier Byte Option X'04'
18	X'22'	USPS Four-State Bar Code Modifier Byte Options X'00' through X'03'

◆ Note

- See p.189 "Bar Code Type and Modifier Description and Values" for all Bar Codes supported.

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Media-Destinations Self-Defining Field ID

Offset	Range	Meaning
0-1	X'001A'	LENGTH of this Self Defining Field
2-3	X'0010'	Media-Destinations self-defining ID
4-5	X'nnnn'	Default media-destination ID (Determined by Configuration)
6-7	X'0001'	First number in a range of available, contiguous media-destination IDs
8-9	X'nnnn'	Last number in a range of available, contiguous media-destination IDs; this ID must be greater than or equal to the value specified in bytes +0-1 for this set

Supported Group Operations Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0005'	LENGTH of this Self-Defining Field
2-3	X'0012'	SUPPORTED GROUP OPERATIONS Self-Defining Field
4	X'01'	Keep group together as a print unit

Product Identifier Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0053'	LENGTH of this Self Defining Field
2-3	X'0013'	PRODUCT IDENTIFIER Self Defining Field ID
4	X'38'	LENGTH of Self Defining Product ID Parameter
5-6	X'0001'	UNIQUE PRODUCT IDENTIFIER Parameter ID
7-12		DEVICE TYPE
	X'F0F0F8F3F0F0'	This machine

Offset	Range	Meaning
13-15		DEVICE MODEL
	X'F0F0F0'	This machine
16-18	X'DCC9C8' (RIH)	MANUFACTURER
19-20	X'0000'	PLANT
21-32		SEQUENCE NUMBER (Serial number)
	X'F0F0F0F0F0F0F2F9F6F5F3F8' (ie. 296538)	(EBCDIC) (12 bytes)
33-34	X'0000'	TAG
35-43		IPDS CODE LEVEL
	X'F0F0F0F0F44BF5F3F0' (4.530)	(EBCDIC) (9 bytes)
44-59		CONTROLLER CODE LEVEL
	X'F0F0F0F0F0F0F0F0F0F0F0F0F14BF2F12' (1.21)	(EBCDIC) (16 bytes)
60	X'17'	LENGTH of Self Defining Product ID Parameter
61-62	X'0003'	PRINTER NAME Parameter ID
63-82	X'nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn'	PRINTER NAME

Object Container Type Support Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0148'	LENGTH of this Self Defining Field
2-3	X'0014'	Object Container Type Support Self Defining Field
4	X'82'	length of the Type record
5	X'01'	Type - Page or Overlay State
6-21	X'06072b 1200040 1011600 0000000 00000'	Graphics Interchange Format (GIF)
22–37	X'06072b 1200040 1012F00 0000000 00000'	IOCA Tile Resource
38-53	X'06072b 1200040 1011700 0000000 00000'	JPEG File Interchange Format (JFIF)
54-69	X'06072b 1200040 1010E00 0000000 00000'	Tag Image File Format (TIFF)
70-85	X'06072b 1200040 1013C00 0000000 00000'	TIFF without transparency

Offset	Range	Meaning
86-101	X'06072b1200040 1013D00 0000000 00000'	TIFF multi-image file with transparency
102-117	X'06072b1200040 1013E00 0000000 00000'	TIFF multi-image file without transparency
118-133	X'06072b1200040 1014200 0000000 00000'	AFPC TIFF
134	X'C2'	length of the Type record
135	X'02'	home state Type
136-151	X'06072b1200040 1011600 0000000 00000'	Graphics Interchange Format (GIF)
152-167	X'06072b1200040 1012F00 0000000 00000'	IOCA Tile Resource
168-183	X'06072b1200040 1011700 0000000 00000'	JPEG File Interchange Format (JFIF)

Offset	Range	Meaning
184-199	X'06072b 1200040 1010E00 0000000 00000'	Tag Image File Format (TIFF)
200-215	X'06072b 1200040 1013C00 0000000 00000'	TIFF without transparency
216-231	X'06072b 1200040 1013D00 0000000 00000'	TIFF multi-image file with transparency
232-247	X'06072b 1200040 1013E00 0000000 00000'	TIFF multi-image file without transparency
248-263	X'06072b 1200040 1013500 0000000 00000'	TrueType/OpenType Collection
264-279	X'06072b 1200040 1013300 0000000 00000'	TrueType/OpenType Font
280-295	X'06072b 1200040 1013900 0000000 00000'	Color Management Resource

Offset	Range	Meaning
296-311	X'06072b 1200040 1011400 0000000 00000'	Color Mapping Table setup file
312-327	X'06072b 1200040 1014200 0000000 00000'	AFPC TIFF

Device-Appearance Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0006'	LENGTH of this Self Defining Field
2-3	X'0022'	Device appearance Self Defining Field
4-5	X'0001'	Device-default monochrome appearance

Finishing Operations Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0008'	LENGTH of this Self Defining Field
2-3	X'0018'	FINISHING OPERATIONS Self Defining Field
4	X'01'	Corner Staple
6	X'03'	Edge Stitch
7	X'0A'	Punch

PFC Triplets Supported Self Defining Field ID

Offset	Range	Meaning
0-1	X'0008'	LENGTH of this Self Defining Field
2-3	X'0016'	PFC Triplets Supported Self Defining Field
4	X'75'	Color Fidelity Triple
5	X'86'	Text Fidelity Triplet
6	X'88'	Finishing Fidelity Control Triplet
7	X'96'	CMR Tag Fidelity Triplet

XOH Select Input Media Source

This order selects the input media source and, indirectly, the input media, for subsequent physical sheets.

The set of valid values differs according to which forms module configuration is installed and selected by the operator. Since printers are capable of supporting multiple installed input bins, multiple configuration combinations are possible. All input media sources are described below.

When the number of installed input bins changes, the printer is POR'd and initial machine settings are established. When the bin configuration changes exception X'0101..00' is reported to the host.

- Actual tray capacities are determined by media weight. The capacities indicated in the table are the maximum allowable.

- The machine supports media source tray numbering. Media source values in the SIMS support tables represent the default settings when the printer is initially installed. For this machine, the printer's control panel menu mode is provided to allow customers to specify the source tray numbers to meet requirements of legacy applications.

↓Note

- For the tray in which "envelope" has been specified as the paper type, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8040', X'8041', etc. If a different paper type is specified for the tray, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8000', X'8001', etc. In regards to the bypass tray and default tray, even if you specify "envelope" as the paper type, the tray value will not be changed.

- To ascertain which machine type your model corresponds to, see "Machine Types", Read This First.

Offset	Range	Meaning	Error Code
0-1	X'1500'	SELECT INPUT MEDIA SOURCE	
2		INPUT MEDIA SOURCE	X'02C8..01'
	X'00'	Tray 1	
	X'01'	Tray 2	
	X'02'	Tray 3	
	X'03'	Tray 4	
	X'02'	Tray 3 (LCT)[*1]	
		Large capacity tray (LCT) [*1]	
	X'03'	Tray 1 + Tray 2 + Tray 3 (LCT) + Large capacity tray (LCT)	
	X'04'	Tray 1 + Tray 2 + Tray 3 + Tray 4 + Large capacity tray (LCT)	
	X'63'	Bypass tray	
	X'FF'	Default tray	

*1 Available values vary depending on the installed option.

XOH Set Media Origin

The XOH Set Media Origin (SMO) command specifies the origin of the media.

This order takes effect on the next-received page. The media origin will not change until either another XOH-SMO command is processed or the printer is reinitialized.

Offset	Range	Meaning	Error Code
0-1	X'1600'	SET MEDIA ORIGIN	

Offset	Range	Meaning	Error Code
2		MEDIA ORIGIN	X'026F.. 02'
	X'00'	Top-left corner	
	X'01'	Top-right corner (Bottom-left corner if back side of duplex sheet)	
	X'02'	Bottom-right corner	
	X'03'	Bottom-left corner (Top-right corner if back side of duplex sheet)	

XOH Set Media Size

This order specifies SIZE of the physical medium.

Offset	Range	Meaning	Error Code
0-1	X'1700'	Set Media Size (SMS) order code	
2		UNIT BASE (Measurement Units)	X'0274..0 2'
	X'00'	10 in.	
	X'01'	10 centimeters	
3-4		L-Units per UNIT BASE	X'0270..0 2'
	X'3840'	14400 L-Units/10 inches	
	X'1626'	5670 L-Units/10 centimeters	
	X'0960'	2400 L-Units/10 inches	
	X'03B1'	945 L-Units/10 centimeters	
5-6	X'0001' - X'7FFF'	Xm EXTENT of MEDIUM See "Notation Conventions", IPDS Technical Reference 1.	X'0272..0 2'
	X'FFFF'	Printer Default (Printer's control panel setting or Tray sensors)	

Offset	Range	Meaning	Error Code
7-8	X'0001' - X'7FFF'	Ym EXTENT of MEDIUM See "Notation Conventions", IPDS Technical Reference 1.	X'0273..02'
	X'FFFF'	Printer Default (Printer's control panel setting or Tray sensors)	

XOH Page Counter Control

The XOH Page Counter Control (PCC) command provides a counter synchronization function that should only be used to recover from an exception or after a XOA Discard Buffer Data command.

Offset	Range	Meaning	Error Code
0-1	X'F500'	OPC Order Code	
2	X'00'	Do Nothing (default)	
	X'01'	Synchronize Counters	

XOH Define Group Boundary

This order initiates or terminates a grouping of pages. When a grouping of pages

is initiated the page that next increments the received page counter is the first

sheet in the designated group.

Offset	Range	Meaning	Error Code
0-1	X'0400'	Define Group Boundary	X'018F..00' X'0277..01' X'0278..01' X'027A..01' X'027B..01'

Offset	Range	Meaning	Error Code
2	X'00'	Initiate Group	
	X'01'	Terminate Group	
3	X'00' - X'FF'	Group Level	
4-end of command	See specific triplet description.	X'00' Group ID triplet	
		X'6E' Group information triplet	X'027C.. 01'
		X'85' Finishing Operation triplet	X'027C.. 02'

Group ID Triplet

The Group ID triplet specifies host specific print-data formats for print job identification. The printer utilizes this information to provide IPDS print job identification on the printer console display.

Offset	Range	Meaning	Error Code
0	X'02'-X'FF'	LENGTH	X'027A.. 01' X'027B.. 02'
1	X'01'	Group ID Triplet	
2		HOST FORMAT	
	X'01'	MVS and VSE print-data	
	X'02'	VM print-data	
	X'03'	OS/400 print-data (4 char spool file #)	
	X'06'	AIX and NT print-data	
	X'13'	OS/400 print-data (6 char spool file #)	

Offset	Range	Meaning	Error Code
4-11		MVS and VSE ID DATA	
	X'C2E4C4 C7C5E3F 0F1' (i.e. BUDGET0 1)	Job Name (EBCDIC) (8 bytes)	
4-11		VM ID DATA	
	X'C2E4C4 C7C5E3F 0F1' (i.e. BUDGET0 1)	Filename (EBCDIC) (8 bytes)	
23-32		OS/400 ID DATA	
	X'C2E4C4 C7C5E3F 2F0F0F1'(i .e. BUDGET2 000)	Filename (EBCDIC) (10 bytes)	
3-End		AIX and NT ID DATA	
	X'444550 5442554 4474554 3230303 0' (i.e. DEPTBUD GET2000)	Name (ASCII) (1-251 bytes)	

Group Information Triplet

The Group Information is accepted, although no specific processing will occur.

Finishing Operation Triplet

The Finishing Operation triplet specifies a specific finishing operation to be applied to a collection of sheets.

Offset	Range	Meaning	Error Code
0	X'09'	LENGTH	X'027A.. 01' X'027B.. 01'
1	X'85'	Finishing Triplet ID	
2		OPERATION TYPE	X'027C.. 03' X'027C.. 09'
	X'01'	Corner Staple	
	X'03'	Edge Stitch	
	X'0A'	Punch	
3-4	X'0000'	Reserved	
5		REFERENCE CORNER	X'027C.. 04'
	X'01'	Top-right corner (SEF only)	
	X'02'	Top-left corner	
	X'03'	Bottom-left corner	
	X'FF'	Device default corner (top left corner) REFERENCE EDGE	
	X'02'	Top edge (SEF only)	
	X'03'	Left edge (LEF only)	
	X'FF'	Device default edge (top edge-SEF, left edge-LEF)	

Offset	Range	Meaning	Error Code
6		FINISHING OPERATION COUNT	X'027C.. 05'
	X'00'	Device Default Number, Default Position	X'027C.. 07'
	X'02'	Punch 2 Holes, Default Position or Edge Stitch 2 Staples, Default Position	
	X'03'	Punch 3 Holes, Default Position	
	X'04'	Punch 4 Holes, Default Position	
7-8		FINISHING OPERATION AXIS OFFSET	X'027C.. 06'
	X'FFFF'	Device Default Axis Offset	

Paper Finishing (Staple and Punch) Support:

Y = Yes / N = No

	1000-sheet finisher	3000-sheet finisher	
	Staple	Staple	Punch
A3 (297 × 420mm) SEF	Y	Y	Y
A4 (210 × 297mm) SEF	Y	Y	Y[1]
A4 (210 × 297mm) LEF	Y	Y	Y
A5 (210 × 148mm) SEF	N	N	Y[1]

	1000-sheet finisher	3000-sheet finisher	
	Staple	Staple	Punch
A5 (210 × 148mm) LEF	N	N	Y*1
A6 (105 × 148mm) SEF	N	N	N
B4 (257 × 364 mm) SEF	Y	Y	Y
B5 (182 × 257mm) SEF	Y	Y	Y*1
B5 (182 × 257mm) LEF	Y	Y	Y
B6 (128 × 182mm) SEF	N	N	N
DLT (11 × 17 in.) SEF	Y	Y	Y
Legal (8.5 × 14in.) SEF	Y	Y	Y*1
Foolscap (8.5 × 13in.) SEF	Y	Y	Y*1

	1000-sheet finisher	3000-sheet finisher	
	Staple	Staple	Punch
Letter (8.5 × 11in.) SEF	Y	Y	Y*1
Letter (8.5 × 11in.) LEF	Y	Y	Y
GovernmentLG (8.25 × 14 in.) SEF	Y	Y	Y*1
Folio (8.25 × 13in.) SEF	Y	Y	Y*1
F/GL (8 × 13in.) SEF	Y	Y	Y*1
G LT (8 × 10.5 in.) SEF	Y	Y	Y*1
G LT (8 × 10.5 in.) LEF	Y	Y	Y
Eng Quatro (8 × 10 in.) SEF	Y	Y	Y*1
Eng Quatro (8 × 10 in.) LEF	Y	Y	Y*2

1

	1000-sheet finisher	3000-sheet finisher	
	Staple	Staple	Punch
Executive (7.25 × 10.5in.) SEF	Y	Y	Y*1
Executive (7.25 × 10.5in.) LEF	Y	Y	Y
HalfLetter (5.5 × 8.5in.) SEF	N	N	Y*1
Com10 (4.125 × 9.5in.) SEF	N	N	N
Com10 (4.125 × 9.5in.) LEF	N	N	N
Monarch (3.875 × 7.5in.) SEF	N	N	N
Monarch (3.875 × 7.5in.) LEF	N	N	N
C5 (162 × 229mm) SEF	N	N	N
C5 (162 × 229mm) LEF	N	N	N

	1000-sheet finisher	3000-sheet finisher	
	Staple	Staple	Punch
C6 (114 × 162mm) SEF	N	N	N
C6 (114 × 162mm) LEF	N	N	N
DL Env (110 × 220mm) SEF	N	N	N
DL Env (110 × 220mm) LEF	N	N	N
12 × 18 in. SEF	Y	Y	N
11 × 15 in. SEF	Y	Y	Y
11 × 14 in. SEF	Y	Y	Y
10 × 15 in. SEF	Y	Y	Y*3
10 × 14 in. SEF	Y	Y	Y*3

*1 Supported on 2 hole punch only.

*2 Not supported on 4 hole punch.

*3 Not supported on 4 hole punch (metric version) except for Northren Europe type (metric version) finisher.

➥Note

- The punch units in this manual are given in two units of measure: metric and inch. If your machine is a Region A model, refer to the metric units. If your machine is a Region B model, refer to the inch units. For details about the region of your machine, see "Model-Specific Information", Getting Started.

- The paper finishing functions are not supported on custom size paper.

- The printer must know about the finishing operation before the first page of a group is received. The printer will ignore finishing operation triplets on the XOH DGB command that terminates the group.

- The media jog and staple functions are mutually exclusive. If both are specified the staple request takes precedence.

- A single sheet cannot be stapled or stitched. If a job specifies only one sheet for stapling or stitching, it will not occur and a X'027C..02' Nack is reported to the host. Web Image Monitor menu parameter is provided to allow provided to allow customers to inhibit the report of this Nack to meet requirements of legacy applications.

- The capacity of the finishers are determined by the physical finisher installed. If a job specifies more sheets for stapling or stitching than the installed finisher can accommodate, a X'027C..02' Nack is reported to the host. Web Image Monitor parameter is provided to allow customers to inhibit the report of this Nack to meet requirements of legacy applications.

- Stapled or stitched job groups may contain mixed media sizes in the following combinations only: Letter-SEF, Legal-SEF, Folio-SEF

- Mixing of simplex and duplex groups in the finisher accumulator is supported. Therefore, it is possible to staple or stitch mixed simplex/duplex groups in a print job.

XOH Specify Group Operation

This order indicates to an attached printer, pre-processor, or post-processor that the specified processing option is to be performed upon subsequent boundary groups of the group level identified in this command.

Offset	Range	Meaning	Error Code
0-1	X'0300'	Define Group Boundary	
2	X'00'-X'FF'	Operation Identifier	
	X'01'	Keep group together as a print unit	
	X'04'	Finish	
3	X'00'-X'FF'	Group Level	

↓Note

- For SGO Identifier (Byte 2), X'01' and X'04' are the only supported operations. All other identifiers are accepted, although no specific processing will occur.

2. Presentation Text Command Set

Presentation Text Commands

Name	Command	Sub-command	Where to Look
Load Equivalence	X'D61D'		p.117 "Load Equivalence"
Write Text	X'D62D'		p.117 "Write Text"

Load Equivalence

This command permits text-suppression values imbedded in text data stored within the printer to be referenced externally using different values. For example, the Internal Suppression value of X'02' may be referenced externally on a Load Copy Control as a X'06' provided that an appropriate Load Equivalence command was previously received.

If more than 127 LE entries are specified, exception X'0202..02' is reported.

Offset	Range	Meaning	Error Code
0-1		MAPPING TYPE	X'02C6..02'
	X'0100'	Suppression Mapping	
2-3	X'0001' - X'00FF'	INTERNAL VALUE from BS..ES Pair	X'02C1..02' X'02C8..02'
4-5	X'0001' - X'007F'	EXTERNAL VALUE from LCC	X'02C8..02'
6-509		Zero or more additional entries analogous to Bytes 2-5	

Write Text

In this Write Text description, references made to pages also apply to overlays and page segments.

The print data is a string of 1-byte code points. To determine the character raster pattern, the printer uses the code point to identify the character metrics obtained from:

- Load Font Index (See p.218 "Load Font Index")

- Load Font Control (See p.213 "Load Font Control")

- Font Local ID (See p.36 "Load Font Equivalence")

- Resident Font Data

When the printer processes a Begin Page, it uses the values from the existing Logical Page Descriptor (See p.40 "Logical Page Descriptor") or Initialization Default (See "IPDS Initialization Defaults", IPDS Technical Reference 1) until it processes one of the following text control sequences:

- Draw B-Axis Rule

- Draw I-Axis Rule

- Set Baseline Increment

- Set Coded Font Local

- Set Extended Text Color

- Set Inline Margin

- Set Intercharacter Adjustment

- Set Text Color

- Set Text Orientation

- Set Variable Space Character Increment

- Temporary Baseline Move

The text control sequence value supersedes the Logical Page Descriptor or Initialization Default value and it remains in effect until it is changed by another text control sequence, or End Page is received.

For a complete description of the following text control sequences see the Presentation Text Object Content Architecture Reference and the Intelligent Printer Data Stream Reference.

Absolute Move Baseline

Absolute Move Baseline Control Sequence moves the baseline coordinate relative to the I-axis of the Presentation Text Space.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04'	LENGTH	X'021E..01'

Offset	Range	Meaning	Error Code
3		ABSOLUTE MOVE BASELINE	
	X'D2'	Unchained	
	X'D3'	Chained	
4-5	X'0000' - X'7FFF'	DISPLACEMENT (Bc) See "Notation Conventions", IPDS Technical Reference 1.	X'0213..01'

Absolute Move Inline

Absolute Move Inline Control Sequence moves an inline coordinate position relative to the B-axis of the Presentation Text Space.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'04'	LENGTH	X'021E..01'
3		ABSOLUTE MOVE INLINE	
	X'C6'	Unchained	
	X'C7'	Chained	
4-5	X'0000' - X'7FFF'	DISPLACEMENT (Ic) See "Notation Conventions", IPDS Technical Reference 1.	X'0214..01'

Begin Line

Begin Line Control Sequence begins a new line.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'02'	LENGTH	X'021E..01'

Offset	Range	Meaning	Error Code
3		BEGIN LINE	
	X'D8'	Unchained	
	X'D9'	Chained	

Begin Suppression

Begin Suppression Control Sequence marks the beginning of a string of presentation text that may be suppressed from the visible output.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'03'	LENGTH	X'021E..01'
3		BEGIN SUPPRESSION	
	X'F2'	Unchained	
	X'F3'	Chained	
4	X'01' - X'FF'	SUPPRESSION ID	X'0298..01'

Draw B-Axis Rule

Draw B-axis Rule Control Sequence draws a rule in the b-direction.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'04' or X'07'	LENGTH	X'021E..01'
3		DRAW B-AXIS RULE	
	X'E6'	Unchained	
	X'E7'	Chained	

Offset	Range	Meaning	Error Code
4-5	X'8000' - X'7FFF'	LENGTH (Bl) See "Notation Conventions", IPDS Technical Reference 1.	
6-7		WIDTH (Bw)	
	X'8000' - X'7FFF'	Printer Default 24/1440 inch	
	X'FFFF'		
8		IGNORED	

Draw I-Axis Rule

Draw I-axis Rule Control Sequence draws a rule in the i-direction.

Table 70. Draw I-Axis Rule

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'04' or X'07'	LENGTH	X'021E.. 01'
3		DRAW I-AXIS RULE	
	X'E4'	Unchained	
	X'E5'	Chained	
4-5	X'8000' - X'7FFF'	LENGTH (Il) See "Notation Conventions", IPDS Technical Reference 1.	
6-7		WIDTH (Iw)	
	X'8000' - X'7FFF'	Printer Default 24/1440 inch	
	X'FFFF'		
8		IGNORED	

End Suppression

End Suppression Control Sequence marks the end of a string of presentation text that may be suppressed from the visible output.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'03'	LENGTH	X'021E.. 01'
3		END SUPPRESSION	
	X'F4'	Unchained	
	X'F5'	Chained	
4	X'01' - X'FF'	SUPPRESSION ID	X'0202..0 1' X'0204..0 1' X'0298..0 1'

No Operation

No Operation Control Sequence has no effect on presentation.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'02' - X'FF'	LENGTH	X'021E.. 01'
3		NO OPERATION	
	X'F8'	Unchained	
	X'F9'	Chained	
4-255		DATA (Ignored)	

Overstrike

The Overstrike control identifies text that is to be overstruck with a specified character.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'05'	LENGTH	X'021E..01'
3		OVERSTRIKE	
	X'72'	Unchained	
	X'73'	Chained	
4		BYPASS IDENTIFIERS	
	Bits 0-3	Reserved	
	Bit 4: 0	Overstrike white space from RMI	
	Bit 4: 1	Bypass white space from RMI	
	Bit 5: 0	Overstrike white space from AMI	
	Bit 5: 1	Bypass white space from AMI	
	Bit 6: 0	Overstrike white space from Space or Variable Space Character	
	Bit 6: 1	Bypass white space from Space or Variable Space Character	
	Bit 7: 0	BYPASS Treat Bits 0-6 according to their set values	
	Bit 7: 1	NO BYPASS Treat Bits 0-6 as if their values are set to zero	
5		IGNORED	
6	X'00' - X'FF'	OVERSTRIKE CHARACTER	

Relative Move Baseline

Relative Move Baseline Control Sequence moves a baseline coordinate relative to the current baseline coordinate position.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'04'	LENGTH	X'021E.. 01'
3		RELATIVE MOVE BASELINE	
	X'D4'	Unchained	
	X'D5'	Chained	
4-5	X'8000' - X'7FFF'	INCREMENT (Br) See "Notation Conventions", IPDS Technical Reference 1.	

Relative Move Inline

Relative Move Inline Control Sequence moves the inline coordinate of the presentation position relative to the current inline position.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04'	LENGTH	X'021E.. 01'
3		RELATIVE MOVE INLINE	
	X'C8'	Unchained	
	X'C9'	Chained	
4-5	X'8000' - X'7FFF'	INCREMENT (Ir) See "Notation Conventions", IPDS Technical Reference 1.	

Repeat String

Repeat String Control Sequence contains a string of coded graphic characters that is repeated on the current line.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	

Offset	Range	Meaning	Error Code
2	X'04' - X'FF'	LENGTH	X'021E.. 01'
3		REPEAT STRING	
	X'EE'	Unchained	
	X'EF'	Chained	
4-5	X'0000' - X'7FFF'	REPEAT LENGTH (RL)	X0219..01'
6-n		REPEAT DATA	X021F.. 01'

Set Baseline Increment

Set Baseline Increment Control Sequence specifies the distance to be added to the current baseline coordinate when a Begin Line control sequence is executed.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04'	LENGTH	X'021E.. 01'
3		SET BASELINE INCREMENT	
	X'D0'	Unchained	
	X'D1'	Chained	
4-5	X'8000' - X'7FFF'	INCREMENT (Bi) See "Notation Conventions", IPDS Technical Reference 1.	
	X'FFFF'	Use LPD value. If no LPD is received, use printer default	

Set Coded Font Local

Set Coded Font Local Control Sequence specifies the character attributes to be used and invokes a coded font.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'03'	LENGTH	X'021E.. 01'
3		SET CODED FONT LOCAL	
	X'F0'	Unchained	
	X'F1'	Chained	
4		LOCAL FONT ID	
	X'01' - X'FE'	Use LPD value. If no LPD is received, use printer default	X'0218..0 2'
	X'FF'		X'023F.. 02'

Set Extended Text Color

The Set Extended Text Color control specifies the color value and defines the color space and encoding for that value. The specified color value is applied to foreground areas of the presentation text space. Foreground areas consist of the following:

- The stroked and filled areas of solid text characters, including overstrike characters. With hollow characters, only the stroked portion of the character is considered foreground.
- The stroked area of a rule.
- The stroked area of an underscore.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'14' - X'16'	LENGTH	X'021E.. 01'
3		SET EXTENDED TEXT COLOR	
	X'80'	Unchained	
	X'81'	Chained	
4	X'00'	RESERVED	

Offset	Range	Meaning	Error Code
5		COLOR SPACE	X'020E.. 02'
	X'01'	RGB - Limited Simulated Color Support	
	X'04'	CMYK - Limited Simulated Color Support	
	X'06'	HCS - Limited Simulated Color Support	
	X'08'	CIELAB - Limited Simulated Color Support	
	X'40'	Standard OCA - Limited Simulated Color Support	
6-9	X'00000000'	RESERVED	
10		1ST COLOR COMPONENT BITS	X'020E.. 05'
	X'01' - X'08'	(RGB, CMYK, CIELAB)	
	X'10'	(Standard OCA, Highlight)	
11		2ND COLOR COMPONENT BITS	X'020E.. 06'
	X'00' - X'08'	(RGB, CMYK, Highlight, CIELAB)	
12		3RD COLOR COMPONENT BITS	X'020E.. 07'
	X'00' - X'08'	(RGB, CMYK, CIELAB)	
13		4TH COLOR COMPONENT BITS	X'020E.. 08'
	X'00' - X'08'	(CMYK)	

Offset	Range	Meaning	Error Code
14-17		COLOR VALUE	X'020E..03'
		RGB Color Space	X'020E..04'
	X'nn'	Red Intensity	
	X'nn'	Green Intensity	
	X'nn'	Blue Intensity	
		CMYK Color Space	
	X'nn'	Cyan Intensity	
	X'nn'	Magenta Intensity	
	X'nn'	Yellow Intensity	
	X'nn'	Black Intensity	
		Highlight Color Space	
	X'nnnn'	Highlight Color Number	
	X'nn'	Percent Coverage	
	X'nn'	Percent Shading	
		CIELAB Color Space	
	X'nn'	Luminance (L)	
	X'nn'	Chrominance Difference (a)	
	X'nn'	Chrominance Difference (b)	

Offset	Range	Meaning	Error Code
14-17		Standard OCA Color Space	
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue	
	X'0002' or X'FF02	Red	
	X'0003' or X'FF03'	Pink	
	X'0004' or X'FF04'	Green	
	X'0005' or X'FF05'	Turquoise	
	X'0006' or X'FF06'	Yellow	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0010'	Brown	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	

Set Inline Margin

Set Inline Margin Control Sequence specifies position of an inline margin.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04'	LENGTH	X'021E.. 01'

Offset	Range	Meaning	Error Code
3		SET INLINE MARGIN	
	X'C0'	Unchained	
	X'C1'	Chained	
4-5	X'0000' - X'7FFF'	DISPLACEMENT (Ia) See "Notation Conventions", IPDS Technical Reference 1.	X'0210..01'
	X'FFFF'	Use LPD value. If no LPD is received, use printer default	

Set Intercharacter Adjustment

Set Intercharacter Adjustment Control Sequence specifies additional increment or decrement between graphic characters.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04' or X'05'	LENGTH	X'021E..01'
3		SET INTERCHARACTER ADJUSTMENT	
	X'C2'	Unchained	
	X'C3'	Chained	
4-5	X'0000' - X'7FFF'	ADJUSTMENT (ica) See "Notation Conventions", IPDS Technical Reference 1.	X'0212..01'
	X'FFFF'	Use LPD value. If no LPD is received, use printer default	
6		DIRECTION	X'0212..01'
	X'00'	Increment Direction	
	X'01'	Decrement Direction	
	X'FF'	Same as X'00'	

Set Text Color

The Set Text Color control specifies the foreground color attribute that selects the color for subsequent text characters.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04' or X'05'	LENGTH	X'021E.. 01'
3		SET TEXT COLOR	
	X'74'	Unchained	
	X'75'	Chained	

Offset	Range	Meaning	Error Code
4-5		COLOR	X'0258..03'
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0010'	Brown - Limited Simulated Color Support	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	
	X'FFFF'	Use LPD color value For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.	
6	X'00' - X'01'	PRECISION	X'0258..03'
	X'FF'	Same as X'00'	

Set Text Orientation

Set Text Orientation Control Sequence establishes i-direction and b-direction for the following presentation text.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'06'	LENGTH	X'021E.. 01'
3		SET TEXT ORIENTATION	
	X'F6'	Unchained	
	X'F7'	Chained	
4-5		I-AXIS ORIENTATION	X'020F.. 01'
	X'0000'	0 degrees (+X direction)	
	X'2D00'	90 degrees (+Y direction)	
	X'5A00'	180 degrees (-X direction)	
	X'8700'	270 degrees (-Y direction)	
	X'FFFF'	Use LPD value. If no LPD is received, use printer default	
6		B-AXIS ORIENTATION	X'020F.. 01'
	X'0000'	0 degrees (+X direction)	
	X'2D00'	90 degrees (+Y direction)	
	X'5A00'	180 degrees (-X direction)	
	X'8700'	270 degrees (-Y direction)	
	X'FFFF"	Use LPD value. If no LPD is received, use printer default	

The permitted combinations are those where the difference between the I-axis orientation and the B-axis orientation are 90 degrees.

```
INLINE-DIRECTION BASELINE-DIRECTION
```

0 deg. rotation 90 deg. rotation

0 deg. rotation 270 deg. rotation

90 deg. rotation 180 deg. rotation

```
90 deg. rotation 0 deg. rotation
180 deg. rotation 270 deg. rotation
180 deg. rotation 90 deg. rotation
270 deg. rotation 180 deg. rotation
270 deg. rotation 0 deg. rotation
```

Set Variable Space Character Increment

Set Variable Space Character Increment Control Sequence specifies the increment of a Variable Space Character.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04'	LENGTH	X'021E.. 01'
3		SET VARIABLE SPACE CHARACTER INCREMENT	
	X'C4'	Unchained	
	X'C5'	Chained	
4-5	X'0000' - X'7FFF'	INCREMENT (vsi) See "Notation Conventions", IPDS Technical Reference 1.	X'0217..0 1'
	X'FFFF'	Default Variable Space Increment for Current Font	

Temporary Baseline Move

The Temporary Baseline Move Control Sequence is used to change the position of the sequential baseline without change to the established baseline.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'03' or X'06'	LENGTH	X'021E.. 01'

Offset	Range	Meaning	Error Code
3		TEMPORARY MOVE BASELINE	
	X'78'	Unchained	
	X'79'	Chained	
4		DIRECTION	X'0298..03'
	X'00'	Baseline is Unchanged	
	X'01'	Return to Established Baseline	
	X'02'	Shift Baseline away from I-axis (Subscript)	
	X'03'	Shift Baseline toward I-axis (Superscript)	
	X'FF'	Same as X'00'	
5		PRECISION	X'0298..03
	X'00'	Accurate placement and character representation is required using the current font.	
	X'01'	A substitute font with characteristics identical to the current font may be used to simulate baseline shift (superscript/ subscript). The printer accepts this value but treats it as X'00'.	
	X'FF'	Same as X'00'	
6-7	X'0000' - X'7FFF'	TEMPORARY BASELINE INCREMENT See "Notation Conventions", IPDS Technical Reference 1.	X'0298..03'
	X'FFFF'	Half the current baseline increment	

Transparent Data

Transparent Data Control Sequence contains a sequence of coded characters that are presented without a scan for embedded control sequences.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'02' - X'FF'	LENGTH	X'021E..01'

Offset	Range	Meaning	Error Code
3		TRANSPARENT DATA	
	X'DA'	Unchained	
	X'DB'	Chained	
4-255		CHARACTER STRING	

Underscore

The Underscore control sequence identifies text that is to be underscored.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'03'	LENGTH	X'021E.. 01'
3		UNDERSCORE	
	X'76'	Unchained	
	X'77'	Chained	

Offset	Range	Meaning	Error Code
4		BYPASS IDENTIFIERS	
	Bits 0-3	Reserved	
	Bit 4: 0	Underscore white space from Relative Move Inline	
	Bit 4: 1	Bypass white space from Relative Move Inline	
	Bit 5: 0	Underscore white space from Absolute Move Inline	
	Bit 5: 1	Bypass white space from Absolute Move Inline	
	Bit 6: 0	Underscore white space from Space or Variable Space Character	
	Bit 6: 1	Bypass white space from Space or Variable Space Character	
	Bit 7: 0	BYPASS Treat Bits 0-6 according to their set values	
	Bit 7: 1	NO BYPASS Treat Bits 0-6 as if their values are set to zero	
	X'FF'	NO BYPASS in EFFECT	

2

2

3. IM Image Command Set

IM Image Commands

Name	Command	Sub-command	Where to Look
Write Image Control	X'D63D'		p.140 "Write Image Control"
Write Image	X'D64D'		p.144 "Write Image"

Write Image Control

The Write Image Control command is the first command in the sequence to send raster image data to the printer. The command contains fields to define the input, scale, and image placement parameters. Several Write Image Control commands may be required to a complete raster image.

Offset	Range	Meaning	Error Code
0-1	X'0001' - X'7FFF'	Pixels per scan line in the output image	X'0242..01' X'0243..01'
2-3	X'0001' - X'7FFF'	Number of scan lines in the output Image	X'0244..01' X'0245..01'
4-5	X'0001' - X'7FFF'	Pixels per scan line in the input image	X'0242..01' X'0243..01'
6-7	X'0001' - X'7FFF'	Number of scan lines in the input image	X'0244..01' X'0245..01'
8	X'00'	Uncompressed input image	X'0246..01'
9	X'00'	One bit per pixel in the input image format	X'0246..01'
10		PIXEL MAGNIFICATION FACTOR	X'0247..01'
	X'01'	No Magnification Factor	
	X'02'	Magnification Factor of 2	
11		SCAN LINE MAGNIFICATION FACTOR	X'0247..01'
	X'01'	No Magnification Factor	
	X'02'	Magnification Factor of 2	

Offset	Range	Meaning	Error Code
12-13		SCAN LINE DIRECTION	X'0248..01'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00	180 degrees	
	X'8700'	270 degrees	
14-15		SCAN LINE SEQUENCE DIRECTION	X'0249..01'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
16		REFERENCE COORDINATE SYSTEM	X'024A..01'
	X'00'	Absolute I, Absolute B	
	X'20'	Absolute I, Relative B	
	X'40'	Relative I, Absolute B	
	X'60'	Relative I, Relative B	
	X'A0'	Xp, Yp	
17-19	X'FF8000' - X'007FFF'	Xp, I or I offset coordinate of the IM image block origin	X'024A..01'
20	X'00'	Reserved	
21-23	X'FF8000' - X'007FFF'	Yp, B or B offset coordinate of the IM image block origin	X'024A..01'

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Offset	Range	Meaning	Error Code
24-25		IMAGE COLOR (Named Color)	X'0253..0 1'
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0009'	Dark Blue - Limited Simulated Color Support	
	X'000A'	Orange - Limited Simulated Color Support	
	X'000B'	Purple - Limited Simulated Color Support	
	X'000C'	Dark Green - Limited Simulated Color Support	
	X'000D'	Dark Turquoise - Limited Simulated Color Support	
	X'000E'	Mustard - Limited Simulated Color Support	

Offset	Range	Meaning	Error Code
24-25	X'000F'	Gray - Limited Simulated Color Support	
	X'0010'	X'0010' Brown - Limited Simulated Color Support	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset) For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.	

Write Image

The data is a binary representation of the raster image. In the binary data, a 1-bit represents a colored pixel and a 0-bit represents a pixel left unchanged in the page map. In other words, if a pixel is set black by another block on the page (for example, text), it will not be reset to white if it is written with a 0-bit in the image block. Several Write Image commands may be required to a complete raster image.

An error occurs if the host program sends the End command and the total number of bytes of image data is a different number than specified in the image control record.

Offset	Range	Meaning	Error Code
0-End		Binary RASTER IMAGE	X'026A.. 01' X'026B.. 01' X'0264..0 1'

4. IO Image Command Set

IO Image Commands

Name	Command	Sub-command	Where to Look
Write Image Control 2	X'D63E'		p.146 "Write Image Control 2"
Image Area Position		X'AC6B'	p.146 "Image Area Position"
Image Output Control		X'A66B'	p.147 "Image Output Control"
Image Data Descriptor		X'A6FB'	p.149 "Image Data Descriptor"
Write Image 2	X'D64E'		p.152 "Write Image 2"
Begin Segment		X'70'	p.152 "Begin Segment"
Begin Image Content		X'91'	p.152 "Begin Image Content"
Image Size Parameter		X'94'	p.152 "Image Size Parameter"
Image Encoding Parameter		X'95'	p.153 "Image Encoding Parameter"
Image Data Element Size Parameter		X'96'	p.154 "Image Data Element Size Parameter"
Image Look -up Table ID Parameter		X'97'	p.155 "Image Look-up Table ID Parameter"
Image Data		X'FE92'	p.155 "Image Data"
End Image Content		X'93'	p.156 "End Image Content"
End Segment		X'71'	p.156 "End Segment"

Write Image Control 2

The Write Image Control 2 data consists of three consecutive structured fields:

- Image Area Position Control (IAP)
- Image Output Control (IOC)
- Image Data Descriptor (IDD)

The Write Image Control 2 command and the command sequence that follows defines the image presentation block area on the current page. The parameters of this command define the size, placement and orientation of the image block and establish the parameters required to interpret the image segments.

Positive acknowledgement of image commands in Overlay State or Page Segment State means that the command or command sequence has been accepted for processing, but does not imply that its parameters have been checked in any way.

Image Area Position

This data structured field specifies the position and orientation of the image output area relative to a reference coordinate system. It is a REQUIRED data field in the Write Image Control 2 command.

Offset	Range	Meaning	Error Code
0-1	X'000B' - X'xxxx'	LENGTH of Image Area Position	X'0202..05'
2-3	X'AC6B'	STRUCTURED FIELD ID	X'020B..05'
4-5	X'8000' - X'7FFF'	Image Object Area Origin Xp, I, or Ioffset Coordinate Position See "Notation Conventions", IPDS Technical Reference 1.	
6-7	X'8000 - X'7FFF'	Image Object Area Origin Yp, B, or B-offset Coordinate Position See "Notation Conventions", IPDS Technical Reference 1.	
8-9		ORIENTATION OF IMAGE BLOCK	X'0203..05'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	

Offset	Range	Meaning	Error Code
10		COORDINATE REFERENCE SYSTEM	X'0204..0 5'
	X'00'	Absolute I, absolute B	
	X'20'	Absolute I, relative B	
	X'40'	Relative I, absolute B	
	X'60'	Relative I, relative B	
	X'A0'	Page Xp, Yp	
11-n		Ignored	

Image Output Control

This data structured field specifies the mapping option for the image object. It is an ELECTIVE data field in the Write Image Control 2 command. If this field is omitted, the printer will use the following default values:

Mapping option = X'30' (Position and Trim)

X, Y Offset = 0.

X, Y Extent = Image Presentation Space extent defined by the Image Data Descriptor structured field.

Offset	Range	Meaning	Error Code
0-1	X'0010' - X'xxxx'	LENGTH of Image Output Control	X'0202..0 5'
2-3	X'A66B'	Structured Field ID	X'020B.. 05'
4		UNIT BASE (Measurement Units)	X'0205..0 5'
	X'00'	10 Inches	
	X'01'	10 Centimeters	
5-6	X'0001'- X'7FFF'	L-units per UNIT BASE	X'0206..0 5'

Offset	Range	Meaning	Error Code
7-8	X'0001'-X'7FFF'	X extent of IO image block in L-units for Page, Overlay and Page Segment See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
9-10	X'0001'-X'7FFF'	Y extent of IO image block in L-units for Page, Overlay and Page See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
11		MAPPING CONTROL OPTION	X'0208..05'
	X'10'	Scale to fit	
	X'20'	Center and trim	
	X'30'	Position and trim	
	X'41'	Point to pixel	
	X'42'	Point to pixel with double dot	
	X'50'	Replicate and Trim	
12-13	X'8000'-X'7FFF'	X OFFSET L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'
14-15	X'8000'-X'7FFF'	Y OFFSET L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'

Offset	Range	Meaning	Error Code
16-n		IOC Triplets • Color Specification Triplet. This optional triplet can be placed at the end of the IOC command to specify the foreground color of the object area, before any object data is placed on the object area. Any number of IOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Color Specification", IPDS Technical Reference 1. • Presentation Space Reset Mixing Triplet. This optional triplet can be placed at the end of the IOC command to specify whether or not an object area is reset to the color of medium before any object data is placed on the object area. Any number of IOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Presentation Space Reset Mixing", IPDS Technical Reference 1.	

Note

• The Replicate and Trim Mapping Control option is supported only when the IPDS Menu PRINT MODE item is set to ENH (Enhanced 600 dpi).

Image Data Descriptor

This is a REQUIRED data structured field in the Write Image Control 2 command. It specifies parameters that define the image presentation space size and resolution.

Offset	Range	Meaning	Error Code
0-1	X'000F' - X'xxxx'	LENGTH of Image Data Descriptor	X'0202..05'
2-3	X'A6FB'	STRUCTURED FIELD ID	X'020B..05'
4-5	X'0000'	Reserved	

Offset	Range	Meaning	Error Code
6		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	
7-8	X'0001'-X'7FFF'	X image points per unit base	X'0206..05'
9-10	X'0001'-X'7FFF'	Y image points per unit base	X'0206..05'
11-12	X'0001'-X'7FFF'	X EXTENT of image presentation space (in image points) See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
13-14	X'0001'-X'7FFF'	Y EXTENT of image presentation space (in image points) See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
15-end of IDD		IOCA SDFs	
0	X'F4'	Set Extended Bilevel Image Color SDF	
	X'F6'	Set Bilevel Image Color SDF [1]	
1	X'04'	LENGTH	
2	X'00'	AREA	
3	X'00'	Reserved	

Offset	Range	Meaning	Error Code
4-5		Named Color	
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0009'	Dark Blue - Limited Simulated Color Support	
	X'000A'	Orange - Limited Simulated Color Support	
	X'000B'	Purple - Limited Simulated Color Support	
4-5	X'000C'	Dark Green - Limited Simulated Color Support	
	X'000D'	Dark Turquoise - Limited Simulated Color Support	
	X'000E'	Mustard - Limited Simulated Color Support	
	X'000F'	Gray - Limited Simulated Color Support	
	X'0010'	Brown - Limited Simulated Color Support	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	

*1 Refer to the Intelligent Printer Data Stream Reference and the Image Object Content Architecture Reference for specifics on the Set Bilevel Image Color SDF format.

Write Image 2

The image segment is processed as it is received by the printer and is not retained or stored as a named image segment.

Write Image 2 command carries the IO image data within a hierarchical sequence of self-defining fields. See the Intelligent Printer Data Stream Reference and the Image Object Content Architecture Reference.

Begin Segment

Offset	Range	Meaning	Error Code
0	X'70'	Begin Segment	X'0570..0F'
1	X'00'-X'FF'	Length	

Begin Image Content

Offset	Range	Meaning	Error Code
0	X'91'	Begin Image Content	X'0591..0F'
1	X'01'-X'FF'	Length	X'0500..03'
2	X'FF'	Format Specification	X'0500..04'

Image Size Parameter

The Image Size Parameter specifies the size of the image defined within the image segment. Mapping of the image into the image presentation space (See p.149 "Image Data Descriptor") is on a 1 image point to 1 image point basis (one image point of an IO-Image segment is mapped to one image point of the image presentation space).

Offset	Range	Meaning	Error Code
0	X'94'	IMAGE SIZE	X'0594..0F'
1	X'09'-X'FF'	LENGTH of the following bytes	X'0500..03'
2		UNIT BASE (Measurement Units)	
	X'00'	10 Inches	
	X'01'	10 Centimeters	
	X'02'	Logical (resolution ratio)	
3-4	X'0000' - X'7FFF'	X image points per unit base	
5-6	X'0000' - X'7FFF'	Y image points per unit base	
7-8	X'0000'- X'7FFF'	X extent of the image in image points	X'0500..04' X'0594..11' X'0595..11' X'05A9..02'
9-10	X'0000'- X'7FFF'	Y extent of the image in image points	X'0500..04' X'05A9..02'

Image Encoding Parameter

Offset	Range	Meaning	Error Code
0	X'95'	IMAGE ENCODING	X'0595..0F'

Offset	Range	Meaning	Error Code
1	X'02'-X'FF'	LENGTH of the following bytes	X'0500..03'
2		COMPRESSION ALGORITHM	X'0595..10' X'0595..11'
	X'01'	IBM MMR compression	
	X'03'	No compression	
	X'06'	RL4 compression	
	X'08'	ABIC (Bilevel Q-Coder)	
	X'80'	G3 MH (CCITT T.4 facsimile 1-D)	
	X'81'	G3 MR (CCITT T.4 G3 facsimile 2-D)	
	X'82'	G4 MMR (CCITT T.6 G4 facsimile 2-D)	
3		RECORDING ALGORITHM	X'0595..10'
	X'01'	RIDIC (Recording Image Data Inline Code) Unpadded RIDIC	
4		BIT ORDER within each image data byte	
	X'00'	Left-to-Right	
	X'01'	Right-to-Left	

Image Data Element Size Parameter

Offset	Range	Meaning	Error Code
0	X'96'	IMAGE DATA ELEMENT SIZE	X'0596..0F'
1	X'01'-X'FF'	LENGTH of the following bytes	X'0500..03'

Offset	Range	Meaning	Error Code
2		NUMBER of BITS per PIXEL	X'0596..10'
	X'01'	1 bit per pixel	X'0500..04'
	X'08'	8 bits per pixel	X'0596..11'

If 1 is specified, the image is binary, with 1-bit representing black pixels and 0- bit representing pixels unchanged in the page map. If the image is uncompressed, each raster scan in the image data must be padded so that it is an integral number of bytes.

If 8 is specified, the image is gray scale. Each image byte is considered to be a value 0 to 255, where 0 is maximum black, 255 is no black at all, and the values in between are shades of gray.

The printer implements 8 bit per pixel images by halftoning. Halftoning significantly degrades image detail. For that reason, resolutions of gray scale data greater than 120 pixels per inch are not recommended except for draft printing purposes.

If 8 is specified, the Image Compression, if specified with the Image Encoding command, must be uncompressed. This error is detected when the first Image Data command is received.

Image Look-up Table ID Parameter

Offset	Range	Meaning	Error Code
0	X'97'	Image Look-up Table ID Parameter	X'0597..0F'
1	X'01'-X'FF'	LENGTH of the following bytes	X'0500..03'
2	X'00'	Look up table ID	X'0597..10'

Image Data

Offset	Range	Meaning	Error Code
0-1	X'FE92'	Image Data	X'0592..0F'

Offset	Range	Meaning	Error Code
2-3	X'0001'-X'FFFF'	Length	X'0500..03" X'0594..01'
4-end	X'x...x'	Image Data	X'0597..10'

End Image Content

Offset	Range	Meaning	Error Code
0	X'93'	End Image Content	X'0593..0F'
1	X'00'-X'FF'	Length	

End Segment

Offset	Range	Meaning	Error Code
0	X'71'	End Segment	X'0571..0F'
1	X'00'-X'FF'	Length	

5. Graphics Command Set

Graphics Commands

The base reference for graphic drawing orders is the Graphics Object Content Architecture Reference.

Name	Command	Sub-command	Where to Look
Write Graphics Control	X'D684'		p.157 "Write Graphics Control"
Graphics Area Position		X'AC6B'	p.157 "Graphics Area Position"
Graphics Output Control		X'A66B'	p.158 "Graphics Output Control"
Graphics Data Descriptor		X'A6BB'	p.160 "Graphics Data Descriptor"
Write Graphics	X'D685'		p.165 "Write Graphics"
Begin Segment Introducer		X'70'	p.166 "Begin Segment Introducer"

Write Graphics Control

Graphics Area Position

Offset	Range	Meaning	Error Code
0-1	X'000B'-X'xxxx'	LENGTH of Graphics Area Position	X'0202..05'
2-3	X'AC6B'	Structured Field ID.	X'020B..05'
4-5	X'8000'-X'7FFF'	GRAPHICS BLOCK ORIGIN Xp, I, or I-offset Coordinate Position. See "Notation Conventions", IPDS Technical Reference 1.	

Offset	Range	Meaning	Error Code
6-7	X'8000'- X'7FFF'	GRAPHICS BLOCK ORIGIN Yp, B, or B-offset Coordinate Position. See "Notation Conventions", IPDS Technical Reference 1.	
8-9		ORIENTATION of Graphic Block	X'0203..05'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
10		COORDINATE REFERENCE SYSTEM	X'0204..05'
	X'00'	Absolute I, Absolute B	
	X'20'	Absolute I, Relative B	
	X'40'	Relative I, Absolute B	
	X'60'	Relative I, Relative B	
	X'A0'	Page Xp, Yp	
11-n		Ignored	

Graphics Output Control

Offset	Range	Meaning	Error Code
0-1	X'0010'- X'xxxx'	LENGTH of Graphics Output Control (GOC)	X'0202..05'
2-3	X'A66B'	STRUCTURED FIELD ID	X'020B..05'
4		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	

Offset	Range	Meaning	Error Code
5-6	X'0001' - X'7FFF'	L-Units per UNIT BASE	X'0206..05'
7-8	X'0001' - X'7FFF'	X EXTENT of GRAPHICS BLOCK in L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
9-10	X'0001' - X'7FFF'	Y EXTENT of GRAPHICS BLOCK in L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
11		MAPPING Control Option	X'0208..05'
	X'10'	Scale to Fit	
	X'20'	Center and Trim	
	X'30'	Position and Trim	
12-13	X'8000' - X'7FFF'	X OFFSET L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'
14-15	X'8000' - X'7FFF'	Y OFFSET L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'

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Offset	Range	Meaning	Error Code
16-n		GOC Triplets • Color Specification Triplet. This optional triplet can be placed at the end of the GOC command to specify the foreground color of the object area, before any object data is placed on the object area. Any number of GOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Color Specification", IPDS Technical Reference. • Presentation Space Reset Mixing Triplet. This optional triplet can be placed at the end of the GOC command to specify whether or not an object area is reset to the color of medium before any object data is placed on the object area. Any number of GOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Presentation Space Reset Mixing", IPDS Technical Reference 1.	

Note

- The Graphics Output Control Self Defining Field is optional and may be omitted from the WGC command. If the GOC is omitted, the printer uses the following:
  - Mapping Control Option X'30' (Position and Trim)
  - X Offset = 0
  - Y Offset = 0
  - Graphics Block size equals the Graphics Presentation Space Window size which is defined in the Graphics Data Descriptor (GDD) Self Defining Field (See p.160 "Graphics Data Descriptor").

Graphics Data Descriptor

Offset	Range	Meaning	Error Code
0-1	X'001C'-X'xxxx'	LENGTH of Graphics Data Descriptor (GDD)	X'0202..05'

Offset	Range	Meaning	Error Code
2-3	X'A6BB'	STRUCTURED FIELD ID	X'020B..05'
4		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	
5	X'00'	Reserved	
6-7	X'0001' - X'7FFF'	Xg UNITS per UNIT BASE	X'0206..05'
8-9	X'0001' - X'7FFF'	Yg UNITS per UNIT BASE Yg = Xg	X'0206..05'
10-13	X'00000000'	Reserved	
14-15	X'8000'- X'7FFF'	Xg LEFT LIMIT of Graphic Presentation Space Window. See "Notation Conventions", IPDS Technical Reference 1.	
16-17	X'8000'- X'7FFF'	Xg RIGHT LIMIT of Graphic Presentation Space Window. See "Notation Conventions", IPDS Technical Reference 1.	
18-19	X'8000'- X'7FFF'	Yg TOP LIMIT of Graphic Presentation Space Window. See "Notation Conventions", IPDS Technical Reference 1.	
20-21	X'8000'- X'7FFF'	Yg BOTTOM LIMIT of Graphic Presentation Space Window. See "Notation Conventions", IPDS Technical Reference 1.	
22-27	X'000000000000'	Reserved	
28-n		INITIAL GRAPHICS DEFAULTS. See "GDD Initial Graphics Defaults Self Describing Instructions"	

If the image resolution specified in the GDD is X'0000' (indicating that no explicit resolution is specified), then the resolution used is the resolution specified in the OPC's Image and Coded Font Resolution Self-Defining Field.

GDD Initial Graphics Defaults Self Describing Instructions

Offset	Range	Meaning	Error Code
0	X'21'	SET CURRENT DEFAULTS	X'0300..21'
1	X'04'-X'FF'	LENGTH of Data	X'0300..03'
2		SET Byte	X'0300..02'
	X'00'	Drawing Attributes	
	X'01'	Line Attributes	
	X'02'	Character Attributes	
	X'03'	Marker Attributes	
	X'04'	Pattern Attributes	
	X'0B'	Arc Parameters	
3-4		MASK Bytes. See "Graphics Drawing Order Defaults and Masks"	X'0300..03'
5		DEFAULT Byte	X'0300..02'
	X'0F'	Use Standard Default	X'0300..03'
	X'8F'	Use the following Data Bytes	
6-n		Data bytes	X'0300..21'

🞃**Note**

Graphics Drawing Order Defaults and Masks

Set Byte	Mask Bit	Meaning
X'00'		DRAWING ATTRIBUTES
	0	Color (Named Color)
	1	Foreground Mix
	2	Background Mix
	3-15	Reserved
X'01'		LINE ATTRIBUTES
	0	Line Type
	1	Line Width
	2-15	Reserved
X'02'		CHARACTER ATTRIBUTES
	0	Angle X, Y
	1	Character Cell Size CW, CH
	2	Direction
	3	Precision
	4	Character Set
	5	Shear X, Y
	6-15	Reserved
X'03'		MARKER ATTRIBUTES
	0-2	Reserved
	3	Precision
	4	Marker Set
	5-6	Reserved
	7	Marker Symbol
	8-15	Reserved

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Set Byte	Mask Bit	Meaning
X'04'		PATTERN ATTRIBUTES
	0-6	Reserved
	7	Pattern Symbol
	8-15	Reserved
X'0B'		ARC PARAMETERS
	0	P Value
	1	R Value
	2	Q Value
	3	S Value
	4-15	Reserved

Write Graphics

Write Graphics Defaults

The following defaults will be used if not previously defined by p.160 "Graphics Data Descriptor" (Graphics Drawing Order Defaults and Masks). The current value of an attribute is taken into account when the drawing order is received.

Meaning	Range
Color	Black
Line Type	Solid
Line Width	Normal (4 pixel)
Character Cell	10 CPI
Character Set	Courier 10
Character Angle	No Rotation
Character Direction	Left to Right
Marker Symbol	Cross
Pattern Symbol	Solid Shading
Current Position	X,Y = 0,0
Arc Parameters	P=Q=1; R=S=0
Foreground Mix	Overpaint
Background Mix	Leave Alone
Character Precision	Character Precision
Marker Precision	Character Precision
Marker Symbol Set	Resident Set in Printer

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Begin Segment Introducer

Offset	Range	Meaning	Error Code
0	X'70'	BEGIN SEGMENT code	
1	X'0C'	LENGTH of the following parameters	X'0370..C1'
2-5		SEGMENT ID (Ignored)	
6	X'00'	Reserved	
7		FLAGS	X'0370..01'
	Bits 0-2: 00	Reserved	X'0370..82'
	Bit 3: 0/1	No Prolog (0); Prolog (1)	
	Bit 4: 0	Reserved	
	Bits 5-6: 00/11	New Segment (reinitialize graphics defaults)/Append Segment (do not reinitialize defaults)	
	Bit 7: 0	Reserved	
8-9	X'0000'-X'FFFF'	Length of this segment (SEGLEN)	
10-13	X'0000000 00'	Reserved	
14-n		See p.166 "Begin Segment Introducer" (Drawing Orders).	

Drawing Orders

The machine supports all DR2 Drawing Orders and valid data values as defined in the Intelligent Printer Data Stream Reference. The following are those Drawing Orders which define specific data values.

Set Background Mix:

Offset	Range	Meaning	Error Code
0	X'0D'	Order code	

Offset	Range	Meaning	Error Code
1		BACKGROUND MIX ATTRIBUTE	X'0300..04'
	X'00'	Drawing default	X'0300..0E'
	X'05'	Leave Alone	

Set Character Angle:

Offset	Range	Meaning	Error Code
0	X'34'	Order code	
1	X'04'	Length	X'0300..03'
2-3	X'8000' - X'7FFF'	Xg COORDINATE	X'0334..00'
4-5	X'8000' - X'7FFF'	Yg COORDINATE	X'0334..00'

- If Xg = 0 and Yg = 0 then the character angle is 0 degrees (default)
- If Xg > 0 and Yg = 0 then the character angle is 0 degrees
- If Xg = 0 and Yg > 0 then the character angle is 90 degrees
- If Xg < 0 and Yg = 0 then the character angle is 180 degrees
- If Xg = 0 and Yg < 0 then the character angle is 270 degrees

Note

- Exception X'0334..00' applies when both Xg and Yg are non-zero values.

Set Character Precision:

Offset	Range	Meaning	Error Code
0	X'39'	Order code	

Offset	Range	Meaning	Error Code
1		PRECISION TYPE	X'0300..04' X'0300..0E'
	X'00'	Current default	
	X'01'	String Precision	
	X'02'	Character Precision	

Set Character Set:

Offset	Range	Meaning	Error Code
0	X'38'	Order code	
1		LOCAL CHARACTER SET ID	X'03C3..00'
	X'00'	Current default	
	X'01' - X'FE'	Local ID for Character Set	
	X'FF'	Printer Default	

Set Color:

Offset	Range	Meaning	Error Code
0	X'0A'	Order code	

Offset	Range	Meaning	Error Code
1		COLOR	X'0300..04'
	X'00'	Printer Default (Black)	
	X'01'	Blue - Limited Simulated Color Support	
	X'02'	Red - Limited Simulated Color Support	
	X'03'	Pink - Limited Simulated Color Support	
	X'04'	Green - Limited Simulated Color Support	
	X'05'	Turquoise - Limited Simulated Color Support	
	X'06'	Yellow - Limited Simulated Color Support	
	X'07'	Black	
	X'08'	Color of Medium (Reset) For details about color simulation and product support specifics, see "Color Simulation" IPDS Technical Reference 1.	

Set Extended Color:

Offset	Range	Meaning	Error Code
0	X'26'	Order code	
1	X'02'	Length	X'0300..03'

Offset	Range	Meaning	Error Code
2-3		EXTENDED COLOR	X'0300..04'
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0009'	Dark Blue - Limited Simulated Color Support\	
	X'000A'	Orange - Limited Simulated Color Support	
	X'000B'	Purple - Limited Simulated Color Support	
	X'000C'	Dark Green - Limited Simulated Color Support	

Offset	Range	Meaning	Error Code
2-3	X'000D'	Dark Turquoise - Limited Simulated Color Support	
	X'000E'	Mustard - Limited Simulated Color Support	
	X'000F'	Gray - Limited Simulated Color Support	
	X'0010'	Brown - Limited Simulated Color Support	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset) For details about color simulation and product support specifics, see "Color Simulation" IPDS Technical Reference 1.	

Set Line Type:

Offset	Range	Meaning	Error Code
0	X'18'	Order code	
1		LINE TYPE	X'0300..04' X'0300..0E'
	X'00'	Current default	
	X'01'	Dotted Line	
	X'02'	Short Dashed Line	
	X'03'	Dashed and Dotted Line	
	X'04'	Double Dotted Line	
	X'05'	Long Dashed Line	
	X'06'	Dashed Double Dotted Line	
	X'07'	Solid Line	
	X'08'	Invisible Line	

Set Fractional Line Width (4028 Emulation Mode):

Offset	Range	Meaning	Error Code
0	X'11'	Order code	
1	X'02'	Length	X'0300..03'
2-3		FRACTIONAL LINE WIDTH	X'0300..04' X'0300..0E'
	X'0000'	Current default	
	X'0001' - X'00FF'	2 Pixels Wide	
	X'0100' - X'017F'	4 Pixels Wide	
	X'0180' - X'01FF'	6 Pixels Wide	
	X'0200' - X'0F7F'	G8-60 Pixels Wide	
	X'0F80' - X'FFFF'	62 Pixels Wide	

Set Fractional Line Width (Native Mode):

Offset	Range	Meaning	Error Code
0	X'11'	Order code	
1	X'02'	Length	X'0300..03'

Offset	Range	Meaning	Error Code
2-3		FRACTIONAL LINE WIDTH	X'0300..04' X'0300..0E'
	X'0000'	Current default	
	X'0001' - X'007F'	1 Pixel Wide	
	X'0080' - X'00BF'	2 Pixels Wide	
	X'00C0' - X'00FF'	3 Pixels Wide	
	X'0100' - X'013F'	4 Pixels Wide	
	X'013F' - X'017F'	5 Pixels Wide	
	X'0180' - X'01BF'	6 Pixels Wide	
	X'01C0' - X'01FF'	7 Pixels Wide	
	X'0200' - X'0F7F'	8-60 Pixels Wide	
	X'0F80' - X'FFFF'	62 Pixels Wide	

Set Line Width:

Offset	Range	Meaning	Error Code
0	X'19'	Order code	

Offset	Range	Meaning	Error Code
1		LINE WIDTH	X'0300..04' X'0300..0E'
	X'00'	Current default	
	X'01' - X'0F'	2-58 Pixels Wide (4 pixels increments)	
	X'10' - X'FF'	62 Pixels Wide	

Set Marker Precision:

Offset	Range	Meaning	Error Code
0	X'3B'	Order code	
1		MARKER PRECISION	X'0300..04' X'0300..0E'
	X'00'	Drawing default	
	X'01'	Character Precision	
	X'02'	Stroke Precision	

Set Mix:

Offset	Range	Meaning	Error Code
0	X'0C'	Order code	
1		MIX ATTRIBUTE	X'0300..04' X'0300..0E'
	X'00'	Drawing default	
	X'02'	Overpaint	

Set Pattern Set:

Offset	Range	Meaning	Error Code
0	X'08'	Order code	

Offset	Range	Meaning	Error Code
1	X'00'	PATTERN SET ID	X'0368..03'

Set Pattern Symbol:

Offset	Range	Meaning	Error Code
0	X'28'	Order code	
1		PATTERN SYMBOL ID	X'0368..04'
	X'00'	Use Current default	
	X'01' - X'08'	Decreasing Density	
	X'09'	Vertical Lines	
	X'0A'	Horizontal Lines	
	X'0B'	Diagonal Lines 1 (Bot L/Top R)	
	X'0C'	Diagonal Lines 2 (Bot L/Top R)	
	X'0D'	Diagonal Lines 1 (Top L/Bot R)	
	X'0E'	Diagonal Lines 2 (Top L/Bot R)	
	X'0F'	No Shading	
	X'10'	Solid Shading	
	X'40'	Blank	

Set Process Color

The Set Process Color control specifies a process color, highlights color or named color that sets the following color attributes to the same value:

- Character color
- Image color
- Line color

- Marker color
- Pattern color

Offset	Range	Meaning	Error Code
0	X'B2'	Order Code	
1	X'12' - X'14'	LENGTH	X'0300..03'
2	X'00'	RESERVED	
3		COLOR SPACE	X'020E..02'
	X'01'	RGB - Limited Simulated Color Support	
	X'04'	CMYK - Limited Simulated Color Support	
	X'06'	HCS - Limited Simulated Color Support	
	X'08'	CIELAB - Limited Simulated Color Support	
	X'40'	Standard OCA - Limited Simulated Color Support	
4-7	X'00000000'	RESERVED	
8		1ST COLOR COMPONENT BITS	X'020E..05'
	X'01' - X'08'	(RGB, CMYK, CIELAB)	
	X'10'	Standard OCA Color Space	
9		2ND COLOR COMPONENT BITS	X'020E..05'
	X'00' - X'08'	(RGB, CMYK, Highlight, CIELAB)	
10		3RD COLOR COMPONENT BITS	X'020E..05'
	X'00' - X'08'	(RGB, CMYK, CIELAB)	
11		4TH COLOR COMPONENT BITS	X'020E..05'
	X'00' - X'08'	(CMYK)	

Offset	Range	Meaning	Error Code
12-15		COLOR VALUE	X'020E..03'
		RGB Color Space	X'020E..04'
	X'nn'	Red Intensity	
	X'nn'	Green Intensity	
	X'nn'	Blue Intensity	
		CMYK Color Space	
	X'nn'	Cyan Intensity	
	X'nn'	Magenta Intensity	
	X'nn'	Yellow Intensity	
	X'nn'	Black Intensity	
		Highlight Color Space	
	X'nnnn'	Highlight Color Number	
	X'nn'	Percent Coverage	
	X'nn'	Percent Shading	
		CIELAB Color Space	
	X'nn'	Luminance (L)	
	X'nn'	Chrominance Difference (a)	
	X'nn'	Chrominance Difference (b)	
		Standard OCA Color Space	

Offset	Range	Meaning	Error Code
12-15	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue	
	X'0002' or X'FF02'	Red	
	X'0003' or X'FF03'	Pink	
	X'0004' or X'FF04'	Green	
	X'0005' or X'FF05'	Turquoise	
	X'0006' or X'FF06'	Yellow	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0010'	Brown	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	

Drawing Order Summary

Zero or more drawing orders follow each Begin Segment Introducer. These drawing orders either specify graphics to be printed or assign drawing attributes.

Given below is a list of the supported drawing orders. Please refer to the AFP GOCA Reference, S544-5498, for complete descriptions of all GOCA drawing orders.

Code	Drawing Order
X'68'	Begin Area
X'D1'	Begin Image

Code	Drawing Order
X'91'	Begin Image at Current Position
X'C0'	Box
X'80'	Box at Current Position
X'C3'	Character String
X'83'	Character String at Current Position
X'01'	Comment
X'60'	End Area
X'93'	End Image
X'3E'	End Prolog
X'71'	End Segment (treated like a No Operation command)
X'C5'	Fillet
X'85'	Fillet at Current Position
X'C7'	Full Arc
X'87'	Full Arc at Current Position
X'92'	Image Data
X'C1'	Line
X'81'	Line at Current Position
X'C2'	Marker
X'82'	Marker at Current Position
X'00'	No Operation
X'E1'	Relative Line
X'E3'	Partial Arc
X'A3'	Partial Arc at Current Position
X'A1'	Relative Line at Current Position
X'04'	Segment Characteristics (treated like a No Operation command)

Code	Drawing Order
X'22'	Set Arc Parameters
X'0D'	Set Background Mix
X'34'	Set Character Angle
X'33'	Set Character Cell
X'3A'	Set Character Direction
X'39'	Set Character Precision
X'38'	Set Character Set
X'35'	Set Character Shear
X'0A'	Set Color
X'21'	Set Current Position
X'26'	Set Extended Color
X'11'	Set Fractional Line Width
X'18'	Set Line Type
X'19'	Set Line Width
X'37'	Set Marker Cell
X'3B'	Set Marker Precision
X'3C'	Set Marker Set
X'29'	Set Marker Symbol
X'0C'	Set Mix
X'08'	Set Pattern Set
X'28'	Set Pattern Symbol
X'43'	Set Pick Identifier (treated like a No Operation command)
X'B2'	Set Process Color

6. Bar Code Command Set

The base reference for Bar Code commands is the Bar Code Object Content Architecture Reference.

Bar Code Commands

Name	Command	Sub-command	Where to Look
Write Bar Code Control	X'D680'		p.182 "Write Bar Code Control"
Bar Code Area Position		X'AC6B'	p.182 "Bar Code Area Position"
Bar Code Output Control		X'A66B'	p.183 "Bar Code Output Control"
Bar Code Data Descriptor		X'A6EB'	p.184 "Bar Code Data Descriptor"
Write Bar Code	X'D681'		p.198 "Write Bar Code"

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Write Bar Code Control

Bar Code Area Position

Offset	Range	Meaning	Error Code
0-1	X'000B'-X'xxxx'	LENGTH of Bar Code Area Position (BCAP)	X'0202..05'
2-3	X'AC6B'	STRUCTURED FIELD ID	X'020B..05'
4-5	X'8000'-X'7FFF'	Bar Code BLOCK ORIGIN Xp, I, or IOFFSET coordinate position (in 1440ths)	X'0411..00'
6-7	X'8000'-X'7FFF'	Bar Code BLOCK ORIGIN Yp, B, or B-OFFSET coordinate position (in 1440ths)	X'0411..00'
8-9		ORIENTATION OF Bar Code BLOCK	X'0203..05'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
10		COORDINATE REFERENCE SYSTEM	X'0204..05'
	X'00'	Absolute I, Absolute B	
	X'20'	Absolute I, Relative B	
	X'40'	Relative I, Absolute B	
	X'60'	Relative I, Relative B	
	X'A0'	Page Xp, Yp	
11-n :c		Ignored	

Bar Code Output Control

Offset	Range	Meaning	Error Code
0-1	X'0010'-X'xxxx'	LENGTH of Bar Code Output Control (BCOC)	X'0202..05'
2-3	X'A66B'	STRUCTURED FIELD ID	X'020B..05'
4		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	
5-6	X'0001' - X'7FFF'	L-Units per UNIT BASE	X'0206..05'
7-8	X'0001' - X'7FFF'	X EXTENT of Bar Code BLOCK in L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
9-10	X'0001' - X'7FFF'	Y EXTENT of Bar Code BLOCK in L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
11	X'30'	MAPPING CONTROL OPTION (Position)	X'0208..05'
12-13	X'8000' - X'7FFF'	X OFFSET L-units See. See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'
14-15	X'8000' - X'7FFF'	Y OFFSET L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'

Offset	Range	Meaning	Error Code
16-n		Triplets • Color Specification Triplet. This optional triplet can be placed at the end of the BCOC command to specify the foreground color of the object area, before any object data is placed on the object area. Any number of BCOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Color Specification", IPDS Technical Reference. • Presentation Space Reset Mixing Triplet. This optional triplet can be placed at the end of the BCOC command to specify whether or not an object area is reset to the color of medium before any object data is placed on the object area. Any number of BCOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Presentation Space Reset Mixing", IPDS Technical Reference 1.	

Bar Code Data Descriptor

Offset	Range	Meaning	Error Code
0-1	X'001B'-X'xxxx'	LENGTH of Bar Code Data Descriptor (BCDD)	X'0202..05'
2-3	X'A6EB'	STRUCTURED FIELD ID	X'020B..05'
4		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	
5	X'00'	Reserved	
6-7	X'0001' - X'7FFF'	Xbc Units per UNIT BASE	X'0206..05'

Offset	Range	Meaning	Error Code
8-9	X'0001' - X'7FFF'	Ybc Units per UNIT BASE	X'0206..05'
10-11	X'0001' - X'7FFF'	X EXTENT of Bar Code Presentation Space in L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use BCOC X EXTENT	
12-13	X'0001' - X'7FFF'	Y EXTENT of Bar Code Presentation Space in L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use BCOC Y EXTENT	
14-15	X'0000'	Reserved	
16		BAR CODE TYPE See p.189 "Bar Code Type and Modifier Description and Values"	X'0403..00'
17		BAR CODE MODIFIER See p.189 "Bar Code Type and Modifier Description and Values"	X'040B..00'
18	X'01' - X'FE'	FONT LOCAL ID	X'0404..00'
	X'FF'	Default Font Local ID (Note 1)	

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Offset	Range	Meaning	Error Code
19-20		COLOR (Named Color)	X'0405..0 0'
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0007'	White - Color of Medium (Reset) Black	
	X'0008'	Dark Blue - Limited Simulated Color Support	
	X'0009'	Orange - Limited Simulated Color Support	

Offset	Range	Meaning	Error Code
19-20	X'000A'	Purple - Limited Simulated Color Support	
	X'000B'	Dark Green - Limited Simulated Color Support	
	X'000C'	Dark Turquoise - Limited Simulated Color Support	
	X'000D'	Mustard - Limited Simulated Color Support	
	X'000E'	Gray - Limited Simulated Color Support	
	X'000F'	Brown - Limited Simulated Color Support	
	X'0010'	Printer Default (Black)	
	X'FF07'	Color of Medium (Reset)	
	X'FF08'	Printer Default (Black)	
	X'FFFF'		
21		UNIT MODULE WIDTH	X'0406..0 0'
	X'07' - X'36'	Printer Default	
	X'FF'	Range and Printer Default are specified by Bar Code Type in Byte 16 (especially 2D bar codes)	
22-23	X'0001' - X'7FFF'	ELEMENT HEIGHT in L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0407..0 0'
	X'FFFF'	Printer Default as specified by Bar Code Type in Byte 16	
24	X'01'-X'FF'	Height multiplier	X'0408..0 0'

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Offset	Range	Meaning	Error Code
25-26		WIDE-TO-NARROW RATIO (WE|NE)	X'0409..00'
	X'0000'	Not Applicable Note 2	
	X'0002'	2: 1	
	X'0003'	3: 1	
	X'0014' to X'001E'	2.0: 1 - 3.0: 1	
	X'00C8' to X'012C'	2.00: 1 - 3.00: 1	
	X'FFFF'	Printer Default as specified by Bar Code Type (Byte 16)	
27-end		Ignored	

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- The Font Local ID specified in BCDD Byte 18 should be OCR-A, OCR-B or Code 128 dependent on the Bar Code Type specified in BCDD Byte 16. The default Font Local ID and Bar Code Type relationships are as follows:

OCR-A	OCR-B
Code 128	UPC-A
Code 3 of 9	UPC-E
MSI	UPC 2-Digit Add-on
2 of 5 Industrial	UPC 5-Digit Add-on
2 of 5 Matrix	EAN-8
2 of 5	EAN-13
Interleaved	EAN 2-Digit Add-on
Codabar	EAN 5-Digit Add-on

- Wide-to-Narrow Ratio (BCDD Bytes 25-26) is only valid for the following Bar Code Types:
    - X'01' 3 of 9
    - X'02' MSI
    - X'0A' 2 of 5 Industrial
    - X'0B' 2 of 5 Matrix
    - X'0C' Interleaved 2 of 5
    - X'0D' Codabar

- Default wide-to-narrow ratio for Codabar, Code 3 of 9, and the 2 of 5 types is dictated by the lowest unit module width that results in a readable bar code. The default wide-to-narrow ratio for MSI is 2:1 unless it can't be printed with the selected unit module width.

Bar Code Type and Modifier Description and Values

Bar Code Type (Byte 16)	Bar Code Description	Unit Module Width Default (mils)	Unit Module Width Range (mils)	Element Height Default (mils)	Element Height Range (mils)	Wide-to-Narrow Ratio
X'01'	3 of 9 Code AIM USS-39	14	7-54	234	234-14000	7.3
X'02'	MSI	14	7-54	300	300-14000	
X'03'	UPC/ CGPC Version A	14	7-54	1020	250-14000	
X'05'	UPC/ CGPC Version E	14	7-54	1020	250-14000	
X'06'	UPC 2 Character Supplemental (Periodicals)	14	7-54	1020	250-14000	
X'07'	UPC 5 Character Supplemental (Paperbacks)	14	7-54	1020	250-14000	
X'08'	EAN-8 (JAN Short)	14	7-54	840	250-14000	
X'09'	EAN-13 (JAN Standard)	14	7-54	1020	250-14000	

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Bar Code Type (Byte 16)	Bar Code Description	Unit Module Width Default (mils)	Unit Module Width Range (mils)	Element Height Default (mils)	Element Height Range (mils)	Wide-to-Narrow Ratio
X'0A'	Industrial 2 of 5	14	7-54	234	234-14000	8:02
X'0B'	Matrix 2 of 5	14	7-54	234	234-14000	4:02
X'0C'	Interleaved 2 of 5 AIM USS-I 2/5	14	7-54	234	234-14000	3:02
X'0D'	Codabar 2 of 7 Code AIM USSCodabar	14	7-54	234	234-14000	4:02
X'11'	Code 128 AIM USS-128	14	7-54	250	250-14000	
X'16'	EAN 2 Digit Add-on	14	7-54	1020	250-14000	
X'17'	EAN 5 Digit Add-on	14	7-54	1020	250-14000	
X'18'	POSTNET (Include PLANET)	14	7-54	1000	250-14000	
X'1A'	RM4SCC Royal Mail (Inc. Dutch KIX)	14	7-54	1000	250-14000	
X'1B'	Japan Postal	14	7-54	1000	250-14000	
X'1C'	Data Matrix 2D	21	12-254	21	12-254	

Bar Code Type (Byte 16)	Bar Code Description	Unit Module Width Default (mils)	Unit Module Width Range (mils)	Element Height Default (mils)	Element Height Range (mils)	Wide-to-Narrow Ratio
X'1D'	MaxiCode 2D					
X'1E'	PDF417 2D	14	7-254	15% of width or 0.2 in.	4*width - 524287	
X'1F'	Australia Post	14	7-54	1000	250-14000	
X'20'	QR Code 2D	14	7-254	21	12-254	
X'21'	Code 93	14	7-54	234	234-14000	7:03
X'22'	USPS Four-State	14	7-54	1000	250-14000	

Bar Code Type and Modifier Description and Values

Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'01'	X'01' 3 of 9 Code, AIM USS-39	X'01'	Print Bar Code with no Printer-Generated Check Character.
		X'02'	Generate Check Character and Print with Bar Code.

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Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'02'	MSI	X'01'	Print Bar Code with no Printer-Generated Check Character.
		X'02'	Print Bar Code with IBM Modulus 10 Check Digit Generated by Printer and Put at End of Data.
		X'03'	First check digit IBM Modulus 10.
		X'04'	First check digit NCR Modulus 11. Check digit equals remainder. Check digit of 10 equals error.
		X'05'	First check digit IBM Modulus 11. Check digit equals remainder. Check digit of 10 equals error.
		X'06'	First check digit NCR Modulus 11. Check digit equals 11 minus remainder. Check digit of 10 equals zero.
		X'07'	First check digit IBM Modulus 11. Check digit equals 11 minus remainder. Check digit of 10 equals error.
		X'08'	First check digit NCR Modulus 11. Check digit equals 11 minus remainder. Check digit of 10 equals error.
		X'09'	First check digit IBM Modulus 11. Check digit equals 11 minus remainder. Check digit of 10 equals error.
X'03'	UPC/CGPC Version A	X'00'	Generate check digit and Print standard symbol.
X'05'	UPC/CGPC Version E	X'00'	Print bar code. Six digits are encoded.
X'06'	UPC 2-Character Supplemental (Periodicals)	X'00'	Print the 2 supplemental digits (bar/space pattern and HRI).

Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'07'	UPC 5-Character Supplemental (Paperbacks)	X'00'	Print the 5 supplemental digits (bar/space pattern and HRI).
X'08'	EAN-8 (JAN Short)	X'00'	Print bar code symbol. Input variable data is 7 digits (2 flag and 5 article ID digits).
X'09'	EAN-13 (JAN Standard)	X'00'	Print bar code symbol. Input variable data is 12 digits (2 flag and 10 article ID digits).
X'0A'	2 of 5 Industrial	X'01'	Print bar code with no printer-generated check character.
		X'02'	Generate check character and print with bar code.
X'0B'	2 of 5 Matrix	X'01'	Print bar code with no printer-generated check character.
		X'02'	Generate check character and print with bar code.
X'0C'	Interleaved 2 of 5, AIM USS-I 2/5	X'01'	Print bar code with no printer-generated check character.
		X'02'	Generate check character and print with bar code.
X'0D'	Codabar, 2 of 7 Code, AIM USS-Codabar	X'01'	Print bar code with no printer-generated check character.
		X'02'	Generate check character and print with bar code (Check character appears in HRI).
X'11'	Code 128, AIM USS-128	X'02'	Generate check character and print with bar code.
		X'03'	Generate check character and print with bar code that supports UCC/EAN 128.
X'16	EAN 2 Digit Add-on	X'00'	Print the 2 digit add-on (bar/space pattern and HRI).
X'17'	EAN 5 Digit Add-on	X'00'	Print the 5 digit add-on (bar/space pattern and HRI).

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Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'18'	POSTNET		USPS Specification
		X'00'	Print 5 digit POSTNET 'Zip Code' bar code with leading frame bar and trailing correction digit and frame.
		X'01'	Print 9 digit POSTNET 'Zip + 4' bar code with leading frame bar and trailing correction digit and frame.
		X'02'	Print 11 digit POSTNET 'ABC' bar code with leading frame bar and trailing correction digit and frame.
		X'03'	Print variable length data POSTNET bar code with leading frame bar and trailing correction digit and frame. Data length checking is not performed with modifier X'03'.
		X'04'	Print PLANET bar code symbology.
X'1A'	RM4SCC (Royal Mail 4 State Customer Code)	X'00'	Variable Length Data. Printer will generate Start bit, Checksum Character and Stop bit. Checksum algorithm is performed on the data characters only. User is responsible for 2 mm quiet zone (all around) and proper sequencing of the Postal Code data (including International Prefix, Outward Code, Inward Code and Delivery Point Suffix).
X'1A'	RM4SCC (Dutch KIX Postal Bar Code)	X'01'	Present a RM4SCC bar code symbol with NO Start bit, NO Checksum Character and NO Stop bit. Checksum algorithm is performed on the data characters only. User is responsible for 2 mm quiet zone (all around) and proper sequencing of the Postal Code data (including International Prefix, Outward Code, Inward Code and Delivery Point Suffix).

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Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'1B'	Japan Postal Bar Code	X'00'	Present a Japan Postal Bar Code symbol with a generated start character, checksum character and stop character.
		X'01'	Present a Japan Postal Bar Code symbol directly from the bar code data.
X'1C'	Data Matrix 2D	X'00'	Present a Data Matrix Bar Code symbol.
X'1D'	MaxiCode 2D	X'00'	Present a MaxiCode Bar Code symbol.
X'1E'	PDF417 2D	X'00'	Present a "full" PDF417 Bar Code symbol.
		X'01'	Present a "truncated" PDF417 Bar Code symbol.

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Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'1F'	Australia Post	X'01'	Standard Customer Bar Code (Format Code 11) - An 8 digit number representing the Sorting Code.
		X'02'	Customer Bar Code 2 using Table N (Format Code 59) An 8 digit number representing the Sorting Code, followed by up to 8 numeric digits representing the Customer Information.
		X'03'	Customer Bar Code 2 using Table C (Format Code 59) An 8 digit number representing the Sorting Code, followed by up to 5 characters (A-Z, az, 0-9, space, #) representing the Customer Information.
		X'04'	Customer Bar Code 2 using proprietary encoding (Format Code 59) - An 8 digit number representing the Sorting Code, followed by up to 16 numeric digits (0-3) representing the Customer Information. Each of the 16 digits specify one of the 4 types of bar code.
		X'05'	Customer Bar Code 3 using Table N (Format Code 62) An 8 digit number representing the Sorting Code, followed by up to 15 numeric digits representing the Customer Information.
		X'06'	Customer Bar Code 3 using Table C (Format Code 62) An 8 digit number representing the Sorting Code, followed by up to 10 characters (A-Z, a-z, 0-9, space, #) representing the Customer Information.
		X'07'	Customer Bar Code 3 using proprietary encoding (Format Code 62) - An 8 digit number representing the Sorting Code, followed by up to 31 numeric digits (0-3) representing the Customer Information. Each of the 31 digits specify one of the 4 types of bar code.
		X'08'	Reply Paid Bar Code (Format Code 45) - An 8 digit number representing the Sorting Code.

Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'20'	QR Code 2D	X'02'	Present a model 2 QR Code bar code symbol.
X'21'	Code 93	X'02'	Present a Code 93 bar code symbol.
X'22'	USPS Four State		USPS Specification
		X'00'	Present a USPS Four-State bar code symbol with no Routing ZIP Code. The input data for this bar code symbol must be 20 numeric digits.
		X'01'	Present a USPS Four-State bar code symbol with a 5-digit Routing ZIP Code. The input data for this bar code symbol must be 25 numeric digits. The valid values for the Routing Zip Code are 00000-99999.
		X'02'	Present a USPS Four-State bar code symbol with a 9-digit Routing ZIP Code. The input data for this bar code symbol must be 29 numeric digits. The valid values for the Routing Zip Code are 000000000- 999999999.
		X'03'	Present a USPS Four-State bar code symbol with an 11 digit Routing ZIP Code. The input data for this bar code symbol must be 31 numeric digits. The valid values for the Routing Zip Code are 00000000000- 99999999999.

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Write Bar Code

Offset	Range	Meaning	Error Code
0		FLAGS	
	Bit 0	HRI PRINTING (Not supported for postal bar code types)	
	0	Print HRI	X'0410..0 0'
	1	No HRI	
	Bits 1-2	HRI LOCATION	
	00	Printer Default (Below symbol)	
	01	Below symbol (Except UPC/EAN with 2 or 5 digit add-on)	
	10	Above symbol (UPC/EAN with 2 or 5 digit add-on only)	
	Bit 3	START/STOP HRI for 3 of 9 Code (Asterisk)	
	0	Do not print HRI for 3 of 9 Start/Stop pattern	
	1	Print HRI for 3 of 9 Start/Stop pattern	
	Bit 4	CODE PAGE TYPE (Ignore)	
	Bit 5	BAR CODE SUPPRESSION	
	0	Present the bar code symbol	
	1	Suppress presentation of the bar code symbol	
	Bit 6		
	Bit 7		
1-2	X'0001' - X'7FFF'	X COORDINATE of the symbol ORIGIN See "Notation Conventions", IPDS Technical Reference 1.	X'040A.. 00'
3-4	X'0001' - X'7FFF'	Y COORDINATE of the symbol ORIGIN See "Notation Conventions", IPDS Technical Reference 1.	X'040A.. 00'

Offset	Range	Meaning	Error Code
5-End		DATA to be bar encoded	X'040C..00'

7. Overlay Command Set

Overlay Function Set Commands

Name	Command	Sub-command	Where to Look
Begin Overlay	X'D6DF'		Intelligent Printer Data Stream Reference
Deactivate Overlay	X'D6EF'		Intelligent Printer Data Stream Reference
Include Overlay	X'D67D'		Intelligent Printer Data Stream Reference

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8. Page Segment Command Set

Page Segment Function Set Commands

Name	Command	Sub-command	Where to Look
Begin Page Segment	X'D65F'		Intelligent Printer Data Stream Reference
Deactivate Page Segment	X'D66F'		Intelligent Printer Data Stream Reference
Include Page Segment	X'D67F'		Intelligent Printer Data Stream Reference

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9. Object Container Command Set

Object Container Function Set Commands

Name	Command	Sub-command	Where to Look
Write Object Container Control	X'D63C'		Intelligent Printer Data Stream Reference
Write Object Container	X'D64C'		Intelligent Printer Data Stream Reference
Deactivate Data-Object-Font	X'D65B'		Intelligent Printer Data Stream Reference
Deactivate Data-Object-Resource	X'D65C'		Intelligent Printer Data Stream Reference
Data-Object-Resource Equivalence	X'D66C'		Intelligent Printer Data Stream Reference
Include Data-Object	X'D67C'		Intelligent Printer Data Stream Reference

⬇ **Note**

- For specific details on the Object Container Command Set, see the Intelligent Printer Data Stream Reference, S544-3417.

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10. Loaded Font Command Set

Loaded Font Function Set Commands

Name	Command	Sub-command	Where to Look
Load Code Page	X'D61B'		p.207 "Load Code Page"
Load Code Page Control	X'D61A'		p.208 "Load Code Page Control"
Load Font	X'D62F'		p.210 "Load Font"
Load Font Character Set Control	X'D619'		p.212 "Load Font Character Set Control"
Load Font Control	X'D61F'		p.213 "Load Font Control"
Load Font Index	X'D60F'		p.218 "Load Font Index"

Load Code Page

This command assigns each code point of a code page to a specific Graphic Character Global ID (GCGID). One or more Load Code Page (LCP) commands follow the Load Code Page Control command.

A sequence of LCP commands are used to transmit the entire code page. This sequence is initiated by the first LCP command that contains data and terminates with an End command. Entries may be split across LCP commands on any byte boundary and are restricted in size by the standard IPDS 32767 byte command length limit.

Offset	Range	Meaning	Error Code
0-7	(8 Bytes)	GRAPHIC CHARACTER GLOBAL ID	

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Offset	Range	Meaning	Error Code
8	Bit 0: 0/1	PROCESSING FLAGS	
	Bit 1: 0/1	Defined/Undefined	
	Bit 2: 0/1	Defined/Undefined	
	Bits 3-7	Incrementing/Nonincrementing Reserved	
9-n		CODE POINT	X'02B0..07'

Load Code Page Control

This command describes a code page resource which will be used to carry code page data. The Load Code Page Control (LCPC) command is followed by one or more Load Code Page (LCP) commands that specify the code page data.

The LCPC command is valid only in Home State and causes a transition to Code Page State. Code Page State ends when the printer receives the End command following receipt of at least one LCP command.

Offset	Range	Meaning	Error Code
0-1	X'0001' - X'7EFF'	CODE PAGE HOST ASSIGNED ID	X'02B0..00' X'02B0..01'
2-3		ENCODING SCHEME	X'02B0..02'
	Bits 0-3: 0000	Reserved	
		Number of Bytes	
	Bits 4-7: 0001	Fixed Single-byte	
	Bits 4-7: 0010	Fixed Double-byte	
	Bits 8-15: 00000000	Reserved	

Offset	Range	Meaning	Error Code
4-7	X'0000000 0A'- X'FFFFFFFF'	BYTE COUNT for subsequent LCP commands	X'02B0..0 4' X'02B0..0 5'
8-9	X'0000'	Reserved	
10-n		VARIABLE SPACE CODE POINT	
	X'nn'	SBCS	
	X'nnnn'	DBCS	
n+1 to n +2		GCSGID	
	X'0000'	No Value Supplied	
	X'0001' - X'FFFE'	Specific GCSGID	
	X'FFFF'	Use Default	
n+3 to n +4	X'0001' - X'FFFE'	CPGID Specific CPGID	
n+5 to n +12		GCGID	
	X'nnnnnnn nnnnnnnnn '	Default GCGID	

Offset	Range	Meaning	Error Code
n+13		GCGID PROCESSING FLAGS	
	Bit 0: 0	Defined	
	Bit 0: 1	Undefined	
	Bit 1: 0	Printing	
	Bit 1: 1	Nonprinting	
	Bit 2: 0	Incrementing	
	Bit 2: 1	Nonincrementing	
	Bit 3: 0	Reserved	
	Bit 4: 0	Retired	
	Bit 4: 1	Retired	
	Bit 5 - 7: 0000	Reserved	

↓Note

- If the code point specified in VARIABLE SPACE CODE POINT is not contained in the associated font character set, the printer will use a character increment of 333 relative units for typographic and proportionally spaced fonts and 600 relative units for fixed pitch, uniform character increment fonts.

- GCSGID/CPGID will be used for CMAP matching (DBCS), in all other instances they will be ignored.

Load Font

LF1 Format

When downloading a fully described font (LF1 format), the Load Font (LF) carries a series of character raster pattern bit strings. Consecutive Load Font commands are supported for downloading the LF1 font character patterns.

Offset	Range	Meaning	Error Code
0-n	Any Value in conformance with LFC Font Byte Count	FONT DATA in LF1 FORMAT (Character Patterns)	X'022E..02' X'0232..02'

LF3 Format

When downloading a font character set (LF3 format), the LF consists of a character ID map followed by zero or more (technology specific) Adobe Type-1 PFB objects. Consecutive LF commands are supported for downloading the LF3 font data.

Character ID Map

Offset	Range	Meaning	Error Code
0	X'02'	IBM CHARACTER ID FORMAT (IBM Registered EBCDIC GCGID)	
1	X'03' X'04'	TECHNOLOGY SPECIFIC CHARACTER ID FORMAT Font-specific ASCII Character name used with Type-1 PFB fonts ASCII numeric Glyph ID (used with Adobe Composite fonts) ASCII numeric Glyph ID (used with Adobe Composite fonts)	
Zero of more entries in the following format			
+0-7		IBM CHARACTER ID (GCGID)	X'02B1..04'
+8-11		OFFSET into the following list of Adobe Type-1 Character ID entries (each GCGID maps to exactly one Adobe Type-1 Character ID)	
Zero or more Adobe Type-1 Character ID entries in the following			
++0	X'02'-X'80'	LENGTH of Adobe Type-1 Character ID entry (including this field)	X'02B1..03'
+1-n		ADOBE Type-1 CHARACTER ID	

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Technology Specific Font Objects

The technology specific LF3 font object supported is a form of Adobe Type-1 PFB file. Each PFB object contains the following information.

Offset	Range	Meaning	Error Code
0-3	X'0000000 0A' - X'FFFFFFF F'	LENGTH of Adobe Type-1 PFB file (including this field)	X'02B1..0 8'
4-7		CHECKSUM	X'02B1..0 9'
8-9	X'0002' - X'FFFF'	LENGTH of Adobe PFB object NAME	X'02B1..0 A
10-n		Adobe PFB Object NAME	
(n+1)-z		OBJECT DATA for Adobe Type-1 PFB fonts (PFB file)	

Load Font Character Set Control

This command provides control information for each font character set that the host downloads to the printer. The command is only used for LF-3 type coded fonts. The LFCSC command is followed by one or more Load Font commands that contain the actual font character set information. This command is valid only in home state and causes a transition to font state. Font state ends when the printer receives the End command following receipt of at least one LF command.

Offset	Range	Meaning	Error Code
0-1	X'0001' - X'7EFF'	FONT CHARACTER SET HAID	X'02B0..0 A' X'02B0..0 B'
2-3	X'0000'	Reserved	
4		PATTERN TECHNOLOGY ID	
	X'1F'	Type 1 PFB	
5	X'00'	Adobe PFB Object NAME	

Offset	Range	Meaning	Error Code
6		INTENDED USE FLAGS	X'02B2..04'
	Bit 0: 0/1	Not intended for MICR printing/Intended for MICR printing (If MICR Installed)	X'02B2..01'
	Bit 1: 0/1	This is NOT a FCS extension/This IS a FCS extension	X'02B2..02'
	Bits 2-7: 000000	Reserved	
7-10	X'00000002' - X'FFFFFFFF'	NUMBER of BYTES in the LOAD FONT COMMANDS	X'022E..02' X'0232..02' X'02B0..0E'
11-14	X'00000002' - X'FFFFFFFF'	NUMBER of BYTES in the CHARACTER ID MAP	X'02B0..0F'
15-16	X'nnnn'	NUMBER of GCGIDs in the CHARACTER ID MAP	
17-18		GCSGID	
	X'0000'	No Value Supplied	
	X'0001' - X'FFFE'	Specific GCSGID	
	X'FFFF'	Use Default	
19-20		FGID	
	X'0001' - X'FFFE'	Specific FGID	

Load Font Control

This command is 40 + (8 × n) bytes long, where n (4090 max) is the number of font characters that have associated raster patterns. The command contains font id, overall font characteristics, and the information needed to parse the font raster patterns. There is only one Load Font Control command for

each font or font section. This command can only be issued in Home State and causes a transition to Font State.

Offset	Range		Meaning	Error Code
0-1	X'0001'-X'7EFF'		FONT HOST ASSIGNED ID	X'0218..02' X'0239..02'
2			SECTION ID	X'0243..02'
	X'00'		Single-byte fonts	
	X'41'-X'FE'		Double-byte font sections	
3	X'00'		Reserved (Font-index Format)	X'0221..02'
4	X'05'		Pattern Data Format (bounded box)	X'0222..02'
5			FONT TYPE BITS	X'0223..02'
	Bits 0-1: 00		Reserved	
	Bits 2-3: 01/10		FONT TYPE: Single-byte/Double-byte	
	Bits 4-5: 00		Reserved	
	Bit 6: 1/0		CHARACTER BOX SIZE: Uniform size (see bytes 6-7)/ Individual size (see bytes 40-End)	
	Bit 7: 0		Reserved	
6-7	X'0001' - X'7FFF'		UNIFORM or MAXIMUM CHARACTER BOX X SIZE	X'0226..02'
8-9	X'0001' - X'7FFF'		UNIFORM or MAXIMUM CHARACTER BOX Y SIZE	X'0227..02'

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Offset	Range	Meaning	Error Code
10		UNIT BASE for L-units	X'021B.. 02'
	X'00'	Ten in. (fixed metric technology)	
	X'02'	Relative units (relative metric technology)	
11	X'00'	Reserved	
12-13		L-units per UNIT BASE in the X direction Byte 10 = X'02'	X'022A.. 02'
	X'03E8'	1000 Byte 10 = X'00'	
	X'0960'	2400 (240 DPI)	
	X'0BB8'	3000 (300 DPI)	
	X'1770'	6000 (600 DPI)	
14-15		L-units per UNIT BASE in the Y direction Byte 10 = X'02'	X'022B.. 02'
	X'03E8'	1000 Byte 10 = X'00'	
	X'0960'	2400 (240 DPI)	
	X'0BB8'	3000 (300 DPI)	
	X'1770'	6000 (600 DPI)	
16-17	X'0000'	Reserved	
18-20	X'000001' - X'7FFFFF'	FONT BYTE COUNT	X'021C.. 02'
21		CHARACTER DATA ALIGNMENT	X'022D.. 02'
	X'01'	Starting address 1 byte aligned	
	X'04'	Starting address 4 byte aligned	
	X'08'	Starting address 8 byte aligned	
22-23	X'nnnn'	GCSGID (ignored)	

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Offset	Range	Meaning	Error Code
24-25	X'nnnn'	CPGID (ignored)	
26	X'00'	UNIT BASE for PIXEL-Units Ten in.	X'0287..02'
27	X'00'	Reserved	
28-29		PIXEL-Units per UNIT BASE in the X direction (only applicable if byte 10 = x'02')	X'0288..02'
	X'0960'	2400 Units per 10 in. (240 dpi)	
	X'0BB8'	3000 Units per 10 in. (300 dpi)	
	X'1770'	6000 Units per 10 in. (600 dpi)	
30-31		PIXEL-Units per UNIT BASE in the Y direction (only applicable if byte 10 = x'02')	X'0289..02'
	X'0960'	2400 Units per 10 in. (240 dpi)	
	X'0BB8'	3000 Units per 10 in. (300 dpi)	
	X'1770'	6000 Units per 10 in. (600 dpi)	
32-33	X'0001' - X'7FFF'	RELATIVE METRIC MULTIPLYING FACTOR	X'028A..02'
34-35	X'nnnn'	FGID (ignored)	
36		STAGEABILITY	X'0220..02'
	X'01'	Font is not stageable (retired)	
37	Bit 0: 0/1	INTENDED USE FLAGS: Not intended for MICR printing/ Intended for MICR printing (If MICR Installed)	
	Bits 1-7: 0000000	Reserved	
38-39	X'nnnn'	Font width (ignored)	
40-n		Zero or more CHARACTER PATTERN DESCRIPTORS in the following format	

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Offset	Range	Meaning	Error Code
+ 0-1 bytes	X'0000' - X'7FFF'	CHARACTER BOX X SIZE	X'0226..02'
+ 2-3 bytes	X'0000' - X'7FFF'	CHARACTER BOX Y SIZE	X'0227..02'
+ 4-7 bytes	X'00000000' - X'007FFFFE'	CHARACTER PATTERN ADDRESS	X'023E..02'

Load Font Index

This command is 32 + (256 × 16) (the (256 × 16) byte field is not always required) bytes long. It contains general information needed to print the patterns and a description of the characteristics of each of the 256 possible code points. Each font can have from one to four associated font indices.

Each index is loaded by a separate Load Font Index command. This command can only be issued in Home State.

Offset	Range	Meaning	Error Code
0-1	X'0001'- X'7EFF'	FONT HOST ASSIGNED ID (HAID)	X'0218..0 2'
2		SECTION ID	X'0243..0 2'
	X'00'	Single byte	
	X'41'-X'FE'	Double-byte section	
3		FLAGS	
	Bit 0: 0/1	VARIABLE SPACE: Disabled/Enabled	
	Bits 1-7: 0000000	Reserved	
4-5		FONT INLINE SEQUENCE	X'0240..0 2'
	X'0000'	0 degrees	X'0246..0 2'
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
6-7	X'0000'	Reserved	
8-9	X'8000' - X'7FFF'	UNIFORM or MAXIMUM BASELINE OFFSET	X'023C.. 02'
10-11	X'8000' - X'7FFF'	UNIFORM or MAXIMUM CHARACTER INCREMENT	X'023C.. 02'
12-13	X'0000'	Reserved	

Offset	Range	Meaning	Error Code
14-15	X'0000' - X'7FFF'	MAXIMUM BASELINE EXTENT	
16		ORIENTATION FLAGS	
	Bits 0-4: 00000	Reserved	
	Bit 5: 1/0	UNIFORM A-SPACE: Bytes 18, 19 specify uniform value/ Bytes 18, 19 specify minimum value A-space for each character is in the character index entry	
	Bit 6: 1/0	UNIFORM BASELINE OFFSET: Bytes 8, 9 specify uniform baseline offset/Bytes 8, 9 specify minimum baseline offset (Baseline offset for each character is in the character index entry)	
	Bit 7: 1/0	UNIFORM CHARACTER INCREMENT: Bytes 10, 11 specify uniform character increment/Bytes 10, 11 specify minimum character increment (Character increment for each character is in the character index entry)	
17	X'00'	Reserved	
18-19	X'8000' - X'7FFF'	UNIFORM or MINIMUM A-SPACE	X'023C.. 02'
20-21	X'0000' - X'FFFF'		
22-23	X'8000' - X'7FFF'		
24-25	X'0000'	RECOMMENDED UNDERSCORE WIDTH	X'023C.. 02'
	X'0001' - X'7FFF'	No recommendation Underscore width in L-units	
26-27	X'8000' - X'7FFF'	RECOMMENDED UNDERSCORE POSITION (L-units)	
28-31	X'00000000'	Reserved	

Offset	Range	Meaning	Error Code
32-4127			
+ 0-1 bytes		CHARACTER FLAGS	
	X'0000'	Defined, printing, incrementing	
	X'2000'	Defined, printing, non-incrementing	
	X'4000'	Defined, non-printing, incrementing	
	X'6000'	Defined, non-printing, non-incrementing	
	X'8000'	Undefined, printing, incrementing	
	X'A000'	Undefined, printing, non-incrementing	
	X'C000'	Undefined, non-printing, incrementing	X'023C..02'
	X'E000'	Undefined, non-printing, non-incrementing	X'023C..02'
+ 2-3 bytes	X'0000' - X'xxxx'	PATTERN INDEX	
+ 4-5 bytes	X'8000' - X'7FFF'	CHARACTER INCREMENT	
+ 6-7 bytes	X'8000' - X'7FFF'	A-SPACE	X'023C..02'
+ 8-13 bytes	X'000000 000000'	Reserved	
+ 14-15 bytes	X'8000' - X'7FFF'	BASELINE OFFSET	

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11. Appendix

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Main Software Products

Product name	Names in the text
DeskTopBinder Lite and DeskTopBinder Professional [*1]	DeskTopBinder
Remote Communication Gate S Pro for @Remote Enterprise [*2] and Remote Communication Gate S [*2]	Remote Communication Gate S

*1   This product is no longer sold.

*2   Sold separately.

1. Getting Started

This chapter describes the precautions to take when using the printer's security features and how to configure the administrator settings.

Before Configuring the Security Function Settings

⭐ Important

- If the security settings are not configured, the data in the printer is vulnerable to attack.

1. To prevent this printer being stolen or willfully damaged, etc., install it in a secure location.

2. Purchasers of this printer must make sure that people who use it do so appropriately, in accordance with operations determined by the machine administrator and supervisor. If the administrator or supervisor does not make the required security settings, there is a risk of security breaches by users.

3. Before setting this printer's security features and to ensure appropriate operation by users, administrators must read the Security Guide completely and thoroughly, paying particular attention to the section entitled "Before Configuring the Security Function Settings".

4. Administrators must inform users regarding proper usage of the security functions.

5. Administrators should routinely examine the printer's logs to check for irregular and unusual events.

6. If this printer is connected to a network, its environment must be protected by a firewall or similar.

7. For protection of data during the communication stage, apply the printer's communication security functions and connect it to devices that support security functions such as encrypted communication.

Before Using This Printer

This section explains how to enable encryption of transmitted data and configure the administrator account. If you want a high level of security, make the following setting before using the printer.

1. **Turn the printer on.**

2. **Press the [User Tools] key.**

CQT607
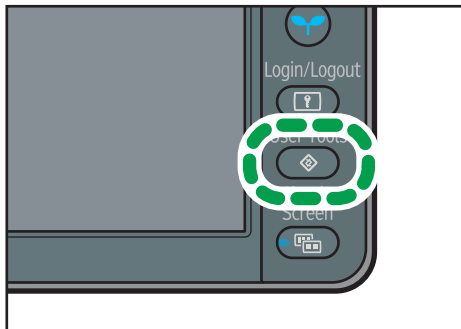
3. **Press [System Settings].**

4. **Press [Interface Settings].**

5. **Press [Network].**

6. **Specify IPv4 Address.**

   For details on how to specify the IPv4 address, see "Ethernet Configuration", Operating Instructions.

7. **Press [Email Settings] in [System Settings].**

8. **Press [Administrator's Email Address], and then specify the e-mail address of the administrator of this printer.**

9. **Create and install the device certificate from the control panel.**

   For information on how to install the device certificate, see p.95 "Protecting the Communication Path via a Device Certificate".

   As the e-mail address for the device certificate, enter the address specified in Step 8.

10. **Change the administrator's user name and password.**

    For details about specifying administrators' user names and passwords, see p.14 "Registering and Changing Administrators".

11. **Connect this printer to the general usage network environment.**

Administrators

Administrators manage user access to the printer and various other important functions and settings.

When an administrator controls limited access and settings, first select the printer's administrator and enable the authentication function before using the printer. When the authentication function is enabled, the login user name and login password are required in order to use the printer. The role of administrator for this printer is divided into four categories according to their function: user administrator, machine administrator, network administrator, and file administrator. Sharing administrator tasks eases the burden on individual administrators while at the same time limiting unauthorized operations by an administrator. Multiple administrator roles can be assigned to one administrator and one role can also be shared by more than one administrator. A supervisor can also be set up, who can then change the administrators' passwords.

Administrators cannot use functions such as printing. To use these functions, the administrator must be authenticated as the user.

For instructions on registering the administrator, see p.14 "Registering and Changing Administrators", and for instructions on changing the administrator's password, see p.21 "Supervisor". For details on Users, see p.25 "Users".

⭐ Important

- If user authentication is not possible because of a problem with the hard disk or network, you can use the printer by accessing it using administrator authentication and disabling user authentication. Do this if, for instance, you need to use the printer urgently.

Configuring Administrator Authentication

Administrator authentication requires the login user name and password for verifying administrators attempting to specify the printer's settings or access them from a network. When registering an administrator, you cannot use a login user name already registered in the Address Book. Administrators are handled differently from the users registered in the Address Book. Windows authentication, LDAP authentication and Integration Server Authentication are not performed for an administrator, so an administrator can log in even if the server is unreachable due to a network problem. Each administrator is identified by a login user name. One person can act as more than one type of administrator if multiple administrator privileges are granted to a single login user name. For instructions on registering the administrator, see p.14 "Registering and Changing Administrators".

You can specify the login user name, login password, and encryption password for each administrator. The encryption password is used for encrypting data transmitted via SNMPv3. It is also used by applications such as SmartDeviceMonitor for Admin that use SNMPv3. Administrators are limited to managing the printer's settings and controlling user access, so they cannot use functions such as printing. To use these functions, the administrator must register as a user in the Address Book and then be authenticated as the user. Specify administrator authentication, and then specify user authentication. For details about specifying authentication, see p.25 "Configuring User Authentication".

Roles of each administrator
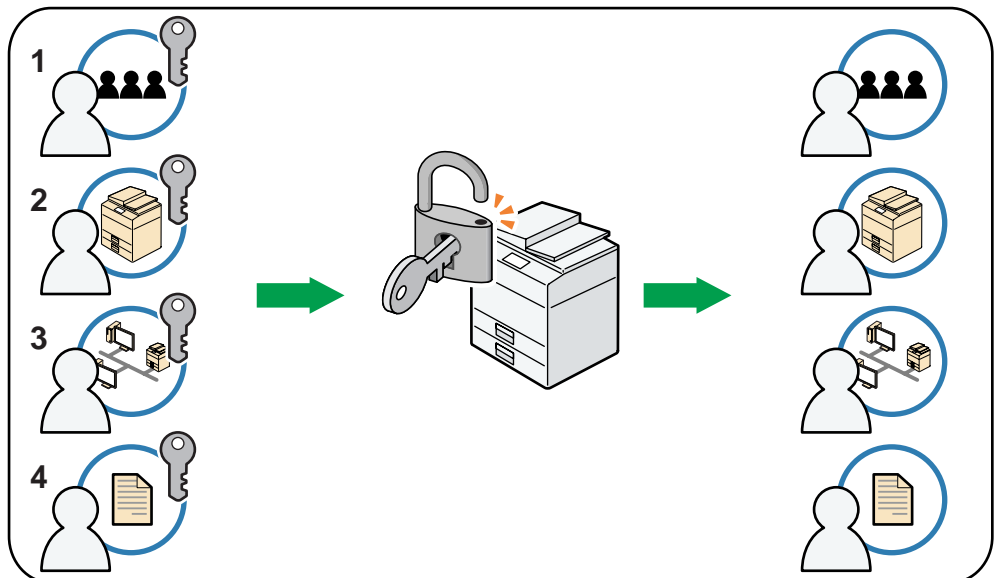
CJC009

1. **User administrator**

   This is the administrator who manages personal information in the Address Book.

   A user administrator can register/delete users in the Address Book or change users' personal information.

   Users registered in the Address Book can also change and delete their own information.

1

If any of the users forget their password, the user administrator can delete it and create a new one, allowing the user to access the printer again.

2. **Machine administrator**

This is the administrator who mainly manages the printer's default settings. You can set the printer so that the default for each function can only be specified by the machine administrator. By making this setting, you can prevent unauthorized people from changing the settings and allow the printer to be used securely by its many users.

3. **Network administrator**

This is the administrator who manages the network settings. You can set the printer so that network settings such as the IP address and settings for sending and receiving e-mail can only be specified by the network administrator.

By making this setting, you can prevent unauthorized users from changing the settings and disabling the printer, and thus ensure correct network operation.

4. **File administrator**

This administrator manages stored files and can specify and delete passwords for locked print files and other files.

⬇️**Note**

- Administrator authentication can also be specified via Web Image Monitor. For details, see Web Image Monitor Help.

- You can specify User Code Authentication without specifying administrator authentication.

Specifying Administrator Privileges

To specify administrator authentication, set "Administrator Authentication Management" to [On]. If this setting is enabled, administrators will be able to configure only settings allocated to them.

To log in as an administrator, use the default login user name and login password.

When you log in as an administrator, the default login user name is "admin". The password is not configured by default.

For details about logging in and logging out with administrator authentication, see p.18 "Administrator Login Method" and p.20 "Administrator Logout Method".

⭐**Important**

- If you have enabled "Administrator Authentication Management", make sure not to forget the administrator login user name and login password. If an administrator login user name or login password is forgotten, a new password must be specified using the supervisor's privilege. For details on supervisor privileges, see p.21 "Supervisor".

- Be sure not to forget the supervisor login user name and login password. If you do forget them, a service representative will have to return the printer to its default state. This will result in all data in the printer being lost. Charges may also apply to the service call.

1. **Press the [User Tools] key.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] three times.**

5. **Press [Administrator Authentication Management].**

6. **Press [User Management], [Machine Management], [Network Management], or [File Management] to select which settings to manage.**

7. **Press [On].**

8. **Select the settings to manage.**
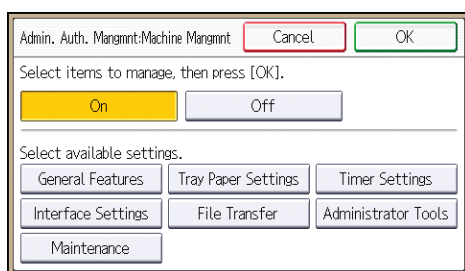
   The selected settings will be unavailable to users.

   The available settings (settings that can be made) differ for each administrator.

   To specify administrator authentication for more than one category, repeat steps 6 to 8.

9. **Press [OK].**

10. **Press the [User Tools] key.**

Registering and Changing Administrators

If administrator authentication has been specified, we recommend only one person take each administrator role.

The sharing of administrator tasks eases the burden on individual administrators while also limiting unauthorized operation by a single administrator. You can register up to four login user names (Administrators 1-4) to which you can grant administrator privileges.

For details about logging in and logging out with administrator authentication, see p.18 "Administrator Login Method" and p.20 "Administrator Logout Method".

1. **Log in as the administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] three times.**

1

5. **Press [Program/Change Administrator].**

6. **Press [Program/Change Administrator].**

7. **Select the number of the administrator whose user name and password you want to change.**
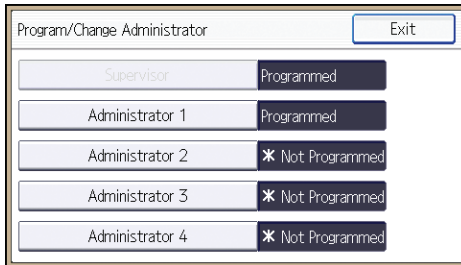
Program/Change Administrator	Exit
Supervisor	Programmed
Administrator 1	Programmed
Administrator 2	✳ Not Programmed
Administrator 3	✳ Not Programmed
Administrator 4	✳ Not Programmed

8. **Press [Change] for "Login User Name".**

9. **Enter the login user name, and then press [OK].**

10. **Press [Change] for "Login Password".**

11. **Enter the login password, and then press [OK].**

    Follow the password policy to make the login password more secure.

    For details about the password policy and how to specify it, see p.190 "Specifying the Extended Security Functions".

12. **Re-enter the login password for confirmation, and then press [OK].**

13. **Press [Change] for "Encryption Password".**

14. **Enter the encryption password, and then press [OK].**

15. **Re-enter the encryption password for confirmation, and then press [OK].**

16. **Press [OK], and then press [Exit].**

17. **Select a category so that administrator settings can be specified from [User Administrator], [Machine Administrator], [Network Administrator], and [File Administrator].**

18. **Select the number of the administrator and press [OK].**

Machine Administrator	Cancel	OK
Select item, then press [OK].		
Administrator 1	Administrator 2	
Administrator 3	Administrator 4	
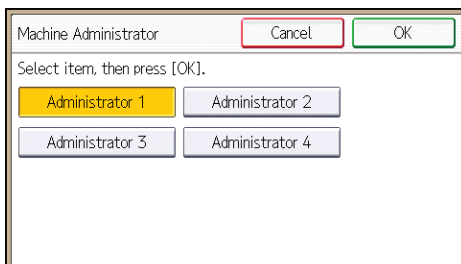
When assigning privileges to each administrator individually, specify administrator numbers in each category separately. For example, if you specify [Administrator 1] for [User Administrator], then specify [Administrator 2] for [Machine Administrator].

To combine the privileges of multiple administrators, assign multiple privileges to a single administrator number.

For example, if you want to combine user and machine administrator privileges for [Administrator 1], specify [Administrator 1] for both [User Administrator] and [Machine Administrator].

19. **Log out.**

⬇ Note

- For the characters that can be used for login user names and passwords, see p.16 "Usable characters for user names and passwords".

- An administrator's privileges can only be changed by an administrator with the relevant privileges.

- Administrator privileges cannot be revoked by any single administrator.

Usable characters for user names and passwords

The following characters can be used for login user names and passwords. Names and passwords are case sensitive.

- Upper case letters: A to Z (26 characters)

- Lower case letters: a to z (26 characters)

- Numbers: 0 to 9 (10 characters)

- Symbols: (space) ! " # $ % & ' ( ) * + , - . / : ; < = > ? @ [\ ] ^ _ ` { | } ~ (33 characters)

Login user name

- Cannot contain spaces, colons or quotation marks.

- Cannot be comprised of numbers only or cannot be left blank.

- Can be up to 32 characters long.

Login password

- The maximum password length for administrators and supervisors is 32 characters; for users it is 128 characters.

- Make passwords using a combination of capitals, small letters, numbers, and symbols. The more characters, the harder it is for others to guess.

- If the password's complexity and minimum length have been configured in [Password Policy] in [Extended Security], only passwords meeting the requirements can be specified. For details about specifying the password policy, see "Password Policy" in p.190 "Specifying the Extended Security Functions".

1

Using Web Image Monitor to Configure Administrator Authentication

Using Web Image Monitor, you can log in to the printer and change the administrator settings. For details about logging in and logging out with administrator authentication, see p.18 "Administrator Login Method" and p.20 "Administrator Logout Method".

1. **Log in as an administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [Administrator Authentication Management] or [Program/Change Administrator] under "Device Settings".**

4. **Change the settings as desired.**

5. **Log out.**

🔽 Note

- For details about Web Image Monitor, see Web Image Monitor Help.

Administrator Login Method

If administrator authentication has been specified, log in using an administrator's user name and password. Supervisors log in the same way.

Logging in Using the Control Panel

1. **Press the [User Tools] key.**

2. **Press the [Login/Logout] key.**
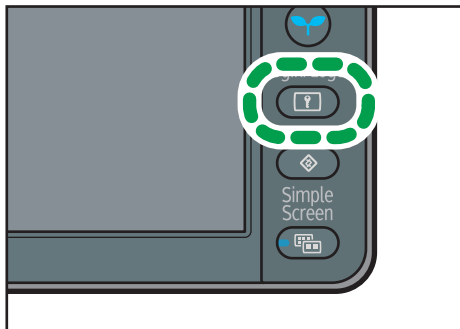
CQT693

The login screen appears.

3. **Press [Login].**

4. **Enter the login user name, and then press [OK].**

The default login name for administrators is "admin" and "supervisor" for supervisors.

5. **Enter the login password, and then press [OK].**

There is no preset default password for administrators or supervisors. Therefore, leave the password field blank and press [OK].

"Authenticating... Please wait." appears, followed by the screen for specifying the default.

⬇Note

- If user authentication has already been specified, a screen for authentication appears. To log in as an administrator, enter the administrator's login user name and login password.

- If you log in using administrator privilege, the name of the administrator logging in appears. When you log in with a user name that has multiple administrator privileges, one of the administrator privileges associated with that name is displayed.

- If you try to log in from an operating screen, "You do not have the privileges to use this function. You can only change setting(s) as an administrator." appears. Press the [User Tools] key to change the default.

Logging in Using Web Image Monitor

1. **Open a Web browser.**

2. **Enter "http://(the printer's IP address or host name)/" in the address bar.**

   When entering an IPv4 address, do not begin segments with zeros. For example: If the address is "192.168.001.010", you must enter it as "192.168.1.10" to connect to the printer.

   Enter the IPv6 address with brackets before and after, like this: [2001:db8::9abc].

3. **Click [Login].**

4. **Enter the login name and password of an administrator, and then click [Login].**

   The default login name for administrators is "admin" and that for supervisors is "supervisor". No login password is set up.

↓Note

- The Web browser might be configured to auto complete login dialog boxes by retaining user names and passwords. This function reduces security. To prevent the browser retaining user names and passwords, disable the browser's auto complete function.

Administrator Logout Method

If administrator authentication has been specified, be sure to log out after completing settings. Supervisors log out in the same way.

Logging out Using the Control Panel

1. **Press the [Login/Logout] key.**

2. **Press [Yes].**

🔽**Note**

- You can log out using the following procedures also.

    - Press the [Energy Saver] key.

Logging out Using Web Image Monitor

1. **Click [Logout] to log out.**

🔽**Note**

- Delete the cache memory in Web Image Monitor after logging out.

Supervisor

The supervisor can delete an administrator's password and specify a new one.

If any of the administrators forgets their password or if any of the administrators changes, the supervisor can assign a new password. If logged in using the supervisor's user name and password, you cannot use normal functions or specify defaults. The methods for logging in and out are the same as for administrators.

⭐**Important**

- The default login user name is "supervisor". No login password is set up. We recommend changing the login user name and login password.

- For the characters that can be used for login user names and passwords, see p.16 "Usable characters for user names and passwords".

- Be sure not to forget the supervisor login user name and login password. If you do forget them, a service representative will have to return the printer to its default state. This will result in all data in the printer being lost and the service call may not be free of charge.

⬇**Note**

- You cannot specify the same login user name for the supervisor and the administrators.

- Using Web Image Monitor, you can log in as the supervisor and delete an administrator's password or specify a new one.

Resetting the Administrator's Password

1. **Log in as the supervisor from the printer's control panel.**

   For details on how to log in, see p.18 "Administrator Login Method".

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] three times.**

5. **Press [Program/Change Administrator].**

6. **Press [Program/Change Administrator].**

7. **Select the administrator number you want to reset.**

Program/Change Administrator	Exit
Supervisor	Programmed
Administrator 1	Programmed
Administrator 2	Programmed
Administrator 3	Programmed
Administrator 4	Programmed
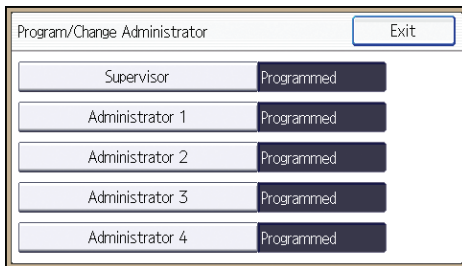
8. **Press [Change] for "Login Password".**

9. **Enter the login password, and then press [OK].**

10. **Re-enter the login password for confirmation, and then press [OK].**

11. **Press [OK].**

12. **Log out.**

⬇ **Note**

- The supervisor can change the administrators' login passwords but not their login user names.

Changing the Supervisor

This section describes how to change the supervisor's login name and password.

To do this, you must enable the user administrator's privileges through the settings under "Administrator Authentication Management". For details, see p.13 "Specifying Administrator Privileges".

1. **Log in as the supervisor from the printer's control panel.**

   For details on how to log in, see p.18 "Administrator Login Method".

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] three times.**

5. **Press [Program/Change Administrator].**

6. **Press [Program/Change Administrator].**

7. **Press [Supervisor].**

8. **Press [Change] for "Login User Name".**

9. **Enter the login user name, and then press [OK].**

10. **Press [Change] for "Login Password".**

11. **Enter the login password, and then press [OK].**

12. **Re-enter the login password for confirmation, and then press [OK].**

13. **Press [OK].**

14. **Log out.**

2. Configuring User Authentication

This chapter describes how to specify user authentication and explains the functions that are enabled by user authentication.

Users

A user performs normal operations on the printer, such as printing. Users are managed using the personal information in the printer's Address Book, and can use only the functions they are permitted to access by administrators. By enabling user authentication, you can allow only people registered in the Address Book to use the printer. Users can be managed in the Address Book by the user administrator. For details about administrator, see p.11 "Administrators". For details about user registration, see "Registering User Information", Operating Instructions or Web Image Monitor Help.

About User Authentication

User authentication is a system requiring the login user name and password for verifying users to operate the printer or access the printer over the network.
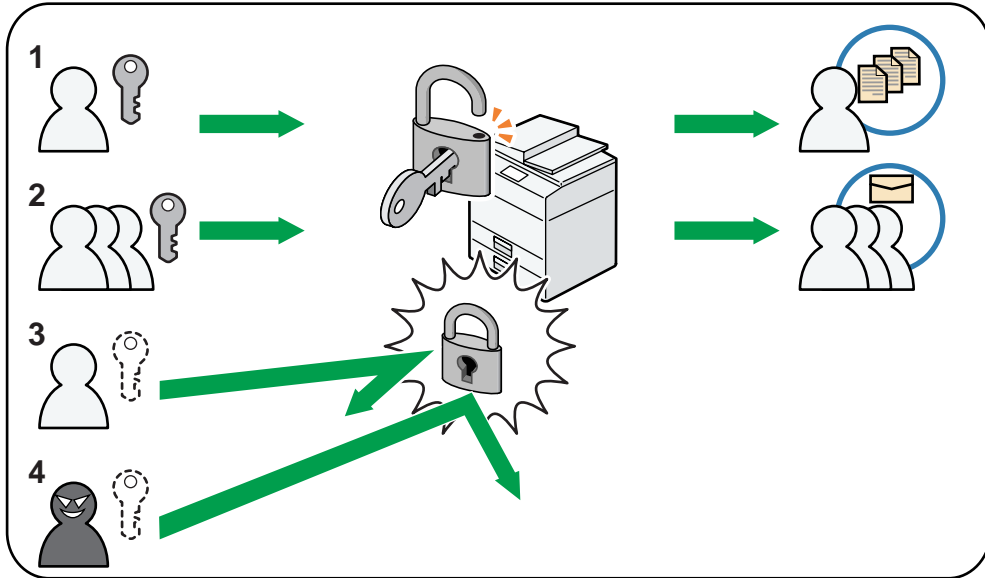
CJC010

1. **User**

   A user performs normal operations on the printer including printing.

2. **Group**

   A group performs normal operations on the printer including printing.

3. **Unauthorized user**

4. **Unauthorized access**

Configuring User Authentication

To control users' access to the printer, perform user authentication using login user names and passwords. There are five types of user authentication methods: User Code authentication, Basic authentication, Windows authentication, LDAP authentication, and Integration Server authentication. To use user authentication, select an authentication method on the control panel, and then make the required settings for the authentication. The settings depend on the authentication method. Specify administrator authentication, and then specify user authentication.

⭐**Important**

* If user authentication is not possible because of a problem with the hard disk or network, you can use the printer by accessing it using administrator authentication and disabling user authentication. Do this if, for instance, you need to use the printer urgently.

User authentication configuration flow

Configuration procedure	Details
Configuring administrator authentication	p.13 "Specifying Administrator Privileges" p.14 "Registering and Changing Administrators"
Configuring user authentication	Specify user authentication. Five types of user authentication are available: • p.29 "User Code Authentication" • p.31 "Basic Authentication" • p.34 "Windows Authentication" • p.39 "LDAP Authentication" • p.43 "Integration Server Authentication"

⬇**Note**

* To specify Basic authentication, Windows authentication, LDAP authentication, or Integration Server authentication, you must first enable user administrator privileges in "Administrator Authentication Management".

* You can specify User Code authentication without specifying administrator authentication.

* User Code authentication is used for authenticating on the basis of a user code, and Basic authentication, Windows authentication, LDAP authentication, and Integration Server authentication are used for authenticating individual users.

* A user code account, that has no more than eight digits and is used for User Code authentication, can be carried over and used as a login user name even after the authentication method has switched from User Code authentication to Basic authentication, Windows authentication, LDAP

authentication, or Integration Server authentication. In this case, since the User Code authentication does not have a password, the login password is set as blank.

- When authentication switches to an external authentication method (Windows authentication, LDAP authentication, or Integration Server authentication), authentication will not occur, unless the external authentication device has the carried over user code account previously registered. However, the user code account will remain in the Address Book of the printer despite an authentication failure.

- From a security perspective, when switching from User Code authentication to another authentication method, we recommend that you delete accounts you are not going to use, or set up a login password. For details about deleting accounts, see "Deleting a registered name", Operating Instructions. For details about changing passwords, see p.32 "Specifying Login User Names and Passwords".

- You cannot use more than one authentication method at the same time.

- User authentication can also be specified via Web Image Monitor. For details, see Web Image Monitor Help.

- After turning the main power on, extended features may not appear in the user authentication items in the User Authentication Management menu. If this happens, wait a while and then open the User Authentication Management menu again.

User Code Authentication

This is an authentication method for limiting access to functions according to a user code. The same user code can be used by more than one user. For details about specifying user codes, see "Authentication Information", Operating Instructions.

For details about specifying the user code for the printer driver, see the printer driver Help.

Specifying User Code Authentication

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] three times.**

5. **Press [User Authentication Management].**

6. **Select [User Code Authentication], and then press [Authentication Info] next to it.**

   If you do not want to use user authentication management, select [Off].

7. **Press [Restrict Other Functions].**

8. **Select which of the printer's functions you want to limit.**

   If the function you want to select is not displayed, press [▼].

   The selected functions are subject to User Code authentication. User Code authentication is not applied to the functions not selected.

   For details about limiting available functions for individuals or groups, see p.57 "Limiting Available Functions".

   To enable printer job authentication, either deselect [PC Control] for "Restrict Other Functions" or select [Printer].

   If you do not want to specify printer job authentication, proceed to step 15.

9. **Press [OK].**

10. **Press [Printer Job Authentication].**

11. **Select the printer job authentication level.**

    For a description of the printer job authentication levels, see p.47 "Printer Job Authentication".

    If you select [Entire] or [Simple (All)], proceed to step 15.

    If you select [Simple (Limitation)], proceed to step 12.

12. **Press [Change Limitation Range].**

13. **Specify the range in which [Simple (Limitation)] is applied to "Printer Job Authentication".**

Pressing [▼] allows you to display all items.

You can specify the IPv4 address range to which this setting is applied, and whether or not to apply the setting to the parallel and USB interfaces.

14. **Press [Exit].**

15. **Press [OK].**

16. **Press [Exit].**

17. **Press [OK].**

18. **Press the [Login/Logout] key.**

A confirmation message appears.

If you press [Yes], you will be automatically logged out.

Basic Authentication

Specify this authentication method when using the printer's Address Book to authenticate each user. Using Basic authentication, you can not only manage the printer's available functions but also limit access to Stored Print files and to the personal data in the Address Book. Under Basic authentication, the administrator must specify the functions available to each user registered in the Address Book. For details about limitation of functions, see p.32 "Authentication Information Stored in the Address Book".

Specifying Basic Authentication

Before beginning to configure the printer, make sure that administrator authentication is properly configured under "Administrator Authentication Management".

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] three times.**

5. **Press [User Authentication Management].**

6. **Select [Basic Authentication], and then press [Authentication Info] next to it.**

   If you do not want to use user authentication management, select [Off].

7. **Press [Available Other Functions].**

8. **Select which of the printer's functions you want to permit.**

   If the function you want to select is not displayed, press [▼].

   The functions you select here become the default Basic Authentication settings that will be assigned to all new users of the Address Book.

   For details about specifying available functions for individuals or groups, see p.57 "Limiting Available Functions".

9. **Press [OK].**

10. **Press [Printer Job Authentication].**

11. **Select the printer job authentication level.**

    For a description of the printer job authentication levels, see p.47 "Printer Job Authentication".

    If you select [Entire] or [Simple (All)], proceed to step 15.

    If you select [Simple (Limitation)], proceed to step 12.

12. **Press [Change Limitation Range].**

13. Specify the range in which [Simple (Limitation)] is applied to "Printer Job Authentication".

Pressing [▼] allows you to display all items.

You can specify the IPv4 address range to which this setting is applied, and whether or not to apply the setting to the parallel and USB interfaces.

14. Press [Exit].

15. Press [OK].

16. Press [Exit].

17. Press [OK].

18. Press the [Login/Logout] key.

A confirmation message appears.

If you press [Yes], you will be automatically logged out.

Authentication Information Stored in the Address Book

If you have enabled user authentication, you can specify access limits and usage limits to the printer's functions for each user or group of users. Specify the necessary settings in the Address Book entry of each user. For details about limiting which functions of the printer are available, see p.57 "Limiting Available Functions".

Users must have a registered account in the Address Book in order to use the printer when user authentication is specified. For details about user registration, see "Registering names", Operating Instructions.

User authentication can also be specified via Web Image Monitor. For details, see Web Image Monitor Help.

Specifying Login User Names and Passwords

In "Address Book Management", specify the login user name and login password to be used for "User Authentication Management".

For the characters that can be used for login user names and passwords, see p.16 "Usable characters for user names and passwords".

1. **Log in as the user administrator from the printer's control panel.**

2. **Press [Address Book Mangmnt].**

3. **Press [Change].**

4. **Press [All Users].**

5. **Select the user.**
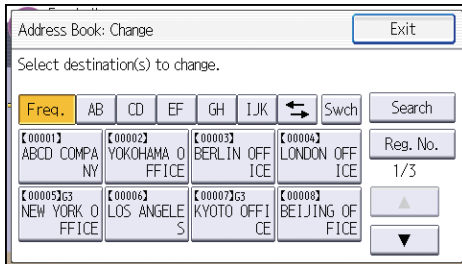
6. **Press [Auth. Info].**

7. **Press [Auth. Info at Login].**

8. **Press [Change] for "Login User Name".**

9. **Enter a login user name, and then press [OK].**

10. **Press [Change] for "Login Password".**

11. **Enter a login password, and then press [OK].**

12. **Re-enter the login password for confirmation, and then press [OK].**

13. **Press [OK].**

14. **Press [Exit].**

15. **Press [OK].**

16. **Log out.**

Windows Authentication

Specify this authentication when using the Windows domain controller to authenticate users who have their accounts on the directory server. Users cannot be authenticated if they do not have their accounts in the directory server. Under Windows authentication, you can specify the access limit for each group registered in the directory server. The Address Book stored in the directory server can be registered to the printer, enabling user authentication without first using the printer to register individual settings in the Address Book.

Windows authentication can be performed using one of two authentication methods: NTLM or Kerberos authentication. The operational requirements for both methods are listed below.

Operational requirements for NTLM authentication

To specify NTLM authentication, the following requirements must be met:

- This printer supports NTLMv1 authentication and NTLMv2 authentication.

- A domain controller has been set up in a designated domain.

- This function is supported by the operating systems listed below. To obtain user information when running Active Directory, use LDAP. If you are using LDAP, we recommend you use SSL to encrypt communication between the printer and the LDAP server. Encryption by SSL is possible only if the LDAP server supports TLSv1 or SSLv3.

  - Windows Server 2003/2003 R2

  - Windows Server 2008/2008 R2

Operational requirements for Kerberos authentication

To specify Kerberos authentication, the following requirements must be met:

- A domain controller must be set up in a designated domain.

- The operating system must support KDC (Key Distribution Center). To obtain user information when running Active Directory, use LDAP. If you are using LDAP, we recommend you use SSL to encrypt communication between the printer and the LDAP server. Encryption by SSL is possible only if the LDAP server supports TLSv1 or SSLv3. Compatible operating systems are listed below.

  - Windows Server 2003/2003 R2

  - Windows Server 2008/2008 R2

  To use Kerberos authentication under Windows Server 2008, Service Pack 2 or later must be installed.

- Transmission between the printer and the KDC server is encrypted if Kerberos authentication is enabled. For details about specifying encrypted transmission, see p.139 "Kerberos Authentication Encryption Setting".

⭐ **Important**

- During Windows Authentication, data registered in the directory server, such as the login user name, is automatically registered in the printer. If user information on the server is changed, information registered in the printer may be overwritten when authentication is performed.

- Users managed in other domains are subject to user authentication, but they cannot obtain items such as login user names.

- If you created a new user in the domain controller and selected "User must change password at next logon" at password configuration, first log on to the computer and change the password.

- If the authenticating server only supports NTLM when Kerberos authentication is selected on the printer, the authenticating method will automatically switch to NTLM.

⬇ **Note**

- For the characters that can be used for login user names and passwords, see p.16 "Usable characters for user names and passwords".

- The first time you access the printer, you can use the functions available to your group. If you are not registered in a group, you can use the functions available under "*Default Group". To limit which functions are available to which users, first make settings in advance in the Address Book.

- When accessing the printer subsequently, you can use all the functions available to your group and to you as an individual user.

- Users who are registered in multiple groups can use all the functions available to those groups.

- If the "Guest" account on the Windows server is enabled, even users not registered in the domain controller can be authenticated. When this account is enabled, users are registered in the Address Book and can use the functions available under "*Default Group".

- Under Windows Authentication, you can select whether or not to use secure sockets layer (SSL) authentication.

- To automatically register user information under Windows authentication, it is recommended that communication between the printer and domain controller be encrypted using SSL. To do this, you must create a server certificate for the domain controller. For details about creating a server certificate, see p.38 "Creating the Server Certificate".

- Under Windows Authentication, you do not have to create a server certificate unless you want to automatically register user information using SSL.

Specifying Windows Authentication

Before beginning to configure the printer, make sure that administrator authentication is properly configured under "Administrator Authentication Management".

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] three times.**

5. **Press [User Authentication Management].**

6. **Select [Windows Authentication], and then press [Authentication Info] next to it.**

   If you do not want to use user authentication management, select [Off].

7. **Press [Kerberos Authentication].**

   If you want to use NTLM authentication, proceed to step 8.

   If you want to use Kerberos authentication, proceed to step 9.

8. **Press [Domain Name], enter the name of the domain controller to be authenticated, and then press [OK]. Proceed to step 12.**

9. **Select [On], and then press [Realm Name].**

10. **Select Kerberos authentication realm.**
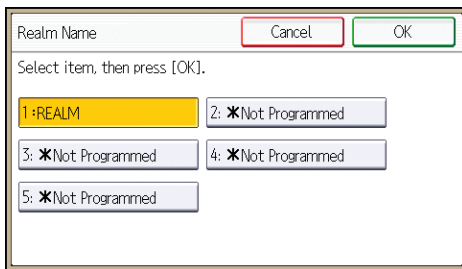
   To enable Kerberos authentication, a realm must be registered beforehand. The realm name must be registered in capital letters. For details about registering a realm, see "Programming the Realm", Operating Instructions.

   Up to 5 realms can be registered.

11. **Press [OK].**
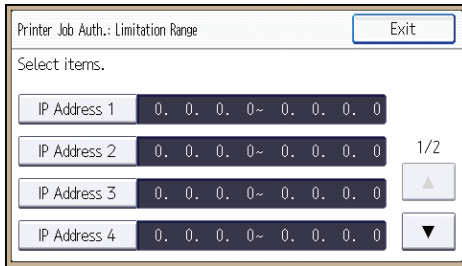
12. **Press [OK].**

13. **Press [Printer Job Authentication].**

14. **Select the printer job authentication level.**

   For a description of the printer job authentication levels, see p.47 "Printer Job Authentication".

   If you select [Entire] or [Simple (All)], proceed to step 18.

   If you select [Simple (Limitation)], proceed to step 15.

15. **Press [Change Limitation Range].**

16. **Specify the range in which [Simple (Limitation)] is applied to "Printer Job Authentication".**

Pressing [▼] allows you to display all items.

You can specify the IPv4 address range to which this setting is applied, and whether or not to apply the setting to the parallel and USB interfaces.

17. **Press [Exit].**

18. **Press [OK].**

19. **Press [Use Secure Connection (SSL)].**

20. **Press [On], and then press [OK].**

    If you are not using secure sockets layer (SSL) for authentication, press [Off].

    If you have not registered a global group, proceed to step 30.

    If you have registered a global group, proceed to step 21.

    If global groups have been registered under Windows server, you can limit the use of functions for each global group.

    You need to create global groups in the Windows server in advance and register in each group the users to be authenticated. You also need to register in the printer the functions available to the global group members. Create global groups in the printer by entering the names of the global groups registered in the Windows Server. (Keep in mind that group names are case sensitive.) Then specify the printer functions available to each group.

    If global groups are not specified, users can use the available functions specified in [*Default Group]. If global groups are specified, users not registered in global groups can use the available functions specified in [*Default Group]. By default, all functions are available to *Default Group members. Specify the limitation on available functions according to user needs.

21. **Press [Program/Change Group].**

22. **Press [* Not Programmed].**

23. **Press [Group Name], and then enter the group name.**

24. **Press [OK].**

25. **Press [Available Other Functions].**

26. **Select which of the printer's functions you want to permit.**

    If the function you want to select is not displayed, press [▼].

Windows Authentication will be applied to the selected functions.

Users can use the selected functions only.

For details about specifying available functions for individuals or groups, see p.57 "Limiting Available Functions".

27. **Press [OK].**

28. **Press [OK].**

29. **Press [Exit].**

30. **Press [Exit].**

31. **Press [OK].**

32. **Press the [Login/Logout] key.**

    A confirmation message appears.

    If you press [Yes], you will be automatically logged out.

Creating the Server Certificate

After installing Internet Information Services (IIS) and Certificate services Windows components, create the Server Certificate as follows:

Windows Server 2008 R2 is used to illustrate the procedure.

1. **On the [Start] menu, point to [Administrator Tools], and then click [Internet Information Services (IIS) Manager].**

2. **In the left column, click the server name, and then double-click [Server Certificates].**

3. **In the right column, click [Create Certificate Request...].**

4. **Enter all the information, and then click [Next].**

5. **In "Cryptographic service provider:", select a provider, and then click [Next].**

6. **Click [...], and then specify a file name for the certificate request.**

7. **Specify a location in which to store the file, and then click [Open].**

8. **Close [Internet Information Services (IIS) Manager] by clicking [Finish].**

LDAP Authentication

Specify this authentication method when using the LDAP server to authenticate users who have their accounts on the LDAP server. Users cannot be authenticated if they do not have their accounts on the LDAP server. The Address Book stored in the LDAP server can be registered to the printer, enabling user authentication without first using the printer to register individual settings in the Address Book. When using LDAP authentication, to prevent the password information being sent over the network unencrypted, it is recommended that communication between the printer and LDAP server be encrypted using SSL. You can specify on the LDAP server whether or not to enable SSL. To do this, you must create a server certificate for the LDAP server. For details about creating a server certificate, see p.38 "Creating the Server Certificate". The setting for using SSL can be specified in the LDAP server setting.

Using Web Image Monitor, you can enable a function that checks whether the SSL server is trustworthy when you connect to the server. For details about specifying LDAP authentication using Web Image Monitor, see Web Image Monitor Help.

⭐ **Important**

- During LDAP authentication, the data registered in the LDAP server is automatically registered in the printer. If user information on the server is changed, information registered in the printer may be overwritten when authentication is performed.

- Under LDAP authentication, you cannot specify access limits for groups registered in the directory server.

- Do not use double-byte Japanese, Traditional Chinese, Simplified Chinese, or Hangul characters when entering the login user name or password. If you use double-byte characters, you cannot authenticate using Web Image Monitor.

Operational requirements for LDAP authentication

To specify LDAP authentication, the following requirements must be met:

- The network configuration must allow the printer to detect the presence of the LDAP server.

- When SSL is being used, TLSv1 or SSLv3 can function on the LDAP server.

- The LDAP server must be registered in the printer.

- When registering the LDAP server, the following setting must be specified.

    - Server Name

    - Search Base

    - Port Number

    - SSL communication

    - Authentication

        Select either Kerberos, DIGEST, or Cleartext authentication.

    - User Name

2

> You do not have to enter the user name if the LDAP server supports "Anonymous Authentication".

- Password

  You do not have to enter the password if the LDAP server supports "Anonymous Authentication".

For details about registering an LDAP server, see "Programming the LDAP Server", Operating Instructions.

↓Note

- For the characters that can be used for login user names and passwords, see p.16 "Usable characters for user names and passwords".

- When you select Cleartext authentication, LDAP Simplified authentication is enabled. Simplified authentication can be performed with a user attribute (such as cn, or uid), instead of the DN.

- In LDAP simple authentication mode, authentication will fail if the password is left blank. To allow blank passwords, contact your service representative.

- Under LDAP authentication, if "Anonymous Authentication" in the LDAP server's settings is not set to Prohibit, users who do not have an LDAP server account might still be able to gain access.

- If the LDAP server is configured using Windows Active Directory, "Anonymous Authentication" might be available. If Windows authentication is available, we recommend you use it.

- The first time an unregistered user accesses the printer after LDAP authentication has been specified, the user is registered in the printer and can use the functions available under the available functions during LDAP authentication. To limit the available functions for each user, register each user and corresponding the available functions setting in the Address Book, or specify the available functions for each registered user. The available functions setting becomes effective when the user accesses the printer subsequently.

- To enable Kerberos for LDAP authentication, a realm must be registered beforehand. The realm must be programmed in capital letters. For details about registering a realm, see "Programming the Realm", Operating Instructions.

- Transmission between the printer and the KDC server is encrypted if Kerberos authentication is enabled. For details about specifying encrypted transmission, see p.139 "Kerberos Authentication Encryption Setting".

Specifying LDAP Authentication

Before beginning to configure the printer, make sure that administrator authentication is properly configured under "Administrator Authentication Management".

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] three times.**

5. **Press [User Authentication Management].**

6. **Press [▼].**

7. **Select [LDAP Authentication], and then press [Authentication Info] next to it.**

    If you do not want to use user authentication management, select [Off].

8. **Press [LDAP Servers].**

9. **Select the LDAP server to be used for LDAP authentication, and then press [OK].**
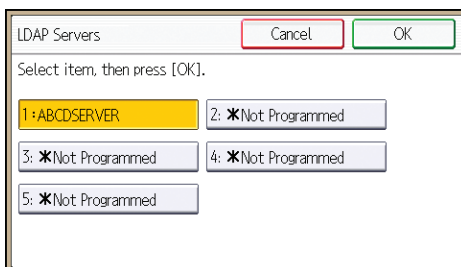
LDAP Servers	Cancel	OK

    Select item, then press [OK].

1:ABCDSERVER	2: ✱Not Programmed
3: ✱Not Programmed	4: ✱Not Programmed
5: ✱Not Programmed	

10. **Press [Printer Job Authentication].**

11. **Select the printer job authentication level.**

    For a description of the printer job authentication levels, see p.47 "Printer Job Authentication".

    If you select [Entire] or [Simple (All)], proceed to step 15.

    If you select [Simple (Limitation)], proceed to step 12.

12. **Press [Change Limitation Range].**

13. **Specify the range in which [Simple (Limitation)] is applied to "Printer Job Authentication".**

Printer Job Auth.: Limitation Range	Exit

    Select items.

IP Address 1	0. 0. 0. 0~ 0. 0. 0. 0	
IP Address 2	0. 0. 0. 0~ 0. 0. 0. 0	1/2
IP Address 3	0. 0. 0. 0~ 0. 0. 0. 0	▲
IP Address 4	0. 0. 0. 0~ 0. 0. 0. 0	▼

    Pressing [▼] allows you to display all items.

    You can specify the IPv4 address range to which this setting is applied, and whether or not to apply the setting to the parallel and USB interfaces.

14. **Press [Exit].**

15. **Press [OK].**

16. **Press [Available Other Functions].**

17. **Select which of the printer's functions you want to permit.**

LDAP authentication will be applied to the selected functions.

Users can use the selected functions only.

For details about specifying available functions for individuals or groups, see p.57 "Limiting Available Functions".

18. **Press [OK].**

19. **Press [Login Name Attribute].**

20. **Enter the login name attribute, and then press [OK].**

Use the login name attribute as a search criterion to obtain information about an authenticated user. You can create a search filter based on the login name attribute, select a user, and then retrieve the user information from the LDAP server so it is transferred to the printer's Address Book.

To specify multiple login attributes, place a comma (,) between them. The search will return hits for either or both attributes.

Also, if you place an equals sign (=) between two login attributes (for example: cn=abcde, uid=xyz), the search will return only hits that match the attributes. This search function can also be applied when Cleartext authentication is specified.

When authenticating using the DN format, login attributes do not need to be registered.

The method for selecting the user name depends on the server environment. Check the server environment and enter the user name accordingly.

21. **Press [▼].**

22. **Press [Unique Attribute].**

23. **Enter the unique attribute and then press [OK].**

Specify unique attribute on the printer to match the user information in the LDAP server with that in the printer. By doing this, if the unique attribute of a user registered in the LDAP server matches that of a user registered in the printer, the two instances are treated as referring to the same user. You can enter an attribute such as "serialNumber" or "uid". Additionally, you can enter "cn" or "employeeNumber", provided it is unique. If you do not specify the unique attribute, an account with the same user information but with a different login user name will be created in the printer.

24. **Press [Exit] twice.**

25. **Press [OK].**

26. **Press the [Login/Logout] key.**

A confirmation message appears.

If you press [Yes], you will be automatically logged out.

Integration Server Authentication

For external authentication, the Integration Server authentication collectively authenticates users accessing the server over the network, providing a server-independent, centralized user authentication system that is safe and convenient.

For example, if the delivery server and the printer share the same Integration Server authentication, single sign-on is possible using DeskTopBinder.

To use Integration Server authentication, access to a server on which Remote Communication Gate S and Authentication Manager are installed, other than the printer, is required. For details about the software, contact your sales representative.

Using Web Image Monitor, you can specify that the server reliability and site certificate are checked every time you access the SSL server. For details about specifying SSL using Web Image Monitor, see Web Image Monitor Help.

⭐ **Important**

- During Integration Server Authentication, the data registered in the server is automatically registered in the printer. If user information on the server is changed, information registered in the printer may be overwritten when authentication is performed.

- The default administrator name for Remote Communication Gate S is "Admin". This is different from the default administrator name for the printer, which is "admin".

Specifying Integration Server Authentication

Before beginning to configure the printer, make sure that administrator authentication is properly configured under "Administrator Authentication Management".

1. **Log in as the machine administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Administrator Tools].**
4. **Press [▼] three times.**
5. **Press [User Authentication Management].**
6. **Press [▼].**
7. **Select [Integration Server Authentication], and then press [Authentication Info] next to it.**

   If you do not want to use user authentication management, select [Off].

8. **Press [Server Name].**

   Specify the name of the server for external authentication.

9. **Enter the server name, and then press [OK].**

   Enter the IPv4 address or host name.

10. **Press [Authentication Type].**

11. **Select the authentication system for external authentication, and then press [OK].**
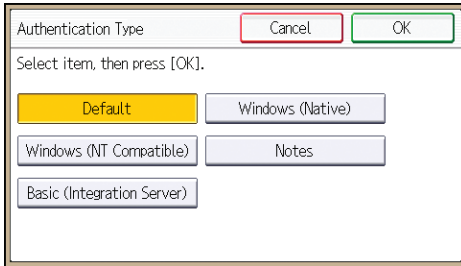
Select an available authentication system. For general usage, select [Default].

12. **Press [Domain Name].**

13. **Enter the domain name, and then press [OK].**

You cannot specify a domain name under an authentication system that does not support domain login.

14. **Press [Obtain URL].**

The printer obtains the URL of the server specified in "Server Name".

If "Server Name" or the setting for enabling SSL is changed after obtaining the URL, the URL is "Not Obtained".

15. **Press [Exit].**

16. **Press [▼].**

In the "Authentication Type", if you have not registered a group, proceed to step 24.

If you have registered a group, proceed to step 17.

If you set "Authentication Type" to [Windows (Native)] or [Windows (NT Compatible)], you can use the global group.

If you set "Authentication Type" to [Notes], you can use the Notes group. If you set "Authentication Type" to [Basic (Integration Server)], you can use the groups created using the Authentication Manager.

17. **Press [Program/Change Group], and then press [* Not Programmed].**
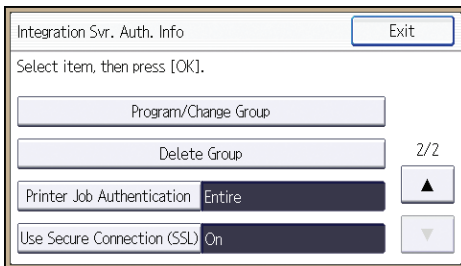
18. **Press [Group Name].**

19. **Enter the group name, and then press [OK].**

20. **Press [Available Other Functions].**

21. **Select which of the printer's functions you want to permit.**

    If the function you want to select is not displayed, press [▼].

    Authentication will be applied to the selected functions.

    Users can use the selected functions only.

    For details about specifying available functions for individuals or groups, see p.57 "Limiting Available Functions".

22. **Press [OK] twice.**

23. **Press [Exit].**

24. **Press [Printer Job Authentication].**

25. **Select the printer job authentication level.**

    For a description of the printer job authentication levels, see p.47 "Printer Job Authentication".

    If you select [Entire] or [Simple (All)], proceed to step 29.

    If you select [Simple (Limitation)], proceed to step 26.

26. **Press [Change Limitation Range].**

27. **Specify the range in which [Simple (Limitation)] is applied to "Printer Job Authentication".**

    Pressing [▼] allows you to display all items.

    You can specify the IPv4 address range to which this setting is applied, and whether or not to apply the setting to the parallel and USB interfaces.

28. **Press [Exit].**

29. **Press [OK].**

30. **Press [Use Secure Connection (SSL)].**

31. **Press [On], and then press [OK].**

    To not use secure sockets layer (SSL) for authentication, press [Off].

32. **Press [Exit].**

33. **Press [OK].**

34. **Press the [Login/Logout] key.**

A confirmation message appears.

If you press [Yes], you will be automatically logged out.

Printer Job Authentication

Printer job authentication is a function allowing user authentication to be applied to print jobs.

User authentication is supported by the PCL and PostScript3 drivers. The PostScript3 driver supports User Code authentication only.

Printer Job Authentication Levels

- Entire

  Select this to authenticate all print jobs and remote configuration.

  The printer authenticates all printer jobs and remote settings, and cancels jobs and settings that fail authentication.

  To print in an environment that does not support authentication, select [Simple (All)] or [Simple (Limitation)].

- Simple (All)

  Select this if you want to print with a printer driver or device that cannot be identified by the machine or if authentication is not required for printing.

  Printer jobs and settings without authentication information are performed without being authenticated.

  The printer authenticates printer jobs and remote settings that have authentication information, and cancels the jobs and settings that fail authentication.

  Unauthorized users may be able to use the printer since printing is allowed without user authentication.

- Simple (Limitation)

  Select this to restrict the range of [Simple (All)].

  You can specify whether to apply [Simple (All)] to parallel connection, USB connection, and the user's IPv4 address. The range of application to IPv6 addresses can be configured from Web Image Monitor.

  The specified range can be printed regardless of the authentication. Authentication will be applied to addresses outside this range.

Printer Job Types

Depending on the combination of printer job authentication level and printer job type, the printer may not print properly. Set an appropriate combination according to the operating environment.

When user authentication is disabled, printing is possible for all job types.

Printer job types: A printer job is specified when:

1. The [User Authentication] check box is selected in the PCL printer driver or in the PCL universal driver.

2. The [User Authentication] and [With Encryption] check boxes are selected in the PCL mini-driver[*].

    * The authentication function cannot be used with IA-64 OS.

3. The [User Authentication] check box is selected in the PCL mini-driver.

4. The [User Authentication] check box is not selected in the PCL printer driver or in the PCL mini-driver[*].

    * The authentication function cannot be used with IA-64 OS.

5. When the User Code is entered using the PostScript 3 printer driver or PS3 universal driver.

    This also applies to recovery/parallel printing using a PCL printer driver that does not support authentication.

6. When the User Code is not entered using the PostScript 3 printer driver or PS3 universal driver. This also applies to recovery/parallel printing using a PCL printer driver that does not support authentication.

7. A printer job or PDF file is sent from a host computer without a printer driver and is printed via LPR.

8. A PDF file is printed via ftp. Personal authentication is performed using the user ID and password used for logging in via ftp. However, the user ID and password are not encrypted.

Printer job authentication levels and printer job types

Printer Job Authentication	Simple (All)	Simple (All)	Simple (All)	Entire	Entire	Entire
Driver Encryption Key:Encryption Strength	Simple Encryption	DES	AES	Simple Encryption	DES	AES
Printer Job Type 1	C[*1]	C[*1]	C[*1]	C[*1]	C[*1]	C[*1]
Printer Job Type 2	C[*1]	C[*1]	X[*1]	C[*1]	C[*1]	X[*1]
Printer Job Type 3	B	X[*1]	X[*1]	B	X[*1]	X[*1]

Printer Job Authentication	Simple (All)	Simple (All)	Simple (All)	Entire	Entire	Entire
Driver Encryption Key:Encryption Strength	Simple Encryption	DES	AES	Simple Encryption	DES	AES
Printer Job Type 4	X	X	X	X	X	X
Printer Job Type 5	A	A	A	B	B	B
Printer Job Type 6	A	A	A	X	X	X
Printer Job Type 7	A	A	A	X	X	X
Printer Job Type 8	B	B	B	B	B	B

*1   Printing with User Code authentication is classified as B.

A: Printing is possible regardless of user authentication.

B: Printing is possible if user authentication is successful. If user authentication fails, the print job is reset.

C: Printing is possible if user authentication is successful and "Driver Encryption Key" for the printer driver and printer match.

X: Printing is not possible regardless of user authentication, and the print job is reset.

⬇ Note

- For details about "Driver Encryption Key:Encryption Strength", see p.190 "Specifying the Extended Security Functions".

"authfree" Command

If [Simple (Limitation)] is selected under printer job authentication, the telnet authfree command can be used to specify exceptions to the printer job authentication.

The default user name for logging into telnet is "admin". The password is not configured by default.

View settings

```
msh> authfree
```

If print job authentication exclusion is not specified, authentication exclusion control is not displayed.

IPv4 address settings

```
msh> authfree "ID" range_addr1 range_addr2
```

IPv6 address settings

```
msh> authfree "ID" range6_addr1 range6_addr2
```

IPv6 address mask settings

```
msh> authfree "ID" mask6_addr1 masklen
```

Parallel/USB settings

```
msh> authfree [parallel|usb] [on|off]
```

- To exclude parallel and USB connections from printer job authentication, set this to "on". The default setting is "off".

- Always specify either "parallel" or "USB".

  "parallel" can be specified when an optional IEEE 1284 interface board is installed.

Authentication exclusion control initialization

```
msh> authfree flush
```

Note

- In both IPv4 and IPv6 environments, up to five access ranges can be registered and selected.

User Lockout Function

If an incorrect password is entered several times, the User Lockout function prevents further login attempts under the same user name. Even if the locked out user enters the correct password later, authentication will fail and the printer cannot be used until the lockout period elapses or an administrator or supervisor disables the lockout.

To use the lockout function for user authentication, the authentication method must be set to Basic authentication. Under other authentication methods, the lockout function protects supervisor and administrator accounts only, not general user accounts.

Lockout setting items

The lockout function settings can be made using Web Image Monitor.

Setting item	Description	Setting values	Default setting
Lockout	Specify whether or not to enable the lockout function.	• Active • Inactive	• Inactive
Number of Attempts before Lockout	Specify the number of authentication attempts to allow before applying lockout.	1-10	5
Lockout Release Timer	Specify whether or not to cancel lockout after a specified period elapses.	• Active • Inactive	• Inactive
Lock Out User for	Specify the number of minutes after which lockout is canceled.	1-9999 min.	60 min.

Lockout release privileges

Administrators with unlocking privileges are as follows.

Locked out user	Unlocking administrator
general user	user administrator
user administrator, network administrator, file administrator, machine administrator	supervisor

Locked out user	Unlocking administrator
supervisor	machine administrator

Specifying the User Lockout Function

1. **Log in as the machine administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [User Lockout Policy] under "Security".**

4. **Set "Lockout" to [Active].**

5. **In the drop-down menu, select the number of login attempts to permit before applying lockout.**

6. **After lockout, if you want to cancel lockout after a specified time elapses, set "Lockout Release Timer" to [Active].**

7. **In the "Lock Out User for" field, enter the number of minutes until lockout is disabled.**

8. **Click [OK].**

   User Lockout Policy is set.

9. **Log out.**

Canceling Password Lockout

1. **Log in as the user administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Address Book].**

3. **Select the locked out user's account.**

4. **Click [Manual Input], and then click [Change].**

5. **Set "Lockout" to [Inactive] under "Authentication Information".**

6. **Click [OK].**

7. **Log out.**

🔽 Note

• You can cancel the administrator and supervisor password lockout by turning the main power off and then turning it back on again, or by canceling the setting in [Program/Change Administrator] under [Configuration] in Web Image Monitor.

Auto Logout

When using Basic authentication, Windows authentication, LDAP authentication or Integration Server authentication, the printer automatically logs you off if you do not use the control panel within a given time. This feature is called "Auto Logout". Specify how long the printer is to wait before performing Auto Logout.

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Timer Settings].**

4. **Press [Auto Logout Timer].**

5. **Select [On].**

   If you do not want to specify [Auto Logout Timer], select [Off].

6. **Press [Change].**

7. **Enter "60" to "999" (seconds) using the number buttons, and then press [OK].**

   If you make a mistake, press [Clear].

8. **Press [OK].**

9. **Press the [Login/Logout] key.**

   A confirmation message appears.

   If you press [Yes], you will be automatically logged out.

Note

- If a paper jam occurs or toner runs out, the printer might not be able to perform the Auto Logout function.

Authentication Using an External Device

To authenticate using an external device, see the device manual.

For details, contact your sales representative.

3. Restricting Printer Usage

This chapter explains how to restrict use of the printer by the user.

Preventing Changes to Administrator Settings

The settings that can be made for this printer vary depending on the type of administrator, allowing the range of operations that can be made to be divided among the administrators.

The following administrators are defined for this printer.

- User administrator
- Machine administrator
- Network administrator
- File administrator

For details on the settings that can be made by each administrator, see p.213 "List of Operation Privileges for Settings".

Register the administrators before using the printer. For instructions on registering the administrator, see p.14 "Registering and Changing Administrators".

Prohibiting Users from Making Changes to Settings

Makes it possible to prohibit users from changing administrator settings.

Select the available settings in "Administrator Authentication Management" to prevent such changes.

For details on selections in the available settings, see p.12 "Configuring Administrator Authentication".

Menu Protect

Menu Protect allows you to limit user permission to access the settings in the User Tools menu except for the System Settings. This setting can be used regardless of user authentication. To specify Menu Protect, enable administrator authentication in advance. For details on how to set administrator authentication, see p.12 "Configuring Administrator Authentication". For a list of settings that users can specify according to the menu protect level, see p.213 "List of Operation Privileges for Settings".

Specifying Menu Protect

If you want to enable "Menu Protect", specify it to [Level 1] or [Level 2]. Select [Level 2] to impose stricter restrictions on users' access permission to the printer settings.

If you want to disable "Menu Protect", specify it to [Off].

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [Printer Features].**

3. **Press [Data Management].**

4. **Press [Menu Protect].**

5. **Select the menu protect level, and then press [OK].**

6. **Log out.**

Limiting Available Functions

To prevent unauthorized operation, you can specify who is allowed to access each of the printer's functions.

Available Printer Functions

- Printer

- Extended feature

Specifying Which Functions are Available

Specify the functions available to registered users. By making this setting, you can limit the functions available to users.

1. **Log in as the user administrator from the printer's control panel.**

2. **Press [Address Book Mangmnt].**

3. **Press [Change].**

4. **Press [All Users].**
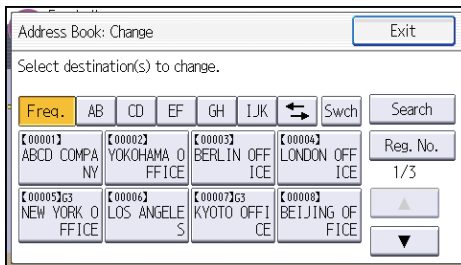
5. **Select the user.**

6. **Press [Auth. Info].**

7. **Press [Available Other Functions].**

8. **Select the functions you want to specify.**

9. **Press [OK].**

10. **Press [Exit].**

11. **Press [OK].**

12. **Log out.**

Restricting Media Slot Access

Specify on the control panel whether or not to allow users to use the media slots. With this setting, you can restrict printing of files stored on a removable memory device.

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] three times.**

5. **Press [Media Slot Use].**

6. **To restrict printing of files stored on a removable memory device, press [Prohibit] under "Print from Memory Storage Device".**

7. **Press [OK].**

8. **Log out.**

🔽 Note

- If you select [Prohibit] under "Print from Memory Storage Device", the [Print from Memory Storage Device] button is not displayed on the printer function's initial screen.

Managing Print Volume per User

This function limits how much each user can print. If users reach their maximum print volume, their print jobs are canceled and/or a message indicating so is displayed.

Either the user administrator or the machine administrator can specify the print volume available to a user.

Print volume

The print volume is calculated by multiplying the number of pages by a unit count.

The unit count can be specified according to the printing condition. For example, if one page is printed with a unit count of 10, the print volume would be 10.

The print volume is tracked for each user.

Setting Items

Item	Explanation	Setting

Machine action when limit is reached	Specify whether to limit print volume and the method for limiting prints.
	• Stop Job
	   When the maximum print volume is reached, both the current job and waiting jobs are canceled.
	• Finish Job and Limit
	   When the maximum print volume is reached, the current job is allowed to finish, but waiting jobs are canceled.
	• Allow Continue Use
	   Print volume is not limited.
		• Stop Job
		• Finish Job and Limit
		• **Allow Continue Use** (Default setting)

Print Volume Use Limitation: Unit Count Setting	For each of the two print conditions, specify a per-page unit count between 0 and 200. The default per-page unit count for every print condition is 1.	• Printer:A3/DLT • Printer:Others

Things to note when limiting print volume

If the following occurs, the user will not be able to print:

• The login user name or user code registered in the Address Book is changed while the user is logged in and authenticated.

If the following occurs, print volume management will not function correctly:

- Under Windows or LDAP authentication, a user logs in to the same user account by using multiple login user names, and these multiple login names are registered in the Address Book as separate users.

The following operations are exempt from print volume limitation:

- Printing from an operating system that does not support the current authentication method

Specifying Limitations for Print Volume

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] twice.**

5. **Press [Machine action when limit is reached].**

6. **Select [Stop Job] or [Finish Job and Limit], and then press [OK].**

   If you do not want to limit print volume, select [Allow Continue Use].

7. **Press [Print Volume Use Limitation: Unit Count Setting].**

8. **Select print condition.**

9. **For each print condition, use the number buttons to enter a per-page unit count between "0" and "200", and then press [OK].**

   If you specify "0" for a print condition, no volume restriction is applied to jobs matching that condition.

10. **Press [OK].**

11. **Log out.**

⬇️ **Note**

- Limitations for print volume can also be specified in [Print Volume Use Limitation] under "Configuration" in Web Image Monitor.

Restrictions When User Code Authentication is Enabled

When User Code authentication is enabled, the following restrictions apply to the print volume limitation settings:

- If [PC Control] is selected for the printer function, the values specified for print volume use units might not be applied to users' print counters. Do not select [PC Control] if you want to limit print volume when running User Code authentication.

- Under Basic, Windows, and LDAP authentication, figures displayed on the lower left of the control panel show users how many of the total prints allotted to them by the administrator they have used.

Under User Code authentication, users cannot check the print volume they have made, using either the control panel or Web Image Monitor. Under User Code authentication, administrators can inform users of the print volume they have made.

- Log information related to print use limitations is not recorded in the Job Log or Access Log.

- Depending on the settings configured for User Code authentication, users might be able to make prints before logging in, regardless of the print volume limitation set by the administrator. Restrict all functions in [User Code Authentication] in [User Authentication Management].

Specifying the Default Maximum Use Count

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] twice.**

5. **Press [Print Volum. Use Limit.: Default Limit Value].**

   [Print Volum. Use Limit.: Default Limit Value] does not appear if you have selected [Allow Continue Use] in "Machine action when limit is reached".

6. **Use the number buttons to enter a value between "0" and "999,999" as the maximum available print volume, and then press [OK].**

7. **Log out.**

Specifying the Maximum Use Count per User

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [Address Book Mangmnt].**

3. **Press [Change].**

4. **Press [All Users].**

5. **Select the user whose maximum available print volume you want to specify.**
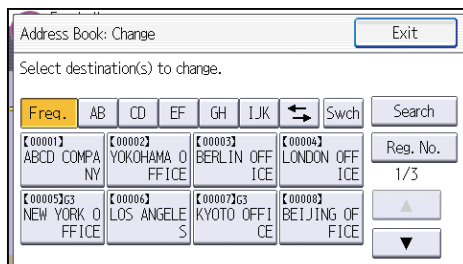
6. **Press [Auth. Info].**

7. **Press [Print Volum. Use Limit.].**

   "Print Volum. Use Limit." does not appear if you have selected [Allow Continue Use] in "Machine action when limit is reached".

8. **Press [Limit].**

   If you do not want to limit user's print volume, press [Do not Limit].

9. **Press [Change].**

10. **Use the number buttons to enter a value between "0" and "999,999" as the maximum available print volume, and then press [OK].**

    A user whose maximum print volume is set to "0" can only print jobs whose print conditions match those with a unit value of "0".

11. **Press [OK].**

12. **Press [Exit].**

13. **Press [OK].**

14. **Log out.**

↓Note

- The maximum print volume for an individual user can also be specified in [Address Book] in Web Image Monitor.

Checking Print Volume per User

This procedure can be done by any administrator.

1. **Log in as the administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼].**

5. **Press [Display/Clear/Print Counter per User].**

6. **Press [Print Volume Use Cntr.].**

   Each user's print volume limit and print volume used to date are displayed.

7. **After confirming the settings, log out.**

↓Note

- Authorized users and the user administrator can also use [Address Book] in Web Image Monitor to check users' print volume use counters.

Printing a List of Print Volume Use Counters

1. Log in as the machine administrator from the printer's control panel.

2. Press [System Settings].

3. Press [Administrator Tools].

4. Press [▼].

5. Press [Display/Clear/Print Counter per User].

6. Press [Print Volume Use Cntr.].

   A list of users' print volume use counters is displayed.

7. To print a list of the volume use counters of every user, press [Print List] under "All Users". To print a list of the volume use counters of selected users only, select the users whose counters you want to print, and then press [Print List] under "Per User".

8. Select the counter you want to print in the list, and then press [Start Printing].
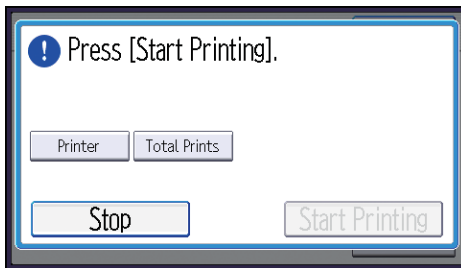
9. Log out.

Note

- Print volume use counter lists can be printed only if the following paper sizes is loaded in the paper tray: A4, $8^1/_2$ × 11 in, B4, $8^1/_2$ × 14 in, A3, or 11 × 17 in.

Clearing Print Volume Use Counters

Clearing a user's print volume counter or increasing a user's print volume limit allows the user to continue printing beyond his/her original print volume limit.

1. Log in as the user administrator from the printer's control panel.

2. Press [System Settings].

3. Press [Administrator Tools].

4. Press [▼].

5. Press [Display/Clear/Print Counter per User].

6. **Press [Print Volume Use Cntr.].**

   A list of users' print volume use counters is displayed.

7. **To clear the print volume use counters of every user, press [Clear] under "All Users". To clear the print volume use counters of selected users only, select the users whose counters you want to clear, and then press [Clear] under "Per User".**

8. **Select [Prt Volum Use], and then press [OK].**
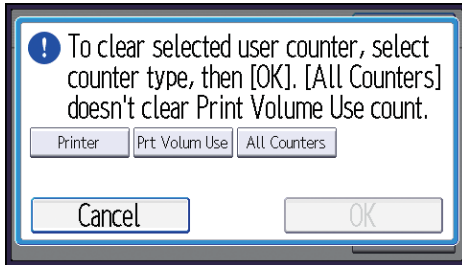
9. **Log out.**

Note

- You can also use [Address Book] in Web Image Monitor to clear the print volume use counters. However if you want to clear the print volume use counters of all users simultaneously, use the control panel.

Configuring the Auto-Reset Function

The print volume counter can be reset at a specified time.

Options	Details
Every Month	Resets the print volume at the specified time/date each month.
Specify Date	Resets the print volume (only once) at the specified time/date.
Specify Cycle	Resets after the specified interval from a reference date, then resets thereafter at the same interval.

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] twice.**

5. **Press [Volm Use Cntr:Scheduld/Specfid Rst Stng].**

6. **Select one of [Every Month], [Specify Date], and [Specify Cycle].**

7. **Configure the conditions.**

8. **Press [OK].**

9. **Log out.**

↓Note

- If the printer is off at the specified time, the print volume will be reset when the power is turned on thereafter.

- If you select in [Every Month] a date, such as the 31st, which is missing on some months, the print volume will be reset at 0:00 on the 1st of the month following such a month.

4. Preventing Leakage of Information from Printer

This chapter explains how to protect information if it is stored in the printer's memory or on the hard disk.

Protecting the Address Book

You can specify who is allowed to access the data in the Address Book. To protect the data from unauthorized reading, you can also encrypt the data in the Address Book.

Specifying Address Book Access Permissions

These access permissions can be specified by the users registered in the Address Book, users with full control privileges, and user administrator.

1. **Log in as the user administrator from the printer's control panel.**
2. **Press [Address Book Mangmnt].**
3. **Press [Change].**
4. **Press [All Users].**
5. **Select the user.**
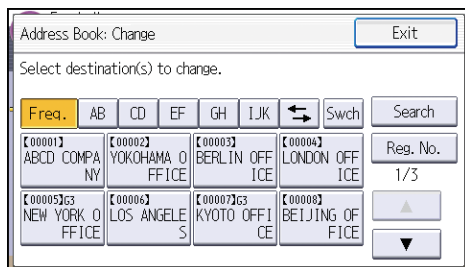
6. **Press [Protection].**
7. **Press [Protect Destination].**
8. **Press [Permissions for Users/Groups: Program/Change/Delete].**
9. **Press [New Program].**
10. **Select the users or groups to register.**

    You can select more than one user.

    By pressing [All Users], you can select all the users.

11. **Press [OK].**

12. **Select the user to whom you want to assign access permission, and then select the permission.**

   Select the permission, from [Read-only], [Edit], [Edit/Delete], or [Full Control].

13. **Press [OK].**

14. **Press [Exit] twice.**

15. **Press [OK].**

16. **Log out.**

⬇Note

- The "Edit", "Edit/Delete", and "Full Control" access permissions allow a user to perform high level operations that could result in loss of or changes to sensitive information. We recommend you grant only the "Read-only" permission to general users.

Encrypting Data in the Address Book

1. **Log in as the user administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] four times.**

5. **Press [Extended Security].**

6. **Press [Encrypt User Custom Setting & Address Book].**

7. **Press [On], and then press [Change Encryption Key].**

8. **Enter the encryption key, and then press [OK].**

   Enter the encryption key using up to 32 alphanumeric characters.

9. **Press [Encrypt/Decrypt].**

10. **Press [Yes].**
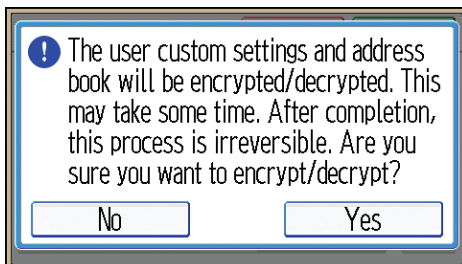
   Do not switch the main power off during encryption, as doing so may corrupt the data.

   Encrypting the data in the Address Book may take a long time.

The time it takes to encrypt the data in the Address Book depends on the number of registered users.

The printer cannot be used during encryption.

Normally, once encryption is complete, "Encryption/Decryption is successfully complete. Press [Exit]." appears.

If you press [Stop] during encryption, the data is not encrypted.

If you press [Stop] during decryption, the data stays encrypted.

11. **Press [Exit].**

12. **Press [Exit].**

13. **Log out.**

↓Note

- If you register additional users after encrypting the data in the Address Book, those users are also encrypted.

- The backup copy of the address book data stored in the SD card is encrypted. For details about backing up and then restoring the address book using an SD card, see "System Settings", Operating Instructions.

Encrypting Data on the Hard Disk

⚠ **CAUTION**

- Keep SD cards or USB flash memory devices out of reach of children. If a child accidentally swallows an SD card or USB flash memory device, consult a doctor immediately.

Prevent information leakage by encrypting the Address Book, authentication information, and stored documents as the data is written.

When the data encryption settings are enabled, an encryption key is generated and this is used to restore the data. This key can be changed at any time.

Data that is encrypted

This function encrypts data that is stored in the printer's NVRAM (memory that remains even after the printer has been turned off) and on the hard disk.

The following data is encrypted:

- Address Book data
- User authentication information
- Temporary stored documents
- Logs
- Network I/F setting information
- System settings information

↓ Note

- If the printer needs to be replaced, the existing data can be transferred to a new printer, even if the data is encrypted. To transfer data, contact your service representative.

- You can back up the printer's data encryption key to an SD card. For details about SD card handling, see "Inserting/Removing a Memory Storage Device", Getting Started.

Time required for encryption

When setting up encryption, specify whether to start encryption after deleting data (initialize) or encrypt existing data and retain it. If data is retained, it may take some time to encrypt it.

Setting	Data to be kept	Data to be initialized	Required time
File System Data Only	• Embedded Software Architecture applications' program/log • Address Book • Registered fonts • Job logs/access logs • Spooled jobs	• Locked Print files / Sample Print files / Stored Print files / Hold Print files	Approx. 1 hour 45 minutes
All Data	All Data: Both the data to be kept and data not kept when [File System Data Only] is specified	None	Approx. 3 hours 45 minutes
Format All Data	None	All Data: Both the data to be kept and data not kept when [File System Data Only] is specified	Several minutes

Things to note when enabling encryption settings

- If you use Embedded Software Architecture application or App2Me, be sure to specify [File System Data Only] or [All Data].

- Note that the printer's settings will not be initialized to their system defaults even if [Format All Data], [File System Data Only], or [All Data] is specified.

Enabling the Encryption Settings

⭐Important

- The printer cannot be operated while data is being encrypted.

- Once the encryption process begins, it cannot be stopped. Make sure that the printer's main power is not turned off while the encryption process is in progress. If the printer's main power is turned off while the encryption process is in progress, the hard disk will be damaged and all data on it will be unusable.

- The encryption key is required for data recovery if the printer malfunctions. Be sure to store the encryption key safely for retrieving backup data.

- Encryption begins after you have completed the control panel procedure and rebooted the printer by turning off and on the main power switch. If both the erase-by-overwrite function and the encryption function are specified, encryption begins after the data that is stored on the hard disk has been overwritten and the printer has been rebooted with the turning off and on of the main power switch.

- If you use hard disk erase-by-overwrite and encryption simultaneously and you select overwrite three times for "Random Numbers", the maximum time to complete the operations will be 7 hours, 15 minutes. Re-encrypting from an already encrypted state takes 7 hours, 45 minutes.

- The "Erase All Memory" function also clears the printer's security settings, with the result that afterward, neither machine nor user administration will be effective. Ensure that users do not save any data on the printer after "Erase All Memory" has completed.

- Rebooting will be faster if there is no data to carry over to the hard disk and if encryption is set to [Format All Data], even if all the data on the hard disk is formatted. Before you perform encryption, we recommend you back up important data such as the Address Book.

- If the encryption key update was not completed, the printed encryption key will not be valid.

1. Log in as the machine administrator from the printer's control panel.

2. Press [System Settings].

3. Press [Administrator Tools].

4. Press [▼] six times.

5. Press [Machine Data Encryption Settings].

6. Press [Encrypt].

7. Select the data to be carried over to the hard disk and not be reset.

   To carry all of the data over to the hard disk, select [All Data]. To carry over only the printer settings data, select [File System Data Only]. To reset all of the data, select [Format All Data].

8. Select the backup method.

   If you have selected [Save to SD], load an SD card into the media slot on the side of the control panel and press [OK] to back up the printer's data encryption key.

   For details about inserting the SD card, see "Inserting/Removing a Memory Storage Device" Operating Instructions.

   If you have selected [Print on Ppr], press [Start Printing] and print out the printer's data encryption key.

9. Press [OK].

10. Press [Exit].

11. Press [Exit].

12. Log out.

13. **Turn off the main power switch, and then turn the main power switch back on.**

The printer will start to convert the data on the memory after you turn on the printer. Wait until the message "Memory conversion complete. Turn the main power switch off." appears, and then turn the main power switches off again.

For details about turning off the power, see "Turning On/Off the Power", Operating Instructions.

Backing Up the Encryption Key

The encryption key can be backed up. Select whether to save it to an SD card or to print it.

⭐ Important

- The encryption key is required for data recovery if the printer malfunctions. Be sure to store the encryption key safely for retrieving backup data.

1. **Log in as the machine administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Administrator Tools].**
4. **Press [▼] six times.**
5. **Press [Machine Data Encryption Settings].**
6. **Press [Back Up Encryption Key].**
7. **Select the backup method.**

If you have selected [Save to SD], load an SD card into the media slot on the side of the control panel and press [OK]; once the printer's data encryption key is backed up, press [Exit].

For details about inserting the SD card, see "Inserting/Removing a Memory Storage Device" Operating Instructions.

If you have selected [Print on Ppr], press [Start Printing] and print out the printer's data encryption key.

8. **Press [Exit].**
9. **Log out.**

Updating the Encryption Key

You can update the encryption key and create a new key. Updates are possible when the printer is functioning normally.

⭐ Important

- The encryption key is required for recovery if the printer malfunctions. Be sure to store the encryption key safely for retrieving backup data.

- When the encryption key is updated, encryption is performed using the new key. After completing the procedure on the printer's control panel, turn off the power and restart the printer to enable the new settings. Restarting can be slow when there is data to be carried over to the hard disk.

- If the encryption key update was not completed, the printed encryption key will not be valid.

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] six times.**

5. **Press [Machine Data Encryption Settings].**

6. **Press [Update Encryption Key].**

7. **Select the data to be carried over to the hard disk and not be reset.**

   To carry all of the data over to the hard disk, select [All Data]. To carry over only the printer settings data, select [File System Data Only]. To reset all of the data, select [Format All Data].

8. **Select the backup method.**

   If you have selected [Save to SD], load an SD card into the media slot on the side of the control panel and press [OK] to back up the printer's data encryption key.

   For details about inserting the SD card, see "Inserting/Removing a Memory Storage Device" Operating Instructions.

   If you have selected [Print on Ppr], press [Start Printing] and print out the printer's data encryption key.

9. **Press [OK].**

10. **Press [Exit].**

11. **Press [Exit].**

12. **Log out.**

13. **Turn off the main power switch, and then turn the main power switch back on.**

   The printer will start to convert the data on the memory after you turn on the printer. Wait until the message "Memory conversion complete. Turn the main power switch off." appears, and then turn the main power switches off again.

   For details about turning off the power, see "Turning On/Off the Power", Operating Instructions.

Canceling Data Encryption

Use the following procedure to cancel the encryption settings when encryption is no longer necessary.

⭐ **Important**

- After completing this procedure on the printer's control panel, turn off the power and restart the printer to enable the new settings. Restarting can be slow when there is data to be carried over to the hard disk.

- When disposing of a printer, completely erase the memory. For details on erasing all of the memory, see p.76 "Deleting Data on the Hard Disk".

1. Log in as the machine administrator from the printer's control panel.

2. Press [System Settings].

3. Press [Administrator Tools].

4. Press [▼] six times.

5. Press [Machine Data Encryption Settings].

6. Press [Cancel Encryption].

7. Select the data to be carried over to the hard disk and not be reset.

   To carry all of the data over to the hard disk, select [All Data]. To carry over only the printer settings data, select [File System Data Only]. To reset all of the data, select [Format All Data].

8. Press [OK].

9. Press [Exit].

10. Press [Exit].

11. Log out.

12. Turn off the main power switch, and then turn the main power switch back on.

    For details about turning off the power, see "Turning On/Off the Power", Operating Instructions.

4

Deleting Data on the Hard Disk

The printer's hard disk stores all document data from the printer function. It also stores the data of code counters, and the Address Book.

To prevent data on the hard disk being leaked before disposing of the machine, you can overwrite all data stored on the hard disk. You can also automatically overwrite temporarily-stored data.

Conditions for Use

When you use the erase-by-overwrite function, make sure to use it under the following conditions:

- The printer is used in its normal state (i.e. it is neither damaged, modified nor are there missing components).
- The printer is managed by an administrator who has carefully read and understood this manual, and can ensure the safe and effective use of this printer by general users.

Note

- Customer engineers dispatched from the manufacturer and its affiliated companies are trained in the maintenance of this printer.

Instructions for Use

- Before turning off the main power of the printer, always make sure that the Data Overwrite icon has turned to "Clear".
- The printer will not enter Sleep mode until overwriting has been completed.
- Should the Data Overwrite icon continue to be "Dirty" even after you have made sure that there is no data to be overwritten, turn off the main power of your printer. Turn it on again and see if the icon changes to "Clear". If it does not, contact your sales or service representative.

Auto Erase Memory

A print data sent from a printer driver is temporarily stored on the printer's hard disk. Even after the job is completed, it remains in the hard disk as temporary data. Auto Erase Memory erases the temporary data on the hard disk by writing over it.

Overwriting starts automatically once the job is completed.

The printer function takes priority over the Auto Erase Memory function. If a print job is in progress, overwriting will only be done after the job is completed.

Methods of overwriting

You can select a method of overwriting from the following:

- NSA

  Temporary data is overwritten twice with random numbers and once with zeros.

- DoD

  Temporary data is overwritten with a fixed value, the fixed value's complement, and random numbers. When completed, the overwriting is then verified.

- Random Numbers

  Temporary data is overwritten multiple times with random numbers. The number of overwrites can be selected from 1 to 9.

↓Note

- The default method for overwriting is "Random Numbers", and the default number of overwrites is 3.

- NSA stands for "National Security Agency", U.S.A.

- DoD stands for "Department of Defense", U.S.A.

Using Auto Erase Memory

⭐Important

- When Auto Erase Memory is set to [On], temporary data that remained on the hard disk when Auto Erase Memory was set to [Off] might not be overwritten.

- If the main power switch is turned off before Auto Erase Memory is completed, overwriting will stop and data will be left on the hard disk.

- Do not stop the overwrite mid-process. Doing so will damage the hard disk.

- Should the main power switch be turned off before Auto Erase Memory is completed, overwriting will continue once the main power switch is turned back on.

- If an error occurs before overwriting is completed, turn off the main power. Turn it on, and then repeat from step 1.

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] five times.**

5. **Press [Auto Erase Memory Setting].**

6. **Press [On].**

7. **Select the method of overwriting.**

   If you select [NSA] or [DoD], proceed to step 10.

   If you select [Random Numbers], proceed to step 8.

8. **Press [Number of Erase].**

9. **Enter the number of times that you want to overwrite using the number buttons, and then press [OK].**

10. **Press [OK].**

11. **Log out.**

↓ Note

- If you enable both overwriting and data encryption, the overwriting data will also be encrypted.

Canceling Auto Erase Memory

1. **Follow steps 1 to 5 in "Using Auto Erase Memory".**

2. **Press [Off].**

3. **Press [OK].**

   Auto Erase Memory is disabled.

4. **Log out.**

↓ Note

- To set Auto Erase Memory to [On] again, repeat the procedure in "Using Auto Erase Memory".

Checking the Auto Erase Memory status

If Auto Erase Memory is enabled, you can use the "Check Status" screen to find out whether there is any data to be erased in the memory.

1. **Press [Check Status] key.**
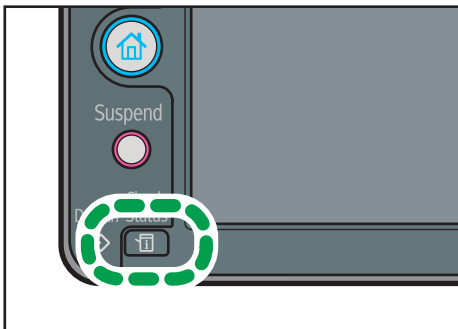
CQT664

2. **Press [Maintnc/MacInfo].**

3. **Press [Data Storage].**

4. **Press [▼] twice.**

5. **Check "Memory Erase Status".**

   If Auto Erase Memory is disabled, "Memory Erase Status" does not appear.

Icon	Icon name	Explanation
	Dirty	This icon is lit when there is temporary data to be overwritten, and blinks during overwriting.
	Clear	This icon is lit when there is no temporary data to be overwritten.

⭐ **Important**

- The Data Overwrite icon will indicate "Clear" when there is a Sample Print/Locked Print/Hold Print/Stored Print job.

⬇ **Note**

- If the Data Overwrite icon is not displayed, first check if Auto Erase Memory has been set to [Off]. If the icon is not displayed even though Auto Erase Memory is [On], contact your service representative.

Types of data that can or cannot be overwritten

The following are the types of data that can or cannot be overwritten by "Auto Erase Memory".

Data overwritten by Auto Erase Memory

- Print jobs
- Sample Print/Locked Print/Hold Print/Stored Print jobs

  A Sample Print/Locked Print/Hold Print job can only be overwritten after it has been executed. A Stored Print job is overwritten after it has been deleted.

- Spool printing jobs

Data Not overwritten by Auto Erase Memory

- Information registered in the Address Book

  Data stored in the Address Book can be encrypted for security. For details, see p.67 "Protecting the Address Book".

- Counters stored under each user code

Erase All Memory

You can erase all the data on the hard disk by writing over it. This is useful if you relocate or dispose of your printer.

⭐ **Important**

- If you select "Erase All Memory", the following are also deleted: user codes, counters under each user code, data stored in the Address Book, printer fonts downloaded by users, applications using Embedded Software Architecture, SSL server certificates, and the printer's network settings.

- If the main power switch is turned off before "Erase All Memory" is completed, overwriting will be stopped and data will be left on the hard disk.

- Do not stop the overwrite mid-process. Doing so will damage the hard disk.

- We recommend that before you erase the hard disk, you use SmartDeviceMonitor for Admin to back up the user codes, the counters for each user code, and the Address Book. The Address Book can also be backed up using Web Image Monitor. For details, see SmartDeviceMonitor for Admin Help or Web Image Monitor Help.

- Other than pausing, no operations are possible during the "Erase All Memory" process. When "Random Numbers" is selected and it is set to overwrite three times, take a maximum of 3 hours, 30 minutes.

- The "Erase All Memory" function also clears the printer's security settings, with the result that afterward, neither printer nor user administration will be effective. Ensure that users do not save any data on the printer after "Erase All Memory" has completed.

Using Erase All Memory

1. Disconnect communication cables connected to the printer.
2. Log in as the machine administrator from the printer's control panel.
3. Press [System Settings].
4. Press [Administrator Tools].
5. Press [▼] five times.
6. Press [Erase All Memory].
7. Select the method of overwriting.

    If you select [NSA] or [DoD], proceed to step 10.

    If you select [Random Numbers], proceed to step 8.
8. Press [Number of Erase].
9. Enter the number of times that you want to overwrite using the number buttons, and then press [OK].
10. Press [Erase].

11. **Press [Yes].**
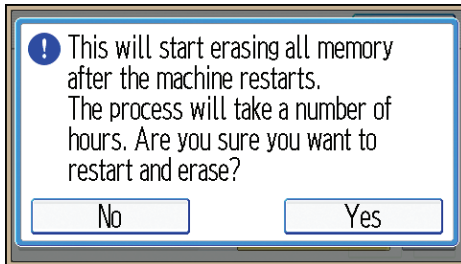
12. **When overwriting is completed, press [Exit], and then turn off the main power.**

    Before turning the power off, see "Turning On/Off the Power", Operating Instructions.

⬇**Note**

- Should the main power switch be turned off before "Erase All Memory" is completed, overwriting will continue once the main power switch is turned back on.

- If an error occurs before overwriting is completed, turn off the main power. Turn it on again, and then repeat from step 2.

Suspending Erase All Memory

The overwriting process can be suspended temporarily.

⭐**Important**

- Erase All Memory cannot be canceled.

1. **Press [Suspend] while Erase All Memory is in progress.**

2. **Press [Yes].**

    Erase All Memory is suspended.

3. **Turn off the main power.**

    Before turning the power off, see "Turning On/Off the Power", Operating Instructions.

⬇**Note**

- To resume overwriting, turn on the main power.

5. Enhanced Network Security

This chapter describes the functions for enhancing security when the printer is connected to the network.

Access Control

The printer can control TCP/IP access.

Limit the IP addresses from which access is possible by specifying the access control range.

For example, if you specify the access control range as [192.168.15.16]-[192.168.15.20], the client PC addresses from which access is possible will be from [192.168.15.16] to [192.168.15.20].

⭐ **Important**

- Using access control, you can limit access involving LPR, RCP/RSH, FTP, ssh/sftp, Bonjour, SMB, WSD (Device), WSD (Printer), IPP, DIPRINT, RHPP, Web Image Monitor, SmartDeviceMonitor for Client, or DeskTopBinder. You cannot limit the monitoring of SmartDeviceMonitor for Client. You cannot limit access involving telnet, or SmartDeviceMonitor for Admin, when using the SNMPv1 monitoring.

1. Log in as the network administrator from Web Image Monitor.
2. Point to [Device Management], and then click [Configuration].
3. Click [Access Control] under "Security".
4. To specify the IPv4 address, enter an IP address that has access to the printer in "Access Control Range".

   To specify the IPv6 address, enter an IP address that has access to the printer in "Range" under "Access Control Range", or enter an IP address in "Mask" and specify the "Mask Length".
5. Click [OK].
6. "Updating..." appears. Wait for about one or two minutes, and then click [OK].

   If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.
7. Log out.

5

Enabling and Disabling Protocols

Specify whether to enable or disable the function for each protocol. By making this setting, you can specify which protocols are available and so prevent unauthorized access over the network. Network settings can be specified on the control panel, or using Web Image Monitor, telnet, SmartDeviceMonitor for Admin or Remote Communication Gate S. If you use SmartDeviceMonitor for Admin, start Web Image Monitor from SmartDeviceMonitor for Admin and configure the settings from there.

Protocol	Port	Setting method	When disabled
IPv4	-	• Control panel • Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	All applications that operate over IPv4 cannot be used. IPv4 cannot be disabled from Web Image Monitor when using IPv4 transmission.
IPv6	-	• Control panel • Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	All applications that operate over IPv6 cannot be used.
IPsec	-	• Control panel • Web Image Monitor • telnet • SmartDeviceMonitor for Admin	Encrypted transmission using IPsec is disabled.

Protocol	Port	Setting method	When disabled
FTP	TCP:21	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	Functions that require FTP cannot be used. You can restrict personal information from being displayed by making settings on the control panel using "Restrict Display of User Information".
ssh/sftp	TCP:22	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	Functions that require sftp cannot be used. You can restrict personal information from being displayed by making settings on the control panel using "Restrict Display of User Information".
telnet	TCP:23	• Web Image Monitor • SmartDeviceMonitor for Admin	Commands using telnet are disabled.
SMTP	TCP:25 (variable)	• Control panel • Web Image Monitor • SmartDeviceMonitor for Admin • Remote Communication Gate S	E-mail notification functions that require SMTP reception cannot be used.
HTTP	TCP:80	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin	Functions that require HTTP cannot be used. Cannot print using IPP on port 80.

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Protocol	Port	Setting method	When disabled
HTTPS	TCP:443	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin	Functions that require HTTPS cannot be used. @Remote cannot be used. You can also make settings to require SSL transmission using the control panel or Web Image Monitor.
SMB	TCP:139	• Control panel • Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	SMB printing functions cannot be used.
NBT	UDP:137 UDP:138	• telnet	SMB printing functions via TCP/IP, as well as NetBIOS designated functions on the WINS server cannot be used.
SNMPv1,v2	UDP:161	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	Functions that require SNMPv1, v2 cannot be used. Using the control panel, Web Image Monitor or telnet, you can specify that SNMPv1, v2 settings are read-only, and cannot be edited.
SNMPv3	UDP:161	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	Functions that require SNMPv3 cannot be used. You can also make settings to require SNMPv3 encrypted transmission and restrict the use of other transmission methods using the control panel, Web Image Monitor, or telnet.

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Protocol	Port	Setting method	When disabled
RSH/RCP	TCP:514	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	Functions that require RSH and network TWAIN functions cannot be used. You can restrict personal information from being displayed by making settings on the control panel using "Restrict Display of User Information".
LPR	TCP:515	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	LPR functions cannot be used. You can restrict personal information from being displayed by making settings on the control panel using "Restrict Display of User Information".
IPP	TCP:631	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	IPP functions cannot be used.
SSDP	UDP:1900	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin	Device discovery using UPnP from Windows cannot be used.
Bonjour	UDP:5353	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	Bonjour functions cannot be used.
@Remote	TCP:7443 TCP:7444	• Control panel • telnet	@Remote cannot be used.

5

Protocol	Port	Setting method	When disabled
DIPRINT	TCP:9100	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	DIPRINT functions cannot be used.
RFU	TCP:10021	• Control panel • telnet	You can attempt to update firmware via FTP.
NetWare	(IPX/SPX)	• Control panel • Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	Cannot print with NetWare. SNMP over IPX cannot be used.
WSD (Device)	TCP:53000 (variable)	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	WSD (Device) functions cannot be used.
WSD (Printer)	TCP:53001 (variable)	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin • Remote Communication Gate S	WSD (Printer) functions cannot be used.
WS-Discovery	UDP/TCP: 3702	• telnet • Remote Communication Gate S	WSD (Device, Printer) search function cannot be used.

Protocol	Port	Setting method	When disabled
RHPP	TCP:59100	• Web Image Monitor • telnet • SmartDeviceMonitor for Admin	Cannot print with RHPP.
LLTD	-	• telnet	Device search function using LLTD cannot be used.
LLMNR	UDP:5355	• Web Image Monitor • telnet	Name resolution requests using LLMNR cannot be respond.

↓Note

- "Restrict Display of User Information" is one of the Extended Security features. For details about making this setting, see p.190 "Specifying the Extended Security Functions".

Enabling and Disabling Protocols Using the Control Panel

1. **Log in as the network administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Interface Settings].**
4. **Press [Network].**
5. **Press [▼] twice.**
6. **Press [Effective Protocol].**
7. **Set the desired protocols to active/inactive.**

   If the protocol you want to select is not displayed, press [▼].

8. **Press [OK].**
9. **Log out.**

Enabling and Disabling Protocols Using Web Image Monitor

1. **Log in as the network administrator from Web Image Monitor.**
2. **Point to [Device Management], and then click [Configuration].**
3. **Click [Network Security] under "Security".**
4. **Set the desired protocols to active/inactive (or open/close).**

5. **Click [OK].**

6. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

   If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

7. **Log out.**

Specifying Network Security Level

This setting lets you change the security level to limit unauthorized access. You can make network security level settings on the control panel, as well as Web Image Monitor. However, the protocols that can be specified differ.

⭐ **Important**

- With some utilities, communication or login may fail depending on the network security level.

Network Security Levels

Security Level	Description
[Level 0]	Select [Level 0] to use all features. Use this setting when you have no information that needs to be protected from external threats.
[Level 1]	Select [Level 1] for moderate security to protect important information. Use this setting if the printer is connected to a local area network (LAN).
[FIPS140]	Provides a security strength intermediate between [Level 1] and [Level 2]. You can only use codes recommended by the U.S. government as its coding/authentication algorithm. Settings other than the algorithm are the same as [Level 2].
[Level 2]	Select [Level 2] for maximum security to protect confidential information. Use this setting when it is necessary to protect information from external threats.
[Custom]	For configurations other than the levels above. Configure using Web Image Monitor.

Specifying Network Security Level Using the Control Panel

1. **Log in as the network administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] five times.**

5. **Press [Network Security Level].**

6. **Select the network security level.**

   Select [Level 0], [Level 1], [Level 2], or [FIPS140].

7. **Press [OK].**

8. **Log out.**

5

Specifying Network Security Level Using Web Image Monitor

1. **Log in as the network administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [Network Security] under "Security".**

4. **Select the network security level in "Security Level".**

5. **Click [OK].**

6. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

   If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

7. **Log out.**

Status of Functions under Each Network Security Level

TCP/IP

Function	Level 0	Level 1	FIPS 140	Level 2
TCP/IP	Active	Active	Active	Active
HTTP > Port 80	Open	Open	Open	Open
IPP > Port 80	Open	Open	Open	Open
IPP > Port 631	Open	Open	Close	Close
SSL/TLS > Port 443	Open	Open	Open	Open
SSL/TLS > Permit SSL/TLS Communication	Ciphertext Priority	Ciphertext Priority	Ciphertext Only	Ciphertext Only
SSL/TLS Version > TLS1.2	Active	Active	Active	Active
SSL/TLS Version > TLS1.1	Active	Active	Active	Active
SSL/TLS Version > TLS1.0	Active	Active	Active	Active
SSL/TLS Version > SSL3.0	Active	Active	Inactive	Inactive
Encryption Strength Setting > AES	128bit/ 256bit	128bit/ 256bit	128bit/ 256bit	128bit/ 256bit
Encryption Strength Setting > 3DES	168bit	168bit	168bit	-

Function	Level 0	Level 1	FIPS 140	Level 2
Encryption Strength Setting > RC4	-	-	-	-
DIPRINT	Active	Active	Inactive	Inactive
LPR	Active	Active	Inactive	Inactive
FTP	Active	Active	Active	Active
sftp	Active	Active	Active	Active
ssh	Active	Active	Active	Active
RSH/RCP	Active	Active	Inactive	Inactive
TELNET	Active	Inactive	Inactive	Inactive
Bonjour	Active	Active	Inactive	Inactive
SSDP	Active	Active	Inactive	Inactive
SMB	Active	Active	Inactive	Inactive
NetBIOS over TCP/IPv4	Active	Active	Inactive	Inactive
WSD (Device)	Active	Active	Active	Active
WSD (Printer)	Active	Active	Active	Active
WSD (Encrypted Communication of Device)	Inactive	Inactive	Active	Active
RHPP	Active	Active	Inactive	Inactive

The same settings are applied to IPv4 and IPv6.

TCP/IP setting is not governed by the security level. Manually specify whether to activate or inactivate this setting.

NetWare

Function	Level 0	Level 1	FIPS 140	Level 2
NetWare	Active	Active	Inactive	Inactive

If NetWare is not used on your network, the above settings are not applicable.

SNMP

Function	Level 0	Level 1	FIPS 140	Level 2
SNMP	Active	Active	Active	Active
Permit Settings by SNMPv1 and v2	On	Off	Off	Off
SNMPv1,v2 Function	Active	Active	Inactive	Inactive
SNMPv3 Function	Active	Active	Active	Active
Permit SNMPv3 Communication	Encryption/ Cleartext	Encryption/ Cleartext	Encryption Only	Encryption Only

TCP/IP Encryption Strength Setting

Function	Level 0	Level 1	FIPS 140	Level 2
ssh > Encryption Algorithm	DES/3DES/ AES-128/ AES-192/ AES-256/ Blowfish/ Arcfour	3DES/ AES-128/ AES-192/ AES-256/ Arcfour	3DES/ AES-128/ AES-192/ AES-256	3DES/ AES-128/ AES-192/ AES-256
SNMPv3 > Authentication Algorithm	MD5	SHA1	SHA1	SHA1
SNMPv3 > Encryption Algorithm	DES	DES	AES-128	AES-128
Kerberos Authentication > Encryption Algorithm	AES256-CTS- HMAC- SHA1-96/ AES128-CTS- HMAC- SHA1-96/ DES3-CBC- SHA1/RC4- HMAC/DES- CBC-MD5	AES256-CTS- HMAC- SHA1-96/ AES128-CTS- HMAC- SHA1-96/ DES3-CBC- SHA1/RC4- HMAC	AES256-CTS- HMAC- SHA1-96/ AES128-CTS- HMAC- SHA1-96/ DES3-CBC- SHA1	AES256-CTS- HMAC- SHA1-96/ AES128-CTS- HMAC- SHA1-96
Driver Encryption Key > Encryption Strength	Simple Encryption	DES	AES	AES

Protecting the Communication Path via a Device Certificate

This printer can protect its communication path and establish encrypted communications using SSL/TLS, IPsec, or IEEE 802.1X.

To use these protocols, it is necessary to create and install a device certificate for the printer in advance.

The following types of device certificate can be used:

- Self-signed certificate created by the machine
- Certificate issued by a certificate authority

⭐ **Important**

- The administrator is required to manage the expiration of certificates and renew the certificates before they expire.
- The administrator is required to check that the issuer of the certificate is valid.
- If SHA256 or SHA512 is selected as the "Algorithm Signature" of the device certificate, Windows XP SP3 or later is required to connect the device using Internet Explorer 6.0.

Creating and Installing a Device Certificate from the Control Panel (Self-Signed Certificate)

Create and install the device certificate using control panel.

This section explains the use of a self-signed certificate as the device certificate.

1. **Log in as the network administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Administrator Tools].**
4. **Press [▼] seven times.**
5. **Press [Program/Delete Device Certificate].**
6. **Press [Program].**

   Select [Delete] to delete the device certificate from the printer.

7. **Press [Certificate 1].**

   Only [Certificate 1] can be created from the control panel.

8. Make the necessary settings.

Press [▼] to flip through pages.

9. Press [OK].

"Installed" appears to the right of "Certificate Stat." to show that a device certificate for the printer has been installed.

10. Log out.

Creating and Installing a Device Certificate from Web Image Monitor (Self-Signed Certificate)

Create and install the device certificate using Web Image Monitor. For details about the displayed items and selectable items, see Web Image Monitor Help.

This section explains the use of a self-signed certificate as the device certificate.

1. Log in as the network administrator from Web Image Monitor.

2. Point to [Device Management], and then click [Configuration].

3. Click [Device Certificate] under "Security".

4. Check the radio button next to the number of the certificate you want to create.

To use SSL/TLS, select [Certificate 1]. To use any other protocol, select the certificate number desired.

5. Click [Create].

6. Make the necessary settings.

7. Click [OK].

The setting is changed.

8. Click [OK].

9. If a security warning dialog box appears, check the details, and then click [OK].

"Installed" appears under "Certificate Status" to show that a device certificate for the printer has been installed.

10. Log out.

◆Note

- Click [Delete] to delete the device certificate from the printer.

Creating the Device Certificate (Issued by a Certificate Authority)

Create the device certificate using Web Image Monitor. For details about the displayed items and selectable items, see Web Image Monitor Help.

This section explains the use of a certificate issued by a certificate authority as the device certificate.

1. **Log in as the network administrator from Web Image Monitor.**
2. **Point to [Device Management], and then click [Configuration].**
3. **Click [Device Certificate] under "Security".**
4. **Check the radio button next to the number of the certificate you want to create.**

   To use SSL/TLS, select [Certificate 1]. To use any other protocol, select the certificate number desired.
5. **Click [Request].**
6. **Make the necessary settings.**
7. **Click [OK].**

   The setting is changed.
8. **Click [OK].**

   "Requesting" appears for "Certificate Status".
9. **Log out.**
10. **Apply to the certificate authority for the device certificate.**

    The application procedure depends on the certificate authority. For details, contact the certificate authority.

    For the application, click Web Image Monitor Details icon and use the information that appears in "Certificate Details".

◆Note

- The issuing location may not be displayed if you request two certificates at the same time. When you install a certificate, be sure to check the certificate destination and installation procedure.
- Using Web Image Monitor, you can create the contents of the device certificate but you cannot send the certificate application.
- Click [Cancel Request] to cancel the request for the device certificate.

5

Installing the Device Certificate (Issued by a Certificate Authority)

Install the device certificate using Web Image Monitor. For details about the displayed items and selectable items, see Web Image Monitor Help.

This section explains the use of a certificate issued by a certificate authority as the device certificate.

Enter the device certificate contents issued by the certificate authority.

1. **Log in as the network administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [Device Certificate] under "Security".**

4. **Check the radio button next to the number of the certificate you want to install.**

   To use SSL/TLS, select [Certificate 1]. To use any other protocol, select the certificate number desired.

5. **Click [Install].**

6. **Enter the contents of the device certificate.**

   In the certificate box, enter the contents of the device certificate issued by the certificate authority.

   If you are installing an intermediate certificate, enter the contents of the intermediate certificate also.

   For details about the displayed items and selectable items, see Web Image Monitor Help.

7. **Click [OK].**

8. **Wait for about one or two minutes, and then click [OK].**

   "Installed" appears under "Certificate Status" to show that a device certificate for the printer has been installed.

9. **Log out.**

Installing an Intermediate Certificate (Issued by a Certificate Authority)

This section explains how to use Web Image Monitor to install an intermediate certificate issued by a certificate authority.

If you do not have the intermediate certificate issued by the certificate authority, a warning message will appear during communication. If the certificate authority has issued an intermediate certificate, we recommend installing the intermediate certificate.

1. **Log in as the network administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [Device Certificate] under "Security".**

4. **Check the radio button next to the number of the certificate you want to install.**

5. **Click [Install Intermediate Certificate].**

6. **Enter the contents of the intermediate certificate.**

   In the certificate box, enter the contents of the intermediate certificate issued by the certificate authority. For details about the items and settings of a certificate, see Web Image Monitor Help.

7. **Click [OK].**

8. **Wait for about one or two minutes, and then click [OK].**

   The intermediate certificate will be installed on the device. The "Certificate Details" screen will inform you whether or not the installation of the intermediate certificate was successful. For details about the "Certificate Details" screen, see Web Image Monitor Help.

9. **Log out.**

Configuring SSL/TLS

Configuring the printer to use SSL/TLS enables encrypted communication. Doing so helps prevent data from being intercepted, cracked or tampered with during transmission.

Flow of SSL/TLS encrypted communications

1. To access the printer from a user's computer, request the SSL/TLS device certificate and public key.
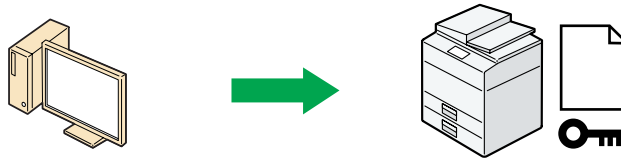
CJC002

2. The device certificate and public key are sent from the printer to the user's computer.
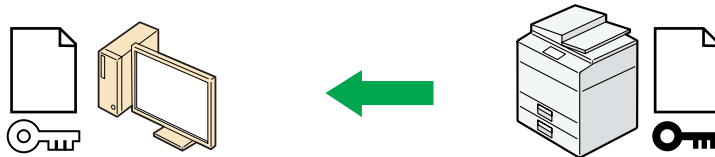
CJC003

3. The shared key created with the computer is encrypted using the public key, sent to the printer, and then decrypted using the private key in the printer.
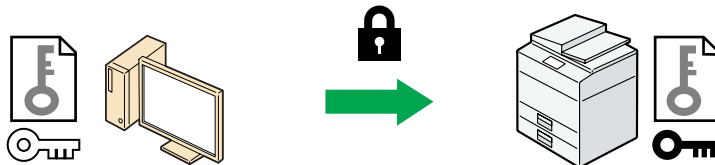
CJC004

4. The shared key is used for data encryption and decryption, thus achieving secure transmission.
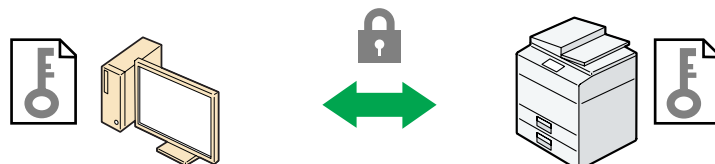
CJC005

Configuration flow when using a self-signed certificate

1. Creating and installing the device certificate

Create and install a device certificate from the control panel or Web Image Monitor.

2. Enabling SSL/TLS

Enable the SSL/TLS setting using Web Image Monitor.

Configuration flow when using an authority issued certificate

1. Creating a device certificate and applying to the authority

After creating a device certificate on Web Image Monitor, apply to the certificate authority.

The application procedure after creating the certificate depends on the certificate authority. Follow the procedure specified by the certificate authority.

2. Installing the device certificate

Install the device certificate using Web Image Monitor.

3. Enabling SSL/TLS

Enable the SSL/TLS setting using Web Image Monitor.

🔻**Note**

- To confirm whether SSL/TLS configuration is enabled, enter "https://(the printer's IP address or host name)/" in your Web browser's address bar to access this printer. If the "The page cannot be displayed" message appears, check the configuration because the current SSL/TLS configuration is invalid.

- If you enable SSL/TLS for IPP (printer functions), sent data is encrypted, preventing it from being intercepted, analyzed, or tampered with.

Enabling SSL/TLS

After installing the device certificate in the printer, enable the SSL/TLS setting.

This procedure is used for a self-signed certificate or a certificate issued by a certificate authority.

1. **Log in as the network administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [SSL/TLS] under "Security".**

4. **Click [Active] for the protocol version used in "SSL/TLS".**

5. **Select the encryption communication mode for "Permit SSL/TLS Communication".**

6. **If you want to disable a protocol, click [Inactive] next to "TLS1.2", "TLS1.1", "TLS1.0", or "SSL3.0".**

At least one of these protocols must be enabled.

7. **Under "Encryption Strength Setting", specify the strength of encryption to be applied for "AES", "3DES", and/or "RC4". You must select at least one check box.**

   Note that the availability of encryption strengths will vary depending on the settings you have specified for "TLS1.2", "TLS1.1", "TLS1.0", or "SSL3.0".

8. **Click [OK].**

9. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

   If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

10. **Log out.**

↓Note

- If you set "Permit SSL/TLS Communication" to [Ciphertext Only], enter " https://(the printer's IP address or host name)/" to access the printer.

- If you set "Permit SSL/TLS Communication" to [Ciphertext Only], communication will not be possible if you select a protocol that does not support a Web browser, or specify an encryption strength setting only. If this is the case, enable communication by setting [Permit SSL/TLS Communication] to [Ciphertext/Cleartext] using the printer's control panel, and then specify the correct protocol and encryption strength.

- The SSL/TLS version and encryption strength settings can be changed, even under [Network Security].

- Depending on the states you specify for "TLS1.2", "TLS1.1", "TLS1.0", and "SSL3.0", the printer might not be able to connect to an external LDAP server.

- If only TLS1.2 and TLS1.1 are enabled, Integration Server authentication cannot be performed.

- The following types of communication and data are always encrypted by SSL3.0: communication via @Remote, Integration Server authentication, and logs transferred to Remote Communication Gate S.

User Setting for SSL/TLS

We recommend that after installing the self-signed certificate or device certificate from a private certificate authority on the main unit and enabling SSL/TLS (communication encryption), you instruct users to install the certificate on their computers. Installation of the certificate is especially necessary for users who want to print via IPP-SSL from Windows Vista/7, Windows Server 2008/2008 R2. The network administrator must instruct each user to install the certificate.

↓Note

- Take the appropriate steps when you receive a user's inquiry concerning problems such as an expired certificate.

- Select [Trusted Root Certification Authorities] for the certificate store location when accessing the printer by IPP.

- If a certificate issued by a certificate authority is installed in the printer, confirm the certificate store location with the certificate authority.

- To change the host name or IP address in [Common Name] of the device certificate when using the operating system's standard IPP port under Windows Vista/7 or Windows Server 2008/2008 R2, delete any previously configured PC printer beforehand and re-install it after changing [Common Name]. Also, to change the user authentication settings (login user name and password), delete any previously configured PC printer beforehand and re-install it after changing the user authentication settings.

Setting the SSL/TLS Encryption Mode

By specifying the SSL/TLS encrypted communication mode, you can change the security level.

Encrypted communication mode

Using the encrypted communication mode, you can specify encrypted communication.

Encrypted communication mode	Description
Ciphertext Only	Allows encrypted communication only. If encryption is not possible, the printer does not communicate.
Ciphertext Priority	Performs encrypted communication if encryption is possible. If encryption is not possible, the printer communicates without it.
Ciphertext/Cleartext	Communicates with or without encryption, according to the setting.

After installing the device certificate, specify the SSL/TLS encrypted communication mode. By making this setting, you can change the security level.

1. **Log in as the network administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Interface Settings].**
4. **Press [Network].**
5. **Press [▼] three times.**
6. **Press [Permit SSL/TLS Communication].**

7. **Select the encrypted communication mode.**

   Select [Ciphertext Only], [Ciphertext Priority], or [Ciphertext/Cleartext] as the encrypted communication mode.

8. **Press [OK].**

9. **Log out.**

Note

- The SSL/TLS encrypted communication mode can also be specified using Web Image Monitor. For details, see Web Image Monitor Help.

Enabling SSL for SMTP Connections

Use the following procedure to enable SSL encryption for SMTP connections.

1. **Log in as the network administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Email Settings].**

4. **Press [SMTP Server].**

5. **Press [▼].**

6. **In "Use Secure Connection (SSL)", press [On].**

   If you are not using SSL for SMTP connections, press [Off].

   When "Use Secure Connection (SSL)" is set to [On], the port number is changed to 465.

7. **Press [OK].**

8. **Log out.**

Configuring IPsec

For communication security, this printer supports IPsec. IPsec transmits secure data packets at the IP protocol level using the shared key encryption method, where both the sender and receiver retain the same key. This printer has two methods that you can use to specify the shared encryption key for both parties: encryption key auto exchange and encryption key manual settings. Using the auto exchange setting, you can renew the shared key exchange settings within a specified validity period, and achieve higher transmission security.

⭐**Important**

- When "Inactive" is specified for "Exclude HTTPS Communication", access to Web Image Monitor can be lost if the key settings are improperly configured. In order to prevent this, you can specify IPsec to exclude HTTPS transmission by selecting "Active". When you want to include HTTPS transmission, we recommend that you select "Inactive" for "Exclude HTTPS Communication" after confirming that IPsec is properly configured. When "Active" is selected for "Exclude HTTPS Communication", even though HTTPS transmission is not targeted by IPsec, Web Image Monitor might become unusable when TCP is targeted by IPsec from the computer side. If you cannot access Web Image Monitor due to IPsec configuration problems, disable IPsec in System Settings on the control panel, and then access Web Image Monitor. For details about enabling and disabling IPsec using the control panel, see "System Settings", Operating Instructions.

- IPsec is not applied to data obtained through DHCP, DNS, or WINS.

- IPsec for IPv4 is supported by Windows XP SP2 and Windows Server 2003/2003 R2. IPsec for both IPv4 and IPv6 is supported by Windows Vista/7, Windows Server 2008/2008 R2, Mac OS X 10.4.8 and later, Red Hat Enterprise Linux WS 4.0 and Solaris 10. However, some setting items are not supported depending on the operating system. Make sure the IPsec settings you specify are consistent with the operating system's IPsec settings.

Encryption and Authentication by IPsec

IPsec consists of two main functions: the encryption function, which ensures the confidentiality of data, and the authentication function, which verifies the sender of the data and the data's integrity. This printer's IPsec function supports two security protocols: the ESP protocol, which enables both of the IPsec functions at the same time, and the AH protocol, which enables only the authentication function.

ESP protocol

The ESP protocol provides secure transmission through both encryption and authentication. This protocol does not provide header authentication.

- For successful encryption, both the sender and receiver must specify the same encryption algorithm and encryption key. If you use the encryption key auto exchange method, the encryption algorithm and encryption key are specified automatically.

- For successful authentication, the sender and receiver must specify the same authentication algorithm and authentication key. If you use the encryption key auto exchange method, the authentication algorithm and authentication key are specified automatically.

AH protocol

The AH protocol provides secure transmission through authentication of packets only, including headers.

- For successful authentication, the sender and receiver must specify the same authentication algorithm and authentication key. If you use the encryption key auto exchange method, the authentication algorithm and authentication key are specified automatically.

AH protocol + ESP protocol

When combined, the ESP and AH protocols provide secure transmission through both encryption and authentication. These protocols provide header authentication.

- For successful encryption, both the sender and receiver must specify the same encryption algorithm and encryption key. If you use the encryption key auto exchange method, the encryption algorithm and encryption key are specified automatically.

- For successful authentication, the sender and receiver must specify the same authentication algorithm and authentication key. If you use the encryption key auto exchange method, the authentication algorithm and authentication key are specified automatically.

Note

- Some operating systems use the term "Compliance" in place of "Authentication".

Encryption Key Auto Exchange Settings and Encryption Key Manual Settings

This printer provides two key setting methods: manual and auto exchange. Using either of these methods, agreements such as the IPsec algorithm and key must be specified for both sender and receiver. Such agreements form what is known as an SA (Security Association). IPsec communication is possible only if the receiver's and sender's SA settings are identical.

If you use the auto exchange method to specify the encryption key, the SA settings are auto configured on both parties' machines. However, before setting the IPsec SA, the ISAKMP SA (Phase 1) settings are auto configured. After this, the IPsec SA (Phase 2) settings, which allow actual IPsec transmission, are auto configured.

Also, for further security, the SA can be periodically auto updated by applying a validity period (time limit) for its settings. This printer only supports IKEv1 for encryption key auto exchange.

If you specify the encryption key manually, the SA settings must be shared and specified identically by both parties. To preserve the security of your SA settings, we recommend that they are not exchanged over a network.

Note that for both the manual and auto method of encryption key specification, multiple settings can be configured in the SA.

Settings 1-4 and default setting

Using either the manual or auto exchange method, you can configure four separate sets of SA details (such as different shared keys and IPsec algorithms). In the default settings of these sets, you can include settings that the fields of sets 1 to 4 cannot contain.

When IPsec is enabled, set 1 has the highest priority and 4 has the lowest. You can use this priority system to target IP addresses more securely. For example, set the broadest IP range at the lowest priority (4), and then set specific IP addresses at a higher priority level (3 and higher). This way, when IPsec transmission is enabled for a specific IP address, the higher level settings will be applied.

IPsec Settings

IPsec settings for this printer can be made on Web Image Monitor. The following table explains individual setting items.

Encryption key auto exchange / manual settings - shared settings

Setting	Description	Setting value
IPsec	Specify whether to enable or disable IPsec.	• Active • Inactive
Exclude HTTPS Communication	Specify whether to enable IPsec for HTTPS transmission.	• Active • Inactive Specify "Active" if you do not want to use IPsec for HTTPS transmission.
Encryption Key Manual Settings	Specify whether to enable Encryption Key Manual Settings, or use Encryption Key Auto Exchange Settings only.	• Active • Inactive Specify "Active" if you want to use "Encryption Key Manual Settings".

The IPsec setting can also be made from the control panel.

Encryption key auto exchange security level

When you select a security level, certain security settings are automatically configured. The following table explains security level features.

Security level	Security level features
Authentication Only	Select this level if you want to authenticate the transmission partner and prevent unauthorized data tampering, but not perform data packet encryption. Since the data is sent in cleartext, data packets are vulnerable to eavesdropping attacks. Do not select this if you are exchanging sensitive information.
Authentication and Low Level Encryption	Select this level if you want to encrypt the data packets as well as authenticate the transmission partner and prevent unauthorized packet tampering. Packet encryption helps prevent eavesdropping attacks. This level provides less security than "Authentication and High Level Encryption".
Authentication and High Level Encryption	Select this level if you want to encrypt the data packets as well as authenticate the transmission partner and prevent unauthorized packet tampering. Packet encryption helps prevent eavesdropping attacks. This level provides higher security than "Authentication and Low Level Encryption".

The following table lists the settings that are automatically configured according to the security level.

Setting	Authentication Only	Authentication and Low Level Encryption	Authentication and High Level Encryption
Security Policy	Apply	Apply	Apply
Encapsulation Mode	Transport	Transport	Transport
IPsec Requirement Level	Use When Possible	Use When Possible	Always Require
Authentication Method	PSK	PSK	PSK
Phase 1 Hash Algorithm	MD5	SHA1	SHA256
Phase 1 Encryption Algorithm	DES	3DES	AES-128-CBC

Setting	Authentication Only	Authentication and Low Level Encryption	Authentication and High Level Encryption
Phase 1 Diffie-Hellman Group	2	2	2
Phase 2 Security Protocol	AH	ESP	ESP
Phase 2 Authentication Algorithm	HMAC-SHA512-256/ HMAC-SHA384-192/ HMAC-SHA256-128/ HMAC-SHA1-96	HMAC-SHA512-256/ HMAC-SHA384-192/ HMAC-SHA256-128/ HMAC-SHA1-96	HMAC-SHA512-256/ HMAC-SHA384-192/ HMAC-SHA256-128
Phase 2 Encryption Algorithm	Cleartext (NULL encryption)	3DES/AES-128/ AES-192/AES-256	AES-128/AES-192/ AES-256
Phase 2 PFS	Inactive	Inactive	2

Encryption key auto exchange settings items

When you specify a security level, the corresponding security settings are automatically configured, but other settings, such as address type, local address, and remote address must still be configured manually.

After you specify a security level, you can still make changes to the auto configured settings. When you change an auto configured setting, the security level switches automatically to "User Setting".

Setting	Description	Setting value
Address Type	Specify the address type for which IPsec transmission is used.	• Inactive • IPv4 • IPv6 • IPv4/IPv6 (Default Settings only)
Local Address	Specify the printer's address. If you are using multiple addresses in IPv6, you can also specify an address range.	The printer's IPv4 or IPv6 address. If you are not setting an address range, enter 32 after an IPv4 address, or enter 128 after an IPv6 address.

Setting	Description	Setting value
Remote Address	Specify the address of the IPsec transmission partner. You can also specify an address range.	The IPsec transmission partner's IPv4 or IPv6 address. If you are not setting an address range, enter 32 after an IPv4 address, or enter 128 after an IPv6 address.
Security Policy	Specify how IPsec is handled.	• Apply • Bypass • Discard
Encapsulation Mode	Specify the encapsulation mode. (auto setting)	• Transport • Tunnel (Tunnel beginning address - Tunnel ending address) Select the transport mode (this has no bearing on the security level). If you specify "Tunnel", you must then specify the "Tunnel End Point", which are the beginning and ending IP addresses. Set the same address for the beginning point as you set in "Local Address".
IPsec Requirement Level	Specify whether to only transmit using IPsec, or to allow cleartext transmission when IPsec cannot be established. (auto setting)	• Use When Possible • Always Require

Setting	Description	Setting value
Authentication Method	Specify the method for authenticating transmission partners. (auto setting)	• PSK • Certificate If you specify "PSK", you must then set the PSK text (using ASCII characters). If you are using "PSK", specify a PSK password using up to 32 ASCII characters. If you specify "Certificate", the certificate for IPsec must be installed and specified before it can be used.
PSK Text	Specify the pre-shared key for PSK authentication.	Enter the pre-shared key required for PSK authentication.
Phase 1 Hash Algorithm	Specify the Hash algorithm to be used in phase 1. (auto setting)	• MD5 • SHA1 • SHA256 • SHA384 • SHA512
Phase 1 Encryption Algorithm	Specify the encryption algorithm to be used in phase 1. (auto setting)	• DES • 3DES • AES-128-CBC • AES-192-CBC • AES-256-CBC
Phase 1 Diffie-Hellman Group	Select the Diffie-Hellman group number used for IKE encryption key generation. (auto setting)	• 1 • 2 • 14
Phase 1 Validity Period	Specify the time period for which the SA settings in phase 1 are valid.	Set in seconds from 300 sec. (5 min.) to 172800 sec. (48 hrs.).

5

Setting	Description	Setting value
Phase 2 Security Protocol	Specify the security protocol to be used in Phase 2. To apply both encryption and authentication to sent data, specify "ESP" or "ESP+AH". To apply authentication data only, specify "AH". (auto setting)	• ESP • AH • ESP+AH
Phase 2 Authentication Algorithm	Specify the authentication algorithm to be used in phase 2. (auto setting)	• HMAC-MD5-96 • HMAC-SHA1-96 • HMAC-SHA256-128 • HMAC-SHA384-192 • HMAC-SHA512-256
Phase 2 Encryption Algorithm Permissions	Specify the encryption algorithm to be used in phase 2. (auto setting)	• Cleartext (NULL encryption) • DES • 3DES • AES-128 • AES-192 • AES-256
Phase 2 PFS	Specify whether to activate PFS. Then, if PFS is activated, select the Diffie-Hellman group. (auto setting)	• Inactive • 1 • 2 • 14
Phase 2 Validity Period	Specify the time period for which the SA settings in phase 2 are valid.	Specify a period (in seconds) from 300 (5min.) to 172800 (48 hrs.).

Encryption key manual settings items

Setting	Description	Setting value
Address Type	Specify the address type for which IPsec transmission is used.	• Inactive • IPv4 • IPv6 • IPv4/IPv6 (Default Settings only)
Local Address	Specify the printer's address. If you are using multiple IPv6 addresses, you can also specify an address range.	The printer's IPv4 or IPv6 address. If you are not setting an address range, enter 32 after an IPv4 address, or enter 128 after an IPv6 address.
Remote Address	Specify the address of the IPsec transmission partner. You can also specify an address range.	The IPsec transmission partner's IPv4 or IPv6 address. If you are not setting an address range, enter 32 after an IPv4 address, or enter 128 after an IPv6 address.
Encapsulation Mode	Select the encapsulation mode.	• Transport • Tunnel (Tunnel beginning address - Tunnel ending address) If you select "Tunnel", set the "Tunnel End Point", the beginning and ending IP addresses. In "Tunnel End Point", set the same address for the beginning point as you set in "Local Address".
SPI (Output)	Specify the same value as your transmission partner's SPI input value.	Any number between 256 and 4095
SPI (Input)	Specify the same value as your transmission partner's SPI output value.	Any number between 256 and 4095

5

Setting	Description	Setting value
Security Protocol	To apply both encryption and authentication to sent data, specify "ESP" or "ESP+AH". To apply authentication data only, specify "AH".	• ESP • AH • ESP+AH
Authentication Algorithm	Specify the authentication algorithm.	• HMAC-MD5-96 • HMAC-SHA1-96 • HMAC-SHA256-128 • HMAC-SHA384-192 • HMAC-SHA512-256
Authentication Key	Specify the key for the authentication algorithm.	Specify a value within the ranges shown below, according to the encryption algorithm. Hexadecimal value 0-9, a-f, A-F • If HMAC-MD5-96, set 32 digits • If HMAC-SHA1-96, set 40 digits • If HMAC-SHA256-128, set 64 digits • If HMAC-SHA384-192, set 96 digits • If HMAC-SHA512-256, set 128 digits ASCII • IF HMAC-MD5-96, set 16 characters • If HMAC-SHA1-96, set 20 characters • If HMAC-SHA256-128, set 32 characters • If HMAC-SHA384-192, set 48 characters • If HMAC-SHA512-256, set 64 characters

Setting	Description	Setting value
Encryption Algorithm	Specify the encryption algorithm.	• Cleartext (NULL encryption) • DES • 3DES • AES-128 • AES-192 • AES-256
Encryption Key	Specify the key for the encryption algorithm.	Specify a value within the ranges shown below, according to the encryption algorithm. hexadecimal value 0-9, a-f, A-F • DES, set 16 digits • 3DES, set 48 digits • AES-128, set 32 digits • AES-192, set 48 digits • AES-256, set 64 digits ASCII • DES, set 8 characters • 3DES, set 24 characters • AES-128, set 16 characters • AES-192, set 24 characters • AES-256, set 32 characters

5

Encryption Key Auto Exchange Settings Configuration Flow


```
        <Printer>                          <PC>

┌───────────────────────────┐    ┌───────────────────────────┐
│   Set the Security Level on │    │   Set the same items on the │
│     Web Image Monitor       │    │         printer             │
└───────────────────────────┘    └───────────────────────────┘
              │                                │
              ▼                                ▼
┌───────────────────────────┐    ┌───────────────────────────┐
│  Install the device certificate │ │  Install the device certificate │
│  only when using certificates   │ │  only when using certificates   │
└───────────────────────────┘    └───────────────────────────┘
              │                                │
              ▼                                ▼
┌───────────────────────────┐    ┌───────────────────────────┐
│   Activate IPsec settings   │    │   Activate IPsec settings   │
└───────────────────────────┘    └───────────────────────────┘
              │                                │
              ▼              ┌──────────────┐  ▼
              └─────────────►│ Confirm IPsec transmission │◄───────┘
                             └──────────────┘
                                    │
                                    ▼
```
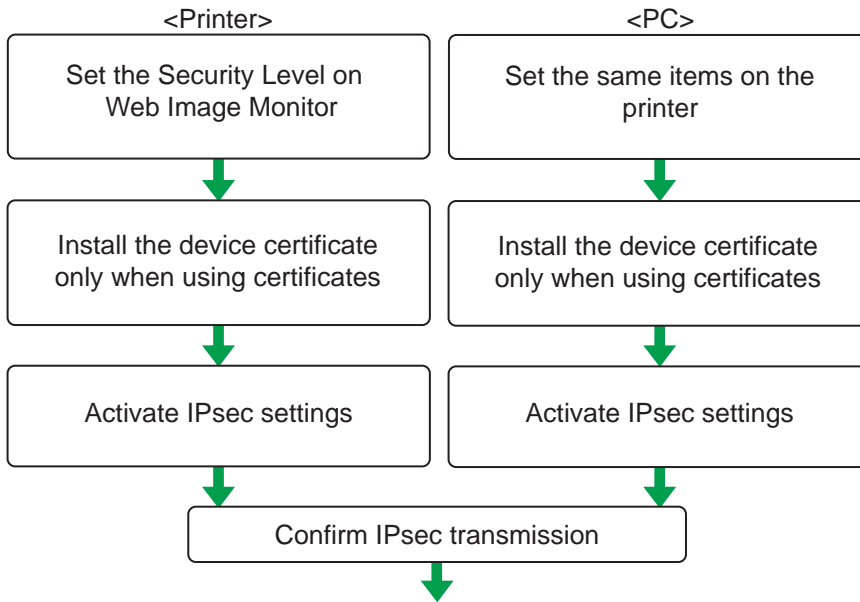
CJD018

◆Note

- To use a certificate to authenticate the transmission partner in encryption key auto exchange settings, a device certificate must be installed.

- After configuring IPsec, you can use "Ping" command to check if the connection is established correctly. However, you cannot use "Ping" command when ICMP is excluded from IPsec transmission on the computer side. Also, because the response is slow during initial key exchange, it may take some time to confirm that transmission has been established.

Specifying Encryption Key Auto Exchange Settings

1. **Log in as the network administrator from Web Image Monitor.**
2. **Point to [Device Management], and then click [Configuration].**
3. **Click [IPsec] under "Security".**
4. **Click [Edit] under "Encryption Key Auto Exchange Settings".**
5. **Make encryption key auto exchange settings in [Settings 1].**

   If you want to make multiple settings, select the settings number and add settings.
6. **Click [OK].**
7. **Select [Active] for "IPsec" in "IPsec".**

8. **Set "Exclude HTTPS Communication" to [Active] if you do not want to use IPsec for HTTPS transmission.**

9. **Click [OK].**

10. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

    If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

11. **Log out.**

⬇ **Note**

- To change the transmission partner authentication method for encryption key auto exchange settings to "Certificate", you must first install and assign a certificate. For details about creating and installing a device certificate, see p.95 "Protecting the Communication Path via a Device Certificate". For the method of assigning installed certificates to IPsec, see "Selecting the Certificate for IPsec".

Selecting the certificate for IPsec

Using Web Image Monitor, select the certificate to be used for IPsec. You must install the certificate before it can be used. For details about creating and installing a device certificate, see p.95 "Protecting the Communication Path via a Device Certificate".

1. **Log in as the network administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [Device Certificate] under "Security".**

4. **Select the certificate to be used for IPsec from the drop-down box in "IPsec" under "Certification".**

5. **Click [OK].**

    The certificate for IPsec is specified.

6. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

    If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

7. **Log out.**

Specifying IPsec settings on the computer

Specify exactly the same settings for IPsec SA settings on your computer as are specified by the printer's security level on the printer. Setting methods differ according to the computer's operating system. The example procedure shown here uses Windows 7 when the "Authentication and Low Level Encryption" security level is selected.

5

1. **On the [Start] menu, click [Control Panel], click [System and Security], and then click [Administrative Tools].**

   If you are using Windows XP, on the [Start] menu, click [Control Panel], click [Performance and Maintenance], and then click [Administrative Tools].

2. **Double-click [Local Security Policy].**

   If the "User Account Control" dialog box appears, click [Yes].

3. **Click [IP Security Policies on Local Computer].**

4. **In the "Action" menu, click [Create IP Security Policy].**

   The IP Security Policy Wizard appears.

5. **Click [Next].**

6. **Enter a security policy name in "Name", and then click [Next].**

7. **Clear the "Activate the default response rule" check box, and then click [Next].**

8. **Select "Edit properties", and then click [Finish].**

9. **In the "General" tab, click [Settings].**

   If you are using Windows XP, in the [General] tab, click [Advanced].

10. **In "Authenticate and generate a new key after every", enter the same validity period (in minutes) that is specified on the printer in "Encryption Key Auto Exchange Settings Phase 1", and then click [Methods].**

11. **Confirm that the hash algorithm ("Integrity"), encryption algorithm ("Encryption") and "Diffie-Hellman Group" settings in "Security method preference order" all match those specified on the printer in "Encryption Key Auto Exchange Settings Phase 1".**

    If the settings are not displayed, click [Add].

12. **Click [OK] twice.**

13. **Click [Add] in the "Rules" tab.**

    The Security Rule Wizard appears.

14. **Click [Next].**

15. **Select "This rule does not specify a tunnel", and then click [Next].**

16. **Select the type of network for IPsec, and then click [Next].**

17. **For Windows XP, select the authentication method, and then click [Next]. For Windows 7, go to Step 18.**

    If you select "Certificate" for authentication method in "Encryption Key Auto Exchange Settings" on the machine, specify the device certificate. If you select "PSK", enter the same PSK text specified on the machine with the pre-shared key.

18. **Click [Add] in the IP Filter List.**

19. **In [Name], enter an IP Filter name, and then click [Add].**

    The IP Filter Wizard appears.

20. **Click [Next].**

21. **If required, enter a description of the IP filter, and then click [Next].**

    For Windows XP, go to Step 22.

22. **Select "My IP Address" in "Source address", and then click [Next].**

23. **Select "A specific IP Address or Subnet" in "Destination address", enter the printer's IP address, and then click [Next].**

24. **Select the protocol type for IPsec, and then click [Next].**

    If you are using IPsec with IPv6, select "58" as the protocol number for the "Other" target protocol type.

25. **Click [Finish].**

26. **Click [OK].**

27. **Select the IP filter that was just created, and then click [Next].**

28. **Click [Add].**

    Filter action wizard appears.

29. **Click [Next].**

30. **In [Name], enter an IP Filter action name, and then click [Next].**

31. **Select "Negotiate security", and then click [Next].**

32. **Select "Allow unsecured communication if a secure connection connect be established.", and then [Next].**

33. **Select "Custom" and click [Settings].**

34. **In "Integrity algorithm", select the authentication algorithm that was specified on the printer in "Encryption Key Auto Exchange Settings Phase 2".**

35. **In "Encryption algorithm", select the encryption algorithm that specified on the printer in "Encryption Key Auto Exchange Settings Phase 2".**

36. **In Session key settings, select "Generate a new key every", and enter the validity period (in seconds) that was specified on the printer in "Encryption Key Auto Exchange Settings Phase 2".**

37. **Click [OK].**

38. **Click [Next].**

39. **Click [Finish].**

40. **Select the filter action that was just created, and then click [Next].**

5

41. Select the authentication method, and then click [Next]. For Windows XP, go to Step 42.

If you select "Certificate" for authentication method in "Encryption Key Auto Exchange Settings" on the printer, specify the device certificate. If you select "PSK", enter the same PSK text specified on the printer with the pre-shared key.

42. Click [Finish].

43. Click [OK].

The new IP security policy (IPsec settings) is specified.

44. Select the security policy that was just created, right click, and then click [Assign].

IPsec settings on the computer are enabled.

✏ Note

- To disable the computer's IPsec settings, select the security policy, right click, and then click [Unassign].

- If you specify the "Authentication and High Level Encryption" security level in "Encryption Key Auto Exchange Settings", also select the "Use session key perfect forward secrecy (PFS)" check box in the filter action properties screen. If using PFS in Windows, the PFS group number used in phase 2 is automatically negotiated in phase 1 from the Diffie-Hellman group number (set in step 11). Consequently, if you change the security level specified automatic settings on the printer and "User Setting" appears, you must set the same the group number for "Phase 1 Diffie-Hellman Group" and "Phase 2 PFS" on the printer to establish IPsec transmission.

Encryption Key Manual Settings Configuration Flow
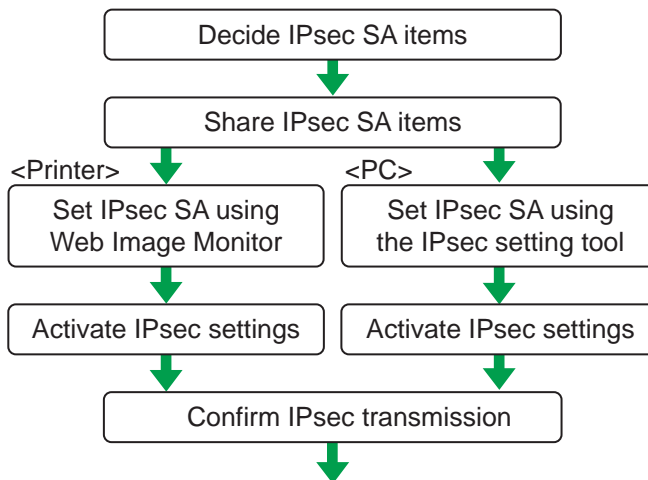
CJD019

↓Note

- Before transmission, SA information is shared and specified by the sender and receiver. To prevent SA information leakage, we recommend that this exchange is not performed over the network.

- After configuring IPsec, you can use "Ping" command to check if the connection is established correctly. However, you cannot use "Ping" command when ICMP is excluded from IPsec transmission. Also, because the response is slow during initial key exchange, it may take some time to confirm that transmission has been established.

Specifying Encryption Key Manual Settings

1. **Log in as the network administrator from Web Image Monitor.**
2. **Point to [Device Management], and then click [Configuration].**
3. **Click [IPsec] under "Security".**
4. **Select [Active] for "Encryption Key Manual Settings".**
5. **Click [Edit] under "Encryption Key Manual Settings".**
6. **Set items for encryption key manual settings in [Settings 1].**

   If you want to make multiple settings, select the settings number and add settings.
7. **Click [OK].**
8. **Select [Active] for "IPsec" in "IPsec".**
9. **Set "Exclude HTTPS Communication" to [Active] if you do not want to use IPsec for HTTPS communication.**
10. **Click [OK].**
11. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

    If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.
12. **Log out.**

telnet Setting Commands

You can use telnet to confirm IPsec settings and make setting changes. This section explains telnet commands for IPsec. The default user name for logging in to telnet is "admin". The password is not configured by default.

★Important

- If you are using a certificate as the authentication method in encryption key auto exchange settings (IKE), install the certificate using Web Image Monitor. A certificate cannot be installed using telnet.

ipsec

To display IPsec related settings information, use the "ipsec" command.

Display current settings

```
msh> ipsec
```

Displays the following IPsec settings information:

- IPsec shared settings values

- Encryption key manual settings, SA setting 1-4 values

- Encryption key manual settings, default setting values

- Encryption key auto exchange settings, IKE setting 1-4 values

- Encryption key auto exchange settings, IKE default setting values

Display current settings portions

```
msh> ipsec -p
```

- Displays IPsec settings information in portions.

ipsec manual_mode

To display or specify encryption key manual settings, use the "ipsec manual_mode" command.

Display current settings

```
msh> ipsec manual_mode
```

- Displays the current encryption key manual settings.

Specify encryption key manual settings

```
msh> ipsec manual_mode {on|off}
```

- To enable encryption key manual settings, set to [on]. To disable settings, set to [off].

ipsec exclude

To display or specify protocols excluded by IPsec, use the "ipsec exclude" command.

Display current settings

```
msh> ipsec exclude
```

- Displays the protocols currently excluded from IPsec transmission.

Specify protocols to exclude

```
msh> ipsec exclude {https|dns|dhcp|wins|all} {on|off}
```

- Specify the protocol, and then enter [on] to exclude it, or [off] to include it for IPsec transmission. Entering [all] specifies all protocols collectively.

ipsec manual

To display or specify the encryption key manual settings, use the "ipsec manual" command.

Display current settings

```
msh> ipsec manual {1|2|3|4|default}
```

- To display the settings 1-4, specify the number [1-4].

- To display the default setting, specify [default].

- Not specifying any value displays all of the settings.

Disable settings

```
msh> ipsec manual {1|2|3|4|default} disable
```

- To disable the settings 1-4, specify the setting number [1-4].

- To disable the default settings, specify [default].

Specify the local/remote address for settings 1-4

```
msh> ipsec manual {1|2|3|4} {ipv4|ipv6} "local address" "remote address"
```

- Enter the separate setting number [1-4] and specify the local address and remote address.

- To specify the local or remote address value, specify masklen by entering [/] and an integer 0-32 if you are specifying an IPv4 address. If you are specifying an IPv6 address, specify masklen by entering [/] and an integer 0-128.

- Not specifying an address value displays the current setting.

Specify the address type in default setting

```
msh> ipsec manual default {ipv4|ipv6|any}
```

- Specify the address type for the default setting.

- To specify both IPv4 and IPv6, enter [any].

Security protocol setting

```
msh> ipsec manual {1|2|3|4|default} proto {ah|esp|dual}
```

- Enter the separate setting number [1-4] or [default] and specify the security protocol.

- To specify AH, enter [ah]. To specify ESP, enter [esp]. To specify AH and ESP, enter [dual].

- Not specifying a protocol displays the current setting.

SPI value setting

```
msh> ipsec manual {1|2|3|4|default} spi "SPI input value" "SPI output value"
```

- Enter the separate setting number [1-4] or [default] and specify the SPI input and output values.

- Specify a decimal number between 256-4095, for both the SPI input and output values.

- Not specifying a SPI value displays the current setting.

Encapsulation mode setting

```
msh> ipsec manual {1|2|3|4|default} mode {transport|tunnel}
```

- Enter the separate setting number [1-4] or [default] and specify the encapsulation mode.

- To specify transport mode, enter [transport]. To specify tunnel mode, enter [tunnel].

- If you have set the address type in the default setting to [any], you cannot use [tunnel] in encapsulation mode.

- Not specifying an encapsulation mode displays the current setting.

Tunnel end point setting

```
msh> ipsec manual {1|2|3|4|default} tunneladdar "beginning IP address" "ending
IP address"
```

- Enter the separate setting number [1-4] or [default] and specify the tunnel end point beginning and ending IP address.

- Not specifying either the beginning or ending address displays the current settings.

Authentication algorithm and authentication key settings

```
msh> ipsec manual {1|2|3|4|default} auth {hmac-md5|hmac-sha1|hmac-sha256|hmac-
sha384|hmac-sha512} "authentication key"
```

- Enter the separate setting number [1-4] or [default] and specify the authentication algorithm, and then set the authentication key.

- If you are setting a hexadecimal number, attach 0x at the beginning.

- If you are setting an ASCII character string, enter it as is.

- Not specifying either the authentication algorithm or key displays the current setting. (The authentication key is not displayed.)

Encryption algorithm and encryption key setting

```
msh> ipsec manual {1|2|3|4|default} encrypt {null|des|3des|aes128|aes192|
aes256} "encryption key"
```

- Enter the separate setting number [1-4] or [default], specify the encryption algorithm, and then set the encryption key.

- If you are setting a hexadecimal number, attach 0x at the beginning. If you have set the encryption algorithm to [null], enter an encryption key of arbitrary numbers 2-64 digits long.

- If you are setting an ASCII character string, enter it as is. If you have set the encryption algorithm to [null], enter an encryption key of arbitrary numbers 1-32 digits long.

- Not specifying an encryption algorithm or key displays the current setting. (The encryption key is not displayed.)

Reset setting values

```
msh> ipsec manual {1|2|3|4|default|all} clear
```

• Enter the separate setting number [1-4] or [default] and reset the specified setting. Specifying [all] resets all of the settings, including default.

ipsec ike

To display or specify the encryption key auto exchange settings, use the "ipsec ike" command.

Display current settings

    msh> ipsec ike {1|2|3|4|default}

• To display the settings 1-4, specify the number [1-4].

• To display the default setting, specify [default].

• Not specifying any value displays all of the settings.

Disable settings

    msh> ipsec ike {1|2|3|4|default} disable

• To disable the settings 1-4, specify the number [1-4].

• To disable the default settings, specify [default].

Specify the local/remote address for settings 1-4

    msh> ipsec ike {1|2|3|4} {ipv4|ipv6} "local address" "remote address"

• Enter the separate setting number [1-4], and the address type to specify local and remote address.

• To set the local or remote address values, specify masklen by entering [/] and an integer 0-32 when settings an IPv4 address. When setting an IPv6 address, specify masklen by entering [/] and an integer 0-128.

• Not specifying an address value displays the current setting.

Specify the address type in default setting

    msh> ipsec ike default {ipv4|ipv6|any}

• Specify the address type for the default setting.

• To specify both IPv4 and IPv6, enter [any].

Security policy setting

    msh> ipsec ike {1|2|3|4|default} proc {apply|bypass|discard}

• Enter the separate setting number [1-4] or [default] and specify the security policy for the address specified in the selected setting.

• To apply IPsec to the relevant packets, specify [apply]. To not apply IPsec, specify [bypass].

• If you specify [discard], any packets to which IPsec can be applied are discarded.

• Not specifying a security policy displays the current setting.

Security protocol setting

```
msh> ipsec ike {1|2|3|4|default} proto {ah|esp|dual}
```

- Enter the separate setting number [1-4] or [default] and specify the security protocol.

- To specify AH, enter [ah]. To specify ESP, enter [esp]. To specify AH and ESP, enter [dual].

- Not specifying a protocol displays the current setting.

IPsec requirement level setting

```
msh> ipsec ike {1|2|3|4|default} level {require|use}
```

- Enter the separate setting number [1-4] or [default] and specify the IPsec requirement level.

- If you specify [require], data will not be transmitted when IPsec cannot be used. If you specify [use], data will be sent normally when IPsec cannot be used. When IPsec can be used, IPsec transmission is performed.

- Not specifying a requirement level displays the current setting.

Encapsulation mode setting

```
msh> ipsec ike {1|2|3|4|default} mode {transport|tunnel}
```

- Enter the separate setting number [1-4] or [default] and specify the encapsulation mode.

- To specify transport mode, enter [transport]. To specify tunnel mode, enter [tunnel].

- If you have set the address type in the default setting to [any], you cannot use [tunnel] in encapsulation mode.

- Not specifying an encapsulation mode displays the current setting.

Tunnel end point setting

```
msh> ipsec ike {1|2|3|4|default} tunneladdr "beginning IP address" "ending IP
address"
```

- Enter the separate setting number [1-4] or [default] and specify the tunnel end point beginning and ending IP address.

- Not specifying either the beginning or ending address displays the current setting.

IKE partner authentication method setting

```
msh> ipsec ike {1|2|3|4|default} auth {psk|rsasig}
```

- Enter the separate setting number [1-4] or [default] and specify the authentication method.

- Specify [psk] to use a shared key as the authentication method. Specify [rsasig] to use a certificate at the authentication method.

- You must also specify the PSK character string when you select [psk].

- Note that if you select "Certificate", the certificate for IPsec must be installed and specified before it can be used. To install and specify the certificate use Web Image Monitor.

PSK character string setting

```
msh> ipsec ike {1|2|3|4|default} psk "PSK character string"
```

- If you select PSK as the authentication method, enter the separate setting number [1-4] or [default] and specify the PSK character string.

- Specify the character string in ASCII characters. There can be no abbreviations.

ISAKMP SA (phase 1) hash algorithm setting

```
msh> ipsec ike {1|2|3|4|default} ph1 hash {md5|sha1|sha256|sha384|sha512}
```

- Enter the separate setting number [1-4] or [default] and specify the ISAKMP SA (phase 1) hash algorithm.

- Not specifying the hash algorithm displays the current setting.

ISAKMP SA (phase 1) encryption algorithm setting

```
msh> ipsec ike {1|2|3|4|default} ph1 encrypt {des|3des|aes128|aes192|aes256}
```

- Enter the separate setting number [1-4] or [default] and specify the ISAKMP SA (phase 1) encryption algorithm.

- Not specifying an encryption algorithm displays the current setting.

ISAKMP SA (phase 1) Diffie-Hellman group setting

```
msh> ipsec ike {1|2|3|4|default} ph1 dhgroup {1|2|14}
```

- Enter the separate setting number [1-4] or [default] and specify the ISAKMP SA (phase 1) Diffie-Hellman group number.

- Specify the group number to be used.

- Not specifying a group number displays the current setting.

ISAKMP SA (phase 1) validity period setting

```
msh> ipsec ike {1|2|3|4|default} ph1 lifetime "validity period"
```

- Enter the separate setting number [1-4] or [default] and specify the ISAKMP SA (phase 1) validity period.

- Enter the validity period (in seconds) from 300 to 172800.

- Not specifying a validity period displays the current setting.

IPsec SA (phase 2) authentication algorithm setting

```
msh> ipsec ike {1|2|3|4|default} ph2 auth {hmac-md5|hmac-sha1|hmac-sha256|hmac-
sha384|hmac-sha512}
```

- Enter the separate setting number [1-4] or [default] and specify the IPsec SA (phase 2) authentication algorithm.

- Separate multiple encryption algorithm entries with a comma (,). The current setting values are displayed in order of highest priority.

- Not specifying an authentication algorithm displays the current setting.

IPsec SA (phase 2) encryption algorithm setting

```
msh> ipsec ike {1|2|3|4|default} ph2 encrypt {null|des|3des|aes128|aes192|
aes256}
```

- Enter the separate setting number [1-4] or [default] and specify the IPsec SA (phase 2) encryption algorithm.

- Separate multiple encryption algorithm entries with a comma (,). The current setting values are displayed in order of highest priority.

- Not specifying an encryption algorithm displays the current setting.

IPsec SA (phase 2) PFS setting

```
msh> ipsec ike {1|2|3|4|default} ph2 pfs {none|1|2|14}
```

- Enter the separate setting number [1-4] or [default] and specify the IPsec SA (phase 2) Diffie-Hellman group number.

- Specify the group number to be used.

- Not specifying a group number displays the current setting.

IPsec SA (phase 2) validity period setting

```
msh> ipsec ike {1|2|3|4|default} ph2 lifetime "validity period"
```

- Enter the separate setting number [1-4] or [default] and specify the IPsec SA (phase 2) validity period.

- Enter the validity period (in seconds) from 300 to 172800.

- Not specifying a validity period displays the current setting.

Reset setting values

```
msh> ipsec ike {1|2|3|4|default|all} clear
```

- Enter the separate setting number [1-4] or [default] and reset the specified setting. Specifying [all] resets all of the settings, including default.

Setting Security Method of Wireless LAN

Setting a WEP Key

If the wireless network uses WEP to encrypt transmitted data, the corresponding WEP key must be set to the printer to allow communications with other network devices.

1. **The network administrator logs in from the control panel.**
2. **Press [System Settings].**
3. **Press [Interface Settings].**
4. **Press [Wireless LAN].**
5. **Press [Security Method].**
6. **Press [WEP], and then press [WEP (Encryption) Key].**
7. **Enter the characters, and then press [OK].**
    - For a 64-bit WEP key, enter the key using either 10 hexadecimal characters or 5 ASCII characters.
    - For a 128-bit WEP key, enter the key using either 26 hexadecimal characters or 13 ASCII characters.
    - For ASCII character strings, uppercase and lowercase letters are differentiated, so be sure to enter characters in the required case.
8. **Press [OK].**
9. **Press [Exit].**
10. **Log out.**

🔽 Note

- The WEP key can also be set using a Web browser. For details, see Web Image Monitor Help.

Setting WPA

In the case of using WPA on a network, activate the WPA setting to be used for communication along with WPA.

1. **The network administrator logs in from the control panel.**
2. **Press [System Settings].**
3. **Press [Interface Settings].**
4. **Press [Wireless LAN].**
5. **Press [Security Method].**

6. **Press [WPA], and then press [WPA Authent. Method].**

7. **Select authentication settings.**

   Authentication settings are as follows:

   - [WPA]

     The printer performs authentication using an external authentication server (RADIUS server) that supports IEEE 802.1X.

   - [WPA2]

     WPA2 is an expanded version of WPA that fully supports IEEE 802.11i.

     As with WPA, the printer performs authentication using an external authentication server (RADIUS server) that supports IEEE 802.1X.

   - [WPA-PSK]

     Performs authentication using an encryption key (a Pre-Shared Key) that is shared by the access point and client. External authentication servers are not used.

   - [WPA2-PSK]

     As with WPA-PSK, authenticate using the encryption key (a Pre-Shared Key) shared by the access point and client. External authentication servers are not used.

   If "WPA" or "WPA2" is selected, proceed to step 9.

   If "WPA-PSK" or "WPA2-PSK" is selected, proceed to step 8.

8. **Press [PSK], and then enter the Pre-Shared Key, and then press [OK].**

   - Enter the Pre-Shared Key using between 8 and 63 ASCII characters.

   - Uppercase and lowercase letters are differentiated, so be sure to enter characters in the required case.

9. **Press [OK] twice.**

10. **Press [Exit].**

11. **Log out.**

⬇ **Note**

- To set the encryption method to [WPA] or [WPA2], you must specify IEEE 802.1X. For details, see p.131 "Configuring IEEE 802.1X Authentication".

- This can also be specified via Web Image Monitor. For details, see Web Image Monitor Help.

Configuring IEEE 802.1X Authentication

IEEE 802.1X is an authentication function that can be used with both wired and wireless networks. Authentication is performed by the authentication server (RADIUS server).

You can select four types of EAP authentication method: EAP-TLS, LEAP, EAP-TTLS and PEAP. Note that each EAP authentication method has different configuration settings and authentication procedures.

Types and requirements of certificates are as follows:

EAP type	Required certificates
EAP-TLS	Site certificate, Device certificate (IEEE 802.1X Client Certificate)
LEAP	-
EAP-TTLS	Site certificate
PEAP	Site certificate
PEAP (Phase 2 is for TLS only)	Site certificate, Device certificate (IEEE 802.1X Client Certificate)

Installing a Site Certificate

Install a site certificate (root CA certificate) for verifying the reliability of the authentication server. You need to have at least a certificate issued by the certificate authority who signed the server certificate or a certificate from a higher certificate authority.

Only PEM (Base64-encoded X.509) site certificates can be imported.

1. **Log in as the network administrator from Web Image Monitor.**
2. **Point to [Device Management], and then click [Configuration].**
3. **Click [Site Certificate] under "Security".**
4. **Click [Browse] on the "Site Certificate to Import" window, and then select the CA certificate you obtained.**
5. **Click [Open].**
6. **Click [Import].**
7. **Check that the imported certificate's [Status] shows "Trustworthy".**

   If [Site Certificate Check] shows [Active], and the [Status] of the certificate shows [Untrustworthy], communication might not be possible.
8. **Click [OK].**
9. **Log out.**

Selecting the Device Certificate

Select the certificate to use under IEEE 802.1X from among the device certificates created and installed in advance on the printer. For details about creating and installing a device certificate, see p.95 "Protecting the Communication Path via a Device Certificate".

1. **Log in as the network administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [Device Certificate] under "Security".**

4. **Select the certificate to be used for IEEE 802.1X from the drop-down box in "IEEE 802.1X" under "Certification".**

5. **Click [OK].**

6. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

   If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

7. **Log out.**

Setting Items of IEEE 802.1X for Ethernet

1. **Log in as the network administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [IEEE 802.1X] under "Security".**

4. **In "User Name", enter the user name set in the RADIUS server.**

5. **Enter the domain name in "Domain Name".**

6. **Select "EAP Type". Configurations differ according to the EAP Type.**

   EAP-TLS

   - Make the following settings according to the operating system you are using:
     - Select [On] or [Off] in "Authenticate Server Certificate".
     - Select [On] or [Off] in "Trust Intermediate Certificate Authority".
     - Enter the host name of the RADIUS server on "Server ID".
     - Select [On] or [Off] in "Permit Sub-domain".

   LEAP

   - Click [Change] in "Password", and then enter the password set in the RADIUS server.

   EAP-TTLS

   - Click [Change] in "Password", and then enter the password set in the RADIUS server.

- Click [Change] in "Phase 2 User Name", and then enter the user name set in the RADIUS server.
- Select [CHAP], [MSCHAP], [MSCHAPv2], [PAP], or [MD5] in "Phase 2 Method".

  Certain methods might not be available, depending on the RADIUS server you want to use.
- Make the following settings according to the operating system you are using:
  - Select [On] or [Off] in "Authenticate Server Certificate".
  - Select [On] or [Off] in "Trust Intermediate Certificate Authority".
  - Enter the host name of the RADIUS server in "Server ID".
  - Select [On] or [Off] in "Permit Sub-domain".

PEAP

- Click [Change] in "Password", and then enter the password set in the RADIUS server.

  If [TLS] is selected for "Phase 2 Method", you do not need to specify a password.
- Click [Change] on "Phase 2 User Name", and then enter the user name set in the RADIUS server.
- Select [MSCHAPv2] or [TLS] in "Phase 2 Method".

  When you select [TLS], you must install "IEEE 802.1X Client Certificate".
- Make the following settings according to the operating system you are using:
  - Select [On] or [Off] in "Authenticate Server Certificate".
  - Select [On] or [Off] in "Trust Intermediate Certificate Authority".
  - Enter the host name of the RADIUS server on "Server ID".
  - Select [On] or [Off] in "Permit Sub-domain".

7. **Click [OK].**

8. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

   If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

9. **Click [Interface Settings] under "Interface".**

10. **Select [Active] in "Ethernet Security".**

11. **Click [OK].**

12. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

    If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

13. **Log out.**

↓Note

- If there is a problem with settings, you might not be able to communicate with the printer. In such a case, access [Print List] in [Interface Settings] on the control panel, and then print the network summary to check the status.

- If you cannot identify the problem, execute [Restore IEEE 802.1X Authentication to Defaults] in [Network] in [Interface Settings] on the control panel, and then repeat the procedure.

Setting Items of IEEE 802.1X for Wireless LAN

1. **Log in as the network administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [IEEE 802.1X] under "Security".**

4. **In "User Name", enter the user name set in the RADIUS server.**

5. **Enter the domain name in "Domain Name".**

6. **Select "EAP Type". Configurations differ according to the EAP Type.**

   EAP-TLS

   - Make the following settings according to the operating system you are using:

     - Select [On] or [Off] in "Authenticate Server Certificate".

     - Select [On] or [Off] in "Trust Intermediate Certificate Authority".

     - Enter the host name of the RADIUS server on "Server ID".

     - Select [On] or [Off] in "Permit Sub-domain".

   LEAP

   - Click [Change] in "Password", and then enter the password set in the RADIUS server.

   EAP-TTLS

   - Click [Change] in "Password", and then enter the password set in the RADIUS server.

   - Click [Change] in "Phase 2 User Name", and then enter the user name set in the RADIUS server.

   - Select [CHAP], [MSCHAP], [MSCHAPv2], [PAP], or [MD5] in "Phase 2 Method".

     Certain methods might not be available, depending on the RADIUS server you want to use.

   - Make the following settings according to the operating system you are using:

     - Select [On] or [Off] in "Authenticate Server Certificate".

     - Select [On] or [Off] in "Trust Intermediate Certificate Authority".

     - Enter the host name of the RADIUS server in "Server ID".

     - Select [On] or [Off] in "Permit Sub-domain".

PEAP

- Click [Change] in "Password", and then enter the password set in the RADIUS server.

  If [TLS] is selected for "Phase 2 Method", you do not need to specify a password.

- Click [Change] on "Phase 2 User Name", and then enter the user name set in the RADIUS server.

- Select [MSCHAPv2] or [TLS] in "Phase 2 Method".

  When you select [TLS], you must install "IEEE 802.1X Client Certificate".

- Make the following settings according to the operating system you are using:

  - Select [On] or [Off] in "Authenticate Server Certificate".

  - Select [On] or [Off] in "Trust Intermediate Certificate Authority".

  - Enter the host name of the RADIUS server on "Server ID".

  - Select [On] or [Off] in "Permit Sub-domain".

7. **Click [OK].**

8. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

   If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

9. **Click [Wireless LAN Settings] under "Interface".**

10. **Select [Wireless LAN] in "LAN Type".**

11. **Select [Infrastructure Mode] in "Communication Mode".**

12. **Enter the alphanumeric characters (a-z, A-Z, or 0-9) in [SSID] according to the access point you want to use.**

13. **Select [WPA] in "Security Method".**

14. **Select [WPA] or [WPA2] in "WPA Authentication Method".**

15. **Click [OK].**

16. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

    If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

17. **Log out.**

↓Note

- If there is a problem with settings, you might not be able to communicate with the printer. In such a case, access [Print List] in [Interface Settings] on the control panel, and then print the network summary to check the status.

- If you cannot identify the problem, execute [Restore IEEE 802.1X Authentication to Defaults] in [Network] in [Interface Settings] on the control panel, and then repeat the procedure.

SNMPv3 Encryption

When using SmartDeviceMonitor for Admin or another application to make various settings, you can encrypt the data transmitted.

By making this setting, you can protect data from being tampered with.

1. **Log in as the network administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Interface Settings].**
4. **Press [Network].**
5. **Press [▼] three times.**
6. **Press [Permit SNMPv3 Communication].**
7. **Press [Encryption Only].**
8. **Press [OK].**
9. **Log out.**

↓Note

- To use SmartDeviceMonitor for Admin for encrypting the data for specifying settings, you need to specify the network administrator's [Encryption Password] setting and [Encryption Password] in [SNMP Authentication Information] in SmartDeviceMonitor for Admin, in addition to specifying [Permit SNMPv3 Communication] on the printer. For details about specifying [Encryption Password] in SmartDeviceMonitor for Admin, see SmartDeviceMonitor for Admin Help.

- If network administrator's [Encryption Password] setting is not specified, the data for transmission may not be encrypted or sent. For details about specifying the network administrator's [Encryption Password] setting, see p.14 "Registering and Changing Administrators".

Encrypting Transmitted Passwords

Configuring the driver encryption key and password encryption for IPP authentication enables communication with encrypted passwords as well as increasing the security against password cracking. In order to further enhance security, we recommend using IPsec, SNMPv3 and SSL/TLS all together.

Also, encrypt the login password for administrator authentication and user authentication.

Driver Encryption Key

This key is a character string used for encrypting login passwords or document passwords sent from each driver when user authentication is ON.

To encrypt the login password, specify the driver encryption key on the printer and on the printer driver installed in the user's computer.

Password for IPP Authentication

To encrypt the IPP Authentication password on Web Image Monitor, set "Authentication" to [DIGEST], and then specify the IPP Authentication password set on the printer.

You can use telnet or FTP to manage passwords for IPP authentication, although it is not recommended.

⬇**Note**

- For details on encrypting the login passwords used for administrator authentication, see p.14 "Registering and Changing Administrators".

Specifying a Driver Encryption Key

Specify the driver encryption key on the printer.

This setting enables encrypted transmission of login passwords and strengthens the security against password cracking.

1. **Log in as the network administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Administrator Tools].**
4. **Press [▼] four times.**
5. **Press [Extended Security].**
6. **Press [Driver Encryption Key].**
7. **Enter the driver encryption key, and then press [OK].**

   Enter the driver encryption key using up to 32 alphanumeric characters.

The network administrator must give users the driver encryption key specified on the printer so they can register it on their computers. Make sure to enter the same driver encryption key as that is specified on the printer.

8. **Press [OK].**

9. **Log out.**

🔽Note

• For details about specifying the encryption key on the printer driver, see the printer driver Help.

Specifying an IPP Authentication Password

Specify an IPP authentication password for the printer. This setting enables encrypted transmission of IPP authentication passwords and strengthens the security against password cracking.

1. **Log in as the network administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [IPP Authentication] under "Security".**

4. **Select [DIGEST] from the "Authentication" list.**

5. **Enter the user name in the "User Name" box.**

6. **Enter the password in the "Password" box.**

7. **Click [OK].**

   IPP authentication is specified.

8. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

   If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

9. **Log out.**

Kerberos Authentication Encryption Setting

You can specify encrypted transmission between the printer and the key distribution center (KDC) server when Kerberos authentication is enabled.

Using Kerberos authentication with Windows or LDAP authentication, LDAP search, etc., ensures safe communication.

The supported encryption algorithm differs depending on the type of KDC server. Select the algorithm that suits your environment.

KDC server	Supported encryption algorithms
Windows Server 2003 Active Directory	• RC4-HMAC (ARCFOUR-HMAC-MD5)
Windows Server 2008	• AES256-CTS-HMAC-SHA1-96 • AES128-CTS-HMAC-SHA1-96 • RC4-HMAC (ARCFOUR-HMAC-MD5)
Windows Server 2008 R2	• AES256-CTS-HMAC-SHA1-96 • AES128-CTS-HMAC-SHA1-96 • RC4-HMAC (ARCFOUR-HMAC-MD5)*
Heimdal	• AES256-CTS-HMAC-SHA1-96 • AES128-CTS-HMAC-SHA1-96 • DES3-CBC-SHA1 • RC4-HMAC (ARCFOUR-HMAC-MD5) • DES-CBC-MD5

* To use Kerberos authentication, it must be enabled in the operating system settings.

1. **Log in as the network administrator from Web Image Monitor.**
2. **Point to [Device Management], and then click [Configuration].**
3. **Click [Kerberos Authentication] under "Device Settings".**
4. **Select the encryption algorithm you want to enable.**

   One or more encryption algorithm must always be selected.
5. **Click [OK].**
6. **Log out.**

5

6. Preventing the Leaking of Documents

This chapter explains how to protect document data stored in the printer or printed using the printer.

Configuring Access Permissions for Stored Print Files

This section describes how to specify access permissions for Stored Print files.

You can specify who is allowed to access Stored Print files.

This can prevent activities such as printing of Stored Print files by unauthorized users.

You can also specify which users can change or delete Stored Print files.

This is applied to files with "Job Type:" set to [Stored Print] or [Store and Print].

Types of access permission

To limit the use of Stored Print files, you can specify four types of access permissions.

Access permission	Description
Read-only	In addition to checking the content of and information about Stored Print files, you can also print and send the files.
Edit	You can change the print settings for Stored Print files. This includes permission to view files.
Edit/Delete	You can delete Stored Print files. This includes permission to view and edit files.
Full Control	You can specify the user and access permission. This includes permission to view, edit, and edit/delete files.

Configuring Access Permission for Each Stored Print File

This can be specified by the file administrator or file creator (owner).

Specify the users and their access permissions for each Stored Print file.

> ⭐**Important**
>
> - If files become inaccessible, reset their access permission as the file creator (owner). This can also be done by the file administrator. If you want to access a file but do not have access permission, ask the file creator (owner).
>
> - The file administrator can change the owner of a document using the document's [Details] setting. This setting also allows the file administrator to change the access privileges of the owner and other users.
>
> - The document owner and users with the [Full Control] privilege for the document can change the access privileges of the owner and other users under the [Details] setting.

1. The file administrator or the file creator (owner) logs in from Web Image Monitor.

2. Point to [Print Job/Stored File], and then click [Printer: Print Jobs].

3. Click the Details 📧 icon of the Stored Print file for which you want to specify the access permission.

4. Click [Change] for "Access Privilege".

5. Display the users and/or groups whose access permission you want to specify, and then specify the appropriate permission.

   Select the access permission from [Read-only], [Edit], [Edit/Delete], or [Full Control].

   You can specify the access permission for multiple users and groups.

   The access permission specified in "All Users" will be applied to all users.

6. Click [OK].

7. Log out.

The "Edit", "Edit/Delete", and "Full Control" access permissions allow a user to perform high level operations that could result in loss of or changes to sensitive information. We recommend you grant only the "Read-only" permission to general users.

Changing the Owner of a Stored Print File

Use this procedure to change the owner of a Stored Print file.

Only the file administrator can change the owner of a Stored Print file.

1. Log in as the file administrator from Web Image Monitor.

2. Point to [Print Job/Stored File], and then click [Printer: Print Jobs].

3. Click the Details 📧 icon of the Stored Print file for which you want to change the owner.

4. Click [Change] for "Owner".

5. In "Select Owner", click the user you want to be the owner.

6. Click [OK].

7. **Log out.**

Changing the Password of a Locked/Stored Print File

This can be specified by the file administrator or file creator (owner).

If the password has been forgotten, the file administrator changes the password to restore access.

1. **The file administrator or the file creator (owner) logs in from the control panel.**

2. **Press the [User Tools] key to close the User Tools menu.**

   If the message "You do not have the privileges to use this function." appears, press [Exit].

3. **Press the [Home] key on the control panel, and press the [Printer] icon on the [Home] screen.**

CQT665
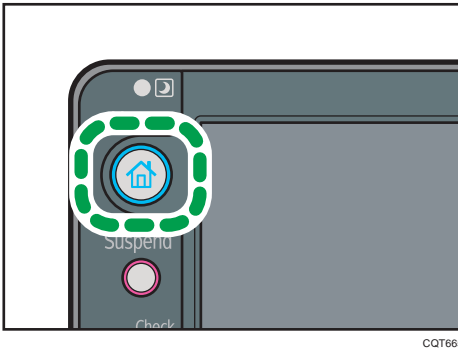
4. **Press [Print Jobs].**
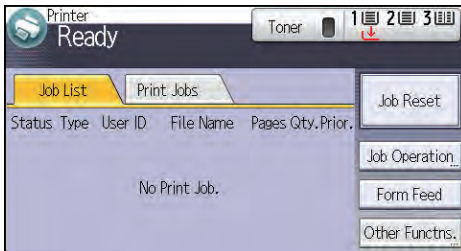
5. **Press [Locked Jobs] or [Stored Jobs].**

6. **Select the file.**

7. **Press [Other Settngs].**

8. **Press [Change Passwd].**

   If a password entry screen appears, press [Enter] and then enter the password for the file, and then press [OK].

   The password entry screen will not appear if the file administrator is logged in.

9. **Press [Enter], and then enter the new password for the file, and then press [OK].**

10. **Press [Enter], and then re-enter the password for confirmation, and then press [OK].**

11. **Log out.**

⬇ Note

- This can also be specified via Web Image Monitor. For details, see Web Image Monitor Help.

Unlocking a Locked/Stored Print File

Only the file administrator can unlock files.

If you specify [On] for "Enhance File Protection", the file will be locked and become inaccessible if an invalid password is entered ten times. This section explains how to unlock files.

"Enhance File Protection" is one of the extended security functions. For details about this and other extended security functions, see p.190 "Specifying the Extended Security Functions".

1. **Log in as the file administrator from the printer's control panel.**

2. **Press the [User Tools] key to close the User Tools menu.**

   If the message "You do not have the privileges to use this function." appears, press [Exit].

3. **Press the [Home] key on the control panel, and press the [Printer] icon on the [Home] screen.**

4. **Press [Print Jobs].**

5. **Press [Locked Jobs] or [Stored Jobs].**

6. **Select the file.**

   The 🚫 icon appears next to a file locked by the Enhance File Protection function.

7. **Press [Other Settngs].**

8. **Press [Unlock File].**

9. **Press [Yes].**

   The 🚫 icon disappears.

10. **Log out.**

⬇ Note

- This can also be specified via Web Image Monitor. For details, see Web Image Monitor Help.

Deleting Locked/Stored Print Files

This can be specified by the file administrator or file creator (owner).

To delete Locked/Stored Print files, you must enter the password for the files. If the password has been forgotten, the file administrator changes the password to restore access.

1. **The file administrator or the file creator (owner) logs in from the control panel.**

2. **Press the [User Tools] key to close the User Tools menu.**

   If the message "You do not have the privileges to use this function." appears, press [Exit].

3. **Press the [Home] key on the control panel, and press the [Printer] icon on the [Home] screen.**
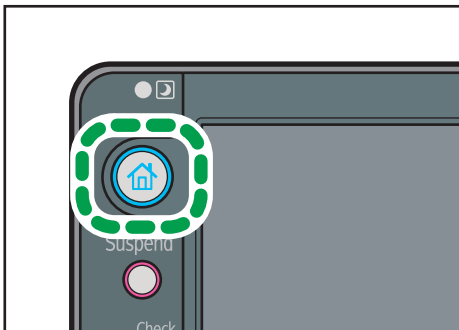
   CQT665

4. **Press [Print Jobs].**
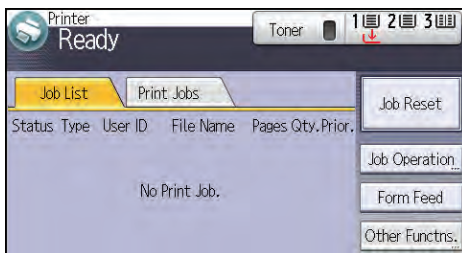
5. **Press [Locked Jobs] or [Stored Jobs].**

6. **Select the file.**

7. **Press [Delete].**

   If a password entry screen appears, press [Enter] and then enter the password of the file, and then press [OK].

   The password entry screen does not appear if the file administrator is logged in.

8. **Press [Yes].**

9. **Log out.**

↓Note

- You can configure this printer to delete stored files automatically by setting the "Auto Delete Temporary Print Jobs" option to [On]. For details about "Auto Delete Temporary Print Jobs", see "System Settings", Operating Instructions.

- This can also be specified via Web Image Monitor. For details, see Web Image Monitor Help.

Unauthorized Copy Prevention / Data Security for Copying

In Printer Features, using the printer driver, you can embed a pattern in the printed copy to discourage or prevent unauthorized copying.

The unauthorized copy prevention function prevents unauthorized copies of documents by embedding a text pattern (for instance, a warning such as "No Copying") that you can set on the print driver (which will appear on printed copies).

Data security for copying prevents document information leaks by graying out copies of documents that were printed with the data security for copying pattern enabled in the printer driver.

However, in order to gray out the security pattern, the Copy Data Security Unit is required for the copier or multi-function printer.

For more information, see the information below.

Unauthorized Copy Prevention

1. Using the printer, specify the settings to print the pattern. The settings must be specified by the machine administrator.

2. Using the printer driver, specify the printer settings for unauthorized copy prevention. The settings must be specified by the printer user. For details on how to specify settings for unauthorized copy prevention, see "Printing Documents that Are Not Allowed for Duplication", Operating Instructions.

Data Security for Copying

1. Using the printer, specify the settings to print the pattern. The settings must be specified by the machine administrator.

2. Using the printer driver, specify the printer settings for data security for copying. The settings must be specified by the printer user. For details on how to specify settings on the printer driver, see "Printing Documents that Are Not Allowed for Duplication", Operating Instructions.

Enabling Pattern Printing

You can enable embedded pattern printing to discourage or prevent unauthorized copying.

1. **Log in as the machine administrator from the printer's control panel.**
2. **Press [Printer Features].**
3. **Press [Unauthd. Copy Prevention].**
4. **Press [Unauthorized Copy Prevention Stg.].**
5. **Press [On], and then press [OK].**
6. **Press [Setting Priority (Drvr/Cmnd/Mach)].**

7. **Select the range within which the user can specify the pattern to be printed using the printer driver.**

    - [Driver/Command]

      You can specify all embedded pattern settings using the printer driver.

    - [Drvr/Cmnd (Most Stgs)]

      You can use the printer driver to specify all embedded pattern settings except for the type and density of the embedded pattern.

    - [Machine Setting(s)]

      You cannot specify embedded pattern settings by the printer driver. The embedded pattern specified using the printer's control panel will be printed.

8. **Press [OK].**

9. **Log out.**

⬇ Note

- For details of the settings when specifying the pattern using the printer, see "Printer Features", Operating Instructions.

Printing User Information on Paper

The start time of the print job, information on the person who prints it (name or login user name), machine number and printer's IP address can be compulsorily embedded on printed sheets. This function is called Compulsory Security Stamp.

Always printing out information on the person printing the job is effective for discouraging information leakage. It can also be used for identifying sources of information leakage.

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼] eight times.**

5. **Press [Compulsory Security Stamp:Printer].**

6. **Press [On].**

   To turn Compulsory Security Stamp off, press [Off].

7. **Select the data you want to use for a stamp, and then press [Stamp]. After this, press [OK].**

   Any items that [Do not Stamp] is specified for will not be printed.

   - Date/Time

     The job start time will be printed.

   - Printout User Name

     If "Stamp User Name" is selected, the "Name" in the "Names" in the Address Book will be printed.

     If "Stamp Login User Name" is selected, the "Login User Name" in the "Auth. Info" in the Address Book will be printed.

     If user authentication or User Code authentication has not been configured, the name of the person printing the job will not be printed.

   - Machine ID

     The numbers displayed as the "Serial No. of Machine" in [Inquiry] will be printed.

   - Machine IP Address

     The printer's IP address will be printed. If there are both IPv4 and IPv6 addresses, the IPv4 address will be printed. If no IP address has been configured, this will be left blank.

   Pressing [▼] allows you to display all items.

8. **Press [Adjust Stamp Position].**

   If it is not displayed, press [▼].

9. **Set the stamp position.**

10. **Press [OK] twice.**

11. **Log out.**

Enforced Storage of Documents to be Printed on a Printer

By making it compulsory to keep jobs in the printer before printing them, you can prevent information leakage due to users failing to collect prints or leaving prints unattended. The following print jobs are subject to compulsory storage.

- Normal Print
- Sample Print
- Store and Print

For details about enabling the enforced storage of print jobs, see "Preparing for Sending a Print Job", Operating Instructions.

7. Managing the Printer

This chapter describes the functions for enhancing the security of the printer and operating the printer effectively.

Managing Log Files

Collecting the logs stored in this printer allows you to track detailed data on access to the printer, user identities, usage of the printer's various functions, and error histories.

The logs can be deleted periodically to make hard disk space available, and they can be encrypted to prevent leaking of information.

The logs can be viewed using Web Image Monitor or using the log collection server. Collected logs can be converted to CSV files and downloaded all at once. They cannot be read directly from the hard disk.

Log types

Three types of logs are stored on this printer: the job log, access log, and eco-friendly log.

- Job Log

    Stores details of printing, and control panel operations such as printing reports (the configuration list, for example).

- Access Log

    Stores details of login/logout activities, service engineer operations such as hard disk formatting, system operations such as viewing log transfer results, and security operations such as specifying settings for encryption, unprivileged access detection, user lockout, and firmware authentication.

- Eco-friendly Log

    Main power ON, OFF, transitions in power status, job run times or time interval between jobs, paper consumption per hour, power consumption.

🔽Note

- For details about the log collection server, see the user's manual of the log collection server.

- When using the log collection server you must configure the log transfer settings on the log collection server.

Managing Logs from the Printer

You can specify settings such as whether or not to transfer logs to the log collection server and whether or not to delete all logs.

Disabling log transfer to the log collection server

Use the following procedure to disable log transfer from the printer to the log collection server. Note that you can change the log transfer setting to [Off] only if it is already set to [On].

For details about the log collection server, contact your sales representative.

For details about the transfer log setting, see the log collection server manual.

1. **Log in as the machine administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Administrator Tools].**
4. **Press [▼] six times.**
5. **Press [Transfer Log Setting].**
6. **Press [Off].**
7. **Press [OK].**
8. **Log out.**

Specifying Delete All Logs

1. **Log in as the machine administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Administrator Tools].**
4. **Press [▼] six times.**
5. **Press [Delete All Logs].**
6. **Press [Yes].**
7. **Press [Exit].**
8. **Log out.**

🔽 **Note**

- Deleting all logs from the printer as a batch can be achieved only if the log collection server is in use or if the Web Image Monitor setting has been specified to collect job log, access log or eco-friendly log.

Managing Logs from the Log Collection Server

For details about using the log collection server to manage Log Files, see the manual supplied with the log collection server.

Using Web Image Monitor to Manage Log Files

You can specify the types of log to store in the printer and the log collection level. You can also encrypt, bulk delete, or download log files.

Specifying log collect settings

Enable the collection settings for each kind of log and configure the collection level.

Job Log Collect Level

> Level 1
>
> User Settings

Access Log Collect Level

> Level 1
>
> Level 2
>
> User Settings

Eco-friendly Log Collect Level

> Level 1
>
> Level 2
>
> User Settings

1. **Log in as the machine administrator from Web Image Monitor.**
2. **Point to [Device Management], and then click [Configuration].**
3. **Click [Logs] under "Device Settings".**
4. **Select [Active] for each function: "Collect Job Logs", "Collect Access Logs" and "Collect Eco-friendly Logs".**
5. **Specify the collection level for each function, "Job Log Collect Level", "Access Log Collect Level", and "Eco-friendly Log Collect Level".**

    When a level is changed, the selection status of log details changes according to the level.

    To change individual items of the log details, configure the setting for each item. Even if the collection level is set to [Level 1] or [Level 2], once individual items of the log details are changed, the level changes to [User Settings].

6. **Click [OK].**
7. **"Updating..." appears. Wait for about one or two minutes, and then click [OK].**

    If the previous screen does not reappear after you click [OK], wait for a while, and then click the web browser's refresh button.

8. **Log out.**

✏️Note

- The greater "Access Log Collect Level" setting value, the more logs are collected.

Disabling log transfer to the log collection server

Use the following procedure to disable log transfer to the log collection server. Note that you can change the log transfer setting to [Inactive] only if it is already set to [Active].

1. **Log in as the machine administrator from Web Image Monitor.**
2. **Point to [Device Management], and then click [Configuration].**
3. **Click [Logs] under "Device Settings".**
4. **Select [Inactive] under "Transfer Logs".**
5. **Click [OK].**
6. **Log out.**

Specifying log encryption

Use the following procedure to enable/disable log encryption.

1. **Log in as the machine administrator from Web Image Monitor.**
2. **Point to [Device Management], and then click [Configuration].**
3. **Click [Logs] under "Device Settings".**
4. **Select [Active] under "Encrypt Logs".**

   To disable log encryption, select [Inactive].

5. **Click [OK].**

   A confirmation message appears.

6. **Click [OK].**
7. **Log out.**

✏️Note

- To encrypt the logs, it is necessary to set the collection setting to active for job log, access log, or eco-friendly log.
- If the data stored in the printer has been encrypted, the log files will still be encrypted, regardless of this setting.

Deleting all logs

Use the following procedure to delete all logs stored in the printer.

1. **Log in as the machine administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [Logs] under "Device Settings".**

4. **Click [Delete] under "Delete All Logs".**

5. **Click [OK].**

6. **Log out.**

Note

- When reading the log settings screen, "Delete All Logs" does not appear if none of the job log, access log, or eco-friendly log is set to [Active].

Downloading logs

Use the following procedure to convert the logs stored in the printer into a CSV file for simultaneous batch download.

1. **Log in as the machine administrator from Web Image Monitor.**

2. **Point to [Device Management], and then click [Configuration].**

3. **Click [Download Logs] under "Device Settings".**

4. **Click [Logs to Download] and select the type of log to download.**

   The security log includes two kinds of logs: job log and access log.

5. **Click [Download].**

6. **Specify the folder in which you want to save the file.**

7. **Click [Back].**

8. **Log out.**

Note

- Downloaded logs contain data recorded up till the time you click the [Download] button. Any logs recorded after the [Download] button is clicked will not be downloaded. The "Result" field of the log entry for uncompleted jobs will be blank.

- Download time may vary depending on the number of logs.

- If an error occurs while the CSV file is downloading or being created, the download is canceled and details of the error are included at the end of the file.

- If a log is downloaded successfully, "Download completed." will appear in the last line of the log file.

- For details about saving CSV log files, see your browser's Help.

- Downloaded log files use UTF-8 character encoding. To view a log file, open it using an application that supports UTF-8.

- To collect logs, set the collection setting for the job log, access log and eco-friendly log to [Active]. This setting can be specified in [Logs] under [Configuration] in Web Image Monitor.

- For details about the items contained in the logs, see p.166 "Attributes of logs you can download".

Number of logs that can be kept on the printer

When the maximum number of job log, access log or eco-friendly log that can be kept on the printer is exceeded and new logs are generated, old logs are overwritten by the new ones. If the logs are not downloaded periodically, it may not be possible to record the old logs onto files.

When using Web Image Monitor to manage logs, download the logs at an interval appropriate to the conditions in the table.

Maximum number of logs that can be stored in the printer

Log types	HDD installed	HDD not installed
Job logs	2000 (or 8000)	500
Access logs	6000 (or 1000)	500
Eco-friendly logs	2000 (or 1000)	500

If the hard disk is installed, the maximum number of logs can be changed. If you change the maximum number of logs, contact your service representative.

Estimated number of logs created per day

Log types	Number of logs created per day
Job logs	100
Access logs	300 This number is based on 100 operations such as initialization and access operations over the Web, and 200 job entries (two entries per job: one login and one logout).
Eco-friendly logs	100

According to these conditions, the printer can maintain logs for 20 days without overwriting, but to be cautious, we recommend downloading after half that time, 10 days, to leave room for error.

Manage downloaded log files appropriately under the responsibility of the machine administrator.

🔽 **Note**

- If you change the [Collect] / [Do not Collect] setting for log collection, you must perform a batch deletion of the logs.

- After downloading the logs, perform a batch deletion of the logs.

- During log downloads, do not perform operations that will create log entries, as logs that are in the process of downloading cannot be updated with new entries.

- Batch deletion of logs can be performed from the control panel or through Web Image Monitor.

Notes on operation when the number of log entries reaches maximum

If the number of logs that can be stored on the machine exceeds the specified maximum limit, old logs are overwritten by new logs. The maximum number of logs that can be stored is defined for each of the job log, access log and eco-friendly log.

The job log and access log are downloaded as one file.

"If logs are downloaded without overwriting" below indicates that the job log and access log are mixed after download.

"If logs are downloaded during overwriting" below indicates that part of the access log is overwritten.

In this example, part of the access log is overwritten by a downloaded log and deleted.

The eco-friendly log is downloaded as an independent file.

Log entries are overwritten in the order of priority. Log entries with higher priority will not be overwritten or deleted.

If logs are downloaded without overwriting

1

| log ID: 0x000000000000263d |
| log ID: 0x000000000000263f |
| log ID: 0x0000000000002641 |
| 0000000002642 |
| log ID: 0x0000 |
| log ID: 0x000000000000264c |
| log ID: 0x000000000000264d |
| log ID: 0x000000000000264f |
| log ID: 0x0000000000002650 |

2

| log ID: 0x000000000000263e |
| 00000002640 |
| log ID: 0x0000 |
| log ID: 0x000000000000264b |
| log ID: 0x000000000000264e |

3

4

| log ID: 0x000000000000263d |
| log ID: 0x000000000000263e |
| log ID: 0x000000000000263f |
| log ID: 0x0000000000002640 |
| log ID: 0x0000000000002641 |
| 0000000002642 |
| log ID: 0x0000 |
| log ID: 0x000000000000264a |
| log ID: 0x000000000000264b |
| log ID: 0x000000000000264c |
| log ID: 0x000000000000264d |
| log ID: 0x000000000000264e |
| log ID: 0x000000000000264f |
| log ID: 0x0000000000002650 |
| Download completed. |

CJD006

1. **Access log**

2. **Job log**

3. **Download**

4. **Downloaded logs**

If logs are downloaded during overwriting

CJD007

1. **Access log**
2. **Job log**
3. **Download**
4. **Downloaded logs**
5. **Overwriting**
6. **Deleted by overwriting**

To determine whether or not overwriting occurred while the logs were downloading, check the message in the last line of the downloaded logs.

- If overwriting did not occur, the last line will contain the following message: Download completed.

- If overwriting did occur, the last line will contain the following message: Download completed. A part of the logs before Log ID xxxx does not exist any more.

🔻Note

- Examine logs following "Log ID xxxx".

Printer Job Logs

Print Log entries are made before the login entry is made in the Access Log.

Details of series of jobs (including reception, processing, and output of the jobs' data) are combined into single entries.

When the printer receives a print job, it creates an ID for the job and records this in the job log. The printer then creates a login ID for the print job and records this in the access log. It then creates a job log entry detailing the job's processing and outputting (under the same login ID). When the printer has finished processing the job, it creates a logout entry and places this in the access log.

Entries detailing the reception, processing, and output of a series of print jobs are created in the job log first, and then the login and logout details of those jobs are recorded in the access log.

Print job flowchart
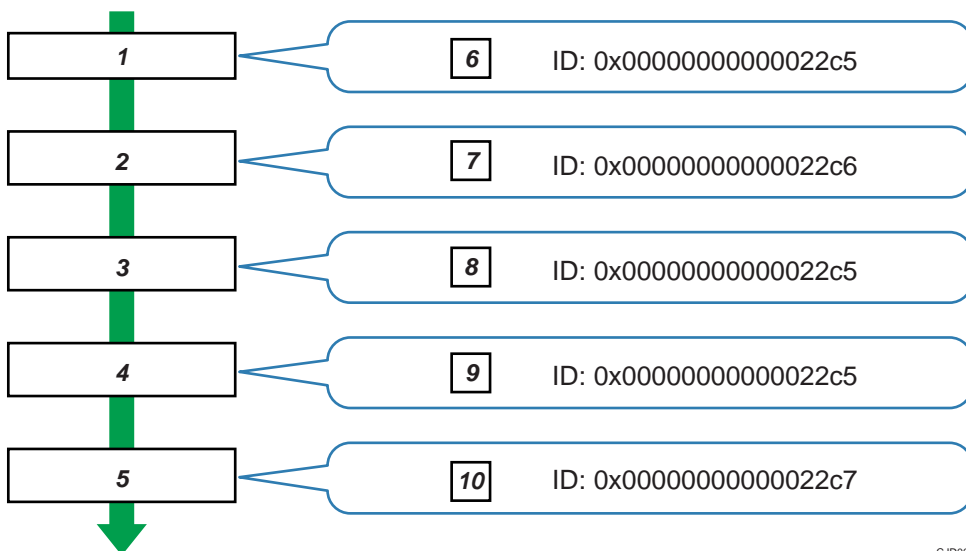
CJD008

1. **Print job data is received.**

2. **Authentication (login) data is received.**

3. **Print job is processed.**

4. **Print job is output.**

5. **Authentication (login) data is received.**

6. **An ID is assigned to the print job and recorded as an entry in the Job Log.**

7. **Authentication (login) data is recorded as an entry in the Access Log.**

8. **Information about the processing of the print job is recorded as an entry in the Job Log (using the same ID).**

9. **Information about the outputting of the print job is recorded as an entry in the Job Log (using the same ID).**

10. **Authentication (logout) data is recorded as an entry in the Access Log.**

Logs That Can Be Managed Using Web Image Monitor

Logs that can be collected

The following tables explain the items in the job log and access log that the printer creates when you enable log collection using Web Image Monitor. If you require log collection, use Web Image Monitor to configure it. This setting can be specified in [Logs] under [Configuration] in Web Image Monitor.

Job log information items

Job Log Item	Log Type Attribute	Content
Printer: Printing	Printer: Printing	Details of normal print jobs.
Printer: Locked Print (Incomplete)	Printer: Locked Print (Incomplete)	Log showing Locked Print documents temporarily stored on the printer.
Printer: Locked Print	Printer: Locked Print	Log showing Locked Print documents temporarily stored on the printer and then printed from the control panel or through Web Image Monitor.
Printer: Sample Print (Incomplete)	Printer: Sample Print (Incomplete)	Log showing Sample Print documents temporarily stored on the printer.
Printer: Sample Print	Printer: Sample Print	Log showing Sample Print documents temporarily stored on the printer and then printed from the control panel or through Web Image Monitor.
Printer: Hold Print (Incomplete)	Printer: Hold Print (Incomplete)	Log showing Hold Print documents temporarily stored on the printer.
Printer: Hold Print	Printer: Hold Print	Log showing Hold Print documents temporarily stored on the printer and then printed from the control panel or through Web Image Monitor.
Printer: Stored Print	Printer: Stored Print	Details of Stored Print files stored on the printer.

Job Log Item	Log Type Attribute	Content
Printer: Store and Normal Print	Printer: Store and Normal Print	Details of Stored Print files that were printed at the time of storage (when "Job Type:" was set to "Store and Print" in printer properties).
Printer: Stored File Printing	Printer: Stored File Printing	Details of Stored Print files printed from the control panel or Web Image Monitor.
Report Printing	Report Printing	Details of reports printed from the control panel.
Printer: Hold Print File Printing	Pause File Store and Print	When a document is held for printing and stored temporarily on the printer, this logs the time a user specifies it be printed via the control panel or Web Image Monitor.

Access log information items

Access Log Item	Log Type Attribute	Content
Login	Login	Times of login and identity of logged in users.
Logout	Logout	Times of logout and identity of logged out users.
HDD Format	HDD Format	Details of hard disk formatting.
All Logs Deletion	All Logs Deletion	Details of deletions of all logs.
Log Setting Change	Log Setting Change	Details of changes made to log settings.
Transfer Log Result	Transfer Log Result	Log of the result of log transfer to Remote Communication Gate S.
Log Collection Item Change	Log Collection Item Change	Details of changes to job log collection levels, access log collection levels, and types of log collected.
Collect Encrypted Communication Logs	Collect Encrypted Communication Logs	Log of encrypted transmissions with utilities, Web Image Monitor or external devices.
Access Violation	Access Violation	Details of failed access attempts.
Lockout	Lockout	Details of lockout activation.
Firmware: Update	Firmware: Update	Details of firmware updates.

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Access Log Item	Log Type Attribute	Content
Firmware: Structure Change	Firmware: Structure Change	Details of structure changes that occurred when an SD card was inserted or removed, or when an unsupported SD card was inserted.
Firmware: Structure	Firmware: Structure	Details of checks for changes to firmware module structure made at times such as when the printer was switched on.
Machine Data Encryption Key Change	Machine Data Encryption Key Change	Details of changes made to encryption keys using "Machine Data Encryption Key Change" setting.
Firmware: Invalid	Firmware: Invalid	Details of checks for firmware validity made at times such as when the printer was switched on.
Date/Time Change	Date/Time Change	Details of changes made to date and time settings.
File Access Privilege Change	File Access Privilege Change	Log for changing the access privilege to the Stored Print files.
Password Change	Password Change	Details of changes made to the login password.
Administrator Change	Administrator Change	Details of changes of administrator.
Address Book Change	Address Book Change	Details of changes made to address book entries.
Machine Configuration	Machine Configuration	Log of changes to the printer's settings.
Back Up Address Book	Address Backup	Log of when data in the Address Book is backed up.
Restore Address Book	Address Restore	Log of when data in the Address Book is restored.
Enhanced Print Volume Use Limitation: Tracking Permission Result	Enhanced Print Volume Use Limitation: Tracking Permission Result	Log of when a tracking error occurs.

Access Log Item	Log Type Attribute	Content
Counter Clear Result: Selected User(s)	User Counter Clear	Log of when the counter for an individual user is cleared.
Counter Clear Result: All Users	All User Counter Clear	Log of when the counters for all users are cleared.
Import Device Setting Information	Import Device Setting Information	Log of when a device setting information file is imported.
Export Device Setting Information	Export Device Setting Information	Log of when a device setting information file is exported.

There is no "Login" log made for SNMPv3.

If the hard disk is formatted, all the log entries up to the format are deleted and a log entry indicating the completion of the format is made.

"Access Violation" indicates the system has experienced frequent remote DoS attacks involving logon attempts through user authentication.

Eco-friendly log information items

Eco-friendly Log Item	Log Type Attribute	Content
Main Power On	Power ON	Log of when the main power switch is turned on.
Main Power Off	Power OFF	Log of when the main power switch is turned off.
Power Status Transition Result	Power Status Change	Log of the results of transitions in power status.
Job Related Information	Job Info	Log of job-related information.
Paper Usage	Paper Consumption	Log of the amount of paper used.
Power Consumption	power consumption	Log of power consumption.

Note

- If "Job Log Collect Level" is set to [Level 1], all job logs are collected.
- If "Access Log Collect Level" is set to [Level 1], the following information items are recorded in the access log:
  - HDD Format

- All Logs Deletion

- Log Setting Change

- Log Collection Item Change

- If "Access Log Collect Level" is set to [Level 2], all access logs are collected.

- The first log made following power on is the "Firmware: Structure" log.

- If "Eco-friendly Log Collect Level" is set to [Level 1], eco-friendly logs are not collected.

- If "Eco-friendly Log Collect Level" is set to [Level 2], all eco-friendly logs are collected.

Attributes of logs you can download

If you use Web Image Monitor to download logs, a CSV file containing the information items shown in the following table is produced.

Note that a blank field indicates an item is not featured in a log.

File output format

- Character Code Set: UTF-8

- Output Format: CSV (Comma-Separated Values)

- File Names of Job Logs and Access Logs: "printer name +_log.csv"

- File names for Eco-friendly Logs: "printer name+_ecolog.csv"

Order of log entries

Log entries are printed in ascending order according to Log ID.

File structure

The data title is printed in the first line (header line) of the file.

Differences in log data formatting

- Job log

Multiple lines appear in the order of All, Source (job input data), and Target (job output data). The same log ID is assigned to all lines corresponding to a single job log entry.

- Access log

Items in the list and access log entries appear on separate lines.

- Eco-friendly log

Items in the list and eco-friendly log entries appear on separate lines.

Start Date/Time	⋯	Result	⋯	Access Result	Source	⋯	Print File Name	Target	⋯	Stored File Name
2011-03-03T15:43:03.0	⋯	Completed	⋯			⋯			⋯	
	⋯	Completed	⋯		Report	⋯			⋯	
	⋯	Completed	⋯			⋯		Print	⋯	

Columns labeled 1, 2, 3 span: 1 = Start Date/Time through Access Result; 2 = Source through Print File Name; 3 = Target through Stored File Name.

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1. **All**

   Each item in the list is displayed on a separate line.

2. **Source**

   Displays details of the job log entry and the "Result" and "Status" of each item.

   If there are multiple sources, multiple lines are displayed.

3. **Target**

   Displays details of the job log entry and the "Result" and "Status" of each item.

   If there are multiple targets, multiple lines are displayed.

Job and access log information items

Start Date/Time

For a job log entry, indicates the start date and time of the operation. If the job has not been completed, this is blank. For an access log entry, indicates the same date and time as shown by "End Date/Time".

This is in Item 1 of the CSV file.

End Date/Time

For a job log entry, indicates the end date and time of the operation.

If the operation is still in progress, this will be blank.

For an access log entry, indicates the same date and time as shown by "Result".

This is Item 2 of the CSV file.

Log Type

Details of the log type. Access logs are classified under "Access Log Type".

For details about the information items contained in each type of log, see p.162 "Logs that can be collected".

This is Item 3 of the CSV file.

Result

Indicates the result of an operation or event:

- If "Succeeded" is displayed for a job log entry, the operation completed successfully; "Failed" indicates the operation was unsuccessful. If the operation is still in progress, this will be blank.

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- If "Succeeded" is displayed for an access log entry, the event completed successfully; "Failed" indicates the event was unsuccessful.

The following log item is recorded only when the logged operations are executed successfully: "Printer: Stored File Printing" (Job logs).

Operation Method

Operation procedures are recorded.

Status

Indicates the status of an operation or event:

- If "Completed" is displayed for a job log entry, the operation completed successfully; "Failed" indicates the operation was unsuccessful; "Processing" indicates the operation is still in progress.

- If "Completed" is displayed for "Source" or "Target" in a job log entry, the operation completed successfully; "Failed" indicates the operation was unsuccessful; "Processing" indicates the operation is still in progress; "Error" indicates an error occurred; "Suspended" indicates the operation is currently suspended.

- If "Succeeded" is displayed for an access log entry, the operation completed successfully; if any of the following are displayed, the operation was unsuccessful:

  "Password Mismatch", "User Not Programmed", "Other Failures", "User Locked Out", "File Password Mismatch", "No Privileges", "Failed to Access File", "File Limit Exceeded", "Transfer Cancelled", "Power Failure", "Lost File", "Functional Problem", "Communication Failure", or "Communication Result Unknown".

Status (For results of a clearing user-specific counter or all-user counter)

If clearing of a user-specific counter or all-user counter fails, "Failure in some or all parts" is recorded.

Status (For importing and exporting device information)

The status of an operation or event is recorded.

If importing or exporting is executed by another user, "Importing/Exporting by Other User" is recorded.

If a connection to an output destination fails, "Connection Failed with Remote Machine" is recorded.

If an error occurs in writing to an output destination, "Write Error to Remote Machine" is recorded.

If the specified file is incompatible, "Specified File: Incompatible" is recorded.

If a format error occurs with the specified file, "Specified File: Format Error" is recorded.

If the specified file cannot be found, "Specified File: Not Exist" is recorded.

If there are no privileges for operating the specified file, "Specified File: No Privileges" is recorded.

If an error occurs in accessing the specified file, "Specified File: Access Error" is recorded.

If the external media is full, "Memory Storage Device Full" is recorded.

If an abnormality is found in the external media, "Memory Storage Device Error" is recorded.

If encryption fails, "Encryption Failed" is recorded.

If decoding fails, "Decoding Failed" is recorded.

If there are no common keys, "Common Key Not Exist" is recorded.

If a communication error occurs, "Connection Error" is recorded.

Status Supplement

If the status of a log is abnormal termination (Failed), the status is recorded.

Otherwise, this is not recorded.

If a user cancels an operation, "Cancelled by User" is recorded.

If an operation is terminated abnormally during data input, "Input Failure" is recorded. For the cause of the failure, see the input information (Source) appearing below it.

If an operation is terminated abnormally during data output, "Output Failure" is recorded. For the cause of the failure, see the output information (Target) appearing below it.

If an error is detected prior to execution of a job, "Other Error" is recorded.

If power is lost, "Power Failure" is recorded.

Status Supplement (If the Source is a Stored File)

If the memory for processing data becomes full, "Memory Full" is recorded.

If an attempt to use a PDL or port not installed on the printer is made, "Print Data Error" is recorded.

If a wrong type of driver is used, network failure occurs, "Data Transfer Interrupted" is recorded.

If any other error occurs, "Other Error" is recorded.

Status Supplement (If the Source is a Printer)

If the number of jobs that can be received is exceeded, "Over Job Limit" is recorded.

If the memory for processing data becomes full, "Memory Full" is recorded.

If device authentication fails, "Authentication Failed (Access Restricted)" is recorded.

If a wrong type of driver is used, network failure occurs, "Data Transfer Interrupted" is recorded.

If an attempt to use a PDL or port not installed on the printer is made, "Print Data Error" is recorded.

If any other error occurs, "Other Error" is recorded.

Status Supplement (If the Source is a Report)

If a system error is detected on the printer, "Other Error" is recorded.

Status Supplement (If the Target is Store)

If a logged-in user exceeds the paper usage limit, "Exceeded Print Volume Use Limitation" is recorded.

If a time-out occurs, "Timeout" is recorded.

If a user does not have the privilege to use a document or function, "No Privilege" is recorded.

If the size of paper specified (including irregular sizes) is of a size that cannot be stored, "Unavailable Size to Store" is recorded.

If any other error occurs, "Other Error" is recorded.

User Entry ID

Indicates the user's entry ID.

This is a hexadecimal ID that identifies users who performed job or access log-related operations:

For supervisors, only 0xffffff86 is available; for administrators, 0xffffff87, 0xffffff88, 0xffffff89, and 0xffffff8a are available. For general users, any value between 0x00000001 and 0xfffffeff is available.

"0x00000000", "0xffffff80", and "0xffffff81" indicate system operations related to user authentication.

IDs "0xffffff80" and "0xffffff81" indicate system operations related to stored files and the address book; "0x00000000" indicates other operations.

"0xffffff80" indicates operations related to deleting Hold Print, Locked Print, and Stored Print jobs (such as when the [Auto Delete Temporary Print Jobs] setting is enabled), and operations related to changing the access permissions of such jobs. Displays Address Book updates when Auto registration of users is enabled through Windows, LDAP, or another authentication system.

ID "0xffffff81" indicates only operations related to the creation of stored files when it is assumed such files will be deleted through system operations.

"0x00000000" and "0xffffff81" indicate operations that do not require user authentication and that were performed by non-authenticated users.

ID "0xffffff81" indicates operations related to stored files, the address book and job logs; "0x00000000" indicates other operations.

User Code/User Name

Identifies the user code or user name of the user who performed the operation.

If an administrator performed the operation, this ID will contain the login name of that administrator.

Log ID

Identifies the ID that is assigned to the log.

This is a hexadecimal ID that identifies the log.

Access log information items

Access Log Type

Indicates the type of access:

"Authentication" indicates a user authentication access.

"System" indicates a system access.

"Stored File" indicates a stored file access.

"Network Attack Detection/Encrypted Communication" indicates a network attack or encrypted communication access.

"Firmware" indicates a firmware verification access.

"Address Book" indicates an address book access.

Authentication Server Name

Indicates the name of the server where authentication was last attempted.

No. of Authentication Server Switches

Indicates the number of times server switching occurred when the authentication server was unavailable.

You can determine whether or not authentication server availability is detected.

The number of server switches is indicated as 0 to 4.

A value of 0 indicates the authentication server is available.

Logout Mode

Mode of logout. The remark "by User's Operation" indicates manual logout by the user; "by Auto Logout Timer" indicates automatic logout following a timeout.

Login Method

The route by which the authentication request is received is recorded.

"Control Panel" indicates the login was performed through the control panel; "via Network" indicates the login was performed remotely through a network computer; and "Others" indicates the login was performed through another method.

Login User Type

Indicates the type of login user:

"User" indicates the logged in user was a registered general user.

"Guest" indicates the logged in user was a guest user.

"File Administrator" indicates the logged in user was a registered file administrator.

"Machine Administrator" indicates the logged in user was a registered machine administrator.

"Network Administrator" indicates the logged in user was a registered network administrator.

"Supervisor" indicates the logged in user was a registered supervisor.

"Custom Engineer (Service Mode)" indicates the logged in user was a customer engineer.

"Others" indicates the logged in user did not belong to any of the above types of user.

Target User Entry ID

Indicates the entry ID of the target user is.

This is a hexadecimal ID that indicates users to whom the following settings are applied:

- Lockout

- Password Change

Target User Code/User Name

User code or user name of the user whose data was accessed.

If the administrator's data was accessed, the administrator's user name is logged.

Registration No.

The registration number of the user who performs the operation is recorded.

Address Book Operation Mode

The method of changing the Address Book is recorded.

Address Book Change Item

The items changed in the Address Book is recorded.

Client Address

The IP addresses (IPv4/IPv6) of users accessing the Address Book are recorded.

Lockout/Release

The mode of operation access.

"Lockout" indicates activation of password lockout; "Release" indicates deactivation of password lockout.

Lockout Release Method

"Manual" is recorded if the printer is unlocked manually.

"Auto" is recorded if the printer is unlocked by the lockout release timer.

Lockout Administrator

If lockout is released, administrators to whom lockout release is applied are recorded.

Clear Counters

The counters cleared under each user are recorded.

Export Range

The settings to be exported as the device information are recorded.

The following settings are recorded:

- System Settings, PrinterUP, WIMSetting, WebService, SystemSP, PrinterSP

File to Import

The names of files to be imported or exported as the device information are recorded.

Stored File ID

Identifies a created or deleted file.

This is a decimal ID that indicates created or deleted stored files.

Stored File Name

Name of a created or deleted file.

Collect Job Logs

Indicates the status of the job log collection setting:

"Active" indicates job log collection is enabled.

"Inactive" indicates job log collection is disabled.

"Not Changed" indicates no changes have been made to the job log collection setting.

Collect Access Logs

Indicates the status of the access log collection setting:

"Active" indicates access log collection is enabled.

"Inactive" indicates access log collection is disabled.

"Not Changed" indicates no changes have been made to the access log collection setting.

Collect Eco-friendly Logs

Indicates the status of the eco-friendly log collection setting:

"Active" indicates eco-friendly log collection is enabled.

"Inactive" indicates eco-friendly log collection is disabled.

"Not Changed" indicates no changes have been made to the eco-friendly log collection setting.

Transfer Logs

Indicates the status of the log transfer setting:

"Active" indicates log transfer is enabled.

"Inactive" indicates log transfer is disabled.

"Not Changed" indicates no changes have been made to the log transfer setting.

Encrypt Logs

Indicates the status of the log encryption setting:

"Active" indicates log encryption is enabled.

"Inactive" indicates log encryption is disabled.

"Not Changed" indicates no changes have been made to the log encryption setting.

Log Type

If a log's collection level setting has been changed, this function indicates details of the change:

"Job Log" indicates the job log's collection level has been changed.

"Access Log" indicates the access log's collection level has been changed.

"Eco-friendly Log" indicates the eco-friendly log's collection level has been changed.

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"Level 1" indicates a level 1 collection setting.

"Level 2" indicates a level 2 collection setting.

"User Settings" indicates a user-specified collection level setting.

Log Collect Level

Indicates the level of log collection: "Level 1", "Level 2", or "User Settings".

Encryption/Cleartext

Indicates whether communication encryption is enabled or disabled:

"Encryption Communication" indicates encryption is enabled; "Cleartext Communication" indicates encryption is not disabled.

Machine Port No.

Indicates the printer's port number.

Protocol

Destination protocol.

"TCP" indicates the destination's protocol is TCP; "UDP" indicates the destination's protocol is UDP; "Unknown" indicates the destination's protocol could not be identified.

IP Address

Destination IP address.

Port No.

Destination port number.

This is in decimal.

MAC Address

Destination MAC (physical) address.

Primary Communication Protocol

Indicates the primary communication protocol.

Secondary Communication Protocol

Indicates the secondary communication protocol.

Encryption Protocol

Indicates the protocol used to encrypt the communication.

Communication Direction

Indicates the direction of communication:

"Communication Start Request Receiver (In)" indicates the printer received a request to start communication; "Communication Start Request Sender (Out)" indicates the printer sent a request to start communication.

Communication Start Log ID

Indicates the log ID for the communication start time.

This is a hexadecimal ID that indicates the time at which the communication started.

Communication Start/End

Indicates the times at which the communication started and ended.

Network Attack Status

Indicates the attack status of the network:

"Violation Detected" indicates an attack on the network was detected.

"Recovered from Violation" indicates the network recovered from an attack.

"Max. Host Capacity Reached" indicates the printer became inoperable due to the volume of incoming data reaching the maximum host capacity.

"Recovered from Max. Host Capacity" indicates that the printer became operable again following reduction of the volume of incoming data.

Network Attack Type

Identifies the type of network attack as either "Password Entry Violation" or "Device Access Violation".

Network Attack Type Details

Indicates details about the type of network attack: "Authentication Error" or "Encryption Error".

Network Attack Route

Identifies the route of the network attack as either "Attack from Control Panel" or "Attack from Other than Control Panel".

Login User Name used for Network Attack

Identifies the login user name that the network attack was performed under.

Add/Update/Delete Firmware

Indicates the method used to add, update, or delete the printer's firmware:

"Updated with SD Card" indicates an SD card was used to perform the firmware update.

"Added with SD Card" indicates an SD card was used to add the firmware update.

"Deleted with SD Card" indicates an SD card was used to delete the firmware update.

"Moved to Another SD Card" indicates the firmware update was moved to another SD card.

"Updated via Remote" indicates the firmware update was updated remotely from a computer.

"Updated for Other Reasons" indicates the firmware updated was performed using a method other than any of the above.

Module Name

Firmware module name.

Parts Number

Firmware module part number.

Version

Firmware version.

Machine Data Encryption Key Operation

Indicates the type of encryption key operation performed:

"Back Up Machine Data Encryption Key" indicates an encryption key backup was performed.

"Restore Machine Data Encryption Key" indicates an encryption key was restored.

"Clear NVRAM" indicates the NVRAM was cleared.

"Start Updating Machine Data Encryption Key" indicates an encryption key update was started.

"Finish Updating Machine Data Encryption Key" indicates an encryption key update was finished.

Machine Data Encryption Key Type

Identifies the type of the encryption key as "Encryption Key for Hard Disk", "Encryption Key for NVRAM", or "Device Certificate".

Validity Error File Name

Indicates the name of the file in which a validity error was detected.

Configuration Category

The category whose settings were changed is recorded.

For details, see p.179 "Category/Attribute List".

Configuration name

The attributes of the categories are recorded.

For details, see p.179 "Category/Attribute List".

Configuration value

The values of the attributes are recorded.

For details, see p.179 "Category/Attribute List".

Destination Server Name

If the log type is "SDK Tracking", the name of the destination server that tracking information failed to be sent is recorded.

If the log type is import or export of preference information, the name of the server that a data export or import request is issued from is recorded.

Hdd Init Partition No.

The initial status of each hard disk partition is recorded.

Access Result

Indicates the results of logged operations:

"Completed" indicates an operation completed successfully; "Failed" indicates an operation completed unsuccessfully.

Job log information items: Input information

Source

Indicates the source of the job file:

"Stored File" indicates the job file was stored on the hard disk; "Printer" indicates the job file was sent from the printer driver; "Report" indicates the job file was a printed report.

Start Date/Time

Dates and times "Printer" operations started.

End Date/Time

Dates and times "Printer" operations ended.

Stored File ID

Indicates the ID of data that is output as a stored file.

This is a decimal ID that identifies the stored file.

Stored File Name

Names of "Stored File" files.

Print File Name

Name of "Printer" files.

Job log information items: Output information

Target

Type of the job target. "Print" indicates a print file; "Store" indicates a stored file.

Start Date/Time

Dates and times "Print" and "Store" operations started.

End Date/Time

Dates and times "Print" and "Store" operations ended.

Stored File ID

Indicates the ID of data that is output as a store file.

This is a decimal ID that identifies the stored file.

Stored File Name

If the Target Type is "Store", the file name of the stored file is recorded.

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Eco-friendly log information items

Start Date/Time

The event start date and time is recorded.

End Date/Time

The event end date and time is recorded.

Log Type

The type of eco-friendly log is recorded.

Power ON, Power OFF, Status of Power, Job Information or Consumption of Paper is recorded.

Log Result

Whether an event has completed or not is displayed.

If an event has completed, "Completed" is recorded. Otherwise, "Failed" is recorded.

Result

The result of the event is recorded.

If an event is successful, "Succeeded" is recorded. If it fails, "Failed" is recorded.

Log ID

The hexadecimal ID for identifying the log is recorded.

Power Mode

The power status of the printer (after state transition) is logged.

When in standby, "Standby" is recorded.

When in a silent state, "Night" is recorded.

When the hard disk is running, "HDD On" is recorded.

When the engine is stopped, "Engine Off" is recorded.

When the controller is stopped, "Kill" is recorded.

When in the STR state (Suspend to RAM), "STR" is recorded.

When in a silent print state, "Night Print" is recorded.

When in a low-noise print state, "Low Print" is recorded.

Log Type

The type of job log is recorded.

Job Interval Times(seconds)

The elapsed time from the start of the previous job until the start of the job is recorded.

Job Times(seconds)

The elapsed time from the start of a job until its end is recorded.

Consumption of paper(Big Size)

The amount of large, one-sided paper used each hour is recorded.

Big size means A3 (11 × 17 inches) or larger.

Consumption of paper(Small Size)

The amount of small, one-sided paper used each hour is recorded.

Small size means smaller than A3 (11 × 17 inches).

Consumption of paper(Both Side/Big Size)

The amount of large, two-sided paper used each hour is recorded.

Big size means A3 (11 × 17 inches) or larger.

Consumption of paper(Both Side/Small Size)

The amount of small, two-sided paper used each hour is recorded.

Small size means smaller than A3 (11 × 17 inches).

Measuring the power state

The power consumption status of the printer is measured and registered in the log while the printer is being used.

"Standby controller" indicates controller standby mode.

"STR State" indicates Suspend to RAM (STR) mode.

"Machine Off" indicates the main power is turned off.

"Printing" indicates printing.

"Engine Standby" indicates the engine is on standby.

"Engine Night Print" indicates the engine is in the silent state.

"Entire Equipment" indicates the printer's total electricity consumption.

Power Consumption(Wh)

The power consumption in each power state is recorded.

Category/Attribute List

User Lockout Policy

1. Lockout

   Whether the lockout is active (Active) or inactive (Inactive) is recorded.

2. Number of Attempts before Lockout

   The number of times a user may attempt to enter a login password is recorded.

3. Lockout Release Timer

   Whether the lockout release timer is active (Active) or inactive (Inactive) is recorded.

4. Lock Out User for

The time until lockout release is recorded.

Auto Logout Timer

1. Auto Logout Timer

Whether an auto logout time is set to (On) or (Off) is recorded.

2. Auto Logout Timer(seconds)

The time until the auto logout operates is recorded.

Device Certificate

1. Operation Mode

The type of operation is recorded.

"Create" is recorded when a certificate is created.

"Delete" is recorded when a certificate is deleted.

"Install" is recorded when a certificate is installed.

When the certificate to be used is changed, "changeCertForApplication" is recorded.

When an intermediate certificate is installed, "InstallIntermediateCertificate" is recorded.

When an intermediate certificate is deleted, "DeleteIntermediateCertificate" is recorded.

2. Certificate No.

The number of the certificate to be used is recorded.

3. (XXX):Certification No.

(XXX) is replaced by one of the following:

- SSL/TLS
- IEEE 802.1X
- IPsec

The number of the certificate for applications is recorded.

When a certificate is not used, "No Certification" is recorded.

IPsec

1. IPsec

Whether IPsec is active (Active) or inactive (Inactive) is recorded.

2. Encryption Key Auto Exchange / Encryption Key Manual Exchange: Setting1-4: Remote Address

The remote address is recorded.

3. Encryption Key Auto Exchange: Setting1-4, Default: Security Level

The security level is recorded.

When [Authentication Only] is selected, "Authentication Only" is recorded.

When [Authentication and Low Level Encryption] is selected, "Authentication and Low Level Encryption" is recorded.

When [Authentication and High Level Encryption] is selected, "Authentication and High Level Encryption" is recorded.

When [User Settings] is selected, "User Settings" is recorded.

4. Encryption Key Auto Exchange: Setting1-4, Default: Authentication Method

The authentication method used for the auto key exchange format is recorded.

Either "PSK" or "Certificate" is recorded.

Compulsory Security Stamp

1. Compulsory Security Stamp

Whether [Compulsory Security Stamp] is set to (On) or (Off) is recorded.

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Customizing the Control Panel

Configurations of settings such as arrangement of icons on the home screen can be made to suit the user.

Configuring the Home Screen for Individual Users

This allows each user to use their own home screen.

When a user logs in, their personalized home screen is displayed.

1. **Log in as the machine administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Administrator Tools].**
4. **Press [▼] eight times.**
5. **Press [Users Own Home Screen].**
6. **Press [Allow].**
7. **Press [OK].**
8. **Log out.**

♦Note

- This can also be configured from Web Image Monitor. For details, see Web Image Monitor Help.
- The home information for each user is maintained even when Users Own Home Screen is set to [Prohibit]. When the setting is changed back to [Allow], the information can be used again.

Warnings about using user's own home screens

Consider these warnings before using this function.

- When a user is registered in the Address Book, a home screen is created for that user. At that time, their user's own home screen is configured with the default settings (arrangement of icons).
- If Menu Protect is set to either [Level 1] or [Level 2], the user cannot use that function's program registration, editing or delete. However, there is no restriction on adding icons to the user's own home screen.
- When Menu Protect has been set to [Level 1] or [Level 2], have the administrator create any necessary programs.
- The icons of functions that an administrator has restricted are not displayed on the home screen of users whose use of the function(s) has been restricted.
- When a user is deleted from the Address Book, that user's home screen information is also deleted.

- When a user has edited a program, the changes are reflected to all the users who have the program's icon distributed to their own home screen.

- When a user deletes a program, the icon of the program is deleted from all the user's home screens to which it is distributed.

- Because each user manages and uses their own home screen, the administrator cannot check each user's own home information (customized state of users' own home screens).

Managing Device Information

⚠ CAUTION

- Keep SD cards or USB flash memory devices out of reach of children. If a child accidentally swallows an SD card or USB flash memory device, consult a doctor immediately.

This can be set by an administrator with privileges to manage everything — devices, users, networks and files.

The printer's device information can be exported to an external device as a device setting information file. By importing an exported device setting information file to the printer, you can use it as a backup file to restore device settings.

Data that can be imported and exported

- Printer Features
- Extended Feature Settings
- Web Image Monitor Setting
- Web Service Settings
- System Settings

Data that cannot be imported or exported

- Address book
- Programs (printer function)
- Settings that can be specified via telnet

↓ Note

- The file format for exports is CSV.

- The device configuration of the printer importing the device setting information file must be the same as that of the printer, which exported the device setting information file. Otherwise, the device setting information file cannot be imported.

- If the device configuration is changed, export the updated device setting information file.

- If there are machines with the same device configuration, you can specify their settings identically by importing the same device setting file.

- If the home screen contains JPG image files, they will also be exported.

- While a user is operating the printer, nothing can be imported or exported until the user completes the operation.

- During export and import, the printer cannot be otherwise operated.

- If you import the device setting information during address book backup/restore using Web Image Monitor or the utility software, it is possible that [Password Policy] in [Extended Security] will not be configured. If this happens, configure the password policy after the import is complete.

- For details about SD card handling, see "Inserting/Removing a Memory Storage Device", Getting Started.

Exporting Device Information

When exporting device information from the control panel, the data is saved on an SD card.

1. **Insert an SD card into the media slot on the side of the control panel.**

   For details about inserting the SD card, see "Inserting/Removing a Memory Storage Device" Operating Instructions.

2. **Log in from the control panel as an administrator with all privileges.**

3. **Press [System Settings].**

4. **Press [Administrator Tools].**

5. **Press [▼] seven times.**

6. **Press [Device Setting Information: Export (Memry Strge Devc)].**

7. **Press [Device Unique Information].**

   Device unique information includes the IP address, host name, etc.

8. **Select [Include] or [Exclude], and then press [OK].**

9. **Press [Enter Encryption Key].**

10. **Enter an encryption key, and then press [OK].**

11. **Press [Run Export].**

12. **Press [OK].**

13. **Press [Exit].**

14. **Log out.**

⬇ Note

- If data export fails, the details of the error can be viewed in the log.

Importing Device Information

Import device information saved on an SD card.

1. **Insert an SD card into the media slot on the side of the control panel.**

   For details about inserting the SD card, see "Inserting/Removing a Memory Storage Device" Operating Instructions.

2. **Log in from the control panel as an administrator with all privileges.**

3. **Press [System Settings].**

4. **Press [Administrator Tools].**

5. **Press [▼] seven times.**

6. **Press [Device Setting Information: Import (Memry Strge Devc)].**

7. **Press [Device Setting Info. File].**
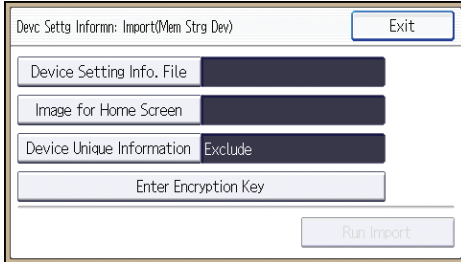
8. **Select the file(s), and then press [OK].**

9. **Press [Image for Home Screen].**

10. **Select the file, and then press [OK].**

11. **Press [Device Unique Information].**

    Device unique information includes the IP address, host name, etc.

12. **Select [Include] or [Exclude], and then press [OK].**

13. **Press [Enter Encryption Key].**

14. **Specify the encryption key that was created when the file was exported, and then press [OK].**

15. **Press [Run Import].**

16. **Press [OK].**

17. **Press [Exit].**

    The printer restarts.

↓ Note

• If data import fails, the details of the error can be viewed in the log.

Managing Eco-friendly Counter

When user authentication is being used, information on the eco-friendly counter is displayed at login.

The eco-friendly counter is the ratio of use of duplex and combine printing to the total number of printed sheets.

How much toner and paper are being saved is indicated by the eco-friendly index.

↓Note

- When Basic, Windows, LDAP or Integration Server authentication is used for user authentication, the printer compiles the data and displays the eco-friendly counter for each user.

- When user code authentication is used for user authentication, or when user authentication is not in use, the printer compiles the data and displays its overall eco-friendly counter.

Configuring the Display of Eco-friendly Counters

You can specify the period over which to collect data for the eco-friendly counter as well as specify the administrator's message.

1. **Log in as the machine administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Administrator Tools].**
4. **Press [▼] twice.**
5. **Press [Eco-friendly Counter Period/Administrator Message].**
6. **Press the setting item you want to change.**
7. **Change the settings.**
8. **Press [OK].**
9. **Press [Exit].**
10. **Log out.**

Eco-friendly counter settings

Count Period

Specify the period over which to collect data for the eco-friendly counter.

When [Specify Days] is selected, data for the eco-friendly counter is compiled for each number of days specified.

Default: [**Do not Count**]

Administrator Message

Select a message type.

If you select "Fixed Message", a preset message is displayed.

If you select "User Message", the machine administrator can enter a message to be displayed.

Default: [**Fixed Message**]

Display Information Screen

Set up whether or not to display the eco-friendly index with information at login.

Default: [**Off**]

Display Time

Set up the timing for displaying information.

Default: [**Every Time Login**]

Clearing a Printer's Eco-friendly Counter

A printer's eco-friendly counter can be cleared.

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼].**

5. **Press [Display/Clear Eco-friendly Counter].**

6. **Press [Clear Current Value] or [Clear Crnt. & Prev. Val].**

7. **Press [OK].**

8. **Press [Exit].**

9. **Log out.**

Clearing the Eco-friendly Counter by User

You can clear user-specific eco-friendly counters.

1. **Log in as the machine administrator from the printer's control panel.**

2. **Press [System Settings].**

3. **Press [Administrator Tools].**

4. **Press [▼].**

5. **Press [Display/Clear Eco-friendly Counter per User].**

6. **Press the counter item to clear.**

7. **Press [Clear Current Value] or [Clear Crnt. & Prev. Val].**

8. **Press [OK].**

9. **Press [Exit].**

10. **Log out.**

↓Note

- The eco-friendly counters for all users are cleared. You cannot clear user-specific eco-friendly counters separately.

7

Specifying the Extended Security Functions

In addition to providing basic security through user authentication and each administrator's specified limits to access the printer, security can also be increased by encrypting transmitted data and data in the Address Book.

1. **Log in from the control panel as an administrator with privileges.**
2. **Press [System Settings].**
3. **Press [Administrator Tools].**
4. **Press [▼] four times**
5. **Press [Extended Security].**
6. **Press the setting item you want to change.**

   If the setting you want to change is not displayed, press [▼] to move to another page.
7. **Change the settings.**
8. **Press [OK].**
9. **Press [Exit].**
10. **Log out.**

⬇️ **Note**

- The operation privileges of an administrator differs depending on the setting.

Extended Security Function Settings

Driver Encryption Key

This can be specified by the network administrator.

Specify the string of text for decrypting the login passwords or file passwords sent from the driver when user authentication is ON.

To specify the driver encryption key, register the encryption key specified using the printer in the driver.

For details, see p.137 "Specifying a Driver Encryption Key".

Driver Encryption Key:Encryption Strength

This can be specified by the network administrator.

Specify the encryption strength for sending jobs from the driver to the printer.

The printer confirms the encryption strength of the password appended to a job and processes it.

If [Simple Encryption] is selected, all jobs that pass user authentication are accepted.

If [DES] is selected, only jobs encrypted with DES or AES are accepted.

If [AES] is selected, only jobs encrypted with AES are accepted.

If you select [AES] or [DES], specify the encryption settings using the printer driver. For details about specifying the printer driver, see the printer driver Help.

Default: [**Simple Encryption**]

Restrict Display of User Information

This can be specified by the machine administrator.

This can be specified if user authentication is specified. When the job history is checked using a network connection for which authentication is not available, all personal information can be displayed as "* * * * * * * *". For example, when someone not authenticated as an administrator checks the job history using SNMP in SmartDeviceMonitor for Admin, personal information can be displayed as "* * * * * * * *" so that users cannot be identified. Because information identifying registered users cannot be viewed, unauthorized users are prevented from obtaining information about the registered files.

Default: [**Off**]

Encrypt User Custom Setting & Address Book

This can be specified by the user administrator.

Encrypt the individual settings of the printer's users and the data in the Address Book.

Even if information on an internal part has been leaked, encryption prevents the individual user settings or the Address Book data from being read.

For details, see p.67 "Protecting the Address Book".

Default: [**Off**]

Enhance File Protection

This can be specified by the file administrator.

By specifying a password, you can limit operations such as printing, deleting, and sending files, and can prevent unauthorized people from accessing the files. However, it is still possible for the password to be cracked.

By specifying "Enhance File Protection", files are locked and so become inaccessible if an invalid password is entered ten times. This can protect the files from unauthorized access attempts in which a password is repeatedly guessed.

The locked files can only be unlocked by the file administrator.

When files are locked, you cannot select them even if the correct password is entered.

Default: [**Off**]

Authenticate Current Job

This can be specified by the machine administrator.

This setting lets you specify whether or not authentication is required for operations such as canceling jobs under the printer function.

If you select [Login Privilege], authorized users and the machine administrator can operate the printer. When this is selected, authentication is not required for users who logged in to the printer before [Login Privilege] was selected.

If [Access Privilege] is specified, any user who performed a print job can cancel the job. Also, the machine administrator can cancel the user's print job.

Even if you select [Login Privilege] and log on to the printer, you cannot cancel a print job that is being processed if you are not privileged to use the printer functions.

You can specify "Authenticate Current Job" only if "User Authentication Management" was specified.

Default: [**Off**]

@Remote Service

This can be specified by the machine administrator.

Communication via HTTPS for @Remote Service is disabled if you select [Prohibit].

When setting it to [Prohibit], consult with your service representative.

If it is set to [Proh. Some Services], it becomes impossible to change settings via a remote connection, providing optimally secure operation.

Default: [**Do not Prohibit**]

Update Firmware

This can be specified by the machine administrator.

Specify whether to allow firmware updates on the printer. Firmware update means having the service representative update the firmware or updating the firmware via the network.

If you select [Prohibit], firmware on the printer cannot be updated.

If you select [Do not Prohibit], there are no restrictions on firmware updates.

Default: [**Do not Prohibit**]

Change Firmware Structure

This can be specified by the machine administrator.

Specify whether to prevent changes in the printer's firmware structure. The Change Firmware Structure function detects when the SD card is inserted, removed or replaced.

If you select [Prohibit], the printer stops during startup when a firmware structure change is detected and a message requesting administrator login is displayed. After the machine administrator logs in, the printer finishes startup with the updated firmware.

The administrator can confirm if the updated structure change is permissible or not by checking the firmware version displayed on the control panel screen. If the firmware structure change is not permissible, contact your service representative before logging in.

When "Change Firmware Structure" is set to [Prohibit], administrator authentication must be enabled.

After [Prohibit] is specified, disable administrator authentication. When administrator authentication is enabled again, you can return the setting to [Do not Prohibit].

If you select [Do not Prohibit], firmware structure change detection is disabled.

Default: [**Do not Prohibit**]

Password Policy

This can be specified by the user administrator.

This setting lets you specify [Complexity Setting] and [Minimum Character No.] for the password. By making this setting, you can limit the available passwords to only those that meet the conditions specified in "Complexity Setting" and "Minimum Character No.".

If you select [Level 1], specify the password using a combination of two types of characters selected from upper-case letters, lower-case letters, decimal numbers, and symbols such as #.

If you select [Level 2], specify the password using a combination of three types of characters selected from upper-case letters, lower-case letters, decimal numbers, and symbols such as #.

Default: [**Off**], Minimum required number of characters not specified

Settings by SNMPv1, v2

This can be specified by the network administrator.

When the printer is accessed using the SNMPv1, v2 protocol, authentication cannot be performed, allowing machine administrator settings such as the paper setting to be changed. If you select [Prohibit], the setting can be viewed but not specified with SNMPv1, v2.

Default: [**Do not Prohibit**]

Security Setting for Access Violation

This can be specified by the machine administrator.

When logging in to the printer via a network application, a user may be locked out erroneously because the number of authentication attempts of the user does not match the number of attempts logged internally.

For example, access may be denied when a print job for multiple sets of pages is sent from an application.

If you select [On] under "Security Setting for Access Violation", you can prevent such authentication errors.

- On

  - Denial Durtn. for Accs. Viol.

    Specify the time to limit repeated access by a user.

    Use the number buttons to enter the time between "0" and "60", and then press [OK].

    Default: [**15**]

  - Managed User Host Limit

Specify the number of user accounts to manage under Security "Security Setting for Access Violation".

Use the number buttons to enter the number between "50" and "200", and then press [OK].

Default: [**200**]

- Password Entry Host Limit

Specify the number of passwords to manage under Security "Security Setting for Access Violation".

Use the number buttons to enter the number between "50" and "200", and then press [OK].

Default: [**200**]

- Status Monitor Interval

Specify the monitoring interval of "Managed User Host Limit" and "Password Entry Host Limit".

Use the number buttons to enter the time between "1" and "10", and then press [OK].

Default: [**3**]

- Off

Default: [**Off**]

Password Entry Violation

This can be specified by the machine administrator.

If the number of authentication requests exceeds the setting, the system classifies the access session as a password attack. The access session is recorded in the Access Log and the log data is sent to the machine administrator by e-mail.

If the "Max. Allowed No. of Access" is set to [0], password attacks are not detected.

- Max. Allowed No. of Access

Specify the maximum number of allowable authentication attempts.

Use the number buttons to enter the number between "0" and "100", and then press [OK].

Default: [**30**]

- Measurement Time

Specify the interval to count the number of repeated failed authentication attempts. When the measurement time is over, the logged counts of failed authentication attempts are cleared.

Use the number buttons to enter the time between "1" and "10", and then press [OK].

Default: [**5**]

⬇Note

- Depending on the values of the settings for [Max. Allowed No. of Access] and [Measurement Time], you may frequently receive violation detection e-mail.

- If violation detection e-mail is received frequently, check the content and review the setting values.

Device Access Violation

This can be specified by the machine administrator.

If the number of log in requests exceeds the setting, the system classifies the access session as an access violation. The access session is recorded in the Access Log and the log data is sent to the machine administrator by e-mail. Also, a message is displayed on the control panel and on Web Image Monitor.

If the "Max. Allowed No. of Access" is set to [0], over access is not detected.

In "Authentication Delay Time", you can specify response delay time for log-in requests to prevent the system from becoming unavailable when an access violation is detected.

In "Simultns. Access Host Limit", you can specify the limit number of hosts accessing the printer at one time. If the number of access exceeds the setting, monitoring becomes unavailable and the detected unavailability is recorded in the Log.

- Max. Allowed No. of Access

  Specify the maximum number of allowable access attempts.

  Use the number buttons to enter the number between "0" and "500", and then press [OK].

  Default: [100]

- Measurement Time

  Specify the interval to count the number of excessive access. When the measurement time is over, the logged counts of access are cleared.

  Use the number buttons to enter the number between "10" and "30", and then press [OK].

  Default: [10]

- Authentication Delay Time

  Specify the authentication delay time when an access violation is detected.

  Use the number buttons to enter the number between "0" and "9", and then press [OK].

  Default: [3]

- Simultns. Access Host Limit

  Specify the number of acceptable authentication attempts when authentications are delayed due to an access violation.

  Use the number buttons to enter the number between "50" and "200", and then press [OK].

  Default: [200]

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Note

- Depending on the values of the settings for [Max. Allowed No. of Access] and [Measurement Time], you may frequently receive violation detection e-mail.

- If violation detection e-mail is received frequently, check the content and review the setting values.

Other Security Functions

System Status

Pressing the [Check Status] key on the control panel allows you to check the printer's current status and settings. If administrator authentication has been specified, [Machine Adres Info] is displayed in [Maintnc/MacInfo] only if you have logged in to the printer as an administrator.

Confirming Firmware Validity

When the printer starts up, this function verifies the validity of its firmware.

If an error occurs during the verification, a verification error is displayed on the control panel.

Note that this can also be checked on Web Image Monitor after startup of the printer. If an error occurs in the verification of Web Image Monitor itself, Web Image Monitor cannot be used, so check the display on the control panel.

7

Limiting Printer Operations to Customers Only

The printer can be set so that operation is impossible without administrator authentication.

The printer can be set to prohibit operation without administrator authentication and also prohibit remote registration in the Address Book by a service representative.

We maintain strict security when handling customers' data. Administrator authentication prevents us from operating the printer without administrator permission.

Settings

Service Mode Lock

> This can be specified by the machine administrator. Service mode is used by a service representative for inspection or repair. If you set "Service Mode Lock" to [On], service mode cannot be used unless the machine administrator logs on to the printer and cancels the service mode lock to allow the service representative to operate the printer for inspection and repair. This ensures that the inspection and repair are done under the supervision of the machine administrator.

Specifying Service Mode Lock

1. **Log in as the machine administrator from the printer's control panel.**
2. **Press [System Settings].**
3. **Press [Administrator Tools].**
4. **Press [▼] five times.**
5. **Press [Service Mode Lock].**
6. **Press [On], and then press [OK].**
7. **Log out.**

8. Troubleshooting

This chapter describes what to do if the printer does not function properly.

If Authentication Fails

This section explains what to do if a user cannot operate the printer because of a problem related to user authentication. Refer to this section if a user comes to you with such a problem.

If a Message is Displayed

This section explains how to deal with problems if a message appears on the screen during user authentication.

If a message not shown below is displayed, follow the message to resolve the problem.

▌ "You do not have the privileges to use this function."

The privileges to use the function is not specified.

If this appears when trying to use a function:

- The function is not specified in the Address Book management setting as being available.
- The user administrator must decide whether to additionally assign the privileges to use the function.

If this appears when trying to specify a printer's setting:

- The administrator differs depending on the printer's settings you wish to specify.
- Using the list of settings, the administrator responsible must decide whether to additionally assign the privileges to use the function. See p.213 "List of Operation Privileges for Settings".

▌ "Authentication has failed."

The cause depends on the error code.

For details, see p.200 "If an Error Code is Displayed".

▌ "Administrator Authentication for User Management must be set to on before this selection can be made."

User administrator privileges have not been enabled in [Administrator Authentication Management].

To specify Basic authentication, Windows authentication, LDAP authentication, or Integration Server authentication, you must first enable user administrator privileges in [Administrator Authentication Management].

For details, see p.12 "Configuring Administrator Authentication".

▌ "Failed to obtain URL."

The printer cannot connect to the server or cannot establish communication.

Make sure the server's settings, such as the IP address and host name, are specified correctly on the printer. Make sure the host name of the UA Server is specified correctly.

"Failed to obtain URL."

The printer is connected to the server, but the UA service is not responding properly.

Make sure the UA service is specified correctly.

"Failed to obtain URL."

SSL is not specified correctly on the server.

Specify SSL using Authentication Manager.

"Failed to obtain URL."

Server authentication failed.

Make sure server authentication is specified correctly on the printer.

"The selected file(s) contained file(s) without access privileges. Only file(s) with access privileges will be deleted."

You have tried to delete files without the privileges to do so.

Files can be deleted by the file creator (owner) or file administrator.

To delete a file which you are not privileged to delete, contact the file creator (owner).

↓Note

- If a service call message appears, contact your service representative.

If an Error Code is Displayed

When authentication fails, the message "Authentication has failed." appears with an error code. The following lists provide solutions for each error code. If the error code that appears is not on the lists, write down the error code and contact your service representative.

Error code display position
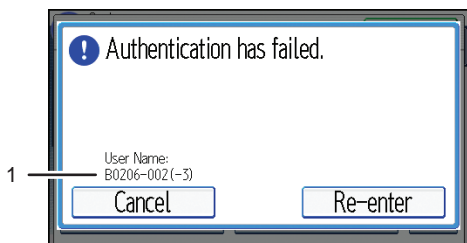
CJD017

1. **Error code**

   An error code appears.

Basic authentication

B0104-000

Failed to decrypt password.

- A password error occurred. Make sure the password is entered correctly.
- Either [DES] or [AES] is selected for "Driver Encryption Key:Encryption Strength". You can make access by specifying the driver encryption key.
- A driver encryption key error occurred. Make sure that the encryption key is correctly specified on the driver.

B0105-000

A login user name was not specified but a DeskTopBinder operation was performed.

- Set the DeskTopBinder login user name correctly.

B0206-002 : Case 1

A login user name or password error occurred.

- Make sure the login user name and password are entered correctly and then log in.

B0206-002 : Case 2

A user attempted authentication from an application on the "System Settings" screen, where only the administrator has authentication ability.

- Only the administrator has login privileges on this screen. Log in as a general user from the application's login screen.

B0206-003

An authentication error occurred because the user name contains a space, colon (:), or quotation mark (").

- Recreate the account if the account name contains any of these prohibited characters.
- If the account name was entered incorrectly, enter it correctly and log in again.

B0207-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

B0208-000 / B0208-002

The account is locked because you have reached the maximum number of failed authentication attempts allowed.

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- Ask the user administrator to unlock the account.

Windows authentication

W0104-000

Failed to decrypt password.

- A password error occurred. Make sure the password is entered correctly.
- Either [DES] or [AES] is selected for "Driver Encryption Key:Encryption Strength". You can make access by specifying the driver encryption key.
- A driver encryption key error occurred. Make sure that the encryption key is correctly specified on the driver.

W0105-000

A login user name was not specified but a DeskTopBinder operation was performed.

- Set the DeskTopBinder login user name correctly.

W0206-002

A user attempted authentication from an application on the "System Settings" screen, where only the administrator has authentication ability.

- Only the administrator has login privileges on this screen. Log in as a general user from the application's login screen.

W0206-003

An authentication error occurred because the user name contains a space, colon (:), or quotation mark (").

- Recreate the account if the account name contains any of these prohibited characters.
- If the account name was entered incorrectly, enter it correctly and log in again.

W0207-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

W0208-000 / W0208-002

The account is locked because you have reached the maximum number of failed authentication attempts allowed.

- Ask the user administrator to unlock the account.

W0400-102

Kerberos authentication failed because the server is not functioning correctly.

- Make sure that the server is functioning properly.

W0400-107 : Case 1

The UserPrincipleName (user@domainname.xxx.com) form is being used for the login user name.

- The user group cannot be obtained if the UserPrincipleName (user@domainname.xxx.com) form is used. Use "sAMAccountName(user)" to log in, because this account allows you to obtain the user group.

W0400-107 : Case 2

Current settings do not allow group retrieval.

- Make sure the user group's group scope is set to "Global Group" and the group type is set to "Security" in group properties.
- Make sure the account has been added to user group.
- Make sure the user group name registered on the printer and the group name on the DC (domain controller) are exactly the same. The DC is case sensitive.
- If there is more than one DC, make sure that a confidential relationship has been configured between each DC.

W0400-107 : Case 3

The domain name cannot be resolved.

- Make sure that DNS/WINS is specified in the domain name in "Interface Settings".

W0400-200

Due to the high number of authentication attempts, all resources are busy.

- Wait a few minutes and then try again.

W0400-202 : Case 1

The SSL settings on the authentication server and the printer do not match.

- Make sure the SSL settings on the authentication server and the printer match.

W0400-202 : Case 2

The user entered sAMAccountName in the user name to log in.

- If a user enters sAMAccountName as the login user name, ldap_bind fails in a arent/subdomain environment.
- Use UserPrincipleName for the login name instead.

W0406-003

An authentication error occurred because the user name contains a space, colon (:), or quotation mark (").

- Recreate the account if the account name contains any of these prohibited characters.
- If the account name was entered incorrectly, enter it correctly and log in again.

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W0406-101

Authentication cannot be completed because of the high number of authentication attempts.

- Wait a few minutes and then try again.

- If the situation does not return to normal, make sure that an authentication attack is not occurring.

- Notify the administrator of the screen message by e-mail, and check the system log for signs of an authentication attack.

W0406-107 : Case 1

Cannot connect to the authentication server.

- Make sure that connection to the authentication server is possible.

- Use the "Ping Command" to check the connection.

W0406-107 : Case 2

A login user name or password error occurred.

- Make sure that the user is registered on the server.

- Use a registered login user name and password.

W0406-107 : Case 3

A domain name error occurred.

- Make sure that the Windows authentication domain name is specified correctly.

W0406-107 : Case 4

Cannot resolve the domain name.

- Specify the IP address in the domain name and confirm that authentication is successful.

If authentication was successful:

- If the top-level domain name is specified in the domain name (such as domainname.xxx.com), make sure that DNS is specified in "Interface Settings"

- If a NetBIOS domain name is specified in domain name (such as DOMAINNAME), make sure that WINS is specified in "Interface Settings".

If authentication was unsuccessful:

- Make sure that Restrict LM/NTLM is not set in either "Domain Controller Security Policy" or "Domain Security Policy".

- Make sure that the ports for the domain control firewall and the firewall on the printer to the domain control connection path are open.

- Under Windows 7, if the Windows firewall is activated, create a firewall rule in the "Advanced settings" on the "System and security" control panel, and then authorize ports 137 and 139.

- Under Windows XP, if the Windows firewall is activated, open the properties for "Network Connections", and then click "Settings" on the "Advanced" tab. On the "Exceptions" tab, specify ports 137 and 139 as exceptions.

- In the Properties window for "Network Connections", open TCP/IP properties. Then click detail settings, WINS, and then check the "Enable NetBIOS over TCP/IP" box and set number 137 to "Open".

W0406-107 : Case 5

Kerberos authentication failed.

- Kerberos authentication settings are not correctly configured. Make sure the realm name, KDC (Key Distribution Center) name and corresponding domain name are specified correctly.

- The KDC and printer timing do not match. Authentication will fail if the difference between the DC and printer timing is more than 5 minutes. Make sure the timing matches.

- Kerberos authentication will fail if the realm name is specified in lowercase letters. Make sure the realm name is specified in capital letters.

- Kerberos authentication will fail if automatic retrieval for KDC fails. Ask your service representative to make sure the KDC retrieval settings are set to "automatic retrieval". If automatic retrieval is not functioning properly, switch to manual retrieval.

W0409-000

Authentication timed out because the server did not respond.

- Check the network configuration, or settings on the authenticating server.

W0511-000

The authentication server login name is the same as a user name already registered on the printer. (Names are distinguished by the unique attribute specified in the LDAP authentication settings.)

- Delete the old, duplicated name or change the login name.

- If the authentication server has just been changed, delete the old name on the server.

W0606-004

Authentication failed because the user name contains language that cannot be used by general users.

- Do not use "other", "admin", "supervisor" or "HIDE*" in general user accounts.

W0607-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

W0612-005

Authentication failed because no more users can be registered. (The number of users registered in the Address Book has reached capacity.)

- Ask the user administrator to delete unused user accounts in the Address Book.

W0707-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

LDAP authentication

L0104-000

Failed to decrypt password.

- A password error occurred. Make sure the password is entered correctly.
- Either [DES] or [AES] is selected for "Driver Encryption Key:Encryption Strength". You can make access by specifying the driver encryption key.
- A driver encryption key error occurred. Make sure that the encryption key is correctly specified on the driver.

L0105-000

A login user name was not specified but a DeskTopBinder operation was performed.

- Set the DeskTopBinder login user name correctly.

L0206-002

A user attempted authentication from an application on the "System Settings" screen, where only the administrator has authentication ability.

- Only the administrator has login privileges on this screen. Log in as a general user from the application's login screen.

L0206-003

An authentication error occurred because the user name contains a space, colon (:), or quotation mark (").

- Recreate the account if the account name contains any of these prohibited characters.
- If the account name was entered incorrectly, enter it correctly and log in again.

L0207-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

L0208-000 / L0208-002

The account is locked because you have reached the maximum number of failed authentication attempts allowed.

- Ask the user administrator to unlock the account.

L0306-018

The LDAP server is not correctly configured.

- Make sure that a connection test is successful with the current LDAP server configuration.

L0307-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

L0400-210

Failed to obtain user information in LDAP search.

- The login attribute's search criteria might not be specified or the specified search information is unobtainable. Make sure the login name attribute is specified correctly.

L0406-003

An authentication error occurred because the user name contains a space, colon (:), or quotation mark (").

- Recreate the account if the account name contains any of these prohibited characters. If the account name was entered incorrectly, enter it correctly and log in again.

L0406-200

Authentication cannot be completed because of the high number of authentication attempts.

- Wait a few minutes and then try again. If the situation does not return to normal, make sure that an authentication attack is not occurring. Notify the administrator of the screen message by e-mail, and check the system log for signs of an authentication attack.

L0406-201

Authentication is disabled in the LDAP server settings.

- Change the LDAP server settings in administrator tools, in "System Settings".

L0406-202 / L0406-203 : Case 1

There is an error in the LDAP authentication settings, LDAP server, or network configuration.

- Make sure that a connection test is successful with the current LDAP server configuration. If connection is not successful, there might be an error in the network settings. Check the domain name or DNS settings in "Interface Settings".
- Make sure the LDAP server is specified correctly in the LDAP authentication settings.
- Make sure the login name attribute is entered correctly in the LDAP authentication settings.
- Make sure the SSL settings are supported by the LDAP server.

L0406-202 / L0406-203 : Case 2

A login user name or password error occurred.

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- Make sure the login user name and password are entered correctly.

- Make sure a usable login name is registered on the printer. Authentication will fail in the following cases: If the login user name contains a space, colon (:), or quotation mark ("). If the login user name exceeds 128 bytes.

L0406-202 / L0406-203 : Case 3

There is an error in the simple encryption method.

- Authentication will fail if the password is left blank in simple authentication mode. To allow blank passwords, contact your service representative.

- In simple authentication mode, the DN of the login user name is obtained in the user account. Authentication fails if the DN cannot be obtained. Make sure there are no errors in the server name, login user name/password, or information entered for the search filter.

L0406-204

Kerberos authentication failed.

- Kerberos authentication settings are not correctly configured. Make sure the realm name, KDC (Key Distribution Center) name, and supporting domain name are specified correctly.

- The KDC and printer timing do not match. Authentication will fail if the difference between the KDC and printer timing is more than 5 minutes. Make sure the timing matches.

- Kerberos authentication will fail if the realm name is specified in lowercase letters. Make sure the realm name is specified in capital letters.

L0409-000

Authentication timed out because the server did not respond.

- Contact the server or network administrator. If the situation does not return to normal, contact your service representative.

L0511-000

The authentication server login name is the same as a user name already registered on the printer. (Names are distinguished by the unique attribute specified in the LDAP authentication settings.)

- Delete the old, duplicated name or change the login name.

- If the authentication server has just been changed, delete the old name on the server.

L0606-004

Authentication failed because the user name contains language that cannot be used by general users.

- Do not use "other", "admin", "supervisor" or "HIDE*" in general user accounts.

L0607-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

L0612-005

Authentication failed because no more users can be registered. (The number of users registered in the Address Book has reached capacity.)

- Ask the user administrator to delete unused user accounts in the Address Book.

L0707-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

Integration Server authentication

I0104-000

Failed to decrypt password.

- A password error occurred. Make sure the password is entered correctly.
- Either [DES] or [AES] is selected for "Driver Encryption Key:Encryption Strength". You can make access by specifying the driver encryption key.
- A driver encryption key error occurred. Make sure that the encryption key is correctly specified on the driver.

I0105-000

A login user name was not specified but a DeskTopBinder operation was performed.

- Set the DeskTopBinder login user name correctly.

I0206-002

An user attempted authentication from an application on the "System Settings" screen, where only the administrator has authentication ability.

- Only the administrator has login privileges on this screen. Log in as a general user from the application's login screen.

I0206-003

An authentication error occurred because the user name contains a space, colon (:), or quotation mark (").

- Recreate the account if the account name contains any of these prohibited characters.
- If the account name was entered incorrectly, enter it correctly and log in again.

I0207-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

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I0208-000 / I0208-002

The account is locked because you have reached the maximum number of failed authentication attempts allowed.

- Ask the user administrator to unlock the account.

I0406-003

An authentication error occurred because the user name contains a space, colon (:), or quotation mark (").

- Recreate the account if the account name contains any of these prohibited characters.

- If the account name was entered incorrectly, enter it correctly and log in again.

I0406-301: Case 1

The URL could not be obtained.

- Obtain the URL using Obtain URL in Integration Server authentication.

I0406-301: Case 2

A login user name or password error occurred.

- Make sure the login user name and password are entered correctly.

- Make sure a usable login name is registered on the printer. Authentication will fail in the following cases: If the login user name contains a space, colon (:), or quotation mark ("). If the login user name exceeds 128 bytes.

I0409-000

Authentication timed out because the server did not respond.

- Contact the server or network administrator. If the situation does not return to normal, contact your service representative.

I0511-000

The authentication server login name is the same as a user name already registered on the printer. (Names are distinguished by the unique attribute specified in the LDAP authentication settings.)

- Delete the old, duplicated name or change the login name.

- If the authentication server has just been changed, delete the old name on the server.

I0606-004

Authentication failed because the user name contains language that cannot be used by general users.

- Do not use "other", "admin", "supervisor" or "HIDE*" in general user accounts.

I0607-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

I0612-005

Authentication failed because no more users can be registered. (The number of users registered in the Address Book has reached capacity.)

- Ask the user administrator to delete unused user accounts in the Address Book.

I0707-001

An authentication error occurred because the Address Book is being used at another location.

- Wait a few minutes and then try again.

If the Printer Cannot Be Operated

If the following conditions arise while users are operating the printer, provide the instructions on how to deal with them.

Condition	Cause	Solution
Cannot perform the following: • Print with the printer driver	User authentication has been rejected.	Confirm the user name and login name with the administrator of the network in use if using Windows authentication, LDAP authentication, or Integration Server authentication. Confirm with the user administrator if using Basic authentication.
Cannot perform the following: • Print with the printer driver	The encryption key specified in the driver does not match the printer's driver encryption key.	Specify the driver encryption key registered in the printer. For details, see p.137 "Specifying a Driver Encryption Key".

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Condition	Cause	Solution
After starting "User Management Tool" or "Address Management Tool" in SmartDeviceMonitor for Admin and entering the correct login user name and password, a message that an incorrect password has been entered appears.	"Driver Encryption Key:Encryption Strength" is not set correctly. Alternatively, "SSL/TLS" has been enabled although the required certificate is not installed in the computer.	Set "Driver Encryption Key:Encryption Strength" to [Simple Encryption]. Alternatively, enable "SSL/TLS", install the server certificate in the printer, and then install the certificate in the computer. For details, see p.190 "Specifying the Extended Security Functions" and p.100 "Configuring SSL/TLS".
User authentication is disabled, yet destinations specified using the printer do not appear.	User authentication might have been disabled without "All Users" being selected for "Protect Destination".	Re-enable user authentication, and select [All Users] as the access permission setting of the destinations you want to display. For details, see p.67 "Protecting the Address Book".
Cannot print when user authentication has been enabled.	User authentication may not be specified in the printer driver.	Specify user authentication in the printer driver. For details, see the printer driver Help.
[Finish Job and Limit] is selected in "Machine action when limit is reached", but the current job is canceled before it is finished.	Depending on the application you are using, the printer might recognize a job as multiple jobs, causing cancelation of the job before it is finished.	Reset the print volume use setting for the user by, for example, clearing the print volume use counter, and then perform printing again. For details about clearing print volume counters, ask the user administrator.
After executing "Encrypt User Custom Settings & Address Book", the "Exit" message does not appear despite waiting a long time.	Authentication may be taking time because a large number of items are registered in the address book. Alternatively, a file may be corrupt or the hard disk may be faulty.	If the screen has still not updated even though the "File System Data Only" time specified in accordance with p.70 "Encrypting Data on the Hard Disk" has elapsed, contact your service representative.

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9. Checking Operation Privileges

This chapter specifies a list of the administrator and user operation privileges for the printer settings when administrator authentication or user authentication is enabled.

List of Operation Privileges for Settings

Understanding headers

- User

  The user administrator has privileges for this operation.

- Mach

  The machine administrator has privileges for this operation.

- N/W

  The network administrator has privileges for this operation.

- File

  The file administrator has privileges for this operation.

- Unset

  The logged in user has privileges for this operation.

  In cases where no settings are selected in the available settings of [Administrator Authentication Management].

- Set

  The logged in user has privileges for this operation.

  Status when settings are selected in the available settings of [Administrator Authentication Management].

- Lv.1

  In cases where the [Menu Protect] setting is set to [Level 1].

- Lv.2

  In cases where the [Menu Protect] setting is set to [Level 2].

Understanding the symbols

R/W: Execute, change and reading possible.

R: Reading is possible.

-: Execute, change and reading are not possible.

⬇Note

- When user authentication is active, users who have not been authenticated or do not have login data cannot operate the printer.

- When [Menu Protect] is set to [Off], users can execute, change and read all of the settings of each function.

System Settings

When administrator authentication is set, the restrictions to user operations differ depending on the configurations of the available settings in [Administrator Authentication Management].

General Features

Settings	User	Mach	N/W	File	Unset	Set
Program/Change/Delete User Text	R	R/W	R	R	R/W	R
Panel Key Sound	R	R/W	R	R	R/W	R
Function Priority	R	R/W	R	R	R/W	R
Screen Color Setting	R	R/W	R	R	R/W	R
Output: Printer	R	R/W	R	R	R/W	R
Key Repeat	R	R/W	R	R	R/W	R
Measurement Unit	R	R/W	R	R	R/W	R
Check Status/Job List Display Time	R	R/W	R	R	R/W	R
Small Size Paper Tray	R	R/W	R	R	R/W	R
External Keyboard	R	R/W	R	R	R/W	R
Compatible ID	R	R/W	R	R	R/W	R

Tray Paper Settings

Settings	User	Mach	N/W	File	Unset	Set
Paper Tray Priority: Printer	R	R/W	R	R	R/W	R
Tray Paper Size: Tray 1-4	R	R/W	R	R	R/W	R
Printer Bypass Paper Size	R	R/W	R	R	R/W	R
Paper Type: Bypass Tray	R	R/W	R	R	R/W	R
Paper Type: Tray 1-4	R	R/W	R	R	R/W	R
Paper Type: LCT	R	R/W	R	R	R/W	R

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Timer Settings

Settings	User	Mach	N/W	File	Unset	Set
Sleep Mode Timer	R	R/W	R	R	R/W	R
Printer Auto Reset Timer	R	R/W	R	R	R/W	R
Set Date	R	R/W	R	R	R/W	R
Set Time	R	R/W	R	R	R/W	R
Auto Logout Timer	R	R/W	R	R	R/W	R
Weekly Timer Code	R	R/W	R	R	R/W	R
Weekly Timer	R	R/W	R	R	R/W	R

Interface Settings

Network

Settings	User	Mach	N/W	File	Unset	Set
Machine IPv4 Address[*1]	R	R	R/W	R	R/W	R
IPv4 Gateway Address	R	R	R/W	R	R/W	R
Machine IPv6 Address	R	R	R	R	R	R
IPv6 Gateway Address	R	R	R	R	R	R
IPv6 Stateless Address Autoconfiguration	R	R	R/W	R	R/W	R
DHCPv6 Configuration	R	R	R/W	R	R/W	R
DNS Configuration[*2]	R	R	R/W	R	R/W	R
DDNS Configuration	R	R	R/W	R	R/W	R
IPsec	R	R	R/W	R	R/W	Set
Domain Name[*1]	R	R	R/W	R	R/W	R
WINS Configuration	R	R	R/W	R	R/W	R
Effective Protocol	R	R	R/W	R	R/W	R
NW Frame Type	R	R	R/W	R	R/W	R
SMB Computer Name	R	R	R/W	R	R/W	R

Settings	User	Mach	N/W	File	Unset	Set
SMB Work Group	R	R	R/W	R	R/W	R
Ethernet Speed	R	R	R/W	R	R/W	R
LAN Type	R	R	R/W	R	R/W	R
Ping Command	–	–	R/W	–	R/W	R
Permit SNMPv3 Communication	R	R	R/W	R	R/W	R
Permit SSL/TLS Communication	R	R	R/W	R	R/W	R
Host Name	R	R	R/W	R	R/W	R
Machine Name	R	R	R/W	R	R/W	R
IEEE 802.1X Authentication for Ethernet	R	R	R/W	R	R/W	R
Restore IEEE 802.1X Authentication to Defaults	–	–	R/W	–	R/W	–
USB Speed	–	–	R/W	–	R/W	–

*1   When auto-obtain is set, the data is read-only.

*2   All administrators and users can run a test of connections.

Parallel Interface

Settings	User	Mach	N/W	File	Unset	Set
Parallel Timing	R	R/W	R	R	R/W	R
Parallel Communication Speed	R	R/W	R	R	R/W	R
Selection Signal Status	R	R/W	R	R	R/W	R
Input Prime	R	R/W	R	R	R/W	R
Bidirectional Communication	R	R/W	R	R	R/W	R
Signal Control	R	R/W	R	R	R/W	R

Wireless LAN

Settings	User	Mach	N/W	File	Unset	Set
Communication Mode	R	R	R/W	R	R/W	R

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Settings	User	Mach	N/W	File	Unset	Set
SSID Setting	R	R	R/W	R	R/W	R
Ad-hoc Channel	R	R	R/W	R	R/W	R
Security Method	R	R	R/W	R	R/W	R
Wireless LAN Signal	R	R	R/W	R	R/W	R
Restore Factory Defaults	–	–	R/W	–	R/W	–

Print List

Settings	User	Mach	N/W	File	Unset	Set
Print List	–	–	R/W	–	R/W	–

Email Settings

Settings	User	Mach	N/W	File	Unset	Set
SMTP Server	R	R	R/W	R	R/W	R
SMTP Authentication*3	R	R/W	R	R	R/W	R
POP before SMTP	R	R/W	R	R	R/W	R
Reception Protocol	R	R/W	R	R	R/W	R
POP3/IMAP4 Settings	R	R/W	R	R	R/W	R
Administrator's Email Address	R	R/W	R	R	R/W	R
Email Communication Port	R	R	R/W	R	R/W	R
Email Reception Interval	R	R	R/W	R	R/W	R
Email Storage in Server	R	R	R/W	R	R/W	R
Auto Email Notify	–	R/W	–	–	R/W	R/W

*3   Passwords cannot be read.

Administrator Tools

Settings	User	Mach	N/W	File	Unset	Set
Address Book Management	R/W	R/W *5	R/W *5	R/W *5	R/W *6	R *6
Address Book: Program/Change/Delete Group	R/W	R/W *5	R/W *5	R/W *5	R/W *6	R *6
Address Book: Change Order	R/W	–	–	–	R/W	–
Address Book: Edit Title	R/W	–	–	–	R/W	–
Address Book: Switch Title	R/W	–	–	–	R/W	R
Backup/Restore: User Custom Settings & Address Book	R/W	–	–	–	R/W	–
Display/Print Counter	R	R/W	R	R	R/W	R/W
Display/Clear/Print Counter per User	R/W *7	R/W *8	R	R	R/W	–
Display/Clear Eco-friendly Counter	–	R/W	–	–	–	–
Display/Clear Eco-friendly Counter per User	–	R/W	–	–	–	–
Eco-friendly Counter Period/Administrator Message	R	R/W	R	R	R	R
Machine action when limit is reached	R	R/W	R	R	R	R
Print Volume Use Limitation: Unit Count Setting	R	R/W	R	R	R	R
Print Volum. Use Limit.: Default Limit Value	R/W	R	R	R	R	R
Volm Use Cntr:Scheduld/Specfid Rst Stng	R	R/W	R	R	R	R
Media Slot Use	R	R/W	R	R	R	R
User Authentication Management	R	R/W	R	R	R/W	R
Enhanced Authentication Management	R	R/W	R	R	R/W	R
Administrator Authentication Management	R/W *9*10	R/W *10	R/W *10	R/W *10	R/W	–

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Settings	User	Mach	N/W	File	Unset	Set
Program/Change Administrator	R/W *11	R/W *11	R/W *11	R/W *11	–	–
Extended Security						
• Driver Encryption Key	–	–	R/W	–	R/W	–
• Driver Encryption Key:Encryption Strength	R	R	R/W	R	R/W	R
• Restrict Display of User Information	R	R/W	R	R	R/W	R
• Encrypt User Cstm. Setg. & Addrs. Book	R/W	R	R	R	R	R
• Enhance File Protection	R	R	R	R/W	R	R
• Authenticate Current Job	R	R/W	R	R	R/W	R
• @Remote Service	R	R/W	R	R	R/W	R
• Update Firmware	R	R/W	R	R	–	–
• Change Firmware Structure	R	R/W	R	R	–	–
• Password Policy	R/W	–	–	–	–	–
• Settings by SNMPv1, v2	R	R	R/W	R	R/W	R
• Security Setting for Access Violation	R	R/W	R	R	–	–
• Password Entry Violation	–	R/W	–	–	–	–
• Device Access Violation	–	R/W	–	–	–	–
Program/Change/Delete LDAP Server*4	–	R/W	–	–	R/W	R
Sleep Mode	R	R/W	R	R	R/W	R
Service Test Call	–	R/W	–	–	R/W	–
Notify Machine Status	–	R/W	–	–	R/W	–
Service Mode Lock	R	R/W	R	R	R/W	R
Firmware Version	R	R	R	R	R	R
Network Security Level	R	R	R/W	R	R	R

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Settings	User	Mach	N/W	File	Unset	Set
Auto Erase Memory Setting	R	R/W	R	R	R	R
Erase All Memory	–	R/W	–	–	–	–
Delete All Logs	–	R/W	–	–	R/W	–
Transfer Log Setting*12	R	R/W	R	R	R/W	R
Fixed USB Port	R	R/W	R	R	R/W	R
Program/Change/Delete Realm	–	R/W	–	–	–	R
Machine Data Encryption Settings	–	R/W	–	–	–	–
Program/Delete Device Certificate	–	–	R/W	–	–	–
Device Setting Information: Export (Memry Strge Devc)*13	–	–	–	–	–	–
Device Setting Information: Import (Memry Strge Devc)*13	–	–	–	–	–	–
Compulsory Security Stamp:Printer	R	R/W	R	R	R/W	R
Users Own Home Screen	R	R/W	R	R	R/W	R
Display Supply Info	–	R/W	–	–	R/W	–
ECO Night Sensor	–	R/W	–	–	R/W	–
Select Switchable Languages	–	R/W	–	–	R/W	–
Ready State After Printing	R	R/W	R	R	R/W	R
Energy Saver Mode to Disable Print Server	R	R/W	R	R	R/W	R

*4 Passwords cannot be read.

*5 Only changing headings and user searches are possible.

*6 The items that can be executed, changed and read differ according is set to access privilege.

*7 Can only be cleared.

*8 Can only be printed.

*9 Cannot be changed when using the individual authentication function.

*10 Only the administrator privilege settings can be changed.

*11 Administrators can only change their own accounts.

9

*12   Can only be changed to [Off].

*13   R/W is the administrator with all privileges that include user administrator, machine administrator, network administrator, and file administrator privileges.

9

Edit Home

When administrator authentication is set, the restrictions to user operations differ depending on the configurations of the available settings in [Administrator Authentication Management].

Edit Home

Settings	User	Mach	N/W	File	Unset	Set
Edit Icons	–	R/W	–	–	R/W	–
Insert Image	–	R/W	–	–	R/W	–

Maintenance: Print

When administrator authentication is set, the restrictions to user operations differ depending on the configurations of the available settings in [Administrator Authentication Management].

Maintenance: Print

Settings	User	Mach	N/W	File	Unset	Set
Supply End Option	–	R/W	–	–	R/W	–

Maintenance: Image

When administrator authentication is set, the restrictions to user operations differ depending on the configurations of the available settings in [Administrator Authentication Management].

Maintenance: Image

Settings	User	Mach	N/W	File	Unset	Set
Adjust Image Density	R	R/W	R	R	R/W	R
Adjust Print Position	R	R/W	R	R	R/W	R

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Printer Functions

This section lists the printer function items that appear if [Printer] on the Home screen is pressed.

When administrator authentication is set, the restrictions to user operations differ depending on the "Menu Protect" setting.

Printer Functions

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Job List	R	R	R	R	R	R
Print Jobs	R/W	R/W	R/W	R/W	R/W	R/W
Prt. From Dev.	–	–	–	–	R/W	R/W
Job Reset	R/W	R/W	R/W	R/W	R/W	R/W
Job Operation	R/W	R/W	R/W	R/W	R/W	R/W
Form Feed	R/W	R/W	R/W	R/W	R/W	R/W
Error Log	–	R	–	–	R	R
Spooling Job List	R	R/W	R	R	R	R

Printer Features

When administrator authentication is set, the restrictions to user operations differ depending on the "Menu Protect" setting.

List / Test Print

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Multiple Lists	–	R/W	–	–	R/W	R/W
Configuration Page	–	R/W	–	–	R/W	R/W
Error Log	–	R/W	–	–	R/W	R/W
Network Summary	–	R/W	–	–	R/W	R/W
Supply Info List	–	R/W	–	–	R/W	R/W
Menu List	–	R/W	–	–	R/W	R/W
PCL Configuration / Font Page	–	R/W	–	–	R/W	R/W
PS Configuration / Font Page	–	R/W	–	–	R/W	R/W
PDF Configuration / Font Page	–	R/W	–	–	R/W	R/W
Hex Dump	–	R/W	–	–	R/W	R/W
Operations Test	–	R/W	–	–	R/W	R/W

Data Management

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Menu Protect	R	R/W	R	R	R	R
List / Test Print Lock	R	R/W	R	R	R	R
Delete All Temporary Print Jobs	–	–	–	R/W	–	–
Delete All Stored Print Jobs	–	–	–	R/W	–	–
Auto Delete Temporary Print Jobs	R	R	R	R/W	R	R
Auto Delete Stored Print Jobs	R	R	R	R/W	R	R

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System

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Print Error Report	R	R/W	R	R	R	R
Auto Continue	R	R/W	R	R	R	R
Store and Skip Errored Job	R	R/W	R	R	R	R
Memory Overflow	R	R/W	R	R	R	R
Auto Cancel Conf. for PDL Err.Job	R	R/W	R	R	R	R
Auto Cancel for Prt. Job(s) on Err.	R	R/W	R	R	R	R
Job Separation	R	R/W	R	R	R	R
Rotate by 180 Degrees	R	R/W	R	R	R	R
Print Compressed Data	R	R/W	R/W	R	R	R
Memory Usage	R	R/W	R	R	R	R
Duplex	R	R/W	R	R	R	R
Copies	R	R/W	R	R	R	R
Blank Page Print	R	R/W	R	R	R	R
Edge Smoothing	R	R/W	R	R	R	R
Toner Saving	R	R/W	R	R	R	R
Spool Printing	R	R/W	R	R	R	R
Jobs Not Printed As Machn. Was Off	R	R/W	R	R	R	R
Restrict Direct Print Jobs	R	R/W	R	R	R	R
Switch Initial Screen	R	R/W	R	File	R	R
Printer Language	R	R/W	R	R	R	R
Default Printer Language	R	R/W	R	R	R	R
Sub Paper Size	R	R/W	R	R	R	R
Page Size	R	R/W	R	R	R	R
Letterhead Setting	R	R/W	R	R	R	R

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Settings	User	Mach	N/W	File	Lv.1	Lv.2
Tray Setting Priority	R	R/W	R	R	R	R
Edge to Edge Print	R	R/W	R	R	R	R
Tray Switching	R	R/W	R	R	R	R
RAM Disk	R	R/W	R	R	R	R
Extended Auto Tray Switching	R	R/W	R	R	R	R
I/O Buffer	R	R/W	R	R	R	R
I/O Timeout	R	R/W	R	R	R	R

PCL Menu

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Orientation	R	R/W	R	R	R	R
Form Lines	R	R/W	R	R	R	R
Font Source	R	R/W	R	R	R	R
Font Number	R	R/W	R	R	R	R
Point Size	R	R/W	R	R	R	R
Font Pitch	R	R/W	R	R	R	R
Symbol Set	R	R/W	R	R	R	R
Courier Font	R	R/W	R	R	R	R
Extend A4 Width	R	R/W	R	R	R	R
Append CR to LF	R	R/W	R	R	R	R
Resolution	R	R/W	R	R	R	R

PS Menu

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Job Timeout	R	R/W	R	R	R	R
Wait Timeout	R	R/W	R	R	R	R

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Settings	User	Mach	N/W	File	Lv.1	Lv.2
Paper Selection Method	R	R/W	R	R	R	R
Switching btwn. 1&2 Sided Print	R	R/W	R	R	R	R
Data Format	R	R/W	R	R	R	R
Resolution	R	R/W	R	R	R	R
Orientation Auto Detect	R	R/W	R	R	R	R

PDF Menu

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Change PDF Password	R	R/W	R	R	R	R
PDF Group Password	R	R/W	R	R	R	R
Reverse Order Printing	R	R/W	R	R	R	R
Resolution	R	R/W	R	R	R	R
Orientation Auto Detect	R	R/W	R	R	R	R

Unauthorized Copy Preventn.

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Unauthorized Copy Prevention Stg.	R	R/W	R	R	R	R
Setting Priority (Drvr/Cmnd/Mach)	R	R/W	R	R	R	R
Unauthorized Copy Prevention Type	R	R/W	R	R	R	R
Mask Type for Patrn./Density/Effect	R	R/W	R	R	R	R
Prevention Text Settings	R	R/W	R	R	R	R

Extended Feature Settings

Extended Feature Settings

Settings	User	Mach	N/W	File	Unset	Set
Startup Setting	R	R/W	R	R	R	R
Install	R	R/W	R	R	R	R
Uninstall	R	R/W	R	R	R	R
Extended Feature Info	R	R/W	R	R	R	R
Administrator Tools	–	R/W	–	–	–	–
Add. Program Startup Setting	R	R/W	R	R	R	R
Install Add. Program	R	R/W	R	R	R	R
Uninstall Add. Program	R	R/W	R	R	R	R
Add. Program Info	R	R	R	R	R	R

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Web Image Monitor: Display Eco-friendly Counter

These settings are in [Status/Information].

Each user can only view his or her own counter.

Settings	User	Mach	N/W	File	Unset	Set
Device Total Counter	–	R	–	–	–	–
Counter per User	–	R	–	–	R	R
Download	–	R/W	–	–	–	–

Web Image Monitor: Job

These settings are in [Status/Information].

Users can only change jobs they themselves executed.

Job List

Settings	User	Mach	N/W	File	Unset	Set
Current/Waiting Jobs: Change Order	–	R/W	–	–	–	–
Current/Waiting Jobs: Suspend Printing/ Resume Printing	–	R/W	–	–	–	–
Current/Waiting Jobs: Delete Reservation	–	R/W	–	–	–	R/W
Job History	–	R	–	–	R	R[*1]

*1   Can be viewed if user code authentication is used for the user authentication method.

Printer

Settings	User	Mach	N/W	File	Unset	Set
Spool Printing: Delete	–	R/W	–	–	–	R/W
Job History	R	R/W	R	R	R	R
Error Log	–	R	–	–	R	R

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Web Image Monitor: Device Settings

These settings are in [Configuration] in [Device Management].

When administrator authentication is set, the restrictions to user operations differ depending on the configurations of the available settings in [Administrator Authentication Management].

System

Settings	User	Mach	N/W	File	Unset	Set
Device Name	R	R	R/W	R	R/W	R
Comment	R	R	R/W	R	R/W	R
Location	R	R	R/W	R	R/W	R
Display Panel Language	R	R/W	R	R	R/W	R
Spool Printing	R	R/W	R	R	R/W	R
Protect Printer Display Panel	R	R/W	R	R	–	–
Stop Key to Suspend Print Job	R	R/W	R	R	R/W	R
Permit Firmware Update	R	R/W	R	R	–	–
Permit Firmware Structure Change	R	R/W	R	R	–	–
Display IP Address on Device Display Panel	R	R/W	R	R	–	–
Media Slot Use	R	R/W	R	R	R	R
Compatible ID	R	R/W	R	R	R/W	R
Display Supply Info: Home Screen	R	R/W	R	R	R/W	R
Display Supply Info: Printer Application Screen	R	R/W	R	R	R/W	R
Output Tray	R	R/W	R	R	R/W	R
Paper Tray Priority	R	R/W	R	R	R/W	R

Paper

Settings	User	Mach	N/W	File	Unset	Set
Tray 1-4	R	R/W	R	R	R/W	R

Settings	User	Mach	N/W	File	Unset	Set
Large Capacity Tray	R	R/W	R	R	R/W	R
Bypass Tray	R	R/W	R	R	R/W	R

Function Priority

Settings	User	Mach	N/W	File	Unset	Set
Function Priority	R	R/W	R	R	R/W	R

User Paper Type

Settings	User	Mach	N/W	File	Unset	Set
User Paper Type 1-8	R	R/W	R	R	R	R

Date/Time

Settings	User	Mach	N/W	File	Unset	Set
Set Date	R	R/W	R	R	R/W	R
Set Time	R	R/W	R	R	R/W	R
SNTP Server Name	R	R/W	R	R	R/W	R
SNTP Polling Interval	R	R/W	R	R	R/W	R
Time Zone	R	R/W	R	R	R/W	R

Timer

Settings	User	Mach	N/W	File	Unset	Set
Sleep Mode Timer	R	R/W	R	R	R/W	R
ECO Night Sensor	R	R/W	R	R	R/W	R
Auto Reset Timer	R	R/W	R	R	R/W	R
Auto Logout Timer	R	R/W	R	R	R/W	R
Weekly Timer Code	R	R/W	R	R	R/W	R
Weekly Timer: Monday-Sunday	R	R/W	R	R	R/W	R

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Logs

Settings	User	Mach	N/W	File	Unset	Set
Job Log	R	R/W	R	R	R/W	R
Access Log	R	R/W	R	R	R/W	R
Eco-friendly Logs	R	R/W	R	R	R/W	R
Transfer Logs*1	R	R/W	R	R	R/W	R
Encrypt Logs	R	R/W	R	R	R/W	R
Classification Code	R	R/W	R	R	R/W	R
Delete All Logs	–	R/W	–	–	R/W	–

*1 Can only be changed to [Inactive].

Download Logs

Settings	User	Mach	N/W	File	Unset	Set
Logs to Download	–	R/W	–	–	–	–
Download	–	R/W	–	–	–	–

Email

Settings	User	Mach	N/W	File	Unset	Set
Administrator Email Address	–	R/W	–	–	R/W	R
Reception Protocol	–	R/W	–	–	R/W	R
Email Reception Interval	–	–	R/W	–	R/W	R
Email Storage in Server	–	–	R/W	–	R/W	R
SMTP Server Name	–	–	R/W	–	R/W	R
SMTP Port No.	–	–	R/W	–	R/W	R
SMTP Authentication	–	R/W	–	–	R/W	R
SMTP Auth. Email Address	–	R/W	–	–	R/W	R
SMTP Auth. User Name	–	R/W	–	–	R/W	–

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Settings	User	Mach	N/W	File	Unset	Set
SMTP Auth. Password*2	–	R/W	–	–	R/W	–
SMTP Auth. Encryption	–	R/W	–	–	R/W	R
POP before SMTP	–	R/W	–	–	R/W	R
POP Email Address	–	R/W	–	–	R/W	R
POP User Name	–	R/W	–	–	R/W	–
POP Password*2	–	R/W	–	–	R/W	–
Timeout setting after POP Auth.	–	R/W	–	–	R/W	R
POP3/IMAP4 Server Name	–	R/W	–	–	R/W	R
POP3/IMAP4 Encryption	–	R/W	–	–	R/W	R
POP3 Reception Port No.	–	–	R/W	–	R/W	R
IMAP4 Reception Port No.	–	–	R/W	–	R/W	R
Email Notification E-mail Address	–	R/W	–	–	R/W	R
Receive Email Notification	–	R/W	–	–	R/W	–
Email Notification User Name	–	R/W	–	–	R/W	–
Email Notification Password*2	–	R/W	–	–	R/W	–

*2 Passwords cannot be read.

Auto Email Notification

Settings	User	Mach	N/W	File	Unset	Set
Notification Message	R	R/W	R	R	R	R
Groups to Notify	R	R/W	R	R	R	R
Select Groups/Items to Notify	R	R/W	R	R	R	R
Detailed Settings of Each Item	R	R/W	R	R	R	R

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On-demand Email Notification

Settings	User	Mach	N/W	File	Unset	Set
Notification Subject	R	R/W	R	R	R	R
Notification Message	R	R/W	R	R	R	R
Access Restriction to Information	R	R/W	R	R	R	R
Receivable Email Address/Domain Name Settings	R	R/W	R	R	R	R

User Authentication Management

Settings	User	Mach	N/W	File	Unset	Set
User Authentication Management	R	R/W	R	R	R/W	R
Printer Job Authentication Settings	R	R/W	R	R	R/W	R
User Code Authentication Settings	R	R/W	R	R	R/W	R
Basic Authentication Settings	R	R/W	R	R	R/W	R
Windows Authentication Settings	R	R/W	R	R	R/W	R
Group Settings for Windows Authentication	R	R/W	R	R	R/W	R
LDAP Authentication Settings	R	R/W	R	R	R/W	R
Integration Server Authentication Settings	R	R/W	R	R	R/W	R
Group Settings for Integration Server Authentication	R	R/W	R	R	R/W	R

Administrator Authentication Management

Settings	User	Mach	N/W	File	Unset	Set
User Administrator Authentication	R/W	R	R	R	R	R
Available Settings for User Administrator	R/W	R	R	R	R	R
Machine Administrator Authentication	R	R/W	R	R	R	R
Available Settings for Machine Administrator	R	R/W	R	R	R	R

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Settings	User	Mach	N/W	File	Unset	Set
Network Administrator Authentication	R	R	R/W	R	R	R
Available Settings for Network Administrator	R	R	R/W	R	R	R
File Administrator Authentication	R	R	R	R/W	R	R
Available Settings for File Administrator	R	R	R	R/W	R	R

Program/Change Administrator

Settings	User	Mach	N/W	File	Unset	Set
User Administrator	R/W	R	R	R	–	–
Machine Administrator	R	R/W	R	R	–	–
Network Administrator	R	R	R/W	R	–	–
File Administrator	R	R	R	R/W	–	–
Login User Name[1]	R/W	R/W	R/W	R/W	–	–
Login Password[1]	R/W	R/W	R/W	R/W	–	–
Encryption Password[1]	R/W	R/W	R/W	R/W	–	–

*1 Administrators can only change their own accounts.

Print Volume Use Limitation

Settings	User	Mach	N/W	File	Unset	Set
Machine Action When Limit is Reached	R	R/W	R	R	R	R
Print Volume Use Limitation: Unit Count Setting	R	R/W	R	R	R	R
Volume Use Counter: Scheduled/Specified Reset Settings	R	R/W	R	R	R	R

LDAP Server

Settings	User	Mach	N/W	File	Unset	Set
Program	–	R/W	–	–	R/W	–

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Settings	User	Mach	N/W	File	Unset	Set
Change	–	R/W	–	–	R/W	–
Delete	–	R/W	–	–	R/W	–

Firmware Update

Settings	User	Mach	N/W	File	Unset	Set
Update	–	R/W	–	–	–	–
Firmware Version	–	R	–	–	–	–

Kerberos Authentication

Settings	User	Mach	N/W	File	Unset	Set
Encryption Algorithm	–	R/W	–	–	–	–
Realm 1-5	–	R/W	–	–	–	–

Eco-friendly Counter Period/Administrator Message

Settings	User	Mach	N/W	File	Unset	Set
Display Information Screen	R	R/W	R	R	R/W	R
Display Time	R	R/W	R	R	R/W	R
Count Period	R	R/W	R	R	R/W	R
Count Period (Days)	R	R/W	R	R	R/W	R
Administrator Message	R	R/W	R	R	R/W	R

Compulsory Security Stamp

Settings	User	Mach	N/W	File	Unset	Set
Compulsory Security Stamp	R	R/W	R	R	R	R
Adjust Stamp Position	R	R/W	R	R	R	R

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Web Image Monitor: Printer

These settings are in [Configuration] in [Device Management].

When administrator authentication is set, the restrictions to user operations differ depending on the "Menu Protect" setting.

Basic Settings

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Print Error Report	R	R/W	R	R	R	R
Auto Continue	R	R/W	R	R	R	R
Memory Overflow	R	R/W	R	R	R	R
Auto Cancel Confirmation for PDL Error Job	R	R/W	R	R	R	R
Auto Cancel for Print Job(s) on Error	R	R/W	R	R	R	R
Job Separation	R	R/W	R	R	R	R
Auto Delete Temporary Print Jobs	R	R	R	R/W	R	R
Auto Delete Stored Print Jobs	R	R	R	R/W	R	R
Jobs Not Printed As Machine Was Off	R	R/W	R	R	R	R
Rotate by 180 Degrees	R	R/W	R	R	R	R
Print Compressed Data	R	R/W	R/W	R	R	R
Memory Usage	R	R/W	R	R	R	R
Duplex	R	R/W	R	R	R	R
Copies	R	R/W	R	R	R	R
Blank Page Print	R	R/W	R	R	R	R
Edge Smoothing	R	R/W	R	R	R	R
Toner Saving	R	R/W	R	R	R	R
Printer Language	R	R/W	R	R	R	R
Sub Paper Size	R	R/W	R	R	R	R
Page Size	R	R/W	R	R	R/W	R

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Settings	User	Mach	N/W	File	Lv.1	Lv.2
Letterhead Setting	R	R/W	R	R	R	R
Tray Setting Priority	R	R/W	R	R	R	R
Paper Thickness by Paper Type if Command selected for Tray Setting Priority	R	R/W	R	R	R	R
Paper Confirmation for Bypass Tray	R	R/W	R	R	R	R
Store and Skip Errored Job	R	R/W	R	R	R	R
Edge to Edge Print	R	R/W	R	R	R	R
Default Printer Language	R	R/W	R	R	R	R
Tray Switching	R	R/W	R	R	R	R
List/Test Print Lock	R	R/W	R	R	R	R
Extended Auto Tray Switching	R	R/W	R	R	R	R
Virtual Printer	R	R/W	R	R	R	R
Restrict Direct Print Jobs	R	R/W	R	R	R	R
Initial screen switch setting	R	R/W	R	R	R	R
Host Interface	R	R/W	R	R	R	R
PCL Menu	R	R/W	R	R	R	R
PS Menu	R	R/W	R	R	R	R
PDF Menu	R	R/W	R	R	R	R

Unauthorized Copy Prevention

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Unauthorized Copy Prevention Setting	R	R/W	R	R	R	R
Setting Priority (Driver/Command/Machine)	R	R/W	R	R	R	R
Unauthorized Copy Prevention Type	R	R/W	R	R	R	R
Mask Type for Pattern/Density/Effect	R	R/W	R	R	R	R

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Settings	User	Mach	N/W	File	Lv.1	Lv.2
Prevention Text Settings	R	R/W	R	R	R	R

Tray Parameters (PCL)

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Tray Parameters (PCL)	–	R/W	–	–	–	–

Tray Parameters (PS)

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Tray Parameters (PS)	–	R/W	–	–	–	–

PDF Temporary Password

Settings	User	Mach	N/W	File	Lv.1	Lv.2
PDF Temporary Password	–	–	–	–	R/W	R/W

PDF Group Password

Settings	User	Mach	N/W	File	Lv.1	Lv.2
PDF Group Password	–	R/W	–	–	–	–

PDF Fixed Password

Settings	User	Mach	N/W	File	Lv.1	Lv.2
PDF Fixed Password	–	R/W	–	–	–	–

Virtual Printer Settings

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Virtual Printer Name	R	R/W	R	R	R	R
Protocol	R	R/W	R	R	R	R
Print Error Report	R	R/W	R	R	R	R
Auto Cancel Confirmation for PDL Error Job	R	R/W	R	R	R	R

Settings	User	Mach	N/W	File	Lv.1	Lv.2
Auto Cancel for Print Job(s) on Error	R	R/W	R	R	R	R
Rotate by 180 Degrees	R	R/W	R	R	R	R
Memory Usage	R	R/W	R	R	R	R
Duplex	R	R/W	R	R	R	R
Copies	R	R/W	R	R	R	R
Blank Page Print	R	R/W	R	R	R	R
Edge Smoothing	R	R/W	R	R	R	R
Toner Saving	R	R/W	R	R	R	R
Sub Paper Size	R	R/W	R	R	R	R
Input Tray	R	R/W	R	R	R/W	R/W
Page Size	R	R/W	R	R	R/W	R
Paper Type	R	R/W	R	R	R/W	R/W
Output Tray	R	R/W	R	R	R/W	R/W
Letterhead Setting	R	R/W	R	R	R	R
Edge to Edge Print	R	R/W	R	R	R	R
PCL Menu	R	R/W	R	R	R	R
PS Menu	R	R/W	R	R	R	R
PDF Menu	R	R/W	R	R	R	R
RHPP Settings	R	R/W	R	R	R/W	R/W

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Web Image Monitor: Interface

These settings are in [Configuration] in [Device Management].

When administrator authentication is set, the restrictions to user operations differ depending on the configurations of the available settings in [Administrator Authentication Management].

Interface Settings

Settings	User	Mach	N/W	File	Unset	Set
LAN Type	–	–	R/W	–	R	–
Network	R	R	R	R	R	R
MAC Address	R	R	R	R	R	R
Ethernet Security	R	R	R/W	R	R/W	R
Ethernet Speed	R	R	R/W	R	R/W	R
USB	R	R/W	R	R	R/W	R
USB Host	R	R	R	R	R	R

Wireless LAN Settings

Settings	User	Mach	N/W	File	Unset	Set
LAN Type	–	–	R/W	–	R	–
Network	R	R	R	R	R	R
MAC Address	R	R	R	R	R	R
Available Wireless LAN	R	R	R	R	R	R
Communication Mode	R	R	R/W	R	R/W	R
SSID	R	R	R/W	R	R/W	R
Channel	R	R	R/W	R	R/W	–
Security Method	R	R	R/W	R	R/W	R
WEP Authentication	–	–	R/W	–	R/W	–
WEP Key Number	R	R	R/W	R	R/W	R

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Settings	User	Mach	N/W	File	Unset	Set
WEP Key	R	R	R/W	R	R/W	R
WPA Authentication Method	R	R	R/W	R	R/W	R
WPA-PSK/WPA2-PSK	R	R	R/W	R	R/W	R

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Web Image Monitor: Network

These settings are in [Configuration] in [Device Management].

When administrator authentication is set, the restrictions to user operations differ depending on the configurations of the available settings in [Administrator Authentication Management].

IPv4

Settings	User	Mach	N/W	File	Unset	Set
IPv4	R	R	R	R	R	R
Host Name	R	R	R/W	R	R/W	R
DHCP	R	R	R/W	R	R/W	R
Domain Name	R	R	R/W	R	R/W	R
IPv4 Address	R	R	R/W	R	R/W	R
Subnet Mask	R	R	R/W	R	R/W	R
DDNS	R	R	R/W	R	R/W	R
WINS	R	R	R/W	R	R/W	R
Primary WINS Server	R	R	R/W	R	R/W	R
Secondary WINS Server	R	R	R/W	R	R/W	R
LLMNR	R	R	R/W	R	R/W	R
Scope ID	R	R	R/W	R	R/W	R
Details	R	R	R/W	R	R/W	R

IPv6

Settings	User	Mach	N/W	File	Unset	Set
IPv6	R	R	R/W	R	R/W	R
Host Name	R	R	R/W	R	R/W	R
Domain Name	R	R	R/W	R	R/W	R
Link-local Address	R	R	R	R	R	R

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Settings	User	Mach	N/W	File	Unset	Set
Stateless Address	R	R	R/W	R	R/W	R
Manual Configuration Address	R	R	R/W	R	R/W	R
DHCPv6	R	R	R/W	R	R/W	R
DHCPv6 Address	R	R	R	R	R	R
DDNS	R	R	R/W	R	R/W	R
LLMNR	R	R	R/W	R	R/W	R
Details	R	R	R/W	R	R/W	R

NetWare

Settings	User	Mach	N/W	File	Unset	Set
NetWare	R	R	R/W	R	R/W	R
NetWare Print Settings	R	R	R/W	R	R/W	R

SMB

Settings	User	Mach	N/W	File	Unset	Set
SMB	R	R	R/W	R	R/W	R
Protocol	R	R	R	R	R	R
Workgroup Name	R	R	R/W	R	R/W	R
Computer Name	R	R	R/W	R	R/W	R
Comment	R	R	R/W	R	R/W	R
Share Name	R	R	R	R	R	R
Notify Print Completion	R	R	R/W	R	R/W	R

SNMP

Settings	User	Mach	N/W	File	Unset	Set
SNMP	–	–	R/W	–	–	–

Settings	User	Mach	N/W	File	Unset	Set
Protocol	–	–	R/W	–	–	–
SNMPv1,v2 Setting	–	–	R/W	–	–	–
Community	–	–	R/W	–	–	–

SNMPv3

Settings	User	Mach	N/W	File	Unset	Set
SNMP	–	–	R/W	–	–	–
Protocol	–	–	R/W	–	–	–
SNMPv3 Setting	–	–	R/W	–	–	–
SNMPv3 Trap Communication Setting	–	–	R/W	–	–	–
Account (User)	–	–	R/W	–	–	–
Account (Network Administrator)	–	–	R/W	–	–	–
Account (Machine Administrator)	–	R/W	–	–	–	–

SSDP

Settings	User	Mach	N/W	File	Unset	Set
SSDP	–	–	R/W	–	–	–
UUID	–	–	R	–	–	–
Profile Expires	–	–	R/W	–	–	–
TTL	–	–	R/W	–	–	–

Bonjour

Settings	User	Mach	N/W	File	Unset	Set
Bonjour	R	R	R/W	R	R/W	R
Local Hostname	R	R	R	R	R	R
Details	R	R	R/W	R	R/W	R

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Settings	User	Mach	N/W	File	Unset	Set
Print Order Priority	R	R	R/W	R	R/W	R

System Log

Settings	User	Mach	N/W	File	Unset	Set
System Log	R	R	R	R	R	–

Web Image Monitor: Security

These settings are in [Configuration] in [Device Management].

Settings	User	Mach	N/W	File	Unset	Set
Network Security	–	–	R/W	–	–	–
Access Control	–	–	R/W	–	–	–
IPP Authentication	–	–	R/W	–	–	–
SSL/TLS	–	–	R/W	–	–	–
ssh	–	–	R/W	–	R	R
Site Certificate	–	–	R/W	–	–	–
Device Certificate	–	–	R/W	–	–	–
IPsec	–	–	R/W	–	–	–
User Lockout Policy	–	R/W	–	–	–	–
IEEE 802.1X	–	–	R/W	–	–	–

Web Image Monitor: @Remote

These settings are in [Configuration] in [Device Management].

Settings	User	Mach	N/W	File	Unset	Set
Setup RC Gate	–	R/W	–	–	–	–
Update RC Gate Firmware	–	R/W	–	–	–	–
RC Gate Proxy Server	–	R/W	–	–	–	–
Notify Functional Problems of Device	–	R/W	–	–	–	–

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Web Image Monitor: Webpage

These settings are in [Configuration] in [Device Management].

When administrator authentication is set, the restrictions to user operations differ depending on the configurations of the available settings in [Administrator Authentication Management].

Webpage

Settings	User	Mach	N/W	File	Unset	Set
Webpage Language	R	R	R/W	R	R/W	R
Web Image Monitor Auto Logout	R	R	R/W	R	R/W	R
Set URL Target of Link Page	R	R	R/W	R	R/W	R
Set Help URL Target	R	R	R/W	R	R/W	R
WSD/UPnP Setting	R	R	R/W	R	R/W	R
Download Help File	R/W	R/W	R/W	R/W	R/W	R/W

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Web Image Monitor: Extended Feature Settings

These settings are in [Configuration] in [Device Management].

Settings	User	Mach	N/W	File	Unset	Set
Startup Setting	–	R/W	–	–	–	–
Extended Feature Info	R	R	R	R	R	R
Install	–	R/W	–	–	–	–
Uninstall	–	R/W	–	–	–	–
Administrator Tools	–	R/W	–	–	–	–
Additional Program Startup Setting	–	R/W	–	–	–	–
Install Additional Program	–	R/W	–	–	–	–
Uninstall Additional Program	–	R/W	–	–	–	–
Copy Extended Features	–	R/W	–	–	–	–
Copy Card Save Data	–	R/W	–	–	–	–

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Web Image Monitor: Address Book

These settings are in [Device Management].

Settings	User	Mach	N/W	File	Unset	Set
Add User	R/W	–	–	–	R/W	R/W
Change	R/W	–	–	–	R/W	R/W
Delete	R/W	–	–	–	R/W	R/W
Add Group	R/W	–	–	–	R/W	R/W
Maintenance	R/W	–	–	–	R/W	R/W

Web Image Monitor: Reset Printer Job

These settings are in [Device Management].

Settings	User	Mach	N/W	File	Unset	Set
Reset Current Job	–	R/W	–	–	–	–
Reset All Jobs	–	R/W	–	–	–	–

Web Image Monitor: Reset the Machine

These settings are in [Device Management].

When administrator authentication is set, the restrictions to user operations differ depending on the configurations of the available settings in [Administrator Authentication Management].

Settings	User	Mach	N/W	File	Unset	Set
Reset the Machine	–	R/W	–	–	R/W	–

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Web Image Monitor: Device Home Management

These settings are in [Device Management].

When administrator authentication is set, the restrictions to user operations differ depending on the configurations of the available settings in [Administrator Authentication Management].

Settings	User	Mach	N/W	File	Unset	Set
Edit Icons	R	R/W	R	R	R/W	R
Restore Default Icon Display	–	R/W	–	–	R/W	–
Home Screen Settings	R	R/W	R	R	R/W	R

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Web Image Monitor: Customize Screen per User

Users can change only their own settings.

Settings	User	Mach	N/W	File	Unset	Set
Edit Icons	–	–	–	–	–	R/W
Restore Default Icon Display	–	–	–	–	–	R/W
Function Priority per User	–	–	–	–	–	R/W

Web Image Monitor: Printer: Print Jobs

These settings are in [Print Job/Stored File].

Users can use the printer documents stored themselves or stored when user authentication is off.

The printer documents stored by other users are not displayed.

Settings	User	Mach	N/W	File	Unset	Set
Print	–	–	–	–	R/W *1	R/W *1
Delete	–	–	–	R/W	R/W *1	R/W *1
Edit detailed information (Detailed information icon)	–	–	–	R/W	R/W *1	R/W *1
Unlock Job	–	–	–	R/W	–	–

*1   Access to saved documents may be restricted, depending on the user's access privileges.

List of Operation Privileges for Stored Files

Understanding headers

- Read

  Users configured for read privileges.

- Edit

  Users configured for editing privileges.

- E/D

  Users configured for edit/delete privileges.

- Full

  Users configured for full control privileges.

- Owner

  Either the user who registered a document or a user set up as the owner.

- File

  The file administrator.

Understanding the symbols

R/W: Can execute.

–: Cannot execute.

Settings	Read	Edit	E/D	Full	Owner	File
Printing	R/W	R/W	R/W	R/W	R/W	–
Details	R/W	R/W	R/W	R/W	R/W	R/W
Change Owner	–	–	–	–	–	R/W
Change Access Privilege: Permissions for Users/Groups	–	–	–	R/W	R/W[*1]	R/W
Change File Name	–	R/W	R/W	R/W	R/W[*1]	–
Change Password	–	–	–	–	R/W	R/W
Unlock File	–	–	–	–	–	R/W
Delete File	–	–	R/W	R/W	R/W[*1]	R/W

*1 The owner can change operation privileges.

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List of Operation Privileges for Address Books

Understanding headers

- Read

  Users configured for read privileges.

- Edit

  Users configured for editing privileges.

- E/D

  Users configured for edit/delete privileges.

- Full

  Users configured for full control privileges.

- Entry

  User whose personal information is registered in the Address Book. The person who knows the user login name and password.

- User

  The user administrator.

Understanding the symbols

R/W: Execute, change and reading possible.

R: Reading is possible.

–: Execute, change and reading are not possible.

Names

Settings	Read	Edit	E/D	Full	Entry	User
Registration No.	R	R/W	R/W	R/W	R/W	R/W
Name	R	R/W	R/W	R/W	R/W	R/W
Key Display	R	R/W	R/W	R/W	R/W	R/W
Select title	R	R/W	R/W	R/W	R/W	R/W

Auth. Info

Settings	Read	Edit	E/D	Full	Entry	User
User Code	–	–	–	–	–	R/W
Login User Name	–	–	–	–	R	R/W

Settings	Read	Edit	E/D	Full	Entry	User
Login Password	–	–	–	–	R/W *1	R/W *1
Available functions	–	–	–	–	R	R/W
Print Volum. Use Limit.	–	–	–	–	R	R/W

*1   Passwords cannot be read.

Protection

Settings	Read	Edit	E/D	Full	Entry	User
Protect Destination: Permissions for Users/Groups	–	–	–	R/W	R/W	R/W

Add to Group

Settings	Read	Edit	E/D	Full	Entry	User
Registration No.	R	R/W	R/W	R/W	R/W	R/W
Search	–	R/W	R/W	R/W	R/W	R/W
Switch Title	R/W	R/W	R/W	R/W	R/W	R/W

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- The product names of Windows 2008 R2 are as follows:

  Microsoft® Windows Server® 2008 R2 Standard

  Microsoft® Windows Server® 2008 R2 Enterprise

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INDEX

Notes for Users

Please note the following corrections and added precaution to this manual.

Operating Instructions/User Guide

Topic	Error	Correction
Operating Instructions **Setting Up the Printer** > Place to Install > Space Required for Installation	"Depth" in the recommended space illustration: 67.7cm (26.7")	"Depth" in the recommended space illustration: **68.4cm (27.0")**
Operating Instructions **Printing** > Loading Paper > Loading Envelopes User Guide p.62	"Types of Envelopes" in the table: Side-opening envelopes	"Types of Envelopes" in the table: **Envelopes**
Operating Instructions **Printing** > Convenient Functions > Printing on Both Sides of Sheets User Guide p.58	Duplex printing precautions • The types of paper that can be printed on both sides are as follows: Plain (60 to 81g/m^2), Recycled, Special, Special 2, Special 3, Middle Thick (82 to 105g/m^2), Thick 1(106 to 160g/m^2), Color, Letterhead, Preprinted, Prepunched, Bond	Duplex printing precautions • The types of paper that can be printed on both sides are as follows: Plain (60 to 81g/m^2), Recycled, **Special 1**, Special 2, Special 3, Middle Thick (82 to 105g/m^2), Thick 1(106 to 160g/m^2), Color, Letterhead, Preprinted, Prepunched, Bond
Operating Instructions **Printing** > Convenient Print Functions > Booklet Printing	Booklet printing precautions The paper types that can be used for booklet printing are as follows: Plain (60 to 81g/m^2), Recycled, Special, Special 2, Special 3, Middle Thick (82 to 105g/m^2), Thick 1 (106 to 160 g/m^2), Color, Letterhead, Preprinted, Prepunched, Bond	Booklet printing precautions The paper types that can be used for booklet printing are as follows: Plain (60 to 81g/m^2), Recycled, **Special 1**, Special 2, Special 3, Middle Thick (82 to 105g/m^2), Thick 1 (106 to 160 g/m^2), Color, Letterhead, Preprinted, Prepunched, Bond
Operating Instructions **Maintenance and Specifications** > Specifications > Specifications for the Main Unit	Dimensions (W x D x H): 670 x 677 x 641 mm (26.4 x 26.7 x 25.3 inches) Space for the main unit (W x D) 1,065 x 677 mm (42.0 x 26.7 inches)	Dimensions (W x D x H): 670 x **684** x 641 mm (26.4 x **27.0** x 25.3 inches) Space for the main unit (W x D) 1,065 x **684** mm (42.0 x **27.0** inches)
Additional Information		
Precaution for label paper: When loading label paper, place one sheet at a time.		

Error:

Settings	User	Mach	N/W	File	Unset	Set
Edit Icons	-	R/W	-	-	R/W	-
Insert Image	-	R/W	-	-	R/W	-

Correction:

Settings	User	Mach	N/W	File	Unset	Set
Move Icon	R	R/W	R	R	R/W	R
Delete Icon	R	R/W	R	R	R/W	R
Add Icon	-	R/W	-	-	R/W	-
Restore Default Icon Display	-	R/W	-	-	R/W	-
Insert Image on Home Screen	-	R/W	-	-	R/W	-

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