Xerox DocuPrint 4850/4890/92C NPS/IPS

Installation Planning Guide

Changes are periodically made to this document. Changes, technical inaccuracies, and typographic errors will be corrected in subsequent editions.

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Safety

Laser safety

The Xerox DocuPrint printers are certified to comply with the performance standards of the U.S. Department of Health, Education, and Welfare for Class 1 laser products. Class 1 laser products do not emit hazardous radiation. The DocuPrint printers do not emit hazardous radiation because the laser beam is completely enclosed during all modes of customer operation.

The laser danger labels on the system are for Xerox service representatives and are on or near panels or shields that must be removed with a tool.

DO NOT REMOVE LABELED PANELS OR PANELS NEAR LABELS. ONLY XEROX SERVICE REPRESENTATIVES HAVE ACCESS TO THESE PANELS.

DANGER
LASER RADIATION WHEN OPEN
AVOID DIRECT EXPOSURE TO BEAM

Ozone information: U. S. only

This product produces ozone during normal operation. The amount of ozone produced depends on copy volume. Ozone is heavier than air. The environmental parameters specified in the Xerox installation instructions ensure that concentration levels are within safe limits. If you need additional information concerning ozone, call 1-800-828-6571 to request the Xerox publication 600P83222, *OZONE.*

Operation safety: U. S.

Your Xerox equipment and supplies have been designed and tested to meet strict safety requirements. They have been approved by safety agencies, and they comply with environmental standards. Please observe the following precautions to ensure your continued safety.

WARNING

Improper connection of the equipment grounding conductor may result in risk of electrical shock.

- Always connect equipment to a properly grounded electrical outlet. If in doubt, have the outlet checked by a qualified electrician.

- Never use a ground adapter plug to connect equipment to an electrical outlet that lacks a ground connection terminal.

- Always place equipment on a solid support surface with adequate strength for its weight.

- Always use materials and supplies specifically designed for your Xerox equipment. Use of unsuitable materials may result in poor performance and may create a hazardous situation.

- Never move either the printer or the printer controller without first contacting Xerox for approval.

- Never attempt any maintenance that is not specifically described in this documentation.

- Never remove any covers or guards that are fastened with screws. There are no operator-serviceable areas within these covers.

- Never override electrical or mechanical interlocks.

- Never use supplies or cleaning materials for other than their intended purposes. Keep all materials out of the reach of children.

- Never operate the equipment if you notice unusual noises or odors. Disconnect the power cord from the electrical outlet and call service to correct the problem.

If you need any additional safety information concerning the equipment or materials Xerox supplies, call Xerox Product Safety at the following toll-free number in the United States:

1-800-828-6571

For customers outside the United States, contact your local Xerox representative or operating company.

Operation safety: Europe

This Xerox product and supplies are manufactured, tested and certified to strict safety regulations, electromagnetic regulations and established environmental standards.

Any unauthorised alteration, which may include the addition of new functions or connection of external devices, may impact the product certification.

Please contact your Xerox representative for more information.

Warning markings

All warning instructions marked on or supplied with the product should be followed.

This WARNING alerts users to areas of the product where there is the possibility of personal damage.

This WARNING alerts users to areas of the product where there are heated surfaces, which should not be touched.

Electrical supply

This product shall be operated from the type of electrical supply indicated on the product's data plate label. If you are not sure that your electrical supply meets the requirements, please consult your local power company for advice.

WARNING

This product must be connected to a protective earth circuit. This product is supplied with a plug that has a protective earth pin. This plug will fit only into an earthed electrical outlet. This is a safety feature. Always connect equipment to a properly grounded electrical outlet. If in doubt, have the outlet checked by a qualified electrician.

To disconnect all electrical power to the product, the disconnect device is the power cord. Remove the plug from the electrical outlet.

Ventilation

Slots and opening in the enclosure of the product are provided for ventilation. Do not block or cover the ventilation vents, as this could result in the product overheating.

This product should not be placed in a built-in installation unless proper ventilation is provided, please contact your Xerox representative for advice.

Never push objects of any kind into the ventilation vents of the product.

Operator accessible areas

This product has been designed to restrict operator access to safe areas only. Operator access to hazardous areas is restricted with covers or guards, which would require a tool to remove. Never remove these covers or guards.

Maintenance

Any operator product maintenance procedures will be described in the user documentation supplied with the product. Do not carry out any maintenance on the product, which is not described in the customer documentation.

Before cleaning your product

Before cleaning this product, unplug the product from the electrical outlet. Always use materials specifically designated for this product, the use of other materials may result in poor performance and may create a hazardous situation. Do not use aerosol cleaners, they may be flammable under certain circumstances.

CE mark: Europe only

January 1, 1995: Council Directive 73/23/EEC, amended by Council Directive 93/68/EEC, approximation of the laws of the member states related to low voltage equipment.

January 1, 1996: Council Directive 89/336/EEC, approximation of the laws of the member states related to electromagnetic compatibility.

March 9, 1999: Council Directive 99/5/EC, on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

A full declaration of conformity, defining the relevant directives and referenced standards, can be obtained from your Xerox representative.

In order to allow this equipment to operate in proximity to Industrial, Scientific and Medical (ISM) equipment, the external radiation for the ISM equipment may have to be limited or special mitigation measures taken.

This is a Class A product. In a domestic environment this product may cause radio frequency interference, in which case the user may be required to take adequate measures.

Shielded interface cables must be used with this product to maintain compliance with Council Directive 89/36/EEC.

Radio and telecommunications equipment directive (Europe only)

Certification to 1999/5/EC Radio Equipment and Telecommunications Terminal Equipment Directive:

This Xerox product has been self-certified by Xerox for pan-European single terminal connection to the analog public switched telephone network (PSTN) in accordance with Directive 1999/5/EC.

The product has been designed to work with the national PSTNs and compatible PBXs of the following countries:

Austria	Germany	Luxembourg	Sweden
Belgium	Greece	Netherlands	Switzerland
Denmark	Iceland	Norway	United Kingdom
Finland	Ireland	Portugal	
France	Italy	Spain	

In the event of problems, contact your local Xerox representative in the first instance.

This product has been tested to, and is compliant with, TBR21, a specification for terminal equipment for use on analog switched telephone networks in the European Economic area.

The product may be configured to be compatible with other country networks. Please contact your Xerox representative if your product needs to be reconnected to a network in another country. This product has no user-adjustable settings.

NOTE: Although this product can use either loop disconnect (pulse) or DTMF (tone) signaling, it should be set to use DTMF signaling. DTMF signaling provides reliable and faster call setup.

Modification or connection to external control software, or to external control apparatus not authorized by Xerox, invalidates its certification.

For further information

For more information on Environment, Health and Safety in relation to this Xerox product and supplies, please contact the following customer help lines:

Europe:+44 1707 353434

USA:1 800 8286571

Canada:1 800 8286571

Introduction

This guide helps you prepare for delivery and installation of your new Xerox DocuPrint NPS/IPS printing system.

About this guide

This guide is intended for the person responsible for coordinating the installation of the DocuPrint printer at your site. It lists the tasks you must complete before installation can begin, as well as your responsibilities during the installation.

Before using this guide, become familiar with its contents and conventions.

Contents

This guide contains the following:

- Chapter 1, "System overview," provides an overview of the printing system.

- Chapter 2, "Controller components and options," describes system controller hardware, software, and options of your printing system.

- Chapter 3, "Printer components and options," describes printer components, configurations, and options.

- Chapter 4, "Preparing for installation," provides a checklist of tasks that must be accomplished before the installation. It also explains connectivity requirements for transporting documents from the host or client to the DocuPrint printing system.

- Chapter 5, "Controller specifications and requirements," describes power, environmental, and space requirements for the system controller.

- Chapter 6, "Printer specifications and requirements," describes power, environmental, and space requirements for the printer. Space planning guidelines and diagrams are provided to help you set up the work area.

- Chapter 7, "System connections," provides cable requirements for your printing system.

- Chapter 8, "Installation," describes the activities that occur during installation. It also describes ongoing maintenance activities.

- Appendix A, "Supplies," describes how to select, store, and use supplies for the DocuPrint printing system. It also provides a list of consumable supplies you can order.

- Appendix B, "Xerox support services," explains how to utilize available Xerox support services.

- Appendix C, "Related publications," lists other Xerox documents that are part of this publication set.

- Appendix D, "DocuPrint NPS/IPS on a Novell network," describes some of the considerations to make before the installation of DocuPrint on a Novell network.

- Appendix E, "Defining the channel-attached printer to the host," provides explanations and sample printer parameters for defining your channel-attached printer to your host.

- Appendix F, "Defining the printer to the host: TCP/IP attachment," provides instructions, prerequisites, and sample printer parameters for defining your TCP/IP-attached printer to your host.

A glossary and index are provided at the back of the guide.

Conventions

This guide uses the following conventions:

- **All caps and angle brackets:** Within procedures, the names of keys are shown in all caps within angle brackets (for example, press <ENTER>).

- **Angle brackets:** Variable information, or the position of a specified argument in the command syntax, appears in angle brackets (for example, List Fonts <Pattern>).

- **Bold:** Within procedures, text and numbers that you enter are shown in bold (for example, enter **privilege operator**).

- **The word "enter" within procedures:** The two-step process of keying in data and pressing <ENTER> (for example, enter **y**).

- **Italics:** Document and library names are shown in italics (for example, the *Xerox DocuPrint NPS/IPS Guide to Managing Print Jobs*).

- **Quotation marks:** Keywords you can enter as arguments appear in quotes (for example, "USLetter").

- **Vertical bars:** Alternatives to specified arguments are separated by vertical bars (for example, Set Time <Time | Remote Host Name | IP Address>).

NOTE: Notes are hints that help you perform a task or understand the text.

CAUTION

Cautions alert you to an action that could damage hardware or software.

WARNING

Warnings alert you to conditions that may affect the safety of people.

Notice

This publication may contain descriptions of concepts and features not currently available for your Xerox printing system. Consult your Xerox sales representative or your operating system software program description for additional information.

1. System overview

This chapter provides an overview of the features and functions of the Xerox DocuPrint NPS/IPS.

Functional overview of the NPS/IPS

The NPS/IPS printers support the processing and printing of PDL and ASCII jobs from network workstations, as well as IPDS jobs from an IBM host. Supported PDL formats are PostScript levels 1 and 2, HP PCL 5c, HP PCL 5e, and TIFF.

Your organization may print only IPDS jobs, network PDL jobs, or jobs from both environments.

DocuPrint 4850, 4890, and 92C NPS/IPS printers support:

- Printing in various shades and tints of a highlight color plus black

- Printing in highlight color (black plus one color) at a rated speed of up to 50 ppm at 300 dpi (4850); 92 ppm at 300 dpi (4890); and 92 ppm at 300 or 600 dpi (92C)

- Printing simplex and duplex

- Processing and printing of network PDL jobs and IPDS jobs without soft boot to switch modes

- Multiple weights, sizes and types of paper (refer to the "Supplies" appendix for details)

- Optional high-capacity feeder

- Optional high-capacity stitcher/stacker

- Optional bypass transport for enhanced finishing and output to third-party finishing devices (4850 and 92C)

- Sixth Sense, a diagnostic tool that provides system assessment and problem analysis.

Resolution

The 4850/4890 NPS/IPS provides high print quality at 300 dpi resolution. It can receive data at 240, 300, or 600 dpi. The controller converts 240 and 600 to 300 dpi data.

The 92C NPS/IPS provides exceptional print quality at 600 dpi resolution. It can receive data at 240, 300, or 600 dpi. The controller can convert incoming data to 600 dpi for printing, or can convert the data to 240 or 300 dpi and allow the print engine to convert the pages to 600 dpi.

The following table shows how data streams of different resolutions are interpolated.

Table 1-1. **Data stream conversion**

Printer	Incoming input resolution of document		
	240 dpi data	**300 dpi data**	**600 dpi data**
4850/4890 NPS/ IPS	Converted by controller to 300 dpi	Print at 300 x 300 dpi	Converted by controller to 300 dpi
92C NPS/IPS	Converted by controller to 600 dpi	Converted by controller to 300 dpi	Print at 600 x 600 dpi

NOTE: For more information on specifying appropriate resolution settings, refer to the Guide to Managing Print Jobs and the Guide to Configuring and Managing the System. For IPDS printing, refer to the to Solutions Guide for IPDS printing.

System components overview

DocuPrint NPS/ IPS The entire DocuPrint NPS/IPS system includes the printer (also known as an IOT or print engine), printer controller, printer interface, and all appropriate software. "DocuPrint printer" or "printer" refers to the base printer engine (IOT) only, without the printer controller and interface.

Xerox-supplied printer controller The printer controller includes a processor, DVD-ROM (or CD-ROM) drive, diskette drive, keyboard, mouse, and a monitor. The printer controller accepts the print job from the client workstation or host, converts the files into page images, and sends the page images to the printer. The user interface at the printer controller allows you to perform tasks such as monitoring job status, prioritizing jobs, and configuring the system.

**Xerox-supplied
printer interface** The printer interface cables provide high-speed data transport and communication between the printer controller and the printer.

**Xerox-supplied
DocuPrint printer** The printer accepts data from the printer controller and prints the document according to the print options specified by the user. The printer also provides optional paper stitching and stacking.

Connectivity configurations

The NPS/IPS can process network PDL and IPDS jobs concurrently.

To support the submission of jobs from a variety of hosts, configuration possibilities include:

- The same Token Ring or Ethernet connection can be used for both IPDS and Postscript/PCL.

- Both a Token Ring card and an Ethernet card can reside in the Sun workstation controller, with one being used for IPDS and the other for PostScript/PCL.

- Bus and tag attachment through the channel interface can be used for IPDS jobs from a channel-attached host; Token Ring or Ethernet connection can be used for jobs submitted over the network.

NPS/IPS concurrent printing

The Xerox NPS/IPS can receive a variety of data streams including IPDS, PostScript Levels 1 and 2, PCL 5c, PCL 5e, TIFF, and ASCII. The system automatically senses the type of job and processes it appropriately.

When your system is printing IPDS jobs, it can accept network PDL data streams in the background. When network PDL jobs are printing, only one IPDS job can be queued.

Document Feeding and Finishing Architecture (DFA)

The Document Feeding and Finishing Architecture (DFA) on the NPS/IPS supports all third-party finishing devices currently validated for the LCDS (J11) printers (DFA is not supported on the 4850). The bypass transport option is required for in-line finishing devices.

IPDS environment

Host environments

The system emulates an IBM AFP Group 3 page printer with the Advanced Function Image and Graphics (AFIG) option and can print in all the following PSF environments:

- MVS

- VM (channel-attached only)

- VSE (channel-attached only)

- OS/2

- OS/400 (with TCP/IP only)

- AIX

NOTE: Although PSF/VSE does not support TCP/IP directly, a printing system with PSF/2, PSF/6000, or InfoPrint Manager can attach to a PSF/VSE system and the PSF/2, PSF/6000, or InfoPrint Manager can furnish the TCP/IP support for the printer.

NOTE: There is no minimum host operating system software level required. The minimum PSF level needed to support full color is v.3.2.

The NPS/IPS can be set up to receive data from the IBM host in one of two ways:

- Through a bus and tag channel connection.

  NOTE: If your system will be channel-attached, the printer controller requires an additional component—either a channel interface board and channel cable connector box, or a Host Channel Unit (HCU) that serves as an interface between the IBM host and the printer controller.

- Through a Token Ring or Ethernet interface using TCP/IP.

  NOTE: Your system supports only one other connectivity option in addition to Ethernet. For example, Ethernet and channel connection or Ethernet and Token Ring.

  NOTE: A transmission rate of at least 16 megabits per second should be used with a Token Ring interface. (Overall performance depends on network traffic and job density.)
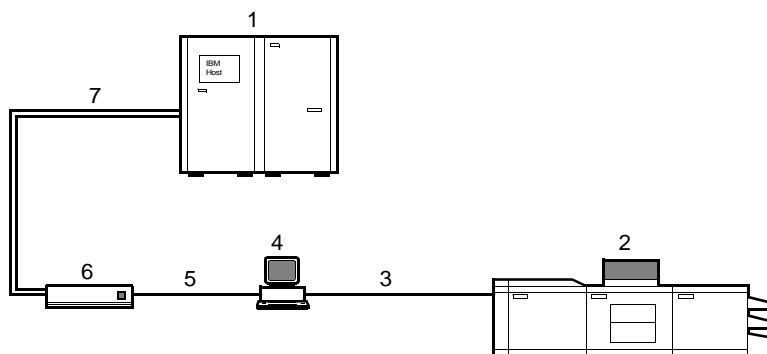
Figure 1-1. Printing system: channel-attached configuration

1. Host system (PC or mainframe)

2. Printer

3. Printer interface cables

4. Printer controller

5. Internal channel cable

6. Host Channel Unit (HCU)

7. Bus and tag cables
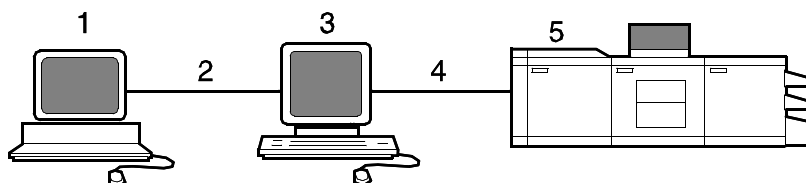
Figure 1-2. Printing system: TCP/IP configuration

1. Host system (PC or mainframe)

2. Interface network (Ethernet or Token Ring)

3. Printer controller

4. Printer interface cables

5. Printer

For information on the various printer configuration options, refer to the "Printer components and options" chapter of this guide.

Channel interface board and channel cable connector box—channel-attached systems only

The channel interface board, connected to a control unit, handles all IPDS communications and handshaking with PSF on the host when the NPS/IPS is receiving data over a channel. (It is not used when the NPS/IPS is printing data using TCP/IP.)
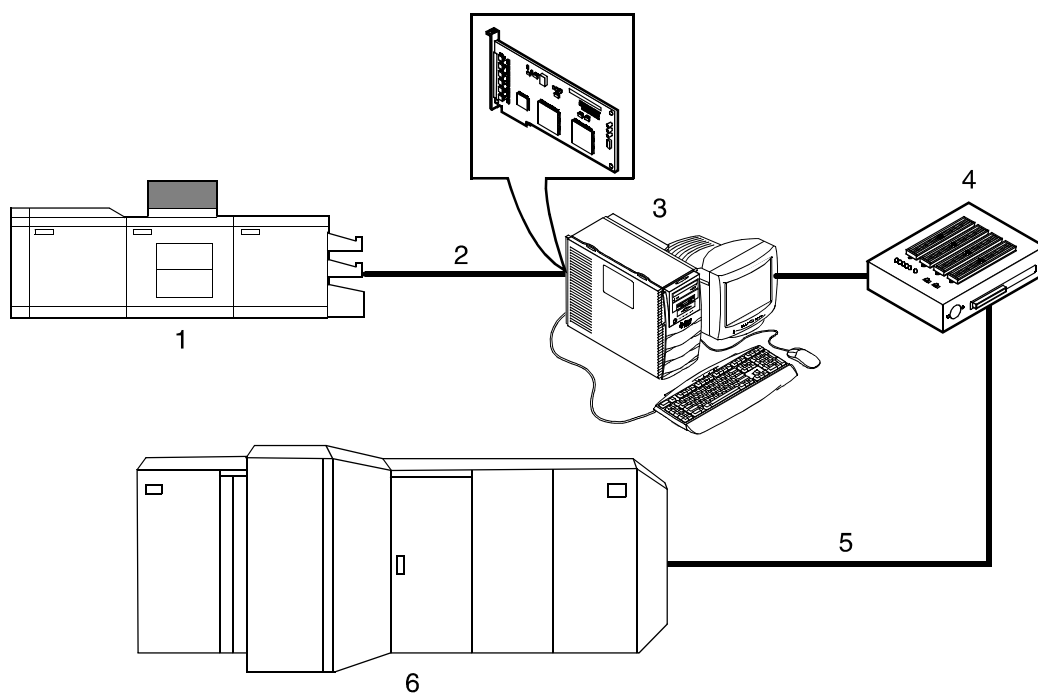
Figure 1-3. Channel interface board and connector box

1. Printer

2. Printer control and video cable

3. Printer controller with channel interface board

4. Channel cable connector box

5. Channel cables

6. Host system

NOTE: The customer is responsible for obtaining, stringing, and maintenance of the bus and tag cables. The bus and tag cables must be fully populated cable sets.

Host Channel Unit (HCU)—channel-attached systems only

Your system may use a Host Channel Unit (HCU) for channel connection to a host for IPDS printing.

The HCU handles all IPDS communications and handshaking with PSF on the host when the system is receiving data over a channel. It is not used when the system is printing data using TCP/IP.
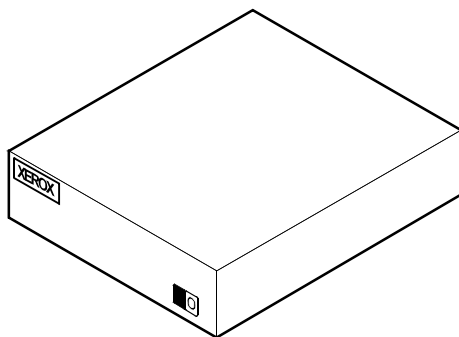
Figure 1-4. Host Channel Unit (HCU)

The front panel of the HCU provides a single-digit LED display that enables you to monitor power-up and offline status, and alerts you to error conditions.

The back panel of the HCU has a power switch and outlet, bus and tag cable input and bypass connectors, and a dual serial port.

NOTE: The customer is responsible for obtaining, stringing, and maintenance of the bus and tag cables. The bus and tag cables must be fully populated cable sets.

IPDS data stream

All IPDS resources (print data sets, page definitions, form definitions, page segments, fonts, and overlays) that are supported by the IBM 3825 and 3827 printers are supported by the Xerox software. Additionally, the data towers that are supported within the AFP environment by the IBM 3825 and IBM 3827 printers are fully supported by the software. Data towers supported are:

- **IM Image IMD1**

- **FOCA:** Font Object Content Architecture

- **MO:DCA-P:** Mixed Object Document Content Architecture for Presentation

- **PTOCA PT1, PT2, and PT3:** Presentation Text Object Content Architecture

- **IOCA:** Image Object Content Architecture

- **GOCA:** Graphics Object Content Architecture

- **BCOCA:** Bar code Object Content Architecture

- **OL1:** Overlay One

- **PS1:** Page Segment One

- **Line mode data streams**

Each of the data objects follow the same object rule of containing delimiting fields with structured fields describing each object.

Network PDL printing environment
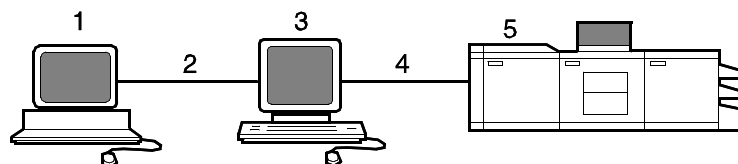
Figure 1-5. DocuPrint NPS/IPS system components

1. Customer-supplied client PC or workstation

2. Customer-supplied network

3. Xerox-supplied printer controller

4. Xerox-supplied printer interface

5. DocuPrint printer.

Customer-supplied client PC or workstation

Users create their documents at the networked client PCs or workstations using software applications that generate PDL output. When ready to print, users submit the documents to the printer controller.

Customer-supplied network

The customer needs to supply one or more of the following networks:

- Ethernet local area network (LAN) running TCP/IP, AppleTalk, or Novell NetWare network protocol.

- Token Ring running TCP/IP, Novell, or AppleTalk network protocol.

Networks

Both network client workstations and the IBM host can communicate with the controller over a network.

Ethernet LAN

Users of networked client workstations may send print jobs to the DocuPrint NPS/IPS printer over the Ethernet LAN using TCP/IP, AppleTalk using EtherTalk Link Access Protocol (ELAP), or Novell NetWare 3.1x as the network protocol.

Regardless of printing or transmission protocol, the Ethernet connection to the printer controller must be

compatible with the Institute of Electrical and Electronics Engineers (IEEE) 802.3 standard.

Token Ring

Users of network client workstations may send print jobs to the printer over Token Ring network using TCP/IP, Novell 3.x, or AppleTalk network protocol.

Regardless of printing transmission protocol, the Token Ring connection to the printer controller must be compatible with the Institute of Electrical and Electronics Engineers (IEEE) 802.5 standard.

Networks

Both network client workstations and the IBM host can communicate with the controller over a network.

Ethernet LAN

Users of networked client workstations may send print jobs to the DocuPrint NPS/IPS printer over the Ethernet LAN using TCP/IP, AppleTalk using EtherTalk Link Access Protocol (ELAP), or Novell NetWare 3.1x as the network protocol.

Regardless of printing or transmission protocol, the Ethernet connection to the printer controller must be

compatible with the Institute of Electrical and Electronics Engineers (IEEE) 802.3 standard.

Token Ring

Users of network client workstations may send print jobs to the printer over Token Ring network using TCP/IP, Novell 3.x, or AppleTalk network protocol.

Regardless of printing transmission protocol, the Token Ring connection to the printer controller must be compatible with the Institute of Electrical and Electronics Engineers (IEEE) 802.5 standard.

Multiple network devices

Multiple network devices may be installed on the same controller. The default network device that ships with your controller is a 100 Mbit Ethernet connection. You may install other network devices by installing additional network cards, provided each card has a unique network to which it connects. For example, if you use a Token Ring network connection, you have the option of using the default Ethernet device as a secondary network.

If you choose to install multiple network devices on your controller, the following parameters apply:

- You must select a primary network device and designate any others as secondary. The primary network device does not have to be the default Ethernet device that ships with your controller; it can be any of the network devices installed.

- You must run the TCP/IP protocol on the primary network device. You may also run TCP/IP on other network devices. For each network device running TCP/IP, you must specify a unique IP address and IP netmask. For the primary network device, you must specify the HostName and router IP address. The HostName for any secondary devices is created from the name chosen for the primary device.

  NOTE: You may not use the controller as an IP router. Consequently, the router IP address must be on the primary network devices network only.

- You may run the AppleTalk protocol on only one network device. The network device on which AppleTalk is run does not have to be the primary network device.

- You may run Novell protocols on only the primary network device.

Network client components

To send print jobs to the NPS/IPS printer, the customer needs to provide the proper client hardware as well as operating system and network software.

Supported client hardware and operating systems

Xerox NPS/IPS supports the following types of networked client workstations and operating systems:

- Sun workstation running a Sun or Linux operating system
- PC running MS-DOS 6.2 and Microsoft Windows 95, 98, NT, 4.0, 2000, and ME using Ethernet with TCP/IP or Novell NetWare 3.11 and 3.12.

NOTE: Customers using Novell 4.1 must set the "Bindery Emulation Mode" to be backwards compatible with Novell 3.11 and 3.12.

- IBM RS/6000 running IBM AIX, version 4.1
- HP/Apollo running HP-UX, version 10.01
- DECStation 5000/200 running DEC Ultrix, version 4.3
- Apple Macintosh, System 7.x or 8.x, using AppleTalk through EtherTalk, phase 1 or 2
- Any system that supports RFC-1179 lpr/lpd

NPS/IPS software may be compatible with workstation models and software versions other than those listed above.

Client networking software

TCP/IP networking software, Novell, or Apple Macintosh Printer Access Protocol (PAP) networking software must be installed on your client workstations. This software provides network communuication with the printer controller, which allows you to submit print jobs and check job status.

To submit jobs, you need a driver, a job submission client like XDS or the Xerox client software, or lpr capability.

NOTE: The printing options available to a client user vary according to the networking software loaded on the client workstation.

For additional information on submitting jobs from a client workstation, refer to the *Guide to Submitting Jobs from the Client*.

Responsibilities

It is your responsibility to supply, install, and maintain hardware and software on any PC, Unix workstation, or Macintosh system used to generate documents for printing on the DocuPrint printers. You are also responsible for obtaining, installing, and maintaining the required Ethernet LAN or Token Ring network, transceivers, cables, and connectors.

Xerox is responsible for the physical installation and service of the printer and printer controller hardware and software components. You have the general responsibility for the site of ensuring that the right personnel, supplies, and that network hardware and software is available. Refer to the "Preparing for installation" chapter of this guide for a detailed description of the shared responsibilities of the customer and of Xerox.

Sixth Sense

Sixth Sense is a unique suite of diagnostic tools that allows Xerox customer service engineers, analysts, and consultants to serve customers more effectively.

Sixth Sense is intended to automate and expedite the range of service-related support functions. Sixth Sense is a tool that enables Xerox to provide benchmark service support. Xerox customers benefit from the ability to bring broader support to focus more quickly.

For example, Sixth Sense can allow the Service Representative to repeatedly "preview" the condition of the system prior to an actual site visit. This may provide the ability to determine the correct part or piece of information to have on hand when the site visit is made.

Sixth Sense is a no charge feature available to customers through Xerox Service. The customer need only provide an analog phone line for use by the Sixth Sense modem connection. For those customers unable to dedicate a phone line to the Sixth Sense connection, three and five port phone share devices are available for purchase.

To take advantage of Sixth Sense, the customer needs to:

- Request Sixth Sense enablement through Xerox Service
- Provide an analog phone line
- If necessary, purchase an optional phone share device.

More information about the Sixth Sense can be found in the *Troubleshooting Guide* for your system.

2. Controller components and options

The printer controller provides the printer with print data and commands, and receives status information from the printer. This chapter describes the components and options available for the controller.

Printer controller components

The printer controller consists of a specially-configured Sun workstation and uses proprietary Xerox hardware, firmware, and software.

Your system may use one of two platforms for the printer controller:

- Sun Blade 1000
- Sun Ultra 60 workstation

Sun Blade 1000 workstation

The printer controller is based on the Sun Blade 1000, a workstation with a high-performance architecture for complex processing tasks. It contains the following hardware components:

- Processor (system unit) containing the following:
  - Two UltraSPARC III 750 Mhz central processing unit (CPU) modules
  - 4 GB memory (four 1 GB Dual In-line Memory Modules, or DIMMs)
  - 36 GB hard disk drive
  - DVD-ROM drive
  - 3.5 inch diskette drive
- Keyboard and mouse
- Monitor

- Optional Token Ring board
- Two printer controller Interface (PCI) boards installed in the processor to interface with the print engine.

Optional components

For channel connection to a host for IPDS printing, the system may use a channel interface board that is connected to a channel cable connector box.

An external 4 mm tape drive is available and recommended for backing up site files. A typical color calibration file is 1.5 MB.

A second internal 36 GB hard disk drive is optional, as are two additional external disks.
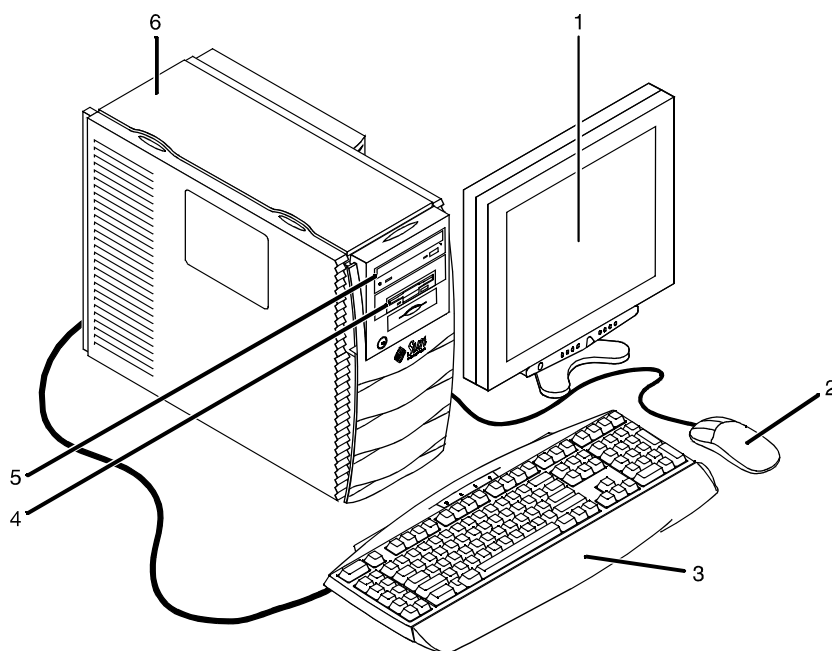
Figure 2-1. Components of the printer controller

1. Monitor
2. Mouse
3. Keyboard
4. Diskette drive
5. DVD-ROM drive
6. Processor

Processor

The central processing unit contains the memory, internal disk drive, a graphics board, a DVD-ROM drive, a diskette drive, power receptacle and outlet, connectors and ports.

- **Memory:** Four 1 GB Dual In-line Memory Modules, or DIMMs are provided as a standard feature of the processor.

- **Hard disk drive:** A 36 GB primary disk drive is provided as a standard feature of the processor. The operating system, the NPS/IPS application, and any queued print jobs are stored on the internal disk. This disk cannot be used to store other applications or data except as directed by your service representative.

- **Graphics board:** The Creator-3D series 3 graphics board is provided as a standard feature of the processor.

- **Diskette drive:** Diskettes inserted into a diskette drive are used to install fonts and to load files to, and back up files from, the internal disk drive. The diskette drive uses industry standard 3.5 inch, 1.44 MB, double-sided, high-density diskettes.

- **DVD-ROM drive:** The DVD-ROM drive is a high density, read-only, optical laser storage device used for loading the NPS/IPS operating system and other files. The CD-ROM drive is located in the processor above the diskette drive.

- **Back panel:** The back panel of the processor has a power receptacle and outlet, connectors, connector openings, and ports. The following figure shows the back panel of the controller.
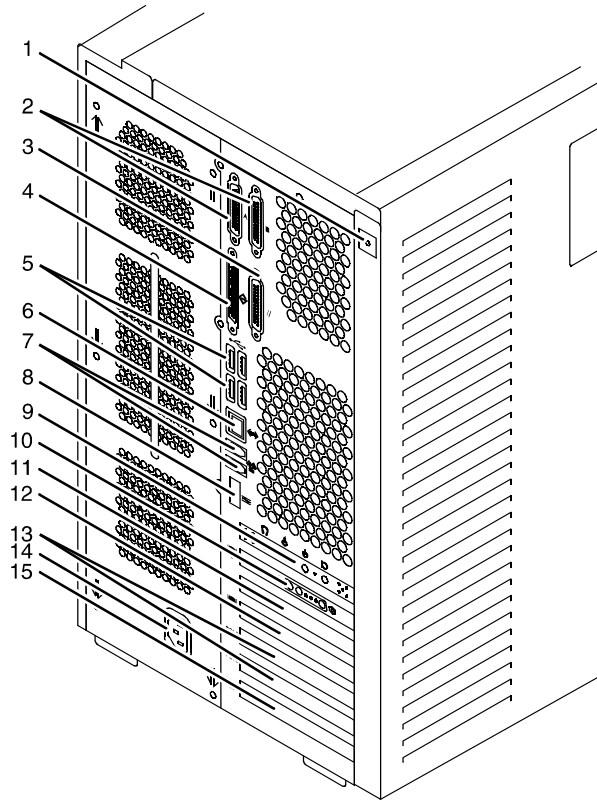
Figure 2-2. Back panel of the printer controller

1. Access panel lock block

2. Serial connectors A and B, DB-25

3. Parallel connector

4. SCSI connector

5. Universal serial bus (USB) connectors

6. Twisted-pair Ethernet (TPE) connector

7. IEEE 1394 connectors

8. Fibre Channel-Arbitrated Loop (FC-AL) connector

9. Audio module headphones, line-in, line-out, and microphone connectors

10. Graphics card / video connector (frame buffer 0)

11. PCI card slot 4

12. Graphics card / video connector (frame buffer not used)

13. PCI card slots 3 and 2

14. Power connector

15. PCI card slot 1

Keyboard   The keyboard consists of alphanumeric keys similar to a typewriter, symbols and special character keys, an extended character set, and function keys. You can use the keyboard to make selections, and to enter commands that control functions such as requesting sample prints, or shutting down the system.

Mouse   Use the mouse to select, move, or resize windows.

Display monitor   The 18.1-inch LCD monitor allows you to interact with the printer and to monitor its interaction with the various components. During a print job, printer error messages may display to notify you of any unexpected conditions.

NOTE: For information on channel-attached systems, refer to the chapter, "IPDS printing environment".

NOTE: Printer controller hardware configurations are subject to upgrade.

Sun Ultra 60 workstation

A PCIM2 card for the Sun Ultra 60 is installed in the processor. The printer cable is connected to the processor. In addition, the processor contains the connectivity boards for Ethernet and optional Token Ring. The disk stores the operating system, the system software, and any buffered pages.

Optional components   For channel connection to a host for IPDS printing, the system may use an HCU.

An external 4 mm tape drive is available and recommended for backing up site files. A typical color calibration file is 1.5 MB.
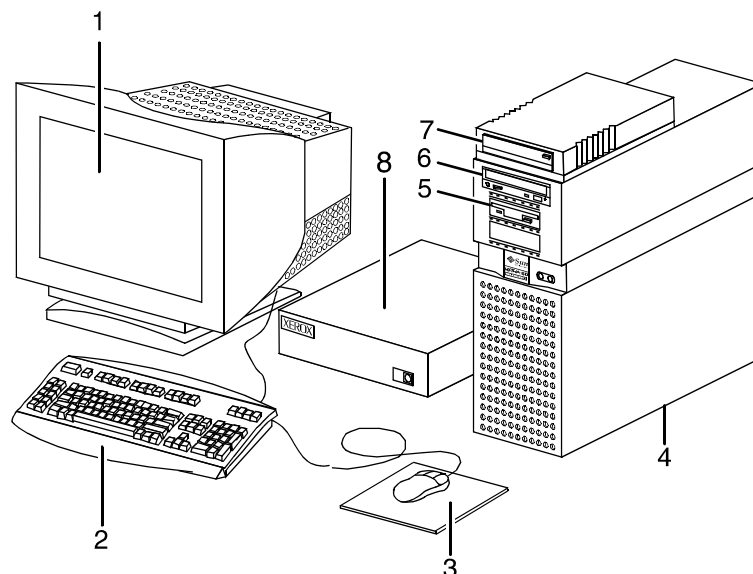
Figure 2-3. Printer controller components (Sun Ultra 60)

1. Monitor
2. Keyboard
3. Mouse
4. Processor
5. Diskette drive
6. CD-ROM
7. Optional cartridge tape drive
8. Optional HCU

Processor
The central processing unit contains the memory, internal disk drive, a CD-ROM drive, a diskette drive, power receptacle and outlet, connectors and ports.

- **Diskette drive:** The floppy disk drive is located in the processor. It uses industry standard 3.5 inch, 1.44-MB, double-sided, high-density floppy disks. This disk drive is not an input source for print jobs or for any other data or application. It is reserved exclusively for use by a service representative to update software and to store files.

- **CD-ROM:** The CD-ROM drive, located in the processor above the diskette drive, is a high-density, read-only, optical laser storage device used for loading the software, fonts and other files.

- **Cartridge tape drive:** The Sun Ultra 60 offers an optional 8 GB, 4 mm external SCSI cartridge tape drive. Unlike the diskette and CD drives, this tape drive is not an input source for print jobs or for any other data or application. It provides the service representative with another means of loading system maintenance files or saving diagnostic information.

Keyboard   The keyboard consists of alphanumeric keys similar to a typewriter, symbols and special character keys, an extended character set, and function keys. The keyboard is one of your main methods of communicating with the printer. You can use the keyboard to make selections, and to enter commands that control functions such as requesting sample prints, or shutting down the system.

Mouse   The mouse is another main method of communicating with the printer.

Display monitor   The display monitor has a high-resolution color screen, which displays the user interface screen.

NOTE: For information on channel-attached systems, refer to the chapter, "IPDS printing environment".

NOTE: Printer controller hardware configurations are subject to upgrade.

Printer controller software and fonts

The installation of printer controller software is performed by your service representative once all the hardware components are in place and properly connected. The following is a summary of major software components installed on the printer controller:

- Xerox printer controller software

    – UNIX Sun operating system

    NOTE: The Sun operating system used on the controller is based on the standard Sun operating system; however, it has been customized for use with the Xerox printer controller. Therefore, not all standard Sun operating system features are available.

- DocuPrint Print Service Software including software components for the user interface, IOT driver, decomposers, Job Pool Manager, and other operating system utilities.

- Xerox Client Software

  - Xerox client protocol software (print command); can be downloaded to client workstations or PCs as a means of submitting jobs.

- Adobe Type 1 PostScript fonts

  - Courier (Courier, Bold, Oblique, Bold Oblique)

  - Helvetica (Helvetica, Bold, Oblique, Bold Oblique, Light, Light Oblique, Black, Black Oblique Condensed, Condensed Oblique, Condensed Bold, Condensed Bold Oblique Narrow, Narrow Bold, Narrow Oblique, Narrow Bold Oblique)

  - ITC AvantGarde Gothic (Book, Book Oblique, Demi, Demi Oblique)

  - ITC Bookman (Demi, Demi Italic, Light, Light Italic)

  - ITC Garamond (Light, Light Italic, Bold, Bold Italic)

  - ITC Korinna (Korinna, Kursiv Regular, Bold, Kursive Bold)

  - ITC Zapf Chancery (Medium Italic)

  - ITC Zapf Dingbats (Medium)

  - New Century Schoolbook (Roman, Bold, Italic, Bold Italic)

  - Palatino (Roman, Bold, Italic, Bold Italic)

  - Symbol (Medium)

  - Times (Roman, Bold, Italic, Bold Italic)

  Using font installation commands, you can load other Type 1 PostScript fonts in *.PFB file format from a MS-DOS-formatted, 3.5-inch diskette or CD-ROM or DVD-ROM. Refer to the *Guide to Configuring and Managing the System* for more information on the font installation commands. Type 1 and Type 3 PostScript fonts can also be downloaded with a print job.

- PCL fonts: Intellifont (scalable)

  - CG Times (Medium, Italic, Bold, Bold Italic)

  - Universe (Medium, Italic, Bold, Bold Italic)

  - Universe Condensed (Medium, Italic, Bold, Bold Italic)

- Courier (Medium, Italic, Bold, Bold Italic)

- Letter Gothic (Medium, Italic, Bold)

- Albertus [Medium (semi-bold), Extra Bold

- Antique Olive (Medium, Italic, Bold)

- Clarendon Condensed (Bold)

- Coronet (Medium Italic)

- Garamond [Antique (medium), Kursiv (Italic), Halbfett (Bold), Kursiv Halbfett (Bold Italic)]

- Marigold (Medium)

- CG Omega (Medium, Italic, Bold, Bold Italic

- PCL fonts: Truetype (scalable)

  - Arial (Medium, Italic, Bold, Bold Italic)

  - Times new Roman (Medium, Italic, Bold, Bold Italic)

  - Symbol (Medium)

  - Wingdings (Medium)

- PCL fonts: Bitmap

  - Line Printer (16.67 pitch / 8.5 point medium)

NOTE: The resident fonts are used for PostScript and PCL printing.

3. Printer components and options

The printer processes the electronic data and images received from the controller and produces the printed output. This chapter describes the components and options available for the printer.

Printer components

The NPS/IPS printers contain the xerographic engine, two standard feeder trays, a sample tray, the printer console, and one of three possible output configurations: the dual stacker, the dual stacker with bypass transport, or the stitcher/stacker.
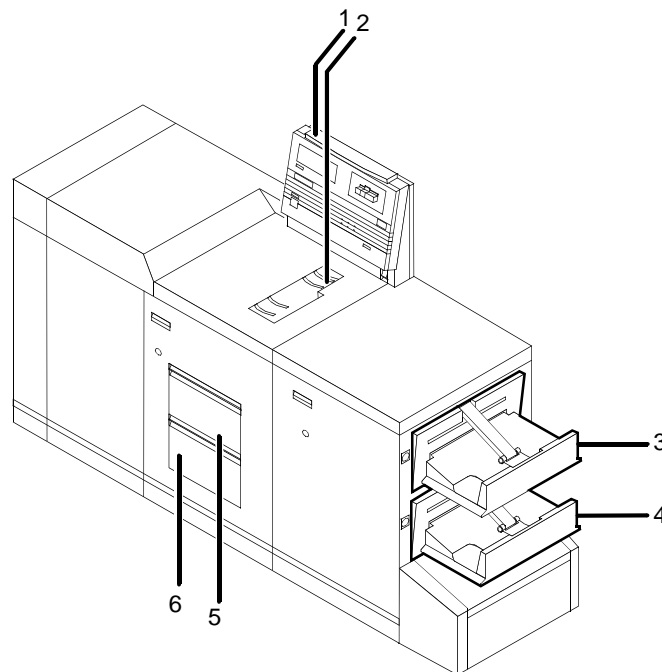
Figure 3-1. 4850/4890/92C NPS/IPS printer

1. Printer console
2. Sample tray
3. Stacker tray 1
4. Stacker tray 2

5. Feeder tray 1

6. Feeder tray 2

Printer console   The printer console contains message and graphic displays, an attention light, and Information, Stop, and Continue buttons. Indicator lights show which feeder tray is active and the paper size in use.

Sample tray   This output tray is used for sample prints, rejected prints, and transparencies. The capacity of the sample tray is 100 sheets of 20-pound or 80-grams per square meter (gsm) paper.

Dual stacker trays 1 and 2   Each output stacker tray has a capacity of 750 sheets of 20-pound or 80-gsm paper (1,500 sheets total capacity). The alternatives to the dual stacker configuration are the stitcher/ stacker or bypass transport option.

Feeder tray 1   The capacity of tray 1 is 1,000 sheets of 20-pound or 80-gsm paper.

Feeder tray 2   The capacity of tray 2 is 500 sheets of 20-pound or 80-gsm paper. Except for capacity, this tray is identical to tray 1.

Printer console

The printer console contains message and graphic displays, as well as attention and status indicator lights that alert you to printer conditions. The indicators and the Information button help you to solve printer problems. The Stop and Continue buttons give you temporary control of the printer without interrupting input processing.

NOTE: The 4850/4890/92C does not provide sample prints while a job is running, therefore, the Sample Print button has no effect on the operation.
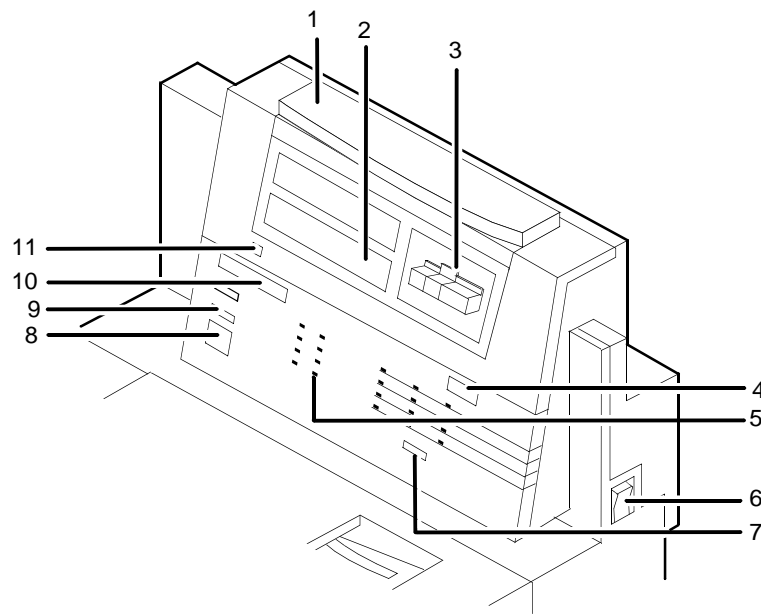
Figure 3-2. Printer console

1. Attention light

2. Message display

3. Graphic display

4. Wire percentage indicator

5. Feeder tray indicators

6. Power on/off switch

7. Sample button (not used)

8. Continue button

9. Stop button

10. Fault code display

11. Information button

Attention light   The yellow attention light glows whenever the system detects an actual or potential problem. When the attention light starts flashing, an explanatory message appears on the printer console display. A similar error or warning message appears on the user interface of the printer controller.

• When the light is flashing, you should act immediately to remedy situations. Typical problems are a paper jam or a full waste container that have caused the printer to stop.

- When the light glows steadily, act soon to avoid a cycle-down. A steady glow typically indicates that paper or dry ink is low.

Message display   Printer status and simple operating and maintenance instructions are shown in a two-line message. One of the following icons indicates the printer mode:

Printer Mode

Black   Highlight
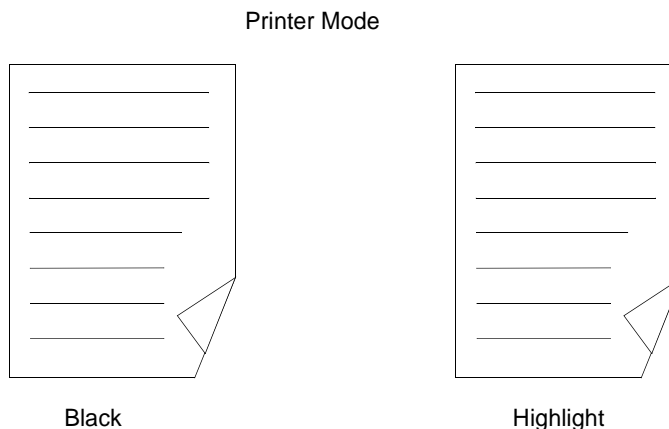
Also in the lower panel, the dry ink color currently loaded is shown.

Graphic display   The graphic display shows a specific area of the printer requiring attention. The graphics help you locate the problem.

Icon display   The icon display is located in a rectangle below the graphic display. The printer mode is indicated by the words that are lighted--Black or Highlight (color). The printer indicates the color of ink loaded in the printer by lighting one of the icons on the right (red, blue, green, or "other").
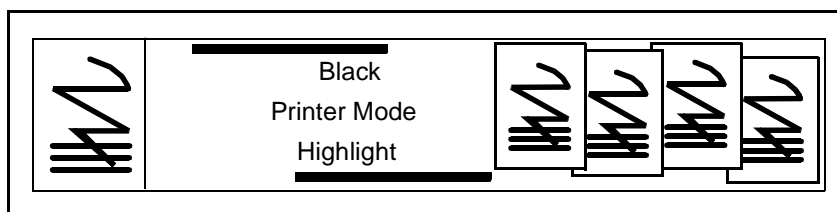
Wire percentage indicator   If your printer has a stitcher/stacker, it displays the percentage of stitcher wire remaining on the spool.

Feeder tray indicators   These lights indicate the selected feeder tray or trays and the size of paper loaded in each tray.

Power on/off switch	This switch controls power to the printer and is used primarily by service representatives.
Sample button	The sample feature is not used.
Continue button	The Continue button resumes printing when it is pressed.
	While it is formatting a complex page, the printer controller may cycle down the printer if the page image is not available within a certain amount of time. If this occurs, the following message appears:
	Press <CONTINUE> to resume printing
	You can ignore this message. As soon as the page image is available, the printer controller cycles up the printer and printing automatically resumes.
Stop button	Pressing the Stop button halts printing.
Fault code display	When enabled by a service representative, shows the number of completed prints and printer fault codes. When a fault code displays here, the corresponding message appears in the message display.
Information button	When "i" appears on the message display, you can press this button for additional information on printer operation. You can press the button repeatedly for more information as long as "i" appears.
Sample tray	This output tray receives sample prints of system files, rejected prints, and transparencies. The capacity of the sample tray is 100 sheets of 20-pound or 80 gsm bond. There is no tray full sensor, therefore, empty this tray regularly to avoid paper jams.
Dual stacker trays 1 and 2	Each output stacker tray has a capacity of 750 sheets of 20-pound or 80 gsm bond (1500 sheets tatal capacity). An alternate to the dual stacker configuration is the stitcher/stacker.
Feeder trays	The standard configuration contains two feeder trays with the following capacities (based on 20-pound or 80 gsm bond):

- **Tray 1**: 1000 sheets
- **Tray 2**: 500 sheets. (Except for capacity, this tray is identical to tray 1.)

Additional printer features

Additional features of the NPS/IPS include the following:

Instruction labels   Located throughout the printer to assist you with a variety of tasks.

Power savers   To conserve energy, the printer has two power savers: one for the raster output scanner (ROS) and one for the fuser.

After a predetermined period, each of these parts times out and shuts down. The time-out period can be adjusted by a service representative to meet your needs. The printer console automatically brings the printer out of power saver mode when there is a document to be printed.

- The ROS power saver times out after about an hour of inactivity and requires about 30 seconds to warm up.

- The fuser power saver times out after about four hours and requires four to seven minutes to warm up.

Language button   Systems with the dual language option have this button to select a message display that shows a different language, such as French instead of English.
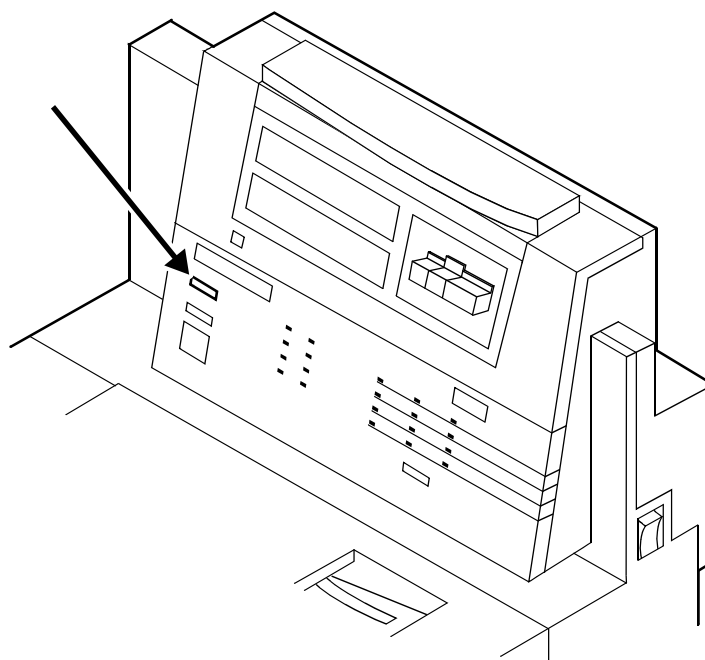
Figure 3-3. Language button on printer console

CCU changeout cart The cart is used to remove and install the customer changeable unit (CCU). The CCU consists of the color developer housing and the dry ink bottle. Because the CCU is heavy, the user will need the cart to make the change.

The carts also serve as storage devices for the CCUs that are not currently in use. For example, if you use both the red and blue dry inks in your operation, one CCU is always out of the machine in storage on the cart while the other CCU is installed.
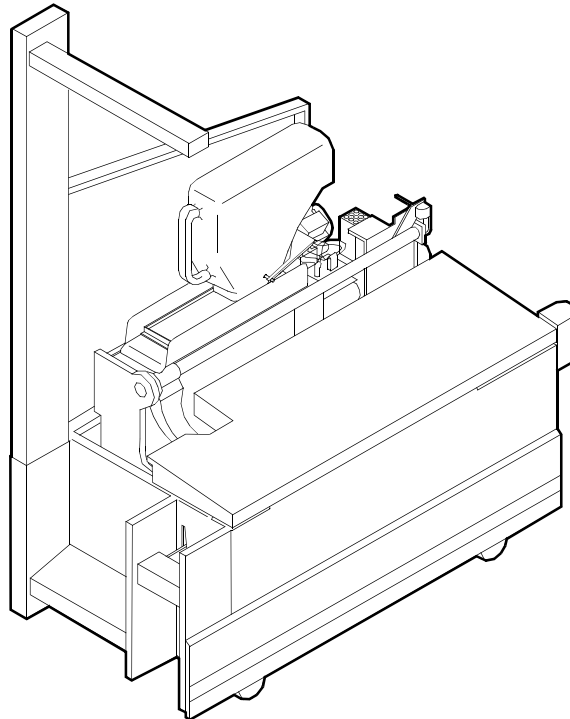
Figure 3-4. CCU on cart

NOTE: You should have a cart for each CCU so that a cart is always available to remove the CCU that is installed in the system. You may not need a cart for each CCU if only one color is used or if there is more than one color printer at your site. Consult your site representative for more details.

Printer configurations

The NPS/IPS may be configured with a high-capacity feeder, a dual stacker, a wire stitcher/stacker, or a bypass transport with a dual stacker.

High-capacity feeder

The high-capacity feeder (HCF) provides two additional feeder trays. The extra trays work interchangeably with feeder trays 1 and 2 to allow automatic tray switching and uninterrupted printing time.
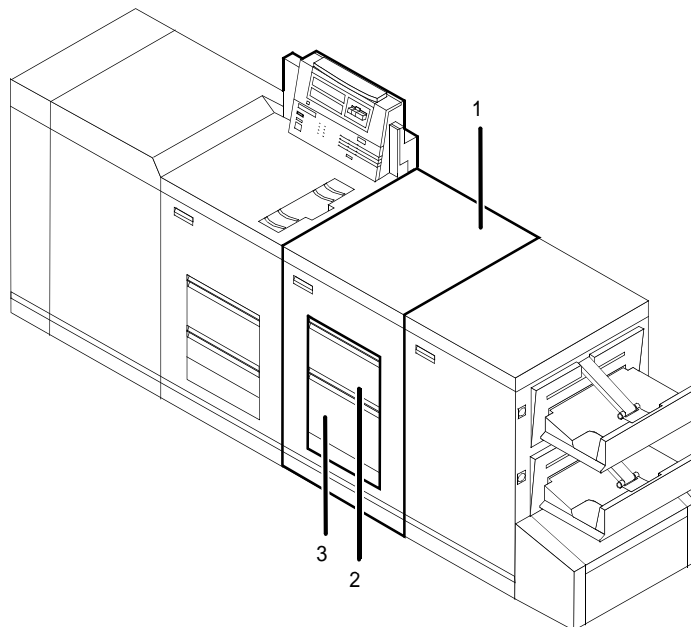
Figure 3-5. 4850/4890/92C NPS/IPS with high-capacity feeder

1. **High-capacity feeder unit**
2. **Feeder tray 3**
3. **Feeder tray 4**

Tray capacities Each high-capacity feeder tray holds 1000 sheets of 20-pound or 80 gsm bond.

Paper sizes Both high-capacity feeder trays handle paper sizes from 8 by 10 inches / 203 by 254 mm to 8.5 by 14 inches / 216 by 352 mm. This range includes international paper size A4 (8.27 by 11.16 inches / 210 by 297 mm).

Dual stacker

The dual stacker contains two identical output trays. Output can be sent to either of these trays or both of these trays.

NOTE: A dual stacker is required on the NPS/IPS for installation of the bypass transport.
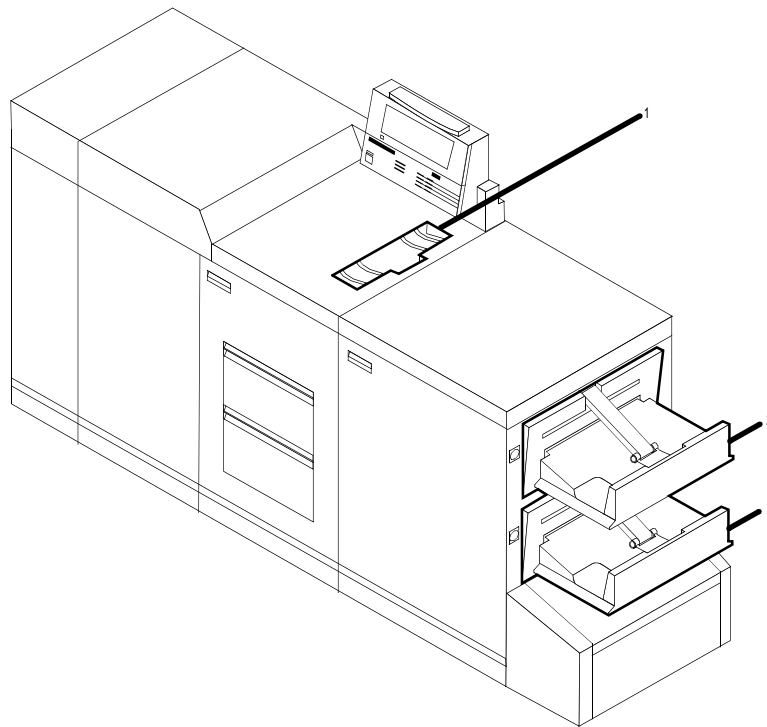
Figure 3-6. 4850/4890/92C NPS/IPS printer with dual stacker

1. **Sample tray (top tray)**
2. **Stacker tray 1**
3. **Stacker tray 2**

Sample tray   Used for sample prints, rejected prints, and transparencies. Holds up to 100 sheets of 20-pound or 80 gsm bond.

Stacker tray 1   Holds up to 750 sheets of 20-pound or 80 gsm bond.

Stacker tray 2   Holds up to 750 sheets of 20-pound or 80 gsm bond.

Stitcher/stacker

The stitcher/stacker inserts wire-stitches (staples) into documents.
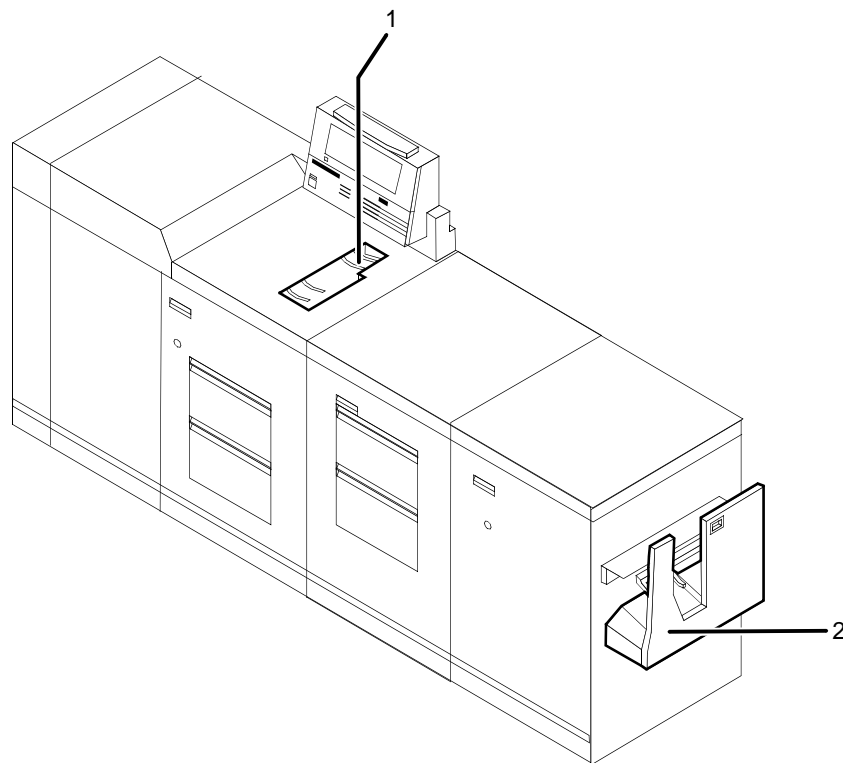
Figure 3-7. 4850/4890/92C NPS/IPS printer with stitcher/ stacker

1. **Sample tray**
2. **Stitcher/stacker tray**

Sample tray Used for sample prints, rejected prints, and transparencies. Holds up to 100 sheets of 20-pound or 80 gsm bond.

Stitcher/stacker tray Used for output that is stitched (stapled) and/or offset. The tray holds up to 2000 sheets of unstitched 20-pound or 80 gsm bond, or an equally high stack of stitched sets (200 two-sheet sets). A stitched set consists of up to 50 sheets of 20-pound or 80 gsm bond. The wire supply provides up to 32000 staples.

NOTE: Mixed paper sizes are not supported for stitching. If your system has a stitcher/stacker, the printer cycles down when it detects any specification for stitching different-sized papers.

Bypass transport (4850 and 4890 only)

The optional bypass transport enables individual printed sheets of paper to pass through the NPS/IPS output tray to third-party finishing devices. These devices perform a variety of finishing tasks, such as saddle-stitching, binding, folding, stapling, trimming, and stacking.

The bypass transport fits into tray 1 of the NPS/IPS dual stacker. Printed pages flow from left to right (when viewed from the front of the printer). The printed pages travel through the NPS/IPS output module and bypass transport, out of the paper exit slot, and into the finishing device. For paper up to 14 inches long, the maximum delivery rate is 92 sheets per minute.
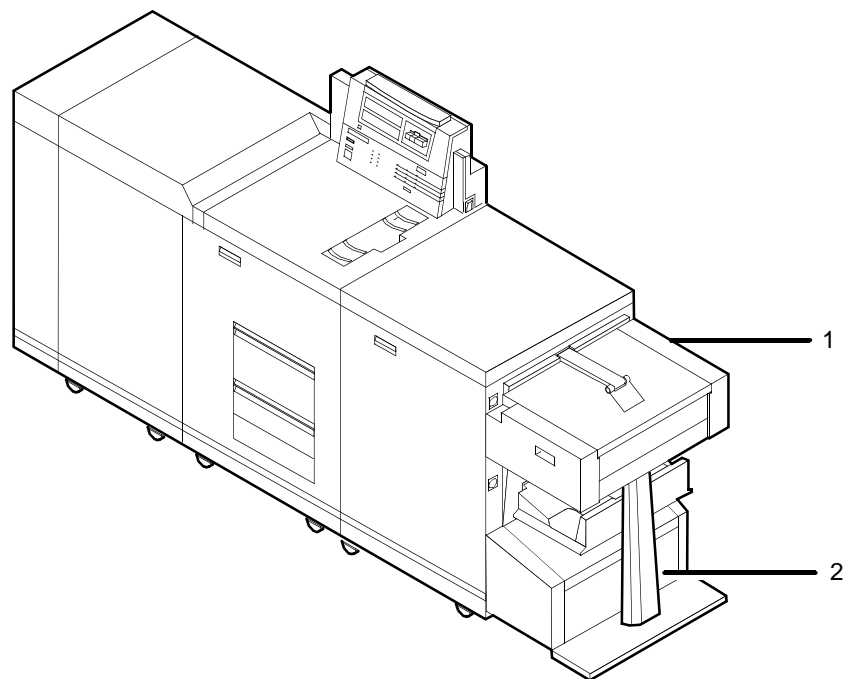
Figure 3-8. 4890/92C printer with bypass transport and dual stacker

1. Bypass transport

2. Bypass transport support

Software, firmware, hardware, and paper requirements

The optional bypass transport requires the following:

- Dual stacker output module

- Standard white, colored, predrilled, or preprinted paper. To minimize paper jams and misfeeds, use 20 pound or 80 gsm (grams per square meter) bond xerographic grade. Xerox 4024 Dual Purpose Paper and Xerox 10 Series Dual Purpose paper are optimal. Use paper with less than 6% moisture content so that the paper will not curl and jam.

NOTE: The time between sheets exiting the bypass transport for 8.5 by 11-inch / 216 by 279 mm paper, A4 paper, and 8.5 by 14-inch / 216 by 352 mm paper is 492 milliseconds in simplex mode and 1052 milliseconds in duplex mode. All times are measured between the trail edge of the exiting sheet and the lead edge of the next entering sheet.

Operator tasks for the bypass transport

To use the bypass transport and third-party finishing devices, you must perform several tasks:

- Install and remove the bypass transport.

- Set up DFA personality profiles to provide the NPS/IPS with information about each finishing device.

- Prepare the finishing device hardware necessary to finish the printed output and inform the NPS/IPS of device names and parameters.

- Enter appropriate commands at the printer controller to initiate finisher jobs.

- Clear paper jams in the bypass transport.

You learn how to install and remove the bypass transport and clear jams in the operator training that is provided by Xerox following installation of the bypass transport.

In addition, you must know how to prepare the third-party finishing device to process printed output. Obtain this information from your third-party supplier.

Profiles for third-party finishing devices

When a bypass transport is connected to the NPS/IPS, you can add any number of third-party finishing devices.
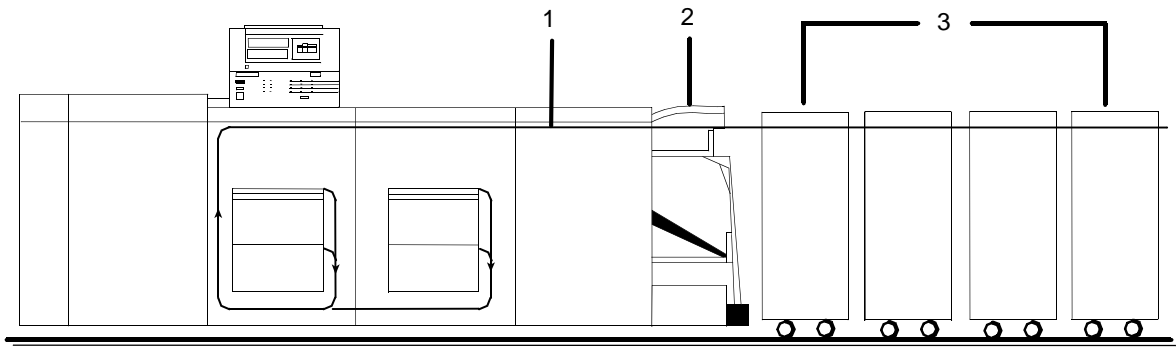
Figure 3-9. Third-party finishing device configuration

1. Paper path
2. Bypass transport
3. Third-party finishing devices

Each third-party device is identified by a specific personality profile. The personality profile contains information about the options available with the finishing device (for example, a booklet-making device that can produce both side-stitched and saddle-stitched booklets). It also specifies timing requirements, constraints, flags, and other parameters.

You can create several personality profiles that correspond to different configurations of the finishing device. Refer to your *Guide to Configuring and Managing the System* for information on creating personality profiles.

Mechanical interface

To connect a third-party finishing device to the NPS/IPS bypass transport, you align the finishing device with the paper exit slot of the bypass transport, dock the finishing device, and establish an electrical interface between the two.

Connecting the bypass transport to third-party finishing devices involves the following:

- **Alignment:** Your finishing device align at the correct height without interference from protruding features. To accomplish this, you must consider the feature locations and the vertical alignment.

- **Paper exit:** The finishing device must align with this exit slot. Printed sheets travel through the printer output module and bypass transport, out of the paper exit, and into the finishing device. The paper exit slot is 16.75 inches (425.45 mm) wide.

- **Module mobility:** Your finishing device must be easy to move so that you can align it precisely.

The following figure illustrates the alignment and docking locations for the bypass transport on the printer (the bypass transport support is not shown).
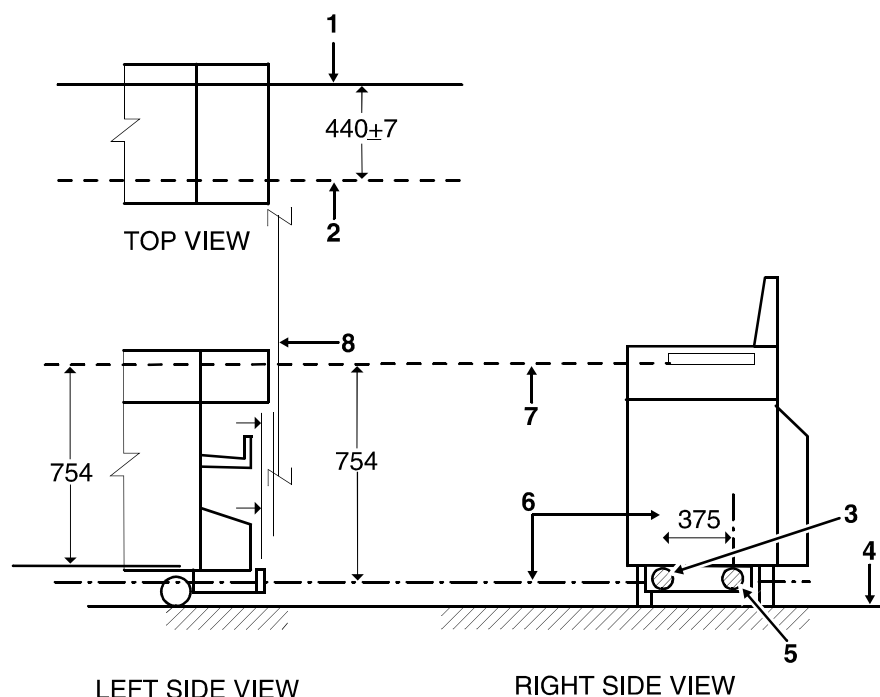
Figure 3-10. Alignment and docking locations (in millimeters)

1. Sheet registration edge

2. Sheet edge

3. Vertical slot to accept 13 mm

4. Floor

5. 22 mm diameter docking zone

6. Center line of docking features

7. Sheet path

8. Finishing device left edge

Electrical connection

The printer automatically detects the presence of the bypass transport and third-party finishing devices when it is powered up. The system also begins monitoring the interlocks (physical links) between the bypass transport and the finishing device. It then starts interface communications.

After a sheet of paper passes through the bypass transport to the external finishing device, the printer loses all record of it. Communications between the printer with bypass transport and the finishing device consist of command and status signals.

Command signals NPS/IPS can send three command signals to third-party finishing devices:

- **Cycle up:** The printer is powered up and signals the finishing device to power up

- **Sheet exit:** A sheet of paper has entered the finishing device

- **End of set:** The last sheet of a print job set has been sent

Status signals The third-party finishing device can send five status signals to the NPS/IPS:

- **Sheet delivered:** A sheet of paper has been successfully delivered to the finishing device.

- **Set delivered:** A print job set has been successfully delivered to the finishing device.

- **Offline:** The finishing device has no power or is not connected to the NPS/IPS.

- **Full:** The finishing device is full and cannot accept more sheets.

- **Faulted:** The finishing device is jammed or faulted and is not ready to accept sheets of paper

Paper paths

The paper path is the route that stocks (paper, transparencies, labels, and so on) follow through the printer from the feeder trays to the output trays.

The figure below illustrates the simplex (one-sided output) paper path of a printer with a dual stacker tray and a standard feeder tray. The materials move from either feeder tray 1 or feeder tray 2 and are stacked in either stacker tray 1, stacker tray 2, or the sample tray, depending on your selection at the beginning of the job.
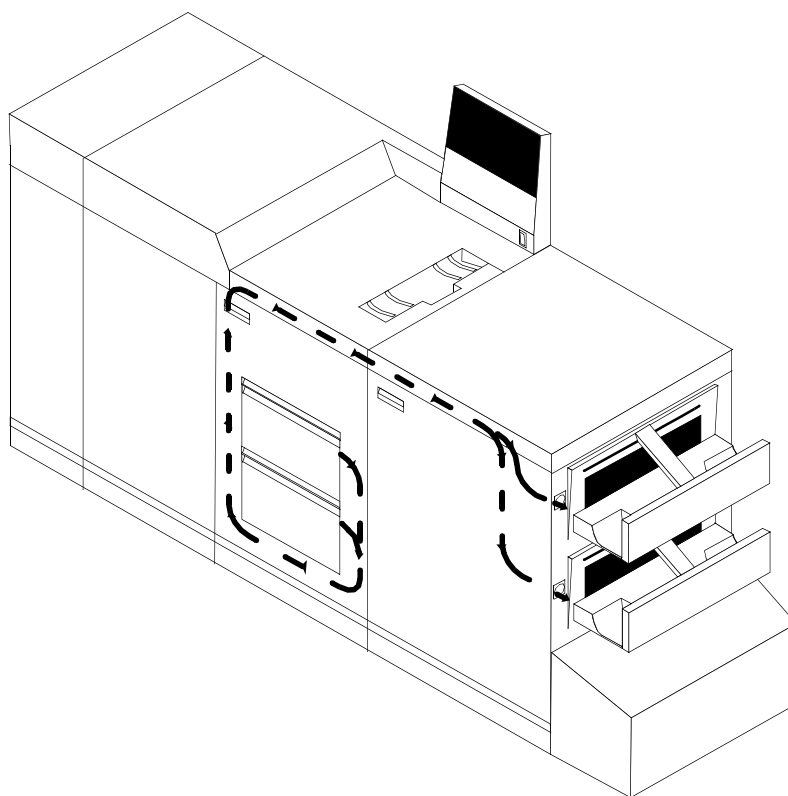
Figure 3-11. Simplex paper path (dual stacker configuration)

The following figure illustrates the duplex (two-sided output) paper path of a printer with a dual stacker and a standard feeder. Materials may originate in either feeder tray 1 or feeder tray 2. The duplex paper tray receives the materials before they go through a second time to receive the second image. As the pages move through for the second image, they follow the simplex path. The pages are then stacked in either stacker tray 1 or stacker tray 2, depending on your selection at the beginning of the job.
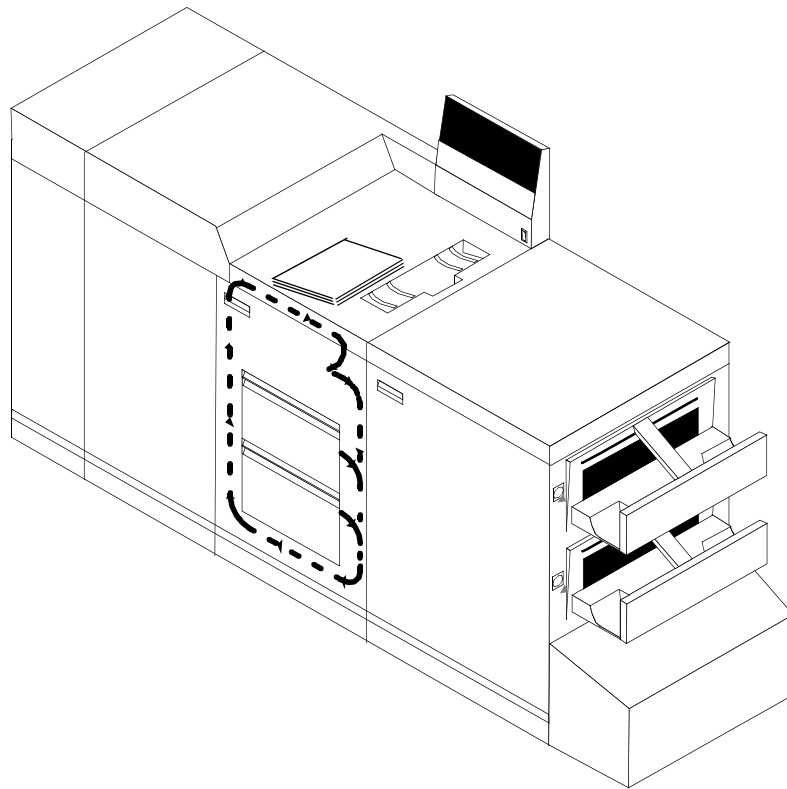
Figure 3-12. Duplex paper path (dual stacker configuration)

When you add a high-capacity feeder to your system, only the beginning of the paper path changes, which is the source of paper supply.

The following figure illustrates the simplex paper path of a printer with the high-capacity feeder.
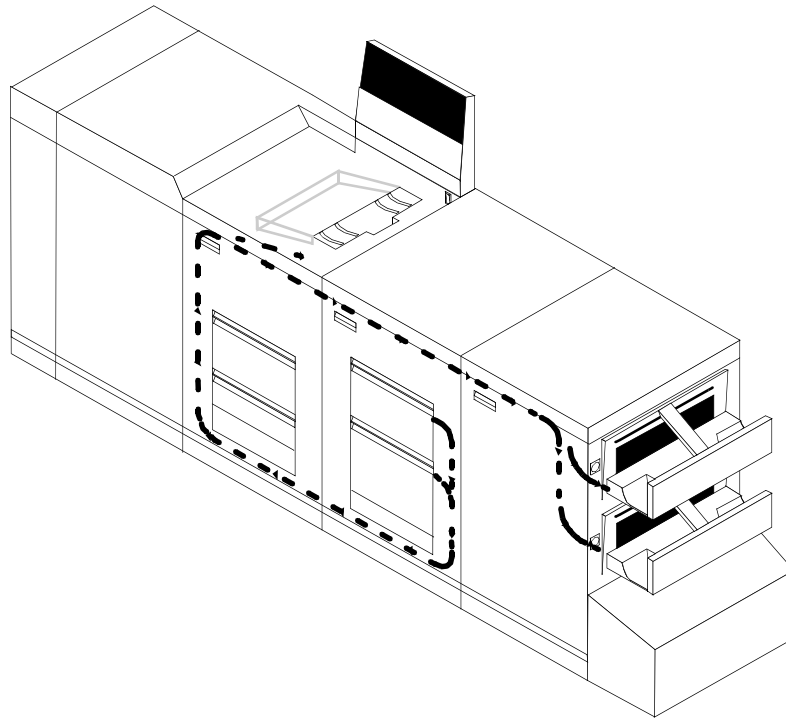
Figure 3-13. Simplex paper path (printer with high-capacity feeder)

If you have the stitcher/stacker option, the paper path is the same, except there is only one tray for the output (other than the sample tray).

4. Preparing for installation

This chapter assists you in preparing for the installation of your Xerox DocuPrint 4850/4890/92C NPS/IPS.

Preparing for installation is a responsibility shared by personnel at your site and Xerox. Your service representatives are available to discuss installation issues and to assist you in completing the site installation tasks.

Before installation, you must select and prepare an appropriate location for the printing system and order supplies. This chapter helps you accomplish these tasks by providing the following information:

- A summary of your responsibilities and those of your Xerox service representative
- Connectivity requirements for setting up the NPS/IPS to receive data from the IBM host
- A checklist of installation planning activities.

For information on controller power and space requirements, refer to the "Controller specifications and requirements" chapter of this guide. For facts about printer power and space requirements, refer to the "Printer specifications and requirements" chapter of this guide.

Responsibilities

This section describes your site responsibilities and the responsibilities of your service representatives. Included are some joint responsibilities.

Xerox responsibilities

This section lists the responsibilities of the service representatives and system analysts before, during, and after installation:

- **Site selection**

- Assist in site selection
- Inspect and approve the site

- **Installation**
  - Schedule the delivery of the hardware
  - Monitor installation activities
  - Assist you in ordering any supplies required
  - Configure system parameters
  - Assist with the configuration of input and output profiles for use with third-party finishing devices
  - Install the DocuPrint system

- **Training**
  - Provide initial operator training
  - Provide information and assistance in registering for Xerox Customer Education classes or obtaining tutorials

- **Service**
  - Review preventive maintenance schedules and service call procedures
  - Provide ongoing maintenance
  - Assist in resolving hardware and software problems

Customer responsibilities

Your responsibilities prior to, during, and after installation of the DocuPrint NPS/IPS system are to schedule and monitor your installation activities. Refer to the "DocuPrint NPS/IPS installation planning checklist" and the "Network preinstallation checklist" in this chapter for a complete list of responsibilities.

Refer to the "Xerox support services" appendix for information on services designed to support you prior to, during, and after your installation.

- **Site personnel**
  - Identify the person (or persons) at your site who will be the primary interface with Xerox.
  - After the installation of your DocuPrint NPS/IPS, there are a few ongoing tasks that must be performed. These tasks may include all or some of the following:
    - Meter reading and reporting

- Overseeing routine maintenance
- Placing service calls for hardware problems
- Ordering additional documentation, software, or fonts
- Arranging additional operator training
- Maintaining an adequate inventory of consumable supplies.

It is your responsibility to designate a person (or persons) to perform these tasks.

- **Operator and Administrator training**
  - Select personnel for Operator and Administrator training.
  - Set up a training schedule.

- **Site preparation**
  - Select and prepare the site for DocuPrint NPS/IPS system installation including proper power, air conditioning, and work space.
  - Plan and schedule installation activities.
  - For channel-attached systems: Provide your host channel address to your Xerox representative.
  - Install the necessary network connections required to connect client workstations to the printer controller. Refer to the "Network preinstallation checklist" in this chapter.
  - Install Ethernet or Token Ring to system location.
  - Obtain the necessary interfaces, cables, transceivers, etc.

    NOTE: You are responsible for obtaining, stringing, and maintaining fully-populated bus and tag cables for channel-attached systems.

  - Sysgen your host to print to an AFP Type1, Group 3 printer. Refer to your IBM documentation for further information.
  - For stitcher/stacker option: Work with your service representative to determine the "low wire" percent values to be displayed on the printer control console.
  - Provide a list of the stocks you want in your default input tray configuration.
  - Review the *NPS/IPS Installation Planning Guide* thoroughly.

– Have the required parameters defined for configuring PSF to print on the NPS/IPS. Refer to the "Defining the channel attached printer to the host" or the "Defining the printer to the host: TCP/IP attachment" appendix of this guide for examples and explanations of these parameters.

- **Client workstations**: Make sure all client workstations that will be submitting print jobs have the proper hardware, operating system, and networking software supported by the DocuPrint system as client platforms.

- **Training**

  – Select the personnel to undergo operator training.

  – Set up the operator training schedules.

- **Applications**

  – Work with your Xerox system analyst to determine requirements for the initial applications.

  – In a mixed environment, where there is a variety of printing systems, discuss print quality differences with your service representative.

Make sure that your system specialists are familiar with the software specific to your printer; system software is not the same for all laser printing systems. If your system specialists are familiar with one of these operating systems and you are converting to or adding another, they should be aware of the differences.

Installation planning checklist

To aid you in installation planning of the DocuPrint NPS/IPS, this section provides a checklist, listing tasks you and your service representative need to complete in the weeks before installation. If you have questions about any of these activities, contact your sales or service representative.

Use the timeframes in this checklist as guidelines. It is best to consult your suppliers to determine the exact lead times they require.

Table 4-1. DocuPrint NPS/IPS installation planning checklist

Week	Activity	Reference	Responsibility	Date completed
-4	• Select location for DocuPrint system.	Chapters 5 and 6	Customer	_____
	• Identify networked client workstations to be used. Make sure the hardware, operating systems, and networking software are supported by the DocuPrint NPS/IPS.	Chapter 4 and Appendix D	Customer	_____
	• In the United States, sign up with Xerox Documentation and Software Services. Order additional documentation, if needed.	Appendix B	Customer	_____
	• In the United States, register for Xerox Customer Education classes, if needed.	Appendix B	Customer and Xerox	_____

Table 4-1. DocuPrint NPS/IPS installation planning checklist (Continued)

Week	Activity	Reference	Responsibility	Date completed
-3	• Schedule hardware delivery. • Prepare the site: – Provide a table with adequate space for hardware and cables. – Ensure and install proper electrical receptacles. – Obtain and string bus and tag cables (must be fully populated), if needed. – Install network to system location. – Install Token Ring to system location (if appropriate). – Install Ethernet to system location (if appropriate). – Establish network addresses and logical unit names for print server and user workstations. – Complete preinstallation checklist. – Provide table with adequate space for hardware and cables. – Ensure and install proper electrical receptacles. – Ensure proper operating environment. – Generate the host for an AFP1 device and IPL, as required.	Sales rep Chapters 4 to 6	Customer and Xerox Customer	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____
-2	• Inspect and approve site. • Order consumable supplies. • Minimum supplies needed for installation: – Paper (2 cartons) – Developer (1 carton, plus 1 carton of each color desired for DocuPrint Model 4850/4890/92C NPS/IPS) – Fuser agent (2 cartons) – Dry ink (1 carton black, plus 1 carton of each color desired for DocuPrint 4850/4890/92C NPS/IPS) After installation, you will need to establish a procedure for ordering supplies according to your ongoing production requirements.	Chapter 4, Appendix A and sales rep	Xerox Customer and Xerox	_____ _____

Table 4-1. DocuPrint NPS/IPS installation planning checklist (Continued)

Week	Activity	Reference	Responsibility	Date completed
-1	• Schedule operator training. • Define parameters needed to configure PSF for connectivity to the NPS/IPS printer.	Systems analyst	Customer and Xerox	_____
Install	• Ensure supplies are available. • Ensure system administrators are available during software installation.	Chapter 4 and Appendix A	Customer Customer	_____ _____
	• Provide preinstallation checklist and network address of print server (or host file containing this information) to Xerox personnel. Also, designate two client workstations if applicable, for Xerox client software installation.	Chapter 4	Customer	_____
	• Provide host channel address and channel unit address (if printing via channel).			_____
	• Provide host IP address.			_____
	• Sysgen your host to print to an AFP Type 1, Group 3 printer.			_____
	• Set up Data Transfer Mode.			_____
	• Install DocuPrint system hardware and software.		Xerox	_____
	• Load Xerox client software on client workstations.		Customer	_____
	• Have operators available for training.	Appendix B	Customer	_____
	• Check documentation and software kits for completeness.		Customer	_____
	• Have test jobs ready to run. • Provide stocks needed for default input configuration.		Customer Customer	_____
	• Provide parameters needed to configure PSF for connectivity to the NPS/IPS printer.		Customer	_____ _____
Post-install	• Become familiar with support services available.	Appendix B	Customer	_____
	• Establish supplies ordering procedure.	Appendix A	Customer	_____
	• Provide ongoing printer controller and DocuPrint printer maintenance.	*Guide to Performing Routine Maintenance*	Customer and Xerox	_____
	• Adjust the printer alignment and magnification.		Xerox	_____
	• Order additional documentation, as necessary.	Appendix B	Customer	_____

NPS/IPS network installation checklist

The DocuPrint NPS/IPS system is installed and configured by your service representative. The service representative needs certain information about your network environment to complete the DocuPrint printer controller software installation. Use the "Network preinstallation checklist" table in this chapter to gather the necessary information for the installation.

Some of the items in the checklist may not apply to your environment. Fill in those items that you know may apply, and refer to your network administrator for information, if necessary.

NOTE: If you are installing the DocuPrint NPS/IPS in a Novell NetWare environment, refer to this chapter and your Novell network NPS/IPS administrator to assist you in completing the checklist in the "Network preinstallation checklist" table.

The information you may need to provide is defined as follows:

Hostname   A unique name that designates a node on the network. You may use up to 32 characters: upper and lower case alpha (a-z and A-Z), integers (0-9), and hyphens (-). The name you choose may be the same as the printer name.

IP address   Series of four integers between 0 and 255 separated by a period, such as 192.9.200.1, to create an IP address for the DocuPrint system. (Do not use all zeros or designate 255 for all integers when assigning an IP address.)

- You must assign a unique, valid IP address for each TCP/IP network to which the NPS/IPS is attached.

  NOTE: To avoid routing problems that will slow down the controller, the IP addresses you assign must belong on different TCP/IP subnets, as determined by the IP subnet netmask.

- If you are not on a TCP/IP network, use the Xerox-supplied IP address value (192.9.200.1), or the IP address value assigned by your network administrator.

IP netmask   Series of four integers between 0 and 255 separated by a period, such as 255.255.255.0 to create an IP netmask. (Do not use all zeros or designate 255 for all integers when assigning an IP netmask, and do not use the IP address value.)

- If you are on a TCP/IP network, assign a valid IP netmask.

- If you are not on a TCP/IP network and you used the Xerox-supplied IP address value (192.9.200.1), use 255.255.255.0 for the IP netmask.

IP broadcast address Series of four integers between 0 and 255 separated by a period, such as 255.255.255.0, to create an IP broadcast address. (Do not use the IP address value.)

- If you are on a TCP/IP network, assign a valid IP broadcast address.

- If you are not on a TCP/IP network, use the Xerox-supplied IP broadcast address value (255.255.252.0), which is a plus (+) sign.

Default router Series of four integers between 0 and 255 separated by a period, such as 188.9.234.1, to specify a default router. Most TCP/IP networks broadcast routing information.

CAUTION

Specify a default router only if your network does not specify broadcast routing information.

- If the TCP/IP network does not broadcast routing information, specify an IP address of an existing router that is on the same subnet as the DocuPrint.

- If you are not on a TCP/IP network, specify the default of NONE.

Superuser password (UNIX root password) Select a password to prevent unauthorized access to your superuser account. You can select a series of any ASCII characters, except those that your UNIX system interprets in a special way. Passwords have no limits on the number of characters, but the system uses only the first eight characters to administer password security. The password selection you make is case sensitive to the system.

CAUTION

Select a password that cannot be easily obtained by others to avoid unauthorized access to your account. This is not the same password used for Operator or Administrator functions.

AppleTalk network information

If the DocuPrint NPS/IPS is installed in an AppleTalk network environment, indicate whether your AppleTalk network is phase 1 or 2. Also, indicate the AppleTalk zone name you want the DocuPrint to locate. The zone name must be the same name as the existing zone used on the network to which the DocuPrint is attached. In addition, you must specify the network device on which AppleTalk runs.

NOTE: Do not use the ampersand ("&") in the zone name to avoid conflict with UNIX expressions. If the ampersand character must be used, enter "\\&" instead.

Accounting information

Indicate whether to set an interval on the system to automatically purge accounting information. If accounting information is not purged manually or automatically, the system disk can reach storage limits. To keep your system running at optimum speed, you need to periodically purge accounting data.

Xerox client software

Indicate whether you have Xerox client software installed, and are supporting Xerox clients on the network.

lpr and lpd

Indicate whether to enable client use of lpr and lpd job submission and status commands.

UNIX command tool

Indicate whether to have a UNIX command tool available for use in the background menu.

Retry count

Determine whether the DocuPrint NPS/IPS system supports a print production environment, or whether the system remains unattended. Once you determine the environment the DocuPrint NPS/IPS supports, you must decide the number of attempts the system makes to print a job before a sequencer restart causes the job to be held for intervention.

- If the DocuPrint NPS/IPS supports a print production environment, you may want to specify a large number or zero as the number of attempts the system makes to retry a print job. (Zero indicates an infinite number of retries.)

- If the DocuPrint NPS/IPS is unattended, you may want to specify only 1 or 2 retries to print a job.

Novell network information

The Novell network information you provide to your service representative is based on whether you configure the DocuPrint as a print server or a remote printer. Refer to this chapter and your Novell network administrator for assistance, if necessary.

DocuPrint as a print server (PSERVER)

Provide the following information to the service representative if you configure DocuPrint NPS/IPS as a print server on the Novell network (for further information, refer to the "Installation process" section in the "Installation" chapter of this guide):

- **Novell file server name:** Indicates the name of the file server that the DocuPrint NPS/IPS services. The file server must have the appropriate print server definition and the queue to be serviced.

- **Print server name:** Indicates the name used by the DocuPrint NPS/IPS print server. A print server definition with this name must exist on the file server that the DocuPrint NPS/IPS services. A single printer (type Remote Other/ Unknown) must be defined for this print server and the queue (refer to the queue name below).

- **Password for the print server:** Refers to a password you may have added in the print server definition (using PCONSOLE). It is not necessary to add a password to a print server, and there is no default password.

- **Queue name to service:** Refers to the name of the queue from which the DocuPrint print server accepts jobs. The queue must be defined on the file server that the DocuPrint NPS/IPS services. The single printer that must be defined for the print server (as stated above) must also be defined to service the specified queue.

- **Form names:** Distinct form names for DocuPrint NPS/IPS that map to the DocuPrint virtual printer names.

DocuPrint NPS/IPS as a remote printer (RPRINTER)

Provide the following information to the service representative if you configure DocuPrint NPS/IPS as a remote printer on the Novell network (for further information, refer to the "Installation process" section in the "Installation" chapter of this guide):

- **Novell print server name:** Indicates the name of the print server to which the DocuPrint NPS/IPS will connect. An advertising print server with this name must be running on the Novell internet.

- **Printer name(s) to service:** Refers to the name(s) of the printers defined for the Novell print server. Virtual printers should be defined with these names after DocuPrint NPS/IPS installation is complete. These printers should be defined as type Remote Other/Unknown.

IPX internal network number
Specify the network number for the internal IPX network in the DocuPrint server. This number must be globally unique within the NetWare internet to which the DocuPrint NPS/IPS is connected. (Do not assign a number that is used by other machines to which the DocuPrint NPS/IPS will be connected.)

LAN network number
Specify the network number for the cabling system to which the DocuPrint NPS/IPS is connected, for example the Ethernet or Token Ring segment.

Network framing type
Specify the network framing type used for IPX/SPX communication by DocuPrint NPS/IPS. There are eight options:

- ETHERNET__II
- ETHERNET__802.3
- ETHERNET__802.2
- ETHERNET__SNAP
- TOKENRING
- TOKENRING__SNAP
- FDDI
- FDDI__SNAP.

Choose a framing type used by the file server that communicates with DocuPrint NPS/IPS. If you are using print server or remote printer, and have the DocuPrint NPS/IPS communicate with a different machine for each, then choose a framing type that is used by both of the machines.

If you are installing a new Novell network using Ethernet, it is recommended that you choose the ETHERNET__II framing type for the file server and the DocuPrint NPS/IPS. If you are using Token Ring and the Novell server has both TOKENRING and TOKEN RING_SNAP enabled, use TOKENRING on the DocuPrint NPS/IPS. For FDDI networks running Novell, it is recommended that you choose the FDDI framing type.

Table 4-2. Network preinstallation checklist

Network information	Information you supply
Hostname	
IP address for primary net device	
IP netmask for primary net device	
IP address for secondary net device #1 (if applicable)	
IP netmask for secondary net device #1 (if applicable)	
IP address for secondary net device #2 (if applicable)	
IP netmask for secondary net device #2 (if applicable)	
IP address for secondary net device #3 (if applicable)	
IP netmask for secondary net device #3 (if applicable)	
Primary network device	
Default router	
Secondary network devices (if applicable)	
Superuser password	
Accounting information	
Xerox client software	
lpr and lpd	
UNIX command tool	
Retry count	

Table 4-3. Novell preinstallation checklist

Novell network information	Information you supply
Novell network information (DocuPrint NPS/IPS as a print server) 　　Novell file server name 　　Print server name 　　Password for the print server 　　Queue name to service 　　Form names	
Novell network information (DocuPrint NPS/IPS as a remote printer) 　　Novell print server name 　　Printer name(s) to service	
IPX internal network number	
LAN network number	
Ethernet framing type (ETHERNET__II, 802.3, 802.2, or SNAP; TOKENRING or TOKENRING_SNAP)	

Table 4-4. AppleTalk preinstallation checklist

AppleTalk network information	Information you supply
AppleTalk Phase 1 or 2	
AppleTalk zone name	
Network device used for the AppleTalk protocol	

Connectivity requirements

A Token Ring network or an Ethernet local area network (LAN) running Transmission Control Protocol/Internet Protocol (TCP/IP), AppleTalk, or Novell NetWare software is a network communications system, which can be used as an alternative to the channel-attached configuration in which data is transmitted via bus and tag cables and the HCU. This network communication system is used to transport documents from the client workstation to the printer.

Ethernet specifications

The Ethernet connection to the printer controller processor must be compatible with the Institute of Electrical and Electronics Engineers (IEEE) 802.3 standard.

The Ethernet interface on the printer controller processor is a 10Mb/sec twisted pair standard (10BaseT and 100BaseT). Attachment Unit Interface (AUI) Coax Ethernet is enabled with an adapter cable.

Work with your system administrator to assess what type of network you have and what modifications need to be made to supply an Ethernet connector to the printer controller processor.

Token Ring specifications

The Token Ring connection must be compatible with the IEEE 802.3 standard. The printer controller processor has a 4 MB/16 MB Token Ring interface (16 MB is preferred).

Channel-attached specifications

For an online configuration with an IBM host system, the following cables must be available:

- Bus and tag cables (bus in, bus out, tag in, tag out)
- Terminators (if necessary, due to location on channel)

For your convenience, it is possible to order the bus and tag cables for the printer through Xerox on a purchase-only basis. Contact your Xerox sales representative for current pricing and order information.

5. Controller specifications and requirements

This chapter provides power and space requirements for your DocuPrint NPS/IPS printer controller. It also provides controller environmental specifications.

For facts about printer power and space requirements, refer to the "Printer specifications and requirements" chapter of this guide.

Power requirements

Your DocuPrint NPS/IPS controller has important power requirements that must be accommodated. These requirements are summarized in the table below.

For details on printer power requirements, refer to the "Printer specifications and requirements" chapter of this guide.

Table 5-1. NPS/IPS controller

Sun Blade 1000 or Sun Ultra 60 printer controller	Voltage	Amp service	KVA rating	NEMA
60 HZ electrical requirements	100 to 240 VAC	15 amp	0.4 KVA	5-15R
50 HZ electrical requirements	100 to 240 VAC	15 amp	0.4 KVA	N/A

Agency certification: UL 478 and 1950, IEC 950, CSA 22.2 #220-1986, FCC (Class A), and VDE 0871 (Class A).

Outlet configurations

This section discusses specifications for system outlets and the required wall outlet configurations for the USA/Canada and internationally.

NOTE: All power outlets must be dedicated to this equipment. When determining the electrical connections for your printing system, make sure that:

- *Each power cord has a separate circuit*

- *The printer power cord configurations match your receptacle*

- *Your electrical outlets are within the required specifications*

50 Hz systems: *Ensure that power connections are per local codes/regulations.*

The following figure shows a 60 Hz American and Canadian wall outlet in which to plug the printer controller.
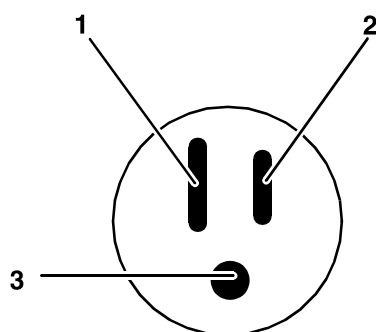
Figure 5-1. 60 Hz wall outlet

1. AC Neutral

2. AC Hot (ACH)

3. Earth Ground (GND)

The required American and Canadian wall outlet voltage is 100 to 120 VAC between AC hot and neutral, and between AC hot and GND. The voltage is less than three VAC between GND and neutral.

Refer to the 60 Hz and 50 Hz controller electrical requirements tables earlier in this chapter for a description of the power specifications for the controller.

WARNING

To reduce the risk of electrical shock, do not plug components into any other type of power system. Contract your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your work area.

Environmental specifications

The environmental requirements for the DocuPrint NPS/IPS controller are all satisfied by the printer module. Refer to the "Printer specifications and requirements" chapter of this guide.

Table 5-2. Heat dissipation specifications for the DocuPrint NPS/IPS controller

Heat dissipation	
Processor/ monitor	1,100 BTU per hour
HCU	408 BTU per hour

Space requirements

This section provides recommendations for placement of printer controller hardware components.

For printer component space requirements, refer to the "Printer specifications and requirements" chapter of this guide. Contact your service representative if you have questions not specifically addressed in this guide.

Printer controller placement

You should consider the following factors when deciding where to place the DocuPrint printer controller:

- Adequate work space and service clearance around the equipment
- Proximity to electrical and network connectors
- Security of the work area. You may need to place the system in an area where you can restrict access to it.

You must supply a table or desk as a work surface for the printer controller, and the HCU if this is part of the system configuration. The top of the table must provide at least 36 by 36 inches / 91 by 91 cm of space for each component, to allow enough space for the components and cables, as well as for service access.

Refer to the "Printer controller specifications and requirements" summary table at the end of this chapter to make sure the tables you supply can support the weight of the printer controller hardware elements, and that they are suitable for the intended use.

WARNING

The printer controller must be positioned within the line-of-sight of the printer for safety purposes while servicing the equipment.

CAUTION

Position the table at least 6 inches / 15.2 cm from the wall. Make sure the printer controller processor is at least 12 inches / 30.4 cm from the wall. Do not put the processor on the NPS/IPS printer.

Sun Blade 1000 workstation placement

Following are guidelines for placement of the Sun Blade 1000 workstation components of the printer controller.

Do:

- Place the monitor and processor on a desk or table top, separate from the printer.

- Keep the processor in an upright, vertical position.

- Allow at least 6 inches / 152 mm of unobstructed space at the front and rear of the processor, so the fan and vents are not blocked.

The following illustration shows the fans and vent locations on the front and back of the controller.
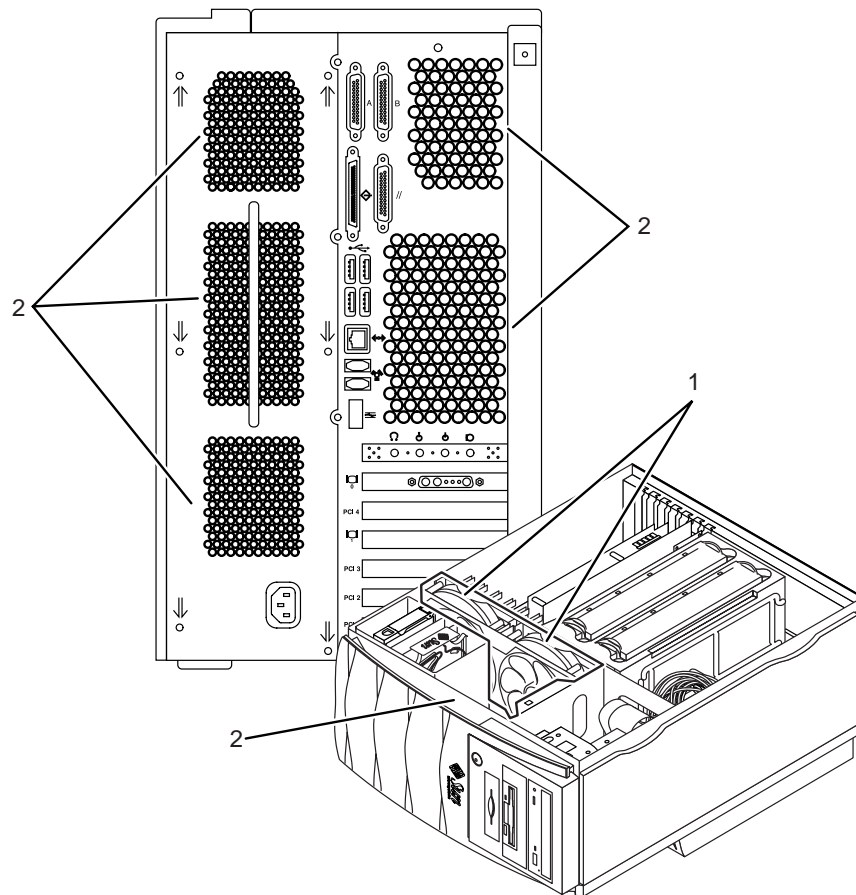
Figure 5-2. Sun Blade 1000 fan and vent locations to keep clear

1. Vents inside the processor

2. Vents in front and back of processor

Do not:

- Do not place the controller monitor on top of the processor.

- Do not allow any piece of equipment to blow warm air into the air intake vents of the processor.

- Do not place the processor on its side, or in any other position but the upright, vertical position.

- Do not place the processor or monitor on top of the printer.

Sun Ultra 60 workstation placement

Following are guidelines for placement of the Sun Ultra 60 workstation components of the printer controller.
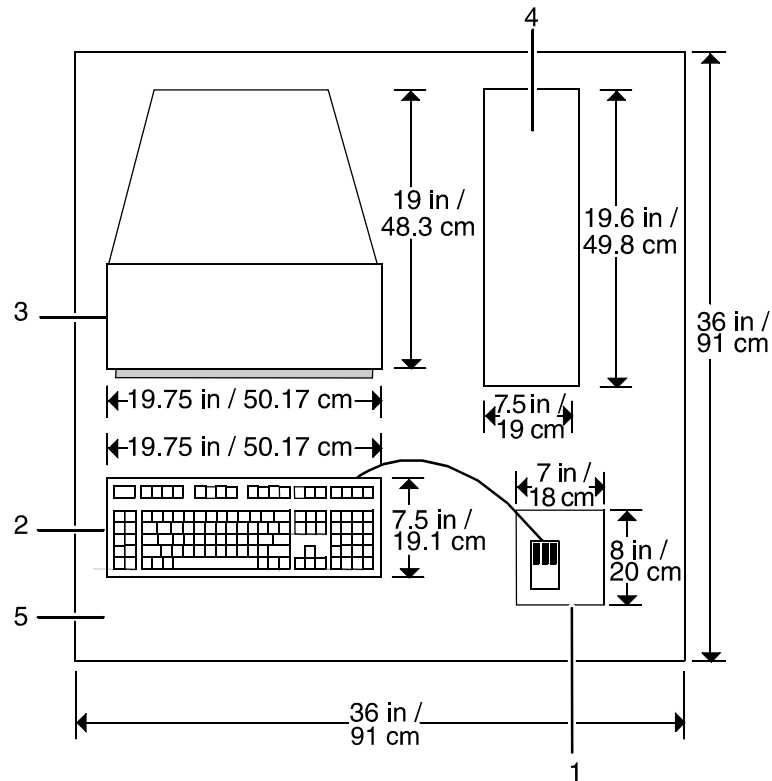
Figure 5-3. Sun Ultra 60 printer controller hardware

1. Mouse and mouse pad

2. Keyboard

3. Monitor

4. Processor

5. Table

To ensure consistent performance and avoid any damage to equipment, follow these rules for placing the components of the Sun Ultra 60 controller.

Do:

- Place the monitor and processor on a desk or table top, separate from the printer. The monitor should be placed beside the processor, on the same surface. (The cartridge tape drive may be placed on top of the processor.)

- Keep the processor in an upright, vertical position as illustrated below.

- Allow at least 6 inches / 152 mm of unobstructed space at the front and rear of the processor, so the fan and vents are not blocked.

The following illustration shows fan and vent locations on the front and back of the controller.
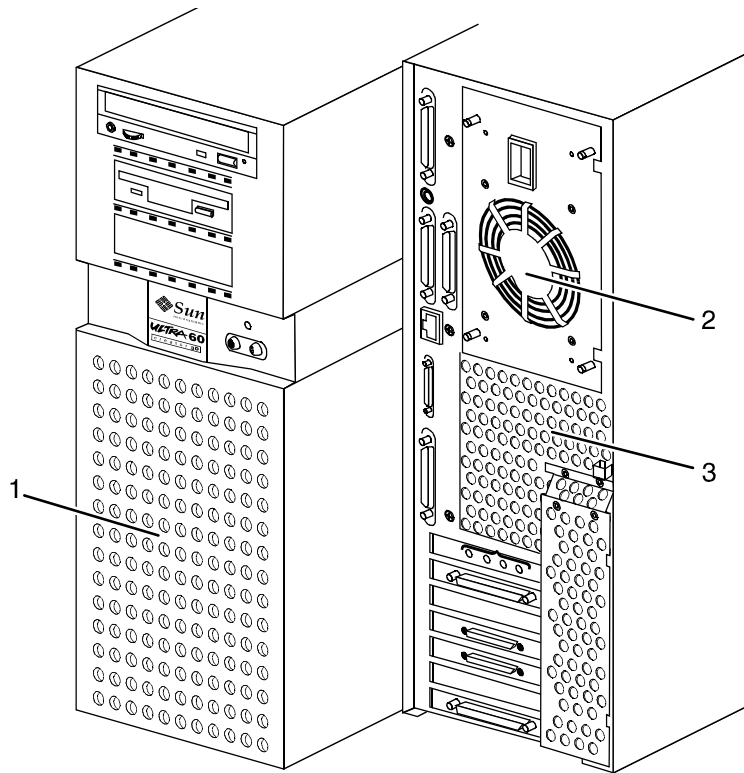
Figure 5-4. Sun Ultra 60 fan and vent locations to keep clear

1. Vent in front of processor

2. Fan in back of processor

3. Vent in back of processor

Do not:

- Do not place the controller monitor on top of the processor.

- Do not allow any piece of equipment to blow warm air into the air intake vents of the processor.

- Do not place the processor on its side, or in any other position but the upright, vertical position shown in the previous figure.

- Do not place the processor or monitor on top of the printer.

HCU placement (channel-attached systems only)   The following shows the recommended HCU hardware placement, for channel-attached systems that do not use the Groupe Set board.
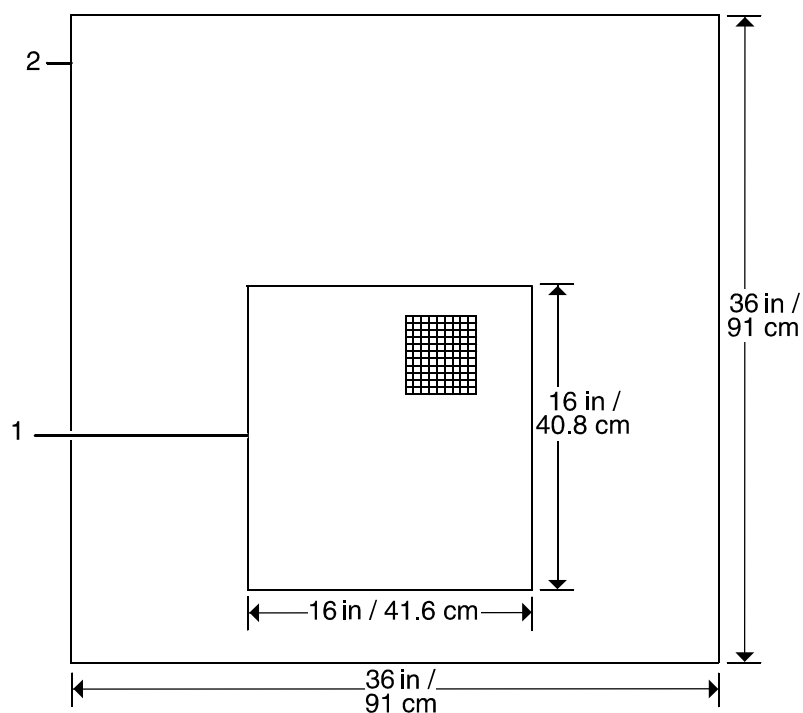
Figure 5-5. HCU hardware (for channel-attached systems)

1. HCU

2. Table

Controller hardware specifications and requirements summary

The following table summarizes the specifications and electrical requirements of your DocuPrint NPS/IPS printer controller hardware components.

For a summary of printer hardware specifications and requirements, refer to the "Printer specifications and requirements" chapter of this guide. Contact your service representative if you have questions not specifically addressed in this guide.

Table 5-3. **DocuPrint NPS/IPS printer controller specifications and power requirements: Sun Blade 1000**

Device	Dimensions (depth, width, height)	Weight	Heat dissipation	Power requirements	Cable lengths
Processor	d=25 in. / 63.5 cm w=10 in. / 25.4 cm h=17.75 in. / 45.1 cm	70 lbs. / 31.8 kgs	1,100 BTU per hour	**60 Hz:** 100 to 240 VAC, 15 amp, 0.4 KVA, 5-15 NEMA **50 Hz:** 100 to 240 VAC, 15 amp, 0.4 KVA	Power: 8 ft. / 2.4 m Interface to printer: 20 ft. / 6.1 m usable length
Monitor	d=10 in. / 25.4 cm w=17.5 in. / 44.5 cm h=18.5 in. / 47 cm	18 lbs. / 8.2 kg	408 BTU per hour	100-120 ~ VAC, 1 phase, 50-60 Hz, 3.0 amp, 0.4 KVA 200-240 ~ VAC, 1 phase, 50-60 Hz, 2.0 amp, 0.4 KVA	Video cable to processor: 46 in. / 1.17 m
4 mm cartridge tape drive	d=12.25 in. / 31 cm w=7.5 in. / 19 cm h=2.75 in. / 7 cm	8 lbs. / 6.6 kg	---	100-120/200-240 VAC, 0.8/0.4 amp, 47-63 Hz	SCSI cable to processor or additional SCSI device: 28 in. / 71 cm
Keyboard	d=7.5 in. / 19.1 cm w=20 in. / 50.8 cm	2 lbs. / 1kg	---	---	72 in. / 1.8 m
Mouse	d=3 in. / 8 cm w=4 in. / 10 cm h=2 in. / 5 cm	0.3 lbs. / 0.14 kg	---	---	25 in. / 63 cm
Channel interface board and channel cable connector box (channel attached systems only)	d=9.7 in. / 24.6 cm w=27.1 in. / 68.8 cm	---	---	100 to 240 VAC, 15 amp, 0.4 KVA	Bus and tag cables must conform to host system requirements (200 gray cable to 400 ft. blue cable / 66.7 to 133.3 m) and accommodate system setup. Cable from board to box: 3 ft / 91.5 cm

Table 5-4. **DocuPrint NPS/IPS printer controller specifications and power requirements: Sun Ultra 60**

Device	Dimensions (depth, width, height)	Weight	Heat dissipation	Power requirements	Cable lengths
Processor	d=17.5 in. / 44.5 cm w=17.5 in. / 44.5 cm h= 5 in. / 12.7 cm	27 lbs. / 12.7 kgs	1,100 BTU per hours	**60 Hz:** 100 to 240 VAC, 15 amp, 0.4 KVA, 5-15 NEMA **50 Hz:** 100 to 240 VAC, 15 amp, 0.4 KVA	Power: 8 ft. / 2.4 m Interface to printer: 20 ft. / 6.1 m usable length
Monitor	d=21 in. / 53.3 cm w=19 in. / 48.3 cm h=21 in. / 53.3 cm	61 lbs. / 27.7 kg	408 BTU per hour	100-120 ~ VAC, 1 phase, 50-60 Hz, 3.0 amp, 0.4 KVA 200-240 ~ VAC, 1 phase, 50-60 Hz, 2.0 amp, 0.4 KVA	Video cable to processor: 46 in. / 1.17 m
4 mm cartridge tape drive	d=12.25 in. / 31 cm w=7.5 in. / 19 cm h=2.75 in. / 7 cm	8 lbs. / 6.6 kg	---	100-120/200-240 VAC, 0.8/0.4 amp, 47-63 Hz	SCSI cable to processor or additional SCSI device: 28 in. / 71 cm
Keyboard	d=7.5 in. / 19.1 cm w=20 in. / 50.8 cm	2 lbs. / 1kg	---	---	72 in. / 1.8 m
Mouse	d=3 in. / 8 cm w=4 in. / 10 cm h=2 in. / 5 cm	0.3 lbs. / 0.14 kg	---	---	25 in. / 63 cm
Host Channel Unit (HCU) (channel-attached systems only)	d=15 in. / 40.8 cm w= 16 in. / 41.6 cm h=5 in. / 12.6 cm	26 lbs. 10 oz. / 12.4 kgs	---	120 VAC within 6 feet; 120 volt at 2 amps or 240 volt at 1 amp	Bus and tag cables must conform to host system requirements (200 gray cable to 400 ft. blue cable / 66.7 to 133.3 m) and accommodate system setup.
Channel interface board and channel cable connector box (channel attached systems only)	d=9.7 in. / 24.6 cm w= 27.1 in. / 68.8 cm	---	---	100 to 240 VAC, 15 amp, 0.4 KVA	Cable from board to box: 3 ft / 91.5 cm

6. Printer specifications and requirements

This chapter provides power and space requirements for your 4850/4890/92C printer. It also provides printer environmental specifications.

For facts about controller power and space requirements, refer to the "Controller specifications and requirements" chapter of this guide.

Power requirements

Your DocuPrint system has important power requirements that must be accommodated. These requirements are summarized in the table below. For further details on power requirements, refer to the voltage charts and wiring diagrams that follow.

For details on controller power requirements, refer to the "Controller specifications and requirements" chapter of this guide.

Table 6-1. **4850 printer 60 Hz electrical requirements**

Voltage	Amp. service	KVA rating	NEMA
120/208 or 120/240 VAC	30 amp	Operating: 4.1 Standby: 2.7	14-30R

Table 6-2. **4850 printer 50 Hz DELTA electrical requirements**

Voltage	Amp. service	KVA rating
220, 230, 240 VAC (3 phase, 4 wire or single-phase)	30 amp	Operating: 3.8 Standby: 2.5

Table 6-3. **4890/92C printer 60 Hz electrical requirements**

Voltage	Amp. service	KVA rating	NEMA
120/208 or 120/240 VAC	30 amp	Operating: 5.5	14-30R

Table 6-4. **4890/92C printer 50 Hz DELTA electrical requirements**

Voltage	Amp. service	KVA rating
220, 230, 240 VAC	30 amp	Operating: 5.5

Agency certification: UL 478 and 1950, IEC 950, CSA 22.2 #220-1986, FCC (Class A), and VDE 0871 (Class A).

Outlet configurations

This section discusses specifications for the DocuPrint system outlets and the required wall outlet configurations for the USA / Canada and internationally.

NOTE: All power outlets must be dedicated to this equipment. When determining the electrical connections for your system, make sure that:

- *Each power cord has a separate circuit*

- *The printer power cord configurations match your receptacle*

- *Your electrical outlets are within the required specifications.*

50 Hz systems: Ensure that power connections are per local codes/regulations.

Printer outlet voltages—60 Hz

The following table shows the voltages for the outlets on your printing system. All power outlets must have a dedicated circuit for each system equipment piece.

Table 6-5. **60 Hz voltage requirements at power outlet**

Measurement of wiring	Nominal	Range
Line 1 to neutral	120 V	105 to 127 V
Line 2 to neutral	120 V	105 to 127 V
Neutral to ground	0 V	0 to 10 V
Line 1 to line 2	208 V	181 to 220 V
Line 1 to ground	120 V	105 to 127 V
Line 2 to ground	120V	105 to 127 V

Printer power cord configurations

The following figure shows the 60 Hz power cord configuration for
30 amp NEMA 14-30R. Voltage to ground is shown for troubleshooting purposes.
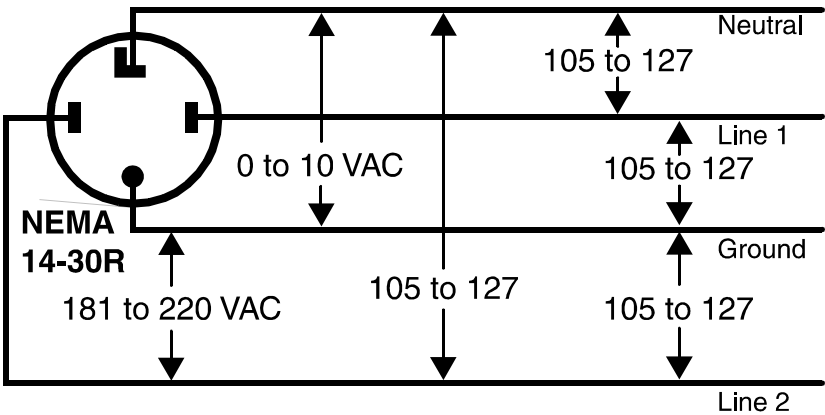
Figure 6-1. 60 Hz power configuration

Printer outlet voltages—50 Hz

All power outlets must have a dedicated circuit for each system equipment piece. Make sure each power cord has a separate circuit.

50 Hz systems: Ensure that power connections are per local codes/regulations.

Single phase DELTA configurations

For 50 Hz DELTA configurations, measure the DELTA connection voltages at the power source.

Table 6-6. **50 Hz single phase DELTA outlet voltage requirements**

Wiring	Nominal	Range
Line to neutral	220 VAC 230 VAC 240 VAC	198-242 VAC 207-253 VAC 216-264 VAC
Neutral to ground	0 VAC	<10 VAC

Three-phase DELTA configurations
The current carrying conductors available for 50 Hz, three-phase, DELTA are:

- Three-phase
- Safety ground.

Table 6-7. **50 Hz three-phase DELTA outlet voltage requirements**

Nominal	Phase to phase
220 VAC	198-242 VAC
230 VAC	207-253 VAC
240 VAC	216-264 VAC

NOTE: If one of the phases is connected to ground in the service system, it should be connected to the neutral terminal of the printer. In this case, the line is not a true neutral, and voltage between all current carrying conductors is equal and mutually 120 degrees out of phase.

Environmental specifications

When you select a site location for your DocuPrint printer, avoid environments with extreme variations in temperature and other hazards, such as excessive dust or humidity. Recommended environmental ranges for the work area are as follows:

Table 6-8. **Environmental specifications for 4850/4890/92C**

Condition	Range	
Temperature:	Recommended:	72° F ± 4° F 22° C ± 2° C
	Minimum: Maximum:	60° F / 15.5 °C 80° F / 26.7° C
Humidity:	Recommended:	45% ±10%
	Minimum: Maximum:	30% 65%
Altitude:	Normal:	Up to 6,000 feet / 1,830 m above sea level
	Maximum:	9,000 feet / 2,743 m above sea level.
4850 printer–60 Hz heat dissipation	Operating:	11,200 BTU/hour
	Standby:	7,400 BTU/hour
4850 printer–50 Hz DELTA heat dissipation:	Operating:	11,200 BTU/hour
	Standby:	7,400 BTU/hour

Table 6-8. **Environmental specifications for 4850/4890/92C**

Condition	Range	
4890/92C Printer–60 Hz heat dissipation:	Operating:	14,980 BTU/hour
	Standby:	9,100 BTU/hour
4890/92C Printer –50 Hz DELTA heat dissipation:	Operating:	14,980 BTU/hour
	Standby:	9,100 BTU/hour

Space requirements

You should consider the following factors when deciding where to place the printer hardware components:

- Adequate work space and service clearance around the equipment

- Proximity to electrical and network connectors

- Security of the work area. You may need to place the system in an area where you can restrict access to it. This may be important if your personnel need to print confidential documents or if you are concerned with unauthorized usage.

Dimensions and weights of the printer components are listed in this section, along with diagrams, to help you visualize the sizes and total space requirements.

WARNING

The printer controller must be positioned within the line-of-sight of the printer for safety purposes while servicing the equipment.

NOTE: There must be a 78-inch / 198-cm vertical clearance throughout the entire area. In addition, your printer must be installed in a fixed location with a minimum clearance space of 36 inches / 91.4 cm around all sides of each piece of equipment for access by service personnel.

For information on clearance space and other space planning considerations, refer to the "Space planning guidelines" section of this chapter. Contact your service representative if you have questions not specifically addressed in this guide.

Printer placement

The following configurations are available for your Xerox DocuPrint 4850/4890/92C printer:

- Standard (two-tray) feeder with dual stacker
- Standard (two-tray) feeder with stitcher/stacker
- High-capacity feeder (HCF) with dual stacker
- HCF with stitcher/stacker.

NOTE: Additional space (6-inch by 64-inch / 15 cm by 163 cm) is required in front of the printer for CCU changeout cart operability.

Printer with standard (two-tray) feeder and dual stacker

The dimensions of the printer with a standard (two-tray) feeder and a dual stacker are as follows:

Dimension	Specifications
Width:	91.8 inches / 233 cm
Depth:	35.7 inches / 91 cm
Height:	41 inches / 104 cm
Total weight:	1,454 pounds / 661 kg
Total space requirement:	164 by 106.5 inches / 417 by 271 cm

The following diagram illustrates a top view of the space requirements for the printer with a standard (two-tray) feeder and dual stacker configuration.
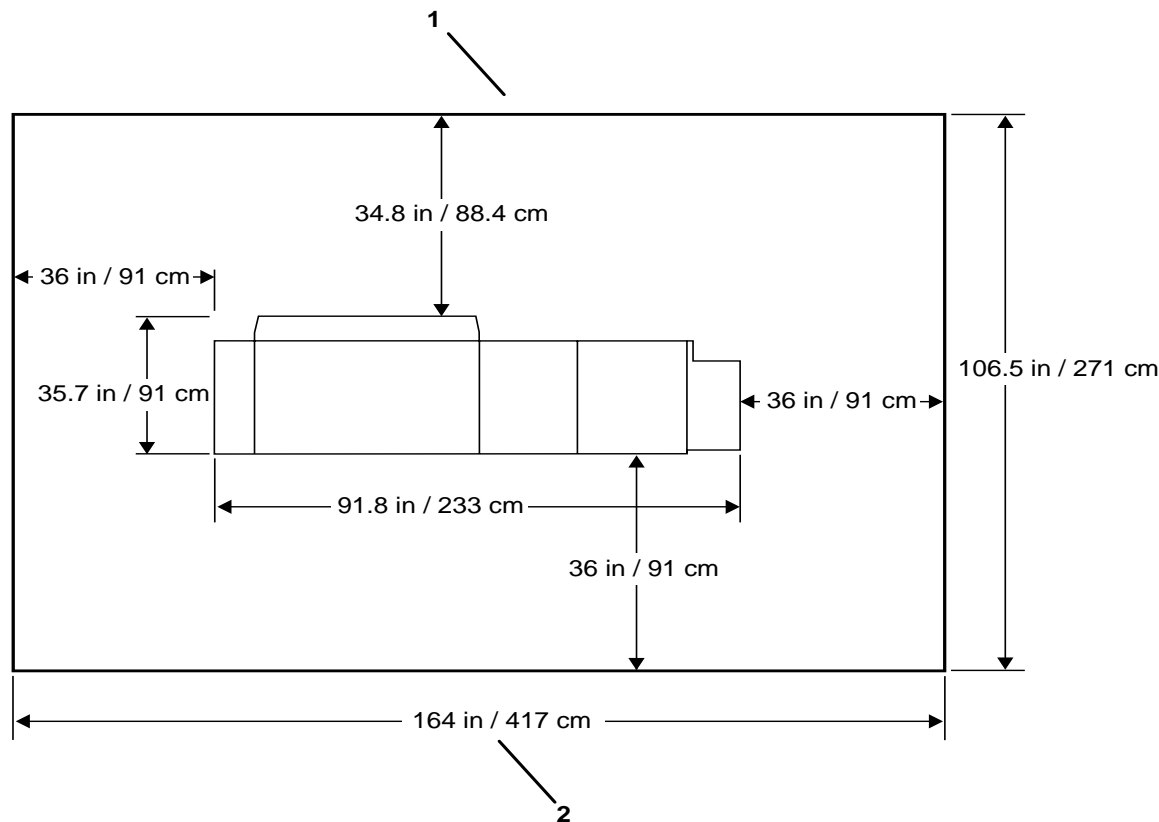
Figure 6-2. Printer with dual stacker

1. Back of system

2. Front of system

Printer with standard (two-tray) feeder and stitcher/stacker

The dimensions of the printer with a standard (two-tray) feeder and a stitcher/stacker are as follows:

Dimension	Specifications
Width:	89.5 inches / 227 cm
Depth:	35.7 inches / 91 cm
Height:	41 inches / 104 cm
Total weight:	1,473 pounds / 670 kg
Total space requirement:	162 inches by 106.5 inches / 411 cm by 271 cm

The following diagram illustrates a top view of the space requirements for the printer with a standard (two-tray) feeder and stitcher/stacker configuration.
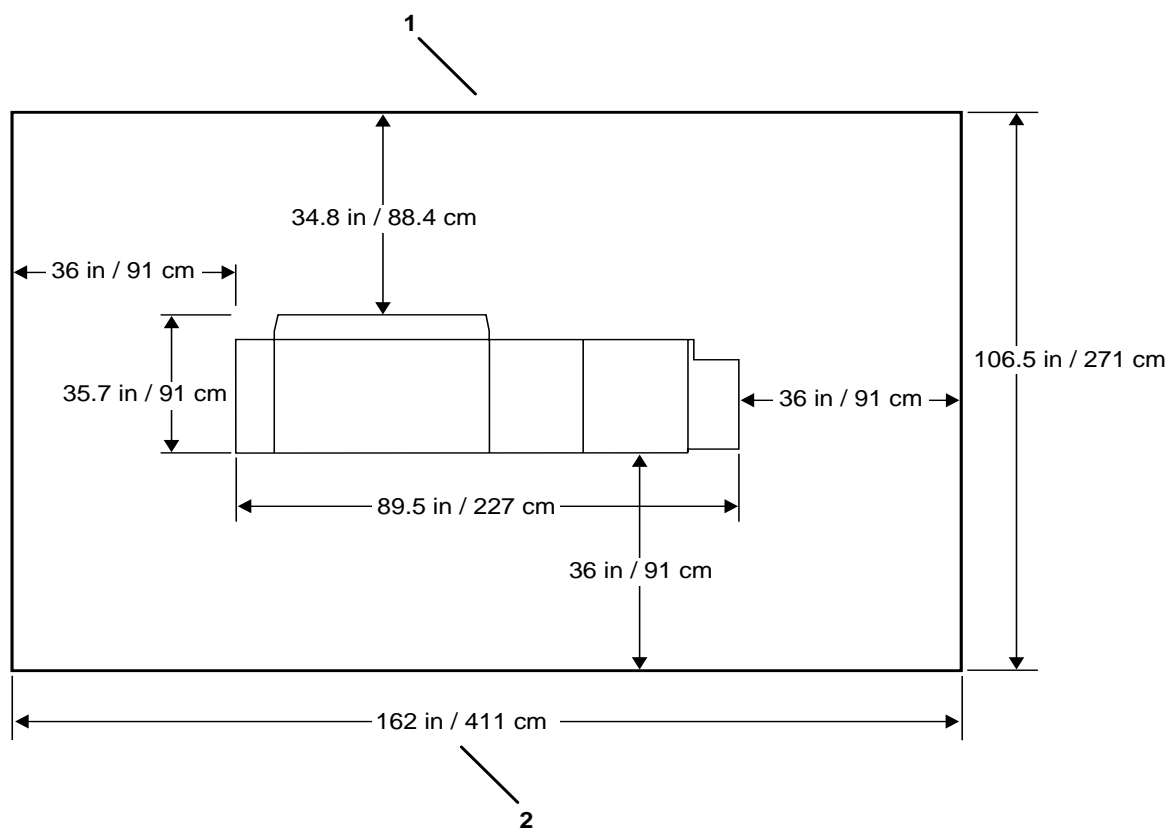
Figure 6-3. Printer with stitcher/stacker

1. Back of system

2. Front of system

Printer with high-capacity feeder and dual stacker

The dimensions of the printer with a high-capacity feeder and a dual stacker are as follows:

Dimension	Specifications
Width:	114.1 inches / 290 cm
Depth:	35.7 inches / 91 cm
Height:	41 inches / 104 cm
Total weight:	1,742 pounds / 792 kg
Total space requirement:	186 inches by 106.5 inches / 473 cm by 271 cm

The following diagram illustrates a top view of the space requirements for the printer with a high-capacity feeder and dual stacker configuration. The high-capacity feeder provides the printer with additional paper handling capabilities.
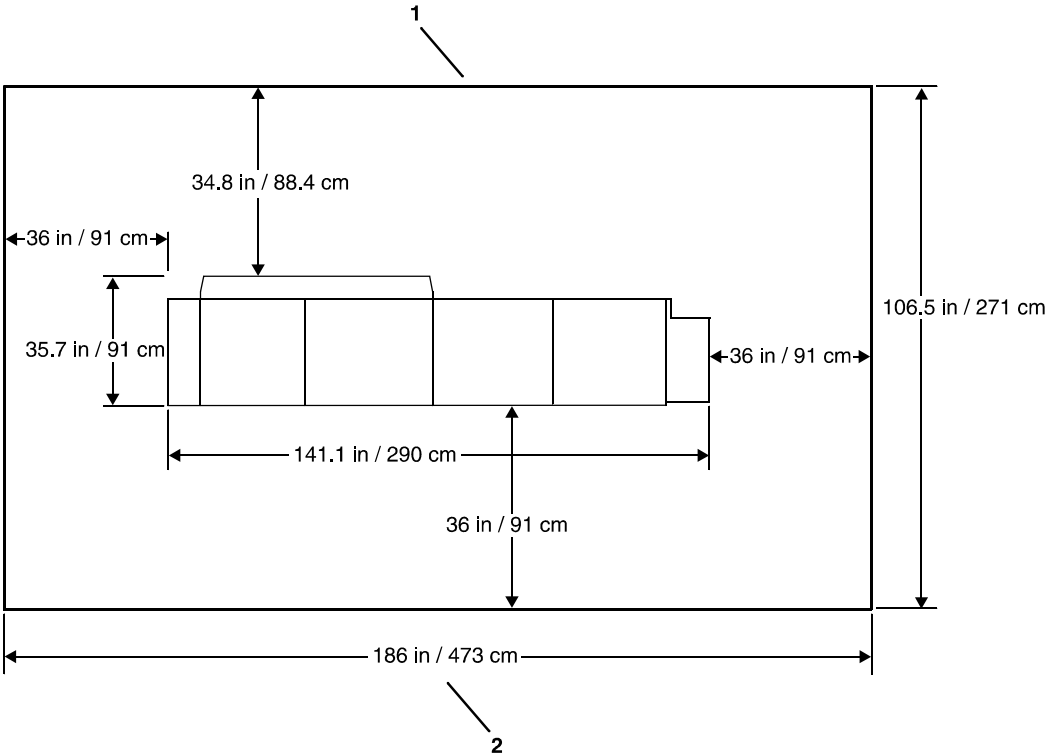
Figure 6-4. Printer with high-capacity feeder and dual stacker

1. Back of system

2. Front of system

Printer with high-capacity feeder and stitcher/stacker

The dimensions of the printer with a high-capacity feeder and a stitcher/stacker are as follows:

Dimension	Specifications
Width:	112 inches / 285 cm
Depth:	35.7 inches / 91 cm
Height:	41 inches / 104 cm
Total weight:	1,761 pounds / 801 kg
Total space requirement:	184 inches by 106.5 inches / 467 cm by 271 cm

The following diagram illustrates a top view of the space requirements for the printer with a high-capacity feeder and stitcher/stacker configuration.
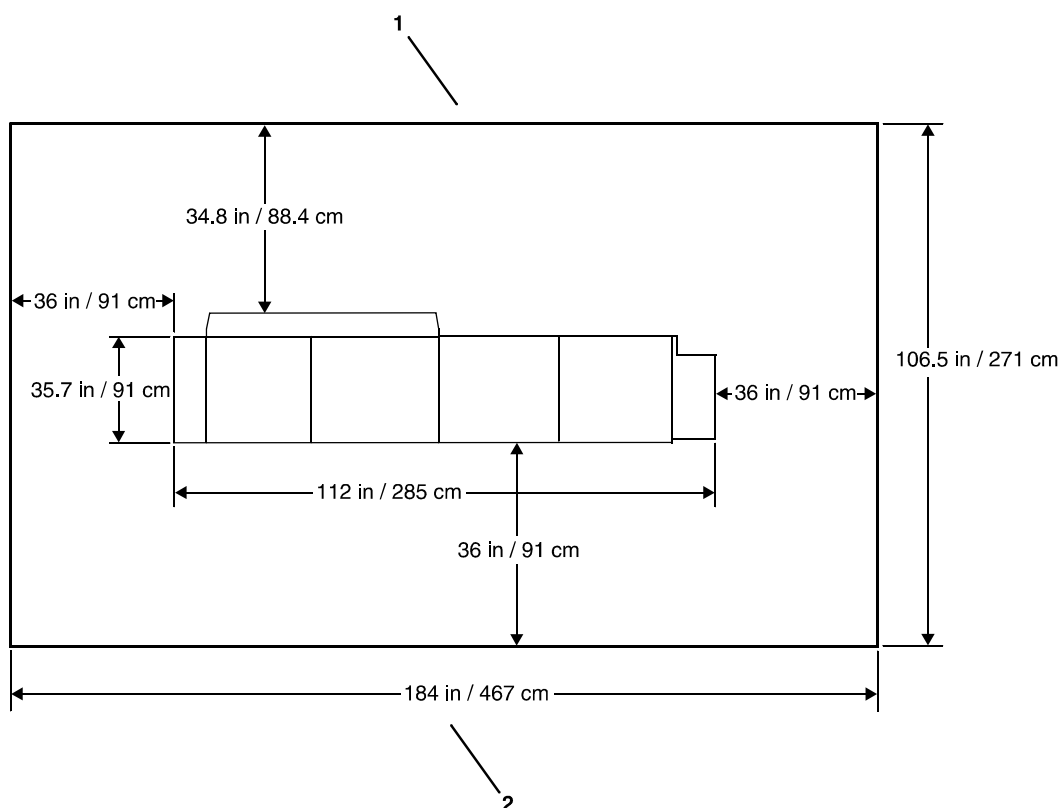
Figure 6-5. Printer with high-capacity feeder and stitcher/stacker

1. Back of system

2. Front of system

CCU changeout cart

The changeout cart is required for installing and removing the CCU, which contains the colored dry ink. A cart must also be used to store any CCUs that are not currently installed in the printer. Therefore, if you intend to print using more than one dry ink color, you should have one cart for each CCU.

NOTE: If there is more than one printer at your site, it may not be necessary to have one cart per CCU. Consult with your site representative for more information.

Empty carts may be stored anywhere in your site that is convenient and provides easy access when the carts are required for a changeout. Carts with a CCU loaded (a CCU being stored on the cart) should be stored in a controlled environment, preferably in the same controlled environment as the printer. This reduces the amount of time required for the printer to set up the color developer housing (inside the CCU) once it is installed and therefore reduces the amount of total time required for a change of dry ink color.

You should plan for the space necessary to store the carts. For example, the space in the controlled environment for loaded carts and other space for empty carts.

The dimensions of the cart are as follows:

Dimension	Specifications
Width:	16.1 inches / 409 mm
Depth:	29.1 inches / 739 mm
Height:	36.9 inches / 937 mm
Weight:	130 pounds / 59 kg (with CCU loaded).

NOTE: Additional space (6-inch by 64-inch / 15 cm by 163 cm) is required in front of the printer for CCU changeout cart operability.

Space planning guidelines

When determining your space requirements and planning for shared space between your DocuPrint printers, it is important to consider all of the components you plan to install.

To ensure all of the space requirements are met, it is important to work with your Xerox representative.

Before installation, you must consider the following:

- Clearance space requirements where you intend to install the printing system

- Delivery access requirements

- Recommended cable lengths and locations (refer to the "System connections" chapter of this guide for more information)

- Floor leveling.

Clearance space requirements

The printer must be installed in a fixed location that provides the following clearance space:

- 36 inches / 91.4 cm on all sides of each component

- 78 inches / 198 cm of vertical clearance throughout the entire area

- 24 inches / 61 cm of exclusive operator area in front of each component.

Shared space

It is best to provide the full amount of clearance space around the hardware components. Your environment may require you to use shared space between components, such as between the printer and another Xerox printing system. You can share the 36-inch / 91.4 cm clearance space around each component, as long as you follow these rules:

- Space may be shared only with other Xerox equipment.

- Components may share the 36-inch / 91.4 cm general service clearance areas, but they may not share the 24-inch / 61 cm operator area in front of each component.

- There must be 78 inches / 198 cm of vertical clearance throughout the entire area.

NOTE: Finishers attached to your bypass transport may occupy shared space with Xerox equipment. However, they must be removable to allow servicing of the DocuPrint NPS printer stackers. Consult with your Xerox representatives to ensure all the requirements are met.

The following figures illustrate three possible configurations of shared space.

Back-to-back shared space The figure below illustrates the two printers placed in a back-to-back position. This allows them to share the entire 36 inches / 91.4 cm of general service space.
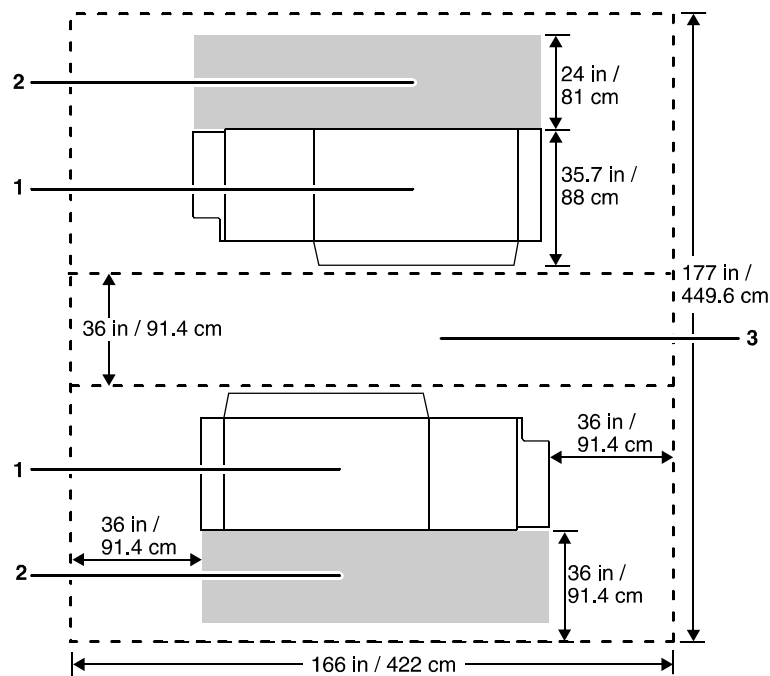
Figure 6-6. Back-to-back shared service area space

1. Printer
2. Operator area
3. General service area

Face-to-face shared space

The following figure shows the two printers facing each other. The printers share 12 inches / 30.5 cm of the general service space, but not the exclusive operator area in front of each printer. Therefore, the printers should be separated by 24 inches / 61 cm, plus 24 inches/ 61 cm, plus 12 inches / 30.5 cm. This allows for the entire operator space for each printer, plus the shared general service area of 12 inches / 30.5 cm.
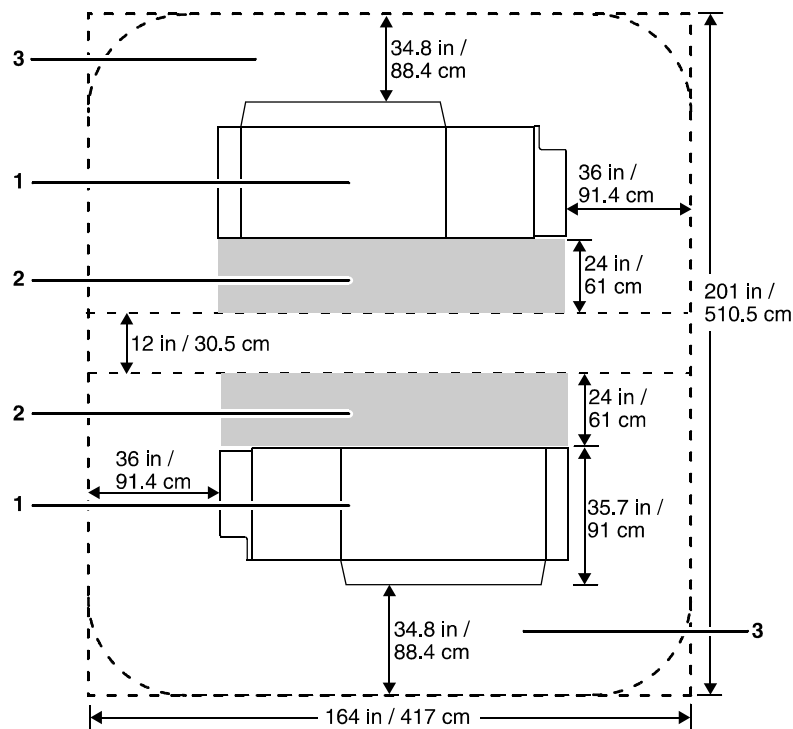
Figure 6-7. Face-to-face shared service area space

1. Printer

2. Operator area

3. General service area

Face-to-back shared space

The following figure shows the two printers arranged with one facing the back of the other. Between them is 60 inches / 152.4 cm of space. This allows for 24 inches / 61 cm of operator space in front of the printer facing toward the other, plus 36 inches / 91.4 cm of service space behind the printer facing away from the other.
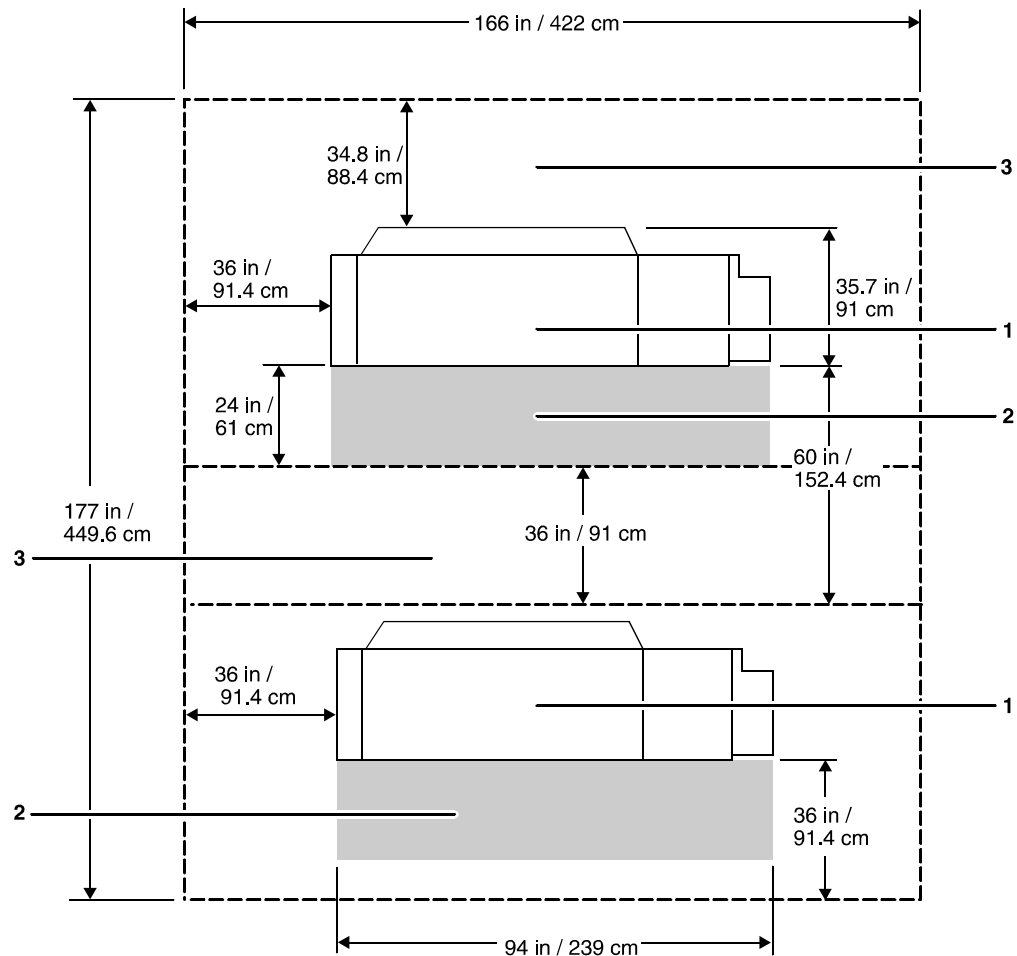
Figure 6-8. Face-to-back shared service area space

1. Printer
2. Operator area
3. General service area

Floor leveling

For proper operation, the printer must be perfectly level. On floors less than two degrees out of level, installation personnel use a leveling kit to level the machine.

NOTE: The printer will not function properly on floors more than two degrees out of level.

If the floor is more than two degrees out of level, find another location for the printer.

For your reference, two degrees represents a height discrepancy of approximately 3.8 inches / 9.6 cm measured at the casters with the printer tilting from left to right, or approximately 0.7 inches / 1.8 cm with the printer tilting from back to front.

If you move the printer after its initial installation, it is your responsibility to make sure that the printer can be leveled properly. If you do not have the leveling kit (the printer in its initial location did not require it), and you need one to level the printer in a new location, contact your Xerox site representative to obtain one.

Delivery access requirements

It is easy to overlook the path required to move the equipment from the truck to the operation site. To determine access, ask the following questions:

- Does the equipment need to go up or down a stairwell? How wide is the stairwell?

- Do you have an elevator, if the equipment is to be located above the first floor?

- Is the elevator large enough for the equipment?

- How wide are the hallways and doorways?

- Do you have a loading dock or a specific door to which the equipment should be delivered?

You need to review these issues before or during the site inspection conducted by your service representative.

The equipment dimensions are specified earlier in this chapter, so it is easy to determine whether your hallways and doorways are wide enough to permit access.

Turning radius You must also consider the width of the passageway when the equipment must negotiate a corner, whether into a room, an elevator, or another passageway.

There are L-shaped turns and T-shaped turns. The diagrams and the tables that follow show the minimum space required to maneuver through the turns.
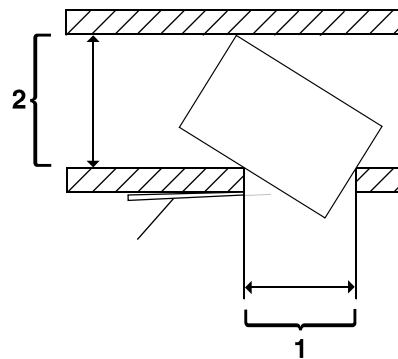
Figure 6-9. T-shaped turn

1. Passage A
2. Passage B
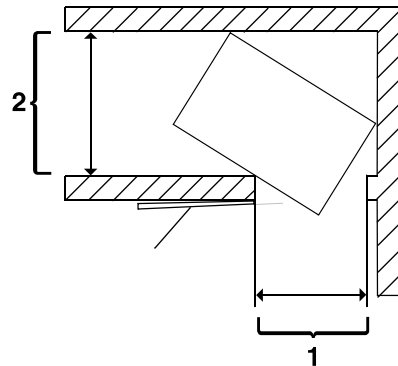
Figure 6-10. L-shaped turn

1. Passage A
2. Passage B

Using the turning radius table

To use the following table:

- Measure the minimum width of the passage or doorway you need to use. This is Passage A.

- Find that number (or the next higher number) in the turning radius table and read across to the corresponding minimum value for Passage B, depending on the type of turn the equipment must negotiate.

The following table contains turning requirements for the printer.

Table 6-9. **Turning radius for the printer**

If passage or doorway A is:	Passage B for an L-turn must be:	Passage B for a T-turn must be:
29 inches / 73.7 cm	68.6 inches / 174.2 cm	67.6 inches / 171.7 cm
30 inches / 76.2 cm	66.2 inches / 168.1 cm	65.7 inches / 166.9 cm
31 inches / 78.7 cm	64.2 inches / 163.1 cm	63.9 inches / 162.3 cm
32 inches / 81.3 cm	62.3 inches / 158.2 cm	62.2 inches / 158 cm
33 inches / 83.8 cm	60.7 inches / 154.2 cm	60.6 inches / 153.9 cm
34 inches / 86.4 cm	59.1 inches / 1501 cm	59.1 inches / 150 cm
35 inches / 88.9 cm	57.7 inches / 146.6 cm	57.7 inches / 146.6 cm
36 inches / 91.4 cm	56.3 inches / 143 cm	56.3 inches / 143 cm
37 inches / 94 cm	55.2 inches / 140.2 cm	55.2 inches / 140.2 cm
38 inches / 96.5 cm	54.0 inches / 137.2 cm	54.0 inches / 137.2 cm
39 inches / 99.1 cm	52.9 inches / 134.4 cm	52.9 inches /134.4 cm
40 inches / 101.6 cm	51.8 inches / 131.6 cm	51.8 inches / 131.6 cm
41 inches / 104.1 cm	50.5 inches / 128.3 cm	50.5 inches / 128.3 cm
42 inches / 106.7 cm	49.8 inches / 126.5 cm	49.8 inches / 126.5 cm

Printer hardware specifications and requirements summary

The following table summarizes the specifications and electrical requirements of your printer hardware components.

For a summary of controller specifications and requirements, refer to the "Controller specifications and requirements" chapter of this guide. Contact your service representative if you have questions not specifically addressed in this guide.

Table 6-10. Printer specifications and power requirements

Device	Dimensions (depth, width, height)	Total Weight	Heat dissipation	Power requirements
4850/4890/92C printer with standard (two-tray) feeder and dual stacker	d=35.7 in. / 91 cm w=91.8 in. / 233 cm h=41 in. / 104 cm Total space required: 164 by 106.5 in. / 417 by 271 cm	1,454 lbs. / 661 kg	**4850 (60 Hz) and 4850 (50 Hz DELTA)**: Operating: 11,200 BTU per hour Standby: 7,400 BTU per hour	**4850 (60 Hz)**: 120/208 VAC or 120/240 VAC 30 amp **Operating:** 4.1 KVA max. **Standby:** 2.7 KVA max. NEMA 14-30R **4850 (50 Hz DELTA)**: 200, 230, 240 VAC (3-phase, 4 wire, or single-phase) 30 amp **Operating**: 3.8 KVA max. **Standby**: 2.5 KVA max.
			4890/92C (60 Hz) and 4890/92C (50 Hz DELTA): Operating: 14,980 BTU per hour Standby: 9,100 BTU per hour	**4890/92C (60 Hz) and 4890/92C (50 Hz DELTA)**: Operating: 5.5 KVA max.

Table 6-10. Printer specifications and power requirements (Continued)

Device	Dimensions (depth, width, height)	Total Weight	Heat dissipation	Power requirements
4850/4890/92C printer with standard (two-tray) feeder and stitcher/stacker	d=35.7 in. / 91 cm w=89.5 in. / 227 cm h=41 in. / 104 cm Total space required: 162 by 106.5 in. / 411 by 271 cm	1,473 lbs. / 670 kg	Same as standard (two-tray) feeder and dual stacker configuration, above.	Same as standard (two-tray) feeder and dual stacker configuration, above.
4850/4890/92C p**rinter with high-capacity feeder and dual stacker**	d=35.7 in. / 91 cm w=114.1 in. / 290 cm h=41 in. / 104 cm Total space required: 186 by 106.5 in. / 473 by 271 cm	1,742 lbs. / 792 kg	Same as standard (two-tray) feeder and dual stacker configuration, above.	Same as standard (two-tray) feeder and dual stacker configuration, above.
Printer with high-capacity feeder and stitcher/stacker	d=35.7 in. / 91 cm w=112 in. / 285 cm h=41 in. / 104 cm Total space required: 184 by 106.5 in. / 467 by 271 cm	1,761 lbs. / 801 kg	Same as standard (two-tray) feeder and dual stacker configuration, above.	Same as standard (two-tray) feeder and dual stacker configuration, above.
CCU (height measured at handle)	d=30 in. / 76 cm w=16 in. / 41 cm h=37 in. / 94 cm	130 lbs. / 59 kg	N/A	N/A
Bypass transport (4890/92C only)	d=20 in. / 51 cm w=31in. / 79 cm h=13.25 in. / 34 cm	35 lbs. / 16 kg	N/A	N/A

Space planning templates

The dimensions and space requirements for your printer components are provided earlier in this chapter. The space planning templates are designed to simplify the space planning process by helping you to create a floor plan for your base components, particularly if you have shared clearance space.

The easiest way to use the space planning templates is to move the templates around on the grid located at the end of this section and determine the optimum placement for your printer components. Make sure to consider other pieces of equipment, such as cabinets, tables, and optional equipment when planning your space. Your customer support representative can help you plan space for additional components.

The templates are to scale with the grid; each square is equal to 12 by 12 inches/30.5 by 30.5 cm. The curved dotted lines in the corners of the space perimeters indicate the corners that may be rounded off while still maintaining the required clearance space.

There are a number of factors to keep in mind when planning your site, including the following:

- Clearance space requirements
- Cable length.

Refer to these sections in this manual when considering the various factors involved in planning the appropriate location for your printing system.

Printer with
dual feeder and
dual stacker

Operator Area

Printer with
high-capacity
feeder and
dual stacker

Operator Area

Printer with
dual feeder and
stitcher / stacker

Operator Area

Printer with
high-capacity
feeder and
stitcher / stacker

Operator Area
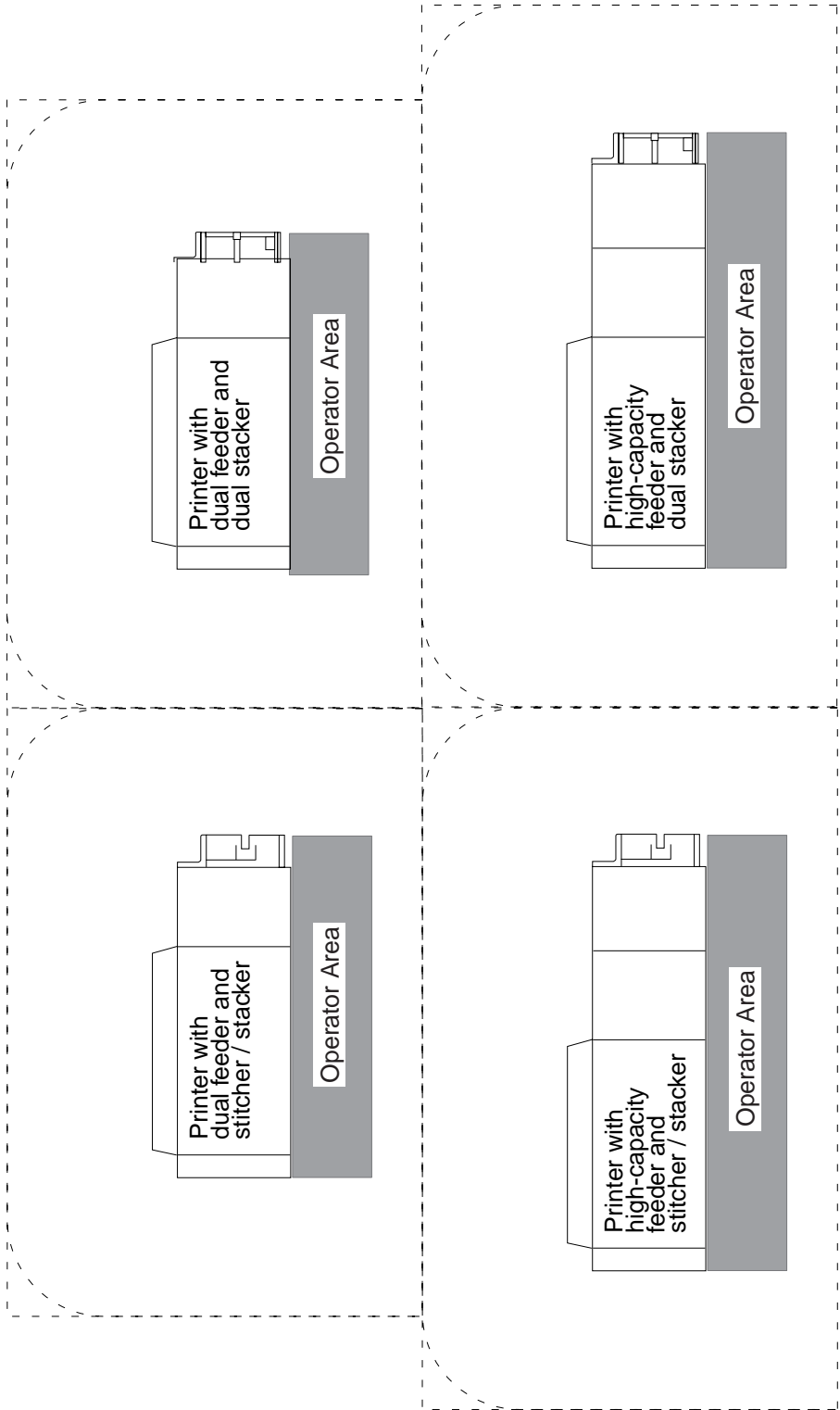
GRID PATTERN

1/4 inch represents one foot

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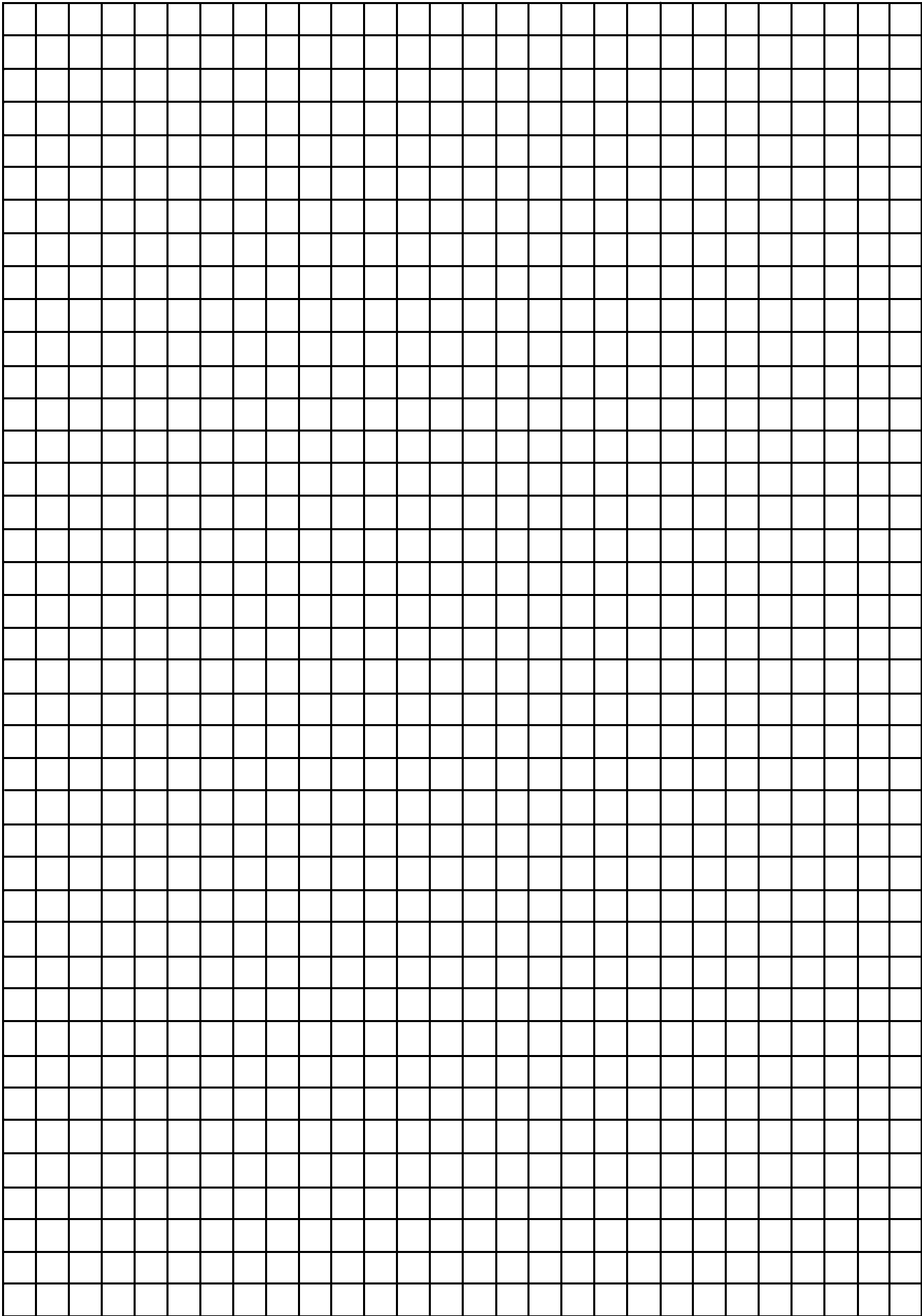
7.   System connections

This chapter provides cable requirements for your DocuPrint NPS/IPS system. To ensure all of your cable requirements are met, it is important to work with your Xerox representative.

Cable lengths

Cable lengths are important considerations in planning your layout, as components can be separated only up to the length of the data interface cables that connect them.

Cables supplied with the printer are long enough to meet the needs of most installations. Some of these cables are specific lengths to conform to engineering and safety standards.

Data cables   The printer components can be separated up to the length of the data interface cables that connect them. The printer and controller are connected by a 25-foot / 7.5 meter data cable.

Power cables   Power cable lengths for the 60 Hz environment are as follows:

Table 7-1. Power cable lengths

Power cable	Length
Printer controller	8 feet / 2.4 meters
Printer	10 feet / 3 meters

Table 7-2. Power cable lengths

Power cables	Length
Printer controller	15 feet / 4.6 meters
Peripheral cabinet	15 feet / 4.6 meters
Printer	15 feet / 4.6 meters

WARNING

Using an inappropriate alternate cable may degrade the performance of your equipment and may also be hazardous.

NOTE: Cable length loss must be factored in if equipment is installed in a raised-floor environment. You should also consider that part of the length of a cable is routed inside the equipment to connect with interior power or data receptacles.

Cable locations

To run the cables beneath the flooring effectively, it is necessary to know where the cables enter and exit the printer. The following diagrams show those locations (marked with an X).

All power cords attach to the back of the printer. Listed below are the distances of the printer power cord attachments from the left end of the printer as you face it.
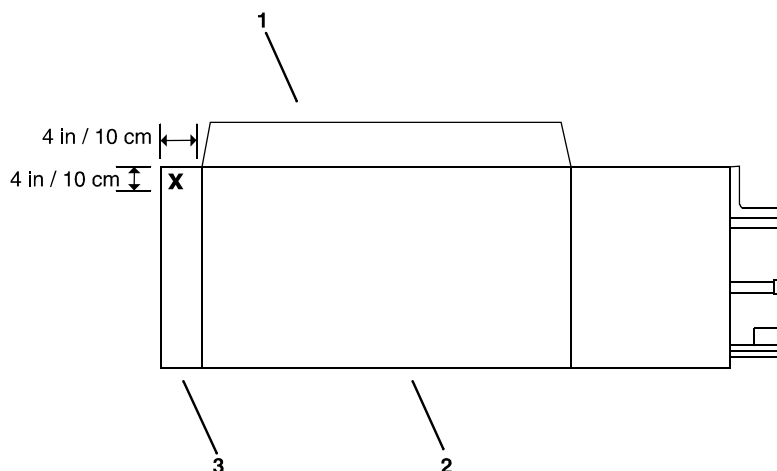
Figure 7-1. Cable enter/exit location (top view)

1. Back of system
2. Front of system
3. Printer

Channel attachments

The NPS/IPS printing system conforms to IBM standards and requirements for any channel-attached printer. When you channel-attach your printer, keep the following in mind:

- Channel length is usually determined by the length of the cables, the number of devices on the channel, and the number of connections in the cable itself (for example, connecting two cables to each other).

- Subtract 15 feet from the total allowable cable length for any device attached to the channel or for any connection of two cables.

- IBM channel cable lengths are as follows:
    - Gray: 200 feet / 61 m (with one device, 185 feet / 56 m)
    - Blue: 400 feet / 122 m (with one device, 385 feet / 117 m)

For further information regarding IBM channel connections, refer to the following IBM manuals:

- *IBM System 360 and System 370 Input-output Interface Channel to Control Unit OEM Information* (#GA22-6974-3825)

- *Page Printer Product Description* (#G544-3482)

- *3825 Introduction and Planning Guide* (#G544-3480).

Installation Planning Guide

8. Installation

This chapter describes the activities performed by you and Xerox during the installation of the Xerox DocuPrint 4850/4890/92C NPS/IPS hardware and software components. Before installation can begin, you must complete the tasks described in the "Preparing for installation" chapter of this guide.

Installation process

Xerox is responsible for the physical installation of the DocuPrint NPS/IPS hardware components and the software.

For customers outside the United States, contact your local Xerox representative or operating company for your specific installation process.

The installation process can take one or several days to complete. Equipment, software kits, and documentation kits may all arrive in one day, or over the course of several days. When all of the necessary items are in place, Xerox personnel will complete the installation of the DocuPrint NPS/IPS components.

In the United States, the steps in the installation process typically occur in the following order:

1. Xerox personnel installs all NPS/IPS printer hardware and connects the printer controller to your network through the Ethernet and Token Ring connector you supply. This process takes approximately four hours if all the necessary network and electrical connectors are in place.

2. Xerox personnel places the system online.

3. Xerox personnel loads printer controller software on the Printer Controller (approximately 1.5 hours).

4. Xerox personnel downloads Xerox client software if applicable, on one client workstation to validate the installation (15 minutes). Software is downloaded on another client workstation as part of training conducted by your systems analyst. All other client software installations are your responsibility. Refer to the *Guide to Submitting Jobs from the Client* for more information.

If your site uses third-party Transmission Control Protocol/ Internet Protocol (TCP/IP) lpr networking software, refer to the *Guide to Submitting Jobs from the Client* for information on defining printers on Unix clients.

5. Xerox personnel tests the system and runs sample jobs (30 minutes).

6. Xerox personnel conducts initial operations training (2 to 4 hours).

7. Xerox personnel reviews preventive maintenance schedules and service call procedures.

Your responsibilities

Xerox is responsible for the physical installation of the printer components and for loading the software and applications. You have the general site responsibility of ensuring that the right personnel, supplies, and network information are available.

At the time of installation, you should do the following:

- Make sure that your system administrator is available during the loading of software.

- For software loading purposes, be prepared to provide Xerox personnel with network information from the preinstallation checklist. Refer to the "Setting up the work area" chapter of this guide for specifics regarding network information.

- Check the documentation and software kits with their packing lists for completeness.

- Have your operators available for training.

Network workstations For network workstations:

- Designate two client workstations for downloading Xerox client software if applicable: one for initial system validation and another for use in operator training provided by your systems analyst.

- Load Xerox client software on any additional client workstations.

  Remember that you are responsible for supplying, installing, and maintaining your client workstations and the Token Ring network or Ethernet local area network (LAN) that connects them with the Printer Controller. You are also responsible for the Ethernet and Token Ring connectors required for your system.

- Have PostScript and PCL test jobs ready to run.

IPDS printing   For IPDS printing:

- Have the necessary parameters defined to configure PSF for connectivity to your IPS printer.

- Have list of stocks you want used for your default input tray configuration.

- Sysgen your host to print to an AFP1-type printer. Refer to the IBM ITSC Distributing AFP Printing from a Host System (#GG24-4493) documentation for further information.

- If your system will be channel-attached, make available a bus and tag connection from the host system as follows:

  – RS/6000 requires a channel card for IPS connectivity.

  – PS/2 requires a channel card for IPS connectivity.

Refer to the installation planning checklist in the "Setting up the work area" chapter of this guide for a complete list of responsibilities.

Defining the printer to the host for IPDS printing

Prior to installation of your DocuPrint NPS/IPS, your host system must be configured to communicate with and print on the DocuPrint NPS/IPS. This requires defining several printer parameters to your host. The required information and configuration procedures differ according to your connectivity type (channel or TCP/IP), and your host and PSF environment. You will need to provide these parameters to your Xerox representative on installation day.

There are two appendices in this guide which provide printer configuration procedures and the parameters you must define in order to configure PSF to make a connection with your DocuPrint NPS/IPS. One appendix discusses channel-attached environments; the other appendix provides information for environments in which the printer uses TCP/IP to communicate via Ethernet or Token Ring. Parameters are given for MVS mainframes, AS/400, RS/6000 running AIX, and PS/2 or other personal computers running OS/2.

Software licensing

When a DocuPrint NPS/IPS is purchased, the owner needs to receive a license to use the operating system software. Once a user calls in with a host ID, (Sun SPARC/Ultra host ID), the user receives a license string.

This license is enabled by entering a authorization text string at the printer controller keyboard. Your Xerox service representative obtains this license text string for you.

Until this license string is entered, while you power on and boot the system, the printer remains in Disabled mode and cannot print.

Although your service representative usually does this for you, you also can enter your license string using the **Install Feature License** command. For more information, refer to the "Using utility commands" chapter of the *Guide to Configuring and Managing the System*.

Ongoing maintenance

After the installation of your Xerox DocuPrint NPS/IPS, there are a few ongoing tasks that must be performed. These tasks may include the following:

- Maintaining an adequate inventory of consumable supplies
- Overseeing routine maintenance and meter reporting
- Arranging for additional operator training
- Ordering additional fonts
- Ordering additional documentation

- Placing service calls for hardware problems

- Obtaining assistance in solving software-related problems.

As installation coordinator, it is your responsibility to designate the staff members responsible for these tasks.

Routine maintenance

A number of routine maintenance tasks must be performed to ensure maximum efficiency of your printer. These tasks include:

- Adding standard dry ink to your printer

- Adding colored dry ink to your printer

- Changing the CCU for colored dry ink in your printer

- Adding fuser lubricant

- Replacing the dry ink and developer waste containers

- Cleaning the exterior surfaces of the system.

Step-by-step instructions for performing these tasks are contained in your *Guide to Performing Routine Maintenance*. You need to decide how many operators will be responsible for performing these tasks. Most maintenance tasks are covered in the initial operator training provided shortly after installation.

NOTE: Only operators who have completed the Xerox Advanced Customer Training (ACT) or eXcellerate courses or equivalent advanced customer training can replace stitcher wire. Refer to the "Xerox support services" appendix of this guide for additional information on training.

Meter reading and reporting

As print jobs are processed, the printer controller accumulates, saves, and maintains usage data.

During the last five working days of each month, you need to review and transmit the data to Xerox for billing purposes. Refer to your *Guide to Performing Routine Maintenance* for complete instructions on how to report meter readings.

A. Supplies

This appendix provides information and specifications for the media you use with your Xerox DocuPrint 4850/4890/92C printer. Instructions for ordering supplies are also provided.

Consumable supplies (those that are depleted during operation of the system), such as paper, dry ink, developer, fuser agent, etc., must be ordered for your printer. It is important that an adequate supply of these items be on hand for installation, and that your supply be maintained afterwards.

Paper and other throughput stocks

The success of any print run is greatly dependent on the proper selection, care, and handling of the stock used.

Selecting paper

You need to select your paper carefully. If you do not use the proper paper, you increase the probability of paper jams and misfeeds. The stocks you use must meet the specifications set forth by Xerox for operability in the printer. For additional information about paper specifications, refer to your *System Overview Guide* and to *Helpful Facts about Paper*, both delivered with your printer.

Acceptable paper stocks and sizes   Your 4850/4890/92C printer accepts the following standard size cut-sheet papers:

- **US Letter:** 8.5 by 11 inches / 216 by 279 mm
- **US Legal:** 8.5 by 14 inches / 216 by 356 mm
- **A4:** 8.27 by 11.69 inches / 210 by 297 mm

Recommended weight and grade: Use a good quality, xerographic-grade paper. For best results, use paper that is 20-pound or 80 gsm (grams per square meter) bond, xerographic grade. Xerox 4024 Dual Purpose Paper provides optimal performance in the printer. Refer to the consumable supplies table, later in this appendix.

Use paper within these parameters:

- **Lightest:** 20-pound or 80 gsm bond
- **Heaviest:** 110-pound or 200 gsm index.

Characteristics The paper stock should have the following characteristics:

- Low moisture content (a paper-to-moisture ratio below 5.7 percent). Paper with higher moisture content may curl and jam.
- Smooth surface
- Moisture-resistant wrapping
- No defects (bent edges, uneven surfaces)
- Grain long (parallel with the long side of paper).

  Paper is usually fed into the printer with the long side as the leading edge. When you purchase paper, buy long-grain paper. Make sure the grain is parallel with the long side (long-grain) for the most reliable feeding and stacking.

Special stocks Following are some guidelines for choosing and using special materials:

- **Labels:** Must be the type designed for high-speed printers and must meet the specifications described in the section above. Loading instructions are printed on all paper trays.

  Load labels with the label side up. You can direct them to any output tray.

- **Transparencies:** Must be the type designed for high-speed printers and must meet the specifications described in the section above. Loading instructions are printed on all paper trays.

  Load transparencies with the opaque strip to the right. All printed transparencies are delivered to the sample tray.

  As long as they meet your printer's paper specifications, you can also use:

- **Tinted paper:** Available in a variety of colors, it has many uses, including calling attention to certain printed material, separating special sections, or dividing chapters of a report.

- **Preprinted paper:** May be letterhead, forms, or logos.

- **Predrilled paper:** Has a varying number of holes for use in binders or binder rings. Before loading predrilled paper, fan it to remove loose plugs that could cause paper jams. Load predrilled paper in the printer with holes to the right.

- **Perforated paper**

Paper care

Once you have purchased your paper, you must be sure it is stored and conditioned properly, so that it performs optimally in the printer with a minimum of jams.

Storing paper Paper has a tendency to curl under the heat that is present inside xerographic equipment. To minimize the amount of curling, use paper with low moisture content. Paper with excessive moisture content has a tendency to jam because of the greater curl. The maximum recommended moisture content is 5.7 percent.

Keep these points in mind when preparing your paper storage area:

- Store paper in its own wrapper; do not leave it unwrapped or where it can be damaged by dampness or heat.

- Store paper on a flat surface and not on its side or edge.

- Store reams of paper in a closed cabinet.

- Always store paper in a cool, dry area. Store on pallets or shelves, not on the floor.

- Plan ahead and keep at least a day's supply of paper in the same area as the printer to allow environmental stabilization prior to printing.

For more detailed information on paper for Xerox printers, refer to *Helpful Facts about Paper*, provided with your printer.
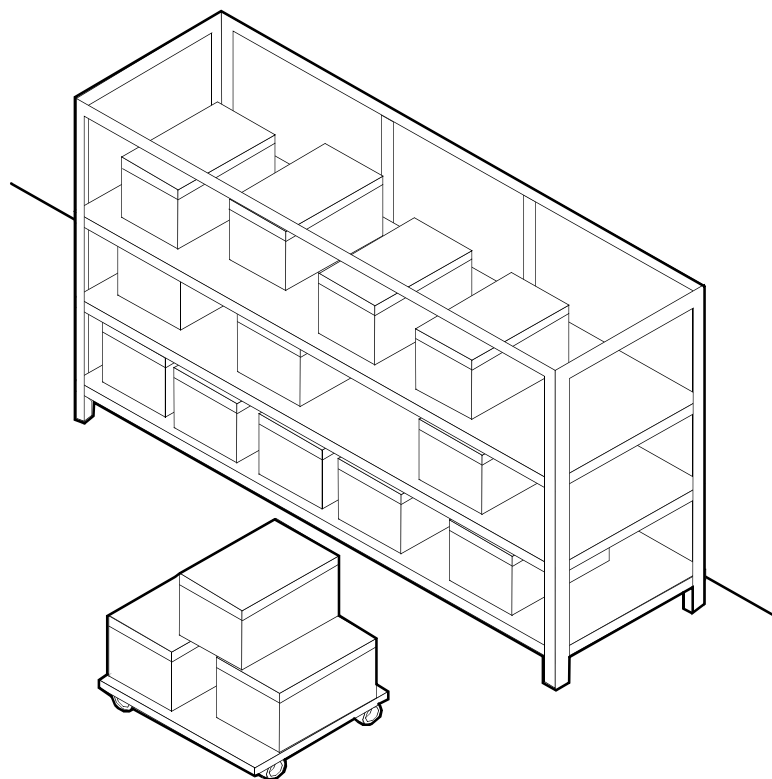
Figure A-1. Storing paper correctly
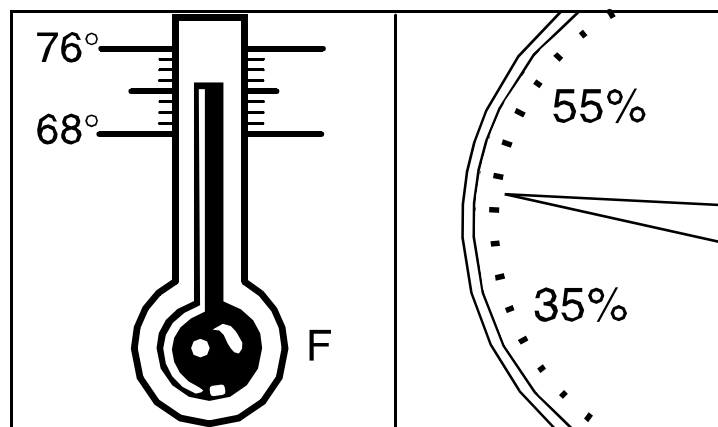
Figure A-2. Recommended temperature and humidity for paper storage

Conditioning paper   Because temperature and humidity affect paper performance in the printer, you need to condition paper before using it. To do this, store paper for a specified length of time in the same type of environment as your printer.

The length of time you should condition your paper depends on the amount of paper and the difference between the storage and operating temperatures.

Use the following chart to determine the length of time needed to condition stacked cartons of paper.

NOTE: The numbers in the top two rows indicate the temperature difference between the storage area and the operating environment, not actual room temperatures.

Table A-1. Paper conditioning: Recommended temperature differences between storage and operating areas

Cartons	Temperature differences between storage and operating areas						
	Fahrenheit						
	10°	15°	20°	25°	30°	40°	50°
	Centigrade						
	5.5^o	8.5^o	11°	13°	17°	22°	28°
Cartons	**Hours**						
1	4	8	11	14	17	24	34
5	5	9	12	15	18	25	35
10	8	14	18	22	27	38	51
20	11	16	23	28	35	48	67
40	14	19	26	32	38	54	75

Example: (See the shaded rows in the table above.) If you want to move ten cartons of paper from a storage area with a temperature of 90 oF to an operating area with a temperature of 75 oF (a 15o difference), you should do so at least 14 hours before using the paper.

Other supplies

This section describes the supplies other than paper that are necessary for installation and afterward. Your sales representative will help you place your initial supply order.

Dry ink

Dry ink (also called toner) is the black powder which forms the image on the printed page. There are three cartridges of dry ink in each carton. You should keep at least one extra cartridge on hand at all times. The disposable cartridges are easily changed with no mess. The consumption rate of Xerox dry ink is approximately one cartridge per 30,000 pages. Use only dry ink that is specified for use in the 4850/4890/92C printer, as described in the consumable supplies table.

Fuser lubricant

Fuser lubricant is a consumable item required by the printer. You should keep at least two boxes (each box contains two tubes) on hand for installation by the service representative. The consumption rate of Xerox fuser lubricant is approximately one tube per 120,000 pages. For product information, refer to the consumable supplies table in this appendix.

Developer

Developer is not consumed by the printer but does have an effective life of approximately 300,000 pages per bottle, guaranteed by Xerox. Developer is a required item and must be kept on hand.

Use only the developer specified for use in your 4850/4890/92C printer.

For colored inks, use the color developer specified for each color in the table below:

Table A-2. **Developers for use with colored inks**

Ink color	Use developer	Part number
Black	Black	502S63250
Blue	Blue	502S63252
Brown	Consult your Xerox representative.	
Cardinal	Red	502S63251
Cyan	Cyan	502S63992
Green	Green	502S63253
Magenta	Magenta	502S63993
Red	Red	502S6325
Royal	Blue	502S63252
Ruby	Magenta	502S63993
Violet	Magenta	502S63993

The developer is changed by your service representative. For product information, refer to the consumable supplies table, later in this appendix.

Stitcher wire

Stitcher wire is a consumable item for a printer equipped with the stitcher/stacker option. You need to order stitcher wire reels and keep them on hand. They are installed by the service representative or operators who have completed the Advanced Customer Training (ACT) or eXcellerate courses offered by Xerox.

Diskettes

Diskettes are optional items that provide loading and backup of fonts, forms, and user files to and from the printing system. The processor accepts 3.5-inch, 1.44 MB, double-sided, high density diskettes.

Cartridge tapes

The optional 4 mm cartridge tape drive uses 5 GB or 8 GB tapes.

Fonts

Data can be printed on DocuPrint printers in many sizes and type styles called fonts. A font is a character set which has unique characteristics, such as type style, size, weight, orientation (portrait, landscape, inverse portrait, and inverse landscape), character spacing (fixed and proportional), line spacing, and postures (Roman, italic, and so forth).

There are three classifications of fonts:

- Standard fonts
- Licensed fonts
- Custom fonts.

Standard fonts A library of 51 fonts is provided with your printer's operating system software.

Licensed fonts Additional fonts may be ordered from your local Xerox Font Center.

Custom fonts Custom fonts and graphic images such as company logos and signatures can be digitized by the Xerox Font Center for use on your printer.

Receiving fonts Fonts are received on a diskette from your local Xerox Font Center.

Consumable supplies tables

A number of supplies are available from Xerox for your DocuPrint printer. Use the following tables to help determine your supply needs.

NOTE: Customers in the U. S. may use the part numbers in these tables to order supplies. Customers outside the U. S. should contact their local service organization for part numbers.

Paper and special stocks tables

The following tables list all throughput stocks available for the 4850/4890/92C printers, with size, order number, and a brief description for each.

Table A-3. **Stocks list for 4850/4890/92C printers**

Item	Description	Part number
Paper	Xerox paper quantities are 10 reams (5,000 sheets) to a carton unless otherwise noted below.	
8.5 x 11 inch	4024 Dual Purpose Paper	3R721
A4	4024 Dual Purpose Paper	3R2594
8.5 x 14 inch	4024 Dual Purpose Paper	3R727
8.5 x 11 inch	4024 Dual Purpose Paper, 3-hole	3R723
8.5 x 11 inch	4024 Dual Purpose Paper, 3-hole*	3R2193
8.5 x 11 inch	4024 Dual Purpose Paper, 4-hole	3R1983
8.5 x 11 inch	4024 Dual Purpose Paper, 4-hole*	3R3008
8.5 x 11 inch	4024 Dual Purpose Paper, 7-hole	3R1984
8.5 x 11 inch	4024 Dual Purpose Paper, 7-hole*	3R3010
8.5 x 11 inch	4024 Smooth	3R2675
8.5 x 14 inch	4024 Smooth	3R2677
8.5 x 11 inch	Dual Purpose Colors—Blue	3R3052
8.5 x 11 inch	Dual Purpose Colors—Blue, 3-hole	3R3068
8.5 x 14 inch	Dual Purpose Colors—Blue, 3-hole	3R3084
8.5 x 11 inch	Dual Purpose Colors—Green	3R3056
8.5 x 11 inch	Dual Purpose Colors—Green, 3-hole	3R3072
8.5 x 14 inch	Dual Purpose Colors—Green	3R3088
8.5 x 11 inch	Dual Purpose Colors—Pink	3R3058
8.5 x 11 inch	Dual Purpose Colors—Pink, 3-hole	3R3074
8.5 x 14 inch	Dual Purpose Colors—Pink	3R3090
8.5 x 11 inch	Dual Purpose Colors—Yellow	3R3054
8.5 x 11 inch	Dual Purpose Colors—Yellow, 3-hole	3R3070
8.5 x 14 inch	Dual Purpose Colors—Yellow	3R3086
8.5 x 11 inch	Dual Purpose Colors—Buff	3R3060
*5/16-inch drilled holes ** Rainbow pack contains 750 sheets each of blue and yellow, 500 sheets each of green and pink, and 250 sheets each of buff, gray, goldenrod, and ivory.		

Table A-3. **Stocks list for 4850/4890/92C printers (Continued)**

Item	Description	Part number
8.5 x 11 inch	Dual Purpose Colors—Buff, 3-hole	3R3076
8.5 x 14 inch	Dual Purpose Colors—Buff	3R3092
8.5 x 11 inch	Dual Purpose Colors—Goldenrod	3R3062
8.5 x 11 inch	Dual Purpose Colors—Goldenrod, 3-hole	3R3078
8.5 x 14 inch	Dual Purpose Colors—Goldenrod	3R3094
8.5 x 11 inch	Dual Purpose Colors—Ivory	3R3064
8.5 x 11 inch	Dual Purpose Colors—Ivory, 3-hole	3R3080
8.5 x 14 inch	Dual Purpose Colors—Ivory	3R3096
8.5 x 11 inch	Dual Purpose Colors—Gray	3R3066
8.5 x 11 inch	Dual Purpose Colors—Gray, 3-hole	3R3802
8.5 x 14 inch	Dual Purpose Colors—Gray	3R3098
8.5 x 11 inch**	Dual Purpose Colors, Rainbow Pack—35,000 sheets per carton**	3R3107
8.5 x 11 inches	4200 Primary Image	3R5802
8.5 x 14 inches	4200 Primary Image	3R5804
8.5 x 11 inches	4200 Primary Image, 3-hole	3R5803
8.5 x 11 inch	10 Series Dual Purpose Paper	3R2950
8.5 x 11 inch	10 Series Dual Purpose Paper, 3-hole	3R2952
8.5 x 11 inch	10 Series Dual Purpose Paper, 3-hole*	3R3016
8.5 x 14 inch	10 Series Dual Purpose Paper	3R2954
8.5 x 11 inch	10 Series Smooth	3R54
8.5 x 14 inch	10 Series Smooth	3R83
8.5 x 11 inch	4024 Dual Purpose, reinforced 3-hole*	3R2057

*5/16-inch drilled holes
** Rainbow pack contains 750 sheets each of blue and yellow, 500 sheets each of green and pink, and 250 sheets each of buff, gray, goldenrod, and ivory.

Table A-3. **Stocks list for 4850/4890/92C printers (Continued)**

Item	Description	Part number
Transparencies	Xerox transparencies are packaged 100 sheets to a box.	
8.5 x 11 inch	Clear, with a white strip on the edge	3R2780
8.5 x 11 inch	Clear, high speed, with paper backing	3R3028
Labels (Gummed)	Xerox labels are packaged 100 sheets to a box.	
8.5 x 11 inch	33 labels per sheet	3R3139
8.5 x 11 inch	6 labels per sheet	3R3146
8.5 x 11 inch	Custom form (uncut)	Contact Xerox Supplies Order Service
8.5 x 11 inch	1-up label	3R4476
8.5 x 11 inch	1-up label	3R4475
8.5 x 11 inch	1-up label	3R4474
Cover stock	Xerox cover stock is packaged 2,500 sheets per carton.	
8.5" x 11"	65-pound, blue	3R3044
8.5" x 11"	65-pound, white	3R3041
*5/16-inch drilled holes ** Rainbow pack contains 750 sheets each of blue and yellow, 500 sheets each of green and pink, and 250 sheets each of buff, gray, goldenrod, and ivory.		

Complete supplies list—4850/4890/92C printers

The following table lists the supplies in addition to paper that are available for your printer. Use this table to help you determine your supplies needs.

Table A-4. Complete supplies list for 4850/4890/92C

Item	Description	Part number	Items/ carton	Expected yield
Developer material	Packaged one container per carton. (Needs replacement only if current supply becomes contaminated.)			
	Black developer	502S63250	1/carton	
	Red developer (also for cardinal ink)	502S63251	1/carton	
	Blue developer (also for royal ink)	502S63252	1/carton	
	Green developer	502S63253	1/carton	
	Cyan developer	502S63992	1/carton	
	Magenta developer (also for ruby and violet inks)	502S63993	1/carton	
	For brown ink, ask your Xerox representative about the correct developer to use.			
Diskettes	3.5-inch, 1.44 MB, double-sided, high density diskettes. Packaged 10 diskettes per box.	8R7683	10/box	
Dry ink	Colored dry ink is packaged three bottles per carton; black, six bottles per carton. (Consumption rate is approximately 33,000 pages per bottle.)			
	Black dry ink	6R296	6/carton	180,000 prints/carton
	Red dry ink	6R297	3/carton	260,000 prints/carton
	Blue dry ink	6R754	3/carton	260,000 prints/carton
	Green dry ink	6R299	3/carton	260,000 prints/carton
	Cyan dry ink	6R755	3/carton	260,000 prints/carton
	Magenta dry ink	6R816	3/carton	260,000 prints/carton
	Royal dry ink	6R826	3/carton	260,000 prints/carton
	Cardinal dry ink	6R825	3/carton	260,000 prints/carton
	Violet dry ink	6R828	3/carton	260,000 prints/carton
	Ruby dry ink	6R827	3/carton	260,000 prints/carton
	Brown dry ink	6R842	3/carton	260,000 prints/carton
Fuser lubricant	Packaged two tubes per carton.	8R983	2/carton	240,000 prints/carton
Cartridge tapes	4mm blank cartridge tape, 5GB	9R01190		
	4mm blank cartridge tape, 8GB	109R00314		

Table A-4. Complete supplies list for 4850/4890/92C

Item	Description	Part number	Items/ carton	Expected yield
Cleaning supplies	4mm cartridge tape head cleaning kit Foam-tipped swabs Lint-free towels	9R01189 99P87256 35P2163		
Waste containers	Dry ink waste container (4850) Dry ink waste container (4890) Dry ink waste container (92C) Developer waste container (4850/4890) Developer waste container (92C)	93K840 93K1401 93K1403 93R850 93K850		400,000/carton 100,000/carton
Stitcher wire	Packaged one reel per box.	8R1174	One reel	32,000 staples

Ordering supplies

To avoid unnecessary downtime, always have an adequate amount of the necessary supplies. To do this, you need to establish a procedure for checking and ordering supplies. A supplies checklist is provided at the end of this appendix to help you with this task. It lists the supplies needed for the printer and contains a column for you to enter the date when you want to place the order and a column to record the date of the actual order. The consumable supplies table, above, contains a list of Xerox supplies available for the printer.

It is important that you check your supplies regularly and order before you run out. Plan on approximately five working days for delivery after placing the order. You can make arrangements to receive them sooner in emergency situations.

Your Xerox sales representative can help you submit the initial order of supplies needed for installation. These items include paper, dry ink, fuser lubricant, and developer.

Once your printer volume is established, planning ahead and buying Xerox supplies in quantity can save you money. Your Xerox supply specialists can help you. There are two centers available to assist you:

• To order Xerox paper, transparencies, labels, dry ink, developer, fuser lubricant, stitcher wire, cartridge tapes, and diskettes, call the Xerox Supply Center at 1-800-822-2200, weekdays between 7:30 a.m. and 6:00 p.m., Pacific time.

If you prefer, you may mail orders to the following address:

Xerox Corporation
P. O. Box 25075
Santa Ana, CA 92799-5075

- To order cleaning supplies, call the Xerox Customer Parts and Product Support Center at 1-800-828-5881, weekdays between 5:30 a.m. and 5:00 p.m., Pacific time, (U.S. only).

You may also mail cleaning supply orders to the following address:

Xerox Corporation
Parts Marketing Center
Building 214-07S
P. O. Box 1020
Webster, NY 14580

Please provide the following information when placing orders:

- Your customer number (provided by your Xerox sales representative)

- Your printer model: Xerox DocuPrint 4850/4890/92C

- Your supply order, including the following information:

  – Item name

  – Part number

  – Quantity desired

  – If your company requires a purchase order for payment of an invoice, you need to provide the purchase order number to Xerox at the time you place the order.

The following table is a checklist you can use to keep track of the supplies you order.

Table A-5. Supplies checklist for 4850/4890/92C printer

Supplies checklist
Use this checklist to help record the supplies and accessories you need, the date you plan to place the order, and the actual date of the order.

Item	Description and part number	Quantity	Date to order	Date ordered
Paper				
Transparencies, labels, and special stocks				
Dry ink				
Fuser lubricant				
Diskettes				
Stitcher wire				
Cartridge tapes				

Table A-5. Supplies checklist for 4850/4890/92C printer

Supplies checklist Use this checklist to help record the supplies and accessories you need, the date you plan to place the order, and the actual date of the order.				
Item	**Description and part number**	**Quantity**	**Date to order**	**Date ordered**
Cleaning supplies				

B. Xerox support services

Xerox provides many services in support of your laser printing system. This appendix contains information on the following services:

- Xerox Customer Service Support Center

- Xerox Documentation and Software Services (XDSS)

- Operator training

- Xerox Customer Education

- Xerox Font Center

Prior to installation, your sales representative is available to answer your questions about products, services, or billing. In the U. S., however, if you need assistance in resolving application-related problems or questions, call the Xerox Printing Systems Customer Support Center (refer to the following section of this chapter). Your systems analyst is also available to assist you with applications development.

NOTE: For customers outside the United States, contact your local Xerox representative or operating company for information on available support services.

Xerox Customer Service Support Center

The Xerox Customer Services Support Center provides regular maintenance care for your printer as well as any necessary repairs.

Before calling your Customer Service Support Center, make sure you have tried the corrective actions described in the *Troubleshooting* Guide. If a problem persists, gather the necessary information and call your customer service support center (or contact your local Xerox operating company).

In the United States, call the following number to report DocuPrint hardware or software problems:**1-800-822-2979**

NOTE: This phone number is attached to your printer at installation time.

Before contacting service, make note of the following:

- Status code numbers and messages which appear on the keyboard/display
- Status messages which appear on the printer control console
- Indicator lights that are lit.

Your call is answered by a representative, who asks you for the model number and the serial number for your printing system, and for the following:

- Serial number for your printing system
- Your name
- Company name
- System condition or status.

Give this information to a customer service representative, who will call you back to help you resolve the problem over the phone, or to give you an estimated time of arrival.

Xerox support personnel may use the Sixth Sense feature to access controller information via modem from a remote location.

More information about Sixth Sense can be found in the *Troubleshooting Guide*.

Xerox Printing Systems Customer Support Center

The Xerox Printing Systems Customer Support Center is available to address your application problems or to direct you to the appropriate documentation.

The key to effective use of the Xerox Printing Systems Customer Support Center is correct identification of the problem. Before calling the center, it is helpful to have the following information available:

- The correct name of your system, such as the Xerox DocuPrint NPS/IPS, and the model, for example, 92C.
- A list of any error messages
- An explanation of how output is different from what was expected

- An assessment of whether the symptoms follow a pattern or occur randomly

- A list of special conditions that may have caused the problem:
    - New applications
    - Changes made to the software
    - Recent service performed
    - Previous conditions under which the application has printed properly.

To contact the Xerox Printing Systems Customer Support Center, call: **1-310-333-0501** (U. S. only), between the hours of 5:00 a.m. and 5:00 p.m., Pacific time.

Xerox Documentation and Software Services (XDSS)

XDSS distributes the documents you need to install and use the DocuPrint printer, other Xerox printers, and associated software. If you register for site subscription service, XDSS will automatically send you updates and revisions as they become available.

To order this documentation, call Xerox Documentation and Software services:

1-800-327-9753 (U.S. only), between the hours of 6:00 a.m. and 4:00 p.m., Pacific time.

XDSS representatives will explain the services available, answer your questions, and take orders for documentation.

You can also order on the web:

www.xdss.com

Operator training

Operator training is conducted at your location by your Xerox system analyst or other identified representative, shortly after the printer is installed. Training takes two to four hours, depending on the system configuration. It includes hands-on practice running basic jobs, performing routine maintenance, and solving problems. Determine the number of operators you want to attend the initial training and schedule training dates and times through your Xerox sales representative.

Additional training classes, such as Advanced Customer Training (ACT) for operators, teach advanced service and maintenance skills.

A variety of classes and workshops are available through Xerox Customer Education.

Xerox Customer Education

Xerox offers classes and tutorial documents on various topics relating to printing systems and document production. For information about Xerox training courses, or to receive a catalog, call Xerox Customer Education at **1-800-445-5554** (U. S. only). Outside the U.S., contact your local Xerox operating company. Customer Education has a web page where you can obtain additional information. Its address is:

www.xerox.com/services/training/customer-ed

Xerox Font Center

The Xerox Font Center (or your local Xerox operating company) can send you samples and catalogs of the fonts available for your printer.

To receive font samples, obtain price information, obtain technical support, or order licensed or custom fonts, call:

1-800-445-FONT (3668) between 6:00 a.m. and 5:00 p.m., Pacific time.

You can get font information on the web at:

www.font.net

C. Related publications

Xerox documents

The Xerox DocuPrint NPS/IPS documentation set includes the documents listed below.

- *Guide to Configuring and Managing the System*
- *Guide to Managing Print Jobs*
- *Guide to Performing Routine Maintenance*
- *Guide to Submitting Jobs from the Client*
- *Guide to Using Page Description Language*s
- *Installation Planning Guide*
- *System Overview Guide*
- *Troubleshooting Guide*
- *Solutions Guide for IPDS Printing*
- *Decomposition Service and Tools Guide*
- *Glossary*
- *Master Index*
- *Customer Information Quick Reference Card*
- *Printer Controller Commands Quick Reference Card*
- *Operator Quick Reference Card*
- *Submitting your Jobs from Macintosh Quick Reference Card*
- *Submitting your Jobs from UNIX & DOS Quick Reference Card*
- *Submitting your Jobs from Windows NT 4.0 (QuickPrint) Quick Reference Card*
- *Submitting your Jobs Using Windows NT 4.0 Drivers Quick Reference Card*

The documentation set also includes an electronic version, the DocuPrint NPS/IPS Interactive Customer Documentation CD.

IBM reference manuals

If you require further information about the various AFP products and system architectures, refer to these IBM publications. Note that the publication numbers shown are current as of the date this document was published. For the most current publication numbers, contact IBM.

- *Guide to Advanced Function Presentation* (G544-3876-00) contains a comprehensive overview of AFP and AFP concepts.

- *Mixed Object Document Content Architecture Reference* (SC31-6802-04) describes the functions and elements that make up MO:DCA data streams.

- *Page Printer Formatting Aid/370: User's Guide* (S544-5284-03) contains information about the PPFA product that is used to create AFP page definitions and form definitions.

- *Page Printer Formatting Aid/370: Command Quick Reference* (G544-3701-04) provides general information about Page Printer Formatting Aid/370 (PPFA/370). It contains information on program invocation, symbolic information, syntax rules, and the command syntax for the PPFA/370 commands.

- *Overlay Generation Language/370 User's Guide and Reference* (S544-3702-03) summarizes the basic information required to define and to generate an overlay using the IBM Overlay Generation Language/370 (OGL/ 370) licensed program. It also includes information on program invocation (in MVS, VSE, and VM), symbolics, syntax rules, and the command syntax for the OGL/370 commands.

- *The Continuing Evolution of Advanced Function Printing* (by Howarth and Plate, IBM Systems Journal, VOL 32, NO 4, 1993) traces the continuing evolution of AFP, its usage, and how it addresses the presentation requirements of businesses in the 1990s.

- *Advanced Function Printing-From Print to Presentation* (G321-5528-00), describes some of the software products and how they use the architecture. It also describes possible future directions for AFP and related technologies.

- *Advanced Function Presentation: Printer Summary* (G544-3135-10) contains detailed characteristics of IBM's page printers.

- *Advanced Function Presentation Workbench for Windows: Using the Viewer Application* (G544-3813-00) contains information about using this product with the AFP application programming interface.

- *Advanced Function Presentation Conversion and Indexing Facility: Application Programming Guide* (G544-3824-01) contains information about using the AFP Conversion and Indexing Facility (ACIF).

- *Advanced Function Presentation: Programming Guide and Reference* (S544-3884-01) contains information about using the AFP application programming interface.

- *Distributing AFP Printing from a Host System* (GG24-4493-00) explains the different ways of distributing print jobs from a host system to remote sites.

- *AFP Printing in an IBM Cross-System Environment* (GG24-3765-00) explains how to print AFP documents in a multiple host environment and how to handle resources in the different the environments.

- *Intelligent Printer Data Stream Reference* (S544-3417-05) describes the functions and composition of elements sent to printers that support the IPDS architecture.

- *Bar Code Object Content Architecture Reference* (S544-3766-02) describes the functions and services associated with Bar Code Object Content Architecture (BCOCA).

- *Font Object Content Architecture Reference* (S544-3285-03) describes the functions and services associated with Font Object Content Architecture (FOCA).

- *Graphics Object Content Architecture Reference* (S544-5498-00) describes the functions and services associated with Graphics Object Content Architecture (GOCA).

- *Image Object Content Architecture Reference* (SC31-6805-04) describes the functions and services associated with Image Object Content Architecture (IOCA).

- *Presentation Text Object Content Architecture Reference* (SC31-6803-02) describes the functions and services associated with Presentation Text Object Content Architecture (PTOCA).

- *Print Service Facility/MVS: Application Programming Guide* (S544-3673-03) provides information about using PSF in an MVS environment.

- *Print Service Facility/VM: Application Programming Guide* (S544-3677-00) provides information about using PSF in a VM environment.

- *Print Service Facility/VSE: Application Programming Guide* (S544-3666-01) provides information about using PSF in a VSE environment.

- *Print Service Facility/2: Getting Started* (G544-3767-01) provides the basic information required for using PSF in an OS/2 environment.

- *IBM AIX Print Service Facility/6000: Print Service Facility for AIX Users* (G544-3814-01) provides information about using PSF for AIX in an RS/6000 environment.

- *AS/400 Information Directory* (GC21-9678-03) provides information on using the AS/400 system.

- *Attachment Configuration Handbook* (30H7322) provides information about attaching your printer to a host system (MVS, VM, VSE, AS/400, PS/2).

- *PSF V3R1 for OS/390: User's Guide* (S544-5630-00) describes the JCL to use and how to use AFP resources such as form definitions, page definitions, color map tables, fonts, and so on.

- *InfoPrint Manager for AIX User's and Operator's Guide* (S544-5596-01) provides syntax for commands and utilities, and detailed information on IPS attributes and values. This publication can be used as a reference for end users, print operators, and administrators.

- *IBM InfoPrint Manager for AIX: PSF Direct* (S544-5486-00) provides information about using InfoPrint Manager for AIX.

IBM documents for specifying color in IPDS Jobs

Refer to the following IBM documents for information on how to specify colors in the AFPDS format for IPDS jobs:

- *IBM Overlay Generation Language/370: User's Guide and Reference* (S544-3702-03)

  Gives information on how to specify color on overlays.

- *IBM Page Printer Formatting Aid: User's Guide* (S544-5284-02)

Gives information on formatting variable data, including how to specify color.

- *Document Composition Facility: SCRIPT/VS Language Reference* (SH35-0070-06)

  For DCF users, tells how to define fonts in various colors.

Refer to the "Xerox support services" appendix of this guide for information on how to order these and other publications.

D. DocuPrint NPS/IPS on a Novell network

This appendix provides a brief overview of Novell NetWare, and describes some of the considerations you must make before the service representative installs DocuPrint NPS/IPS on a Novell network.

NOTE: The information in this appendix does not apply to IPDS printing.

Novell NetWare overview

In a Novell network, clients who connect to the file server are authenticated and maintain an open connection. Communication is through the file server and not client-to-device. Communications are typically on an Ethernet or Token Ring LAN.

Novell NetWare software receives and queues print jobs. It assigns priorities to incoming jobs and tracks information about each job. It sends print jobs to the printer, and contains a series of utilities and menus to set up, manage, and manipulate print queues.

DocuPrint NPS/IPS supports Novell NetWare versions 3.11 and 3.12.

NOTE: Customers using Novell 4.1 must set the Bindery Emulation Mode to be compatible with Novell 3.12.

Print queues

A print queue is a holding area on the file server where print jobs are stored until a printer is ready. A queue allows multiple users to send jobs to the same printer at the same time. The queue software accepts and tracks jobs to enable users to view, remove, and change values of jobs while they are in the queue.

Each queue has a directory on a hard disk. A print job sent to a queue is stored as a file within that directory. Once the job is printed, the file is removed from the queue directory.

The print queue software maintains a temporary record of information for every print job. The information includes such items as job number, job position in the queue, time the job entered the queue, print server designated to print the job, user ID of the person who submitted the job, and so on. The user can access this information or cancel a job, using PCONSOLE, for each queue.

Queue to printer relationships

Novell NetWare allows for flexibility in setting up different printing configurations. Multiple queues and printers can be associated in different ways to meet different needs, such as the following:

- One queue to one printer
- Multiple queues to one printer
- One queue to many printers
- Multiple queues to multiple printers.

PCONSOLE

PCONSOLE is the main Novell utility used for creating, viewing and managing print queues. When you create a queue with PCONSOLE, the Novell software sets up the queue directory and a bindery entry. The bindery is the database of all users, groups, and other defined entities on the NetWare file server.

NOTE: There is no PCONSOLE access at the DocuPrint NPS/ IPS Printer Controller.

You can perform the following tasks using PCONSOLE:

- Add or remove the following:
  - Definitions of file servers serviced by the print server
  - Definitions of print queues serviced by the print server
  - Definitions of printers for a print server
  - Print servers
  - Users
  - Jobs to and from a queue

- Queues
- View or change job information
- Check or change queue status.

A user or operator can change job values or delete a job while it is still in the Novell queue, and before DocuPrint NPS/IPS starts to receive it. If the user has deleted the job after DocuPrint NPS/IPS begins to receive it, DocuPrint receives the delete action and attempts to cancel the job. Cancellation may fail and the job will partially or completely print.

Print server (PSERVER)

A Novell print server (PSERVER) is a combination of hardware and software that takes ready-to-print jobs from the print queue and sends them to the printer. The print server software is the link between the print queue and the printer (either local or remote). Only one print server can be running on the file server. Each print server can service up to 16 printers. A print server can also run on a dedicated machine that is not running as a file server.

NOTE: Although Novell PSERVER can support multiple queues on multiple file servers, DocuPrint NPS/IPS PSERVER does not. It supports one queue on one file server only.

The print server software scans the print queues to which it is assigned looking for jobs that are ready to print. When it obtains a job from a queue, the print server sends the data to the DocuPrint NPS/IPS through an NCP/IPX connection. Once the job is sent to the printer, the job is deleted from the print queue, and the file removed from the queue directory.

File server

Client workstations
sending print jobs
to print queue
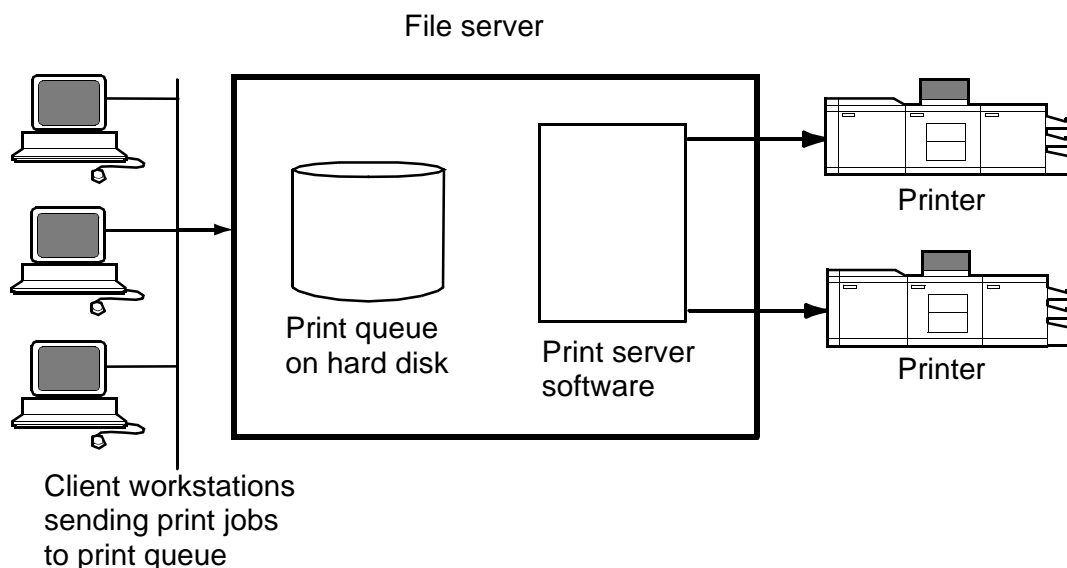
Job parameters

The following job parameters are affected when the DocuPrint
NPS/IPS is configured as a PSERVER:

- Job description is used as the document name

- Copies is used to set the number of copies

- Sender name is set from the user name

- Message is sent to the user when the job finishes printing or
  is canceled, if you set the Notify flag

- ElideHeaders is set to TRUE if you disable banner

- Form name is used to specify the virtual printer.

Using Novell forms to specify virtual printers

Novell allows the user to specify a form that has a name,
number, length and width.

DocuPrint NPS/IPS uses Novell form names to specify virtual
printers.

- If a Novell user wishes to access a given virtual printer, a
  form with the same name as the virtual printer must be
  defined by the NetWare administrator. The user must specify
  that form for the job.

- The Novell system administrator must create form names to match the names of DocuPrint NPS/IPS virtual printers.

- The form name can have a maximum of twelve characters, and the first character must be alphabetic.

If a form name is not used, a virtual printer with the same name as the queue is used.

Forms are defined on the Novell server using the Novell PRINTDEF program. (Use a prefix such as "DP" to distinguish them from other form names.)

NOTE: DocuPrint NPS/IPS is not using a form in the Novell sense. It reads the name field of the form specified, and interprets it as a DocuPrint virtual printer. None of the form attributes other than name is read.

Remote printer (RPRINTER)

A Novell remote printer workstation (DocuPrint NPS/IPS Printer Controller) is a vehicle for the print server to move print data to a printer that is not directly connected to the print server. The remote printer software runs on a workstation that connects to a remote printer through a parallel or serial port.

The remote printer software communicates with a print server running print server software. The print server services jobs from the print queue and sends the data over the network through a SPX connection to the RPRINTER. The RPRINTERSs are associated with DocuPrint NPS/IPS virtual printers. There can be up to sixteen RPRINTERs on the Novell file server. The RPRINTER does not have access to the queue or the data for a job in the queue. The RPRINTER configuration allows for multiple queues to provide access to the attributes of the associated virtual printers.

File/Print server running PSERVER — Remote printer workstation running RPRINTER — Remote printer

Client Workstations
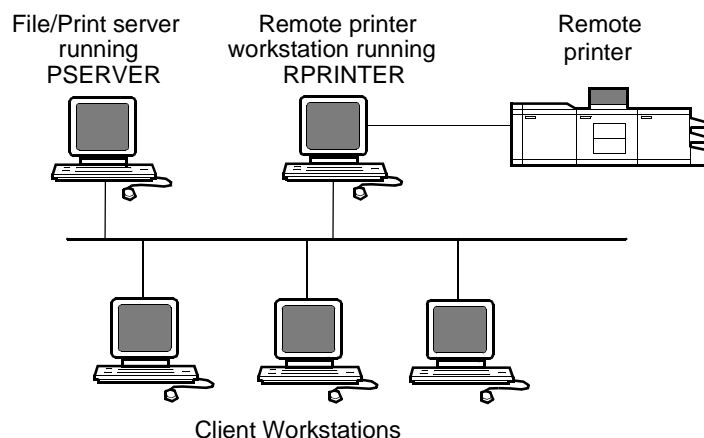
DocuPrint NPS/IPS as a print server or as a remote printer

Before installing DocuPrint NPS/IPS on a Novell network, first determine whether you want the DocuPrint to function as a print server, or a remote printer.

Choosing a print server or remote printer configuration

The following contrasts the Print Server (PSERVER) configuration with the Remote Printer (RPRINTER) configuration for your DocuPrint NPS/IPS.

- The PSERVER configuration uses a licensed connection to a File Server. The RPRINTER configuration connects to a Print Server, and does not require a regular client connection.

- Using the PSERVER configuration, DocuPrint NPS/IPS can obtain job attributes from the Novell Queue.

   NOTE: The RPRINTER configuration can't do this, and this leads to some irregularities, such as no job and submitter names, as well as an inability to select duplex through the submission interface.

- The setting of the Novell banner pages switch operates successfully using PSERVER (this toggles the ElideHeader attribute).

If Banner Page is requested with RPRINTER, DocuPrint NPS/IPS prints a Novell-generated ASCII banner page as the first page of a job, and will print the entire job as an ASCII file (500 pages could be generated when requesting a banner page regardless of the actual file contents.)

• With PSERVER, multiple copies are requested as a job attribute; DocuPrint NPS/IPS receives only one copy and prints multiple copies.

With RPRINTER, since most remote printers can't understand a request for multiple copies, the Print Server will send the job multiple times to print multiple copies, tying up network and DocuPrint NPS/IPS resources as the file is processed.

• With PSERVER, a DocuPrint NPS/IPS can receive jobs from only one print queue on one File Server, but users can submit jobs to different DocuPrint NPS/IPS virtual printers using Novell forms. The administrator uses the PRINTDEF program to create forms with the same name as DocuPrint NPS/IPS virtual printers. Users then select a virtual printer by selecting a form with the same name using the User Tools program in the NetWare Tools folder of Windows, or the -F option in the DOS CAPTURE command.

With RPRINTER, the Print Server can direct jobs to different virtual printers, from multiple queues, possibly on multiple file servers.

• The PSERVER configuration allows the submitter to determine when printing is complete. Jobs are retained in the Novell queue until DocuPrint NPS/IPS completes printing them. This may fill up the queue in some environments.

The RPRINTER configuration informs the submitter only when the job has been submitted, even though it may print days later.

• PSERVER requires that unencrypted login is enabled on the Novell File Server to which PSERVER connects. Regular Novell clients still use encrypted passwords.

RPRINTER does not require that unencrypted logins be permitted.

The following table lists the differences between DocuPrint NPS/IPS as a print server or as a remote printer.

Table D-1. Print server and remote printer differences

DocuPrint NPS/IPS as a PSERVER	DocuPrint NPS/IPS as an RPRINTER
Functions like a Novell print server.	Functions like a Novell remote printer.
Connects to a Novell file server and consumes a licensed connection.	Connects to a Novell print server without consuming a licensed connection.
Reads the Novell print queue directly and obtains all the job parameters.	Cannot read the Novell print queue; receives only the job data, not the data from the queue entry.
Not necessary for the user to disable the print job banner.	User must disable the banner for each print job. If not disabled, the job prints incorrectly.
No unusual delays in output of print jobs.	May be delays in output of print jobs when jobs are not sent back-to-back. The system views the start of a print job as the end of a previous job.
Services only one queue on one file server.	May service multiple print queues through the Novell print server.
Supports user notification of the end of a print job (completion of printing).	Notifies user only when job submission completes (does not notify user of print completion).
Can send a job ticket that references one file on the Novell file server to which the DocuPrint NPS/IPS is connected.	Cannot reference files on a Novell file server.

Novell configuration

Once you decide to configure the DocuPrint NPS/IPS as an RPRINTER or as a PSERVER on your Novell network, there are a number of tasks you must perform.

Configuring DocuPrint as a PSERVER

The following is a summary of the tasks to perform if the DocuPrint NPS/IPS is configured as a PSERVER:

1. Perform the following Novell tasks:

a. Sign on to the Novell workstation as a network administrator.

CAUTION

If you use Novell's Quick Setup feature, you must do the following after creating the queue and server:

b. From PCONSOLE, create a Printer Queue (for example, Gazette) and a Print Server (for example, PGazette).

- In the definition of the server, choose Printer Setup.

- Define the printer per the naming convention suggested by NPS/IPS.

- Select DEFINED ELSEWHERE.

c. From the Print Server window, configure a printer for PServer using the Printer Configuration option.

d. Type any name (for example, Gazette) for the printer. Select **Remote Other/Unknown type** for the printer and save the information.

e. Define the printer in the Queue Service by highlighting the printer name (for example, Gazette) and pressing **Enter**.

f. Press the **Insert** key to select the Print Queue (for example, Gazette) you want to bind with PServer (for example, PGazette).

g. Save the information.

2. When configuring NPS/IPS, answer the configuration questions as follows:

- Remote Printer for Novell Netware -- **<N>**

- Use Print Server for Novell Netware -- **<Y>**

- Name of Novell Print Server -- **PGazette**

- IPX Internal Network Number **[000000##]** (assigned by network administrator)

- IPX number of Connected LAN **[000000##]** (assigned by network administrator)

- Token Ring Framing type -- **TOKENRING** (or **TOKENRING_SNAP**)

3. After installation, change from PSERVER to RPRINTER as follows:

a. Sign on to privilege as an administrator.

b. Enter **Configure** to specify the printer configuration.

c. Select **Option 3**, enter **<N>** to the **Review All Information** question, and type **Novell** to review Novell information.

d. Remote Printer for Novell Netware -- **<N>**

e. Use Print Server for Novell Netware -- **<N>**

f. Name of Novell Print Server -- **PGazette**

g. IPX Internal Network Number **[000000##]** (assigned by network administrator)

h. IPX number of Connected LAN **[000000##]** (assigned by network administrator)

i. Token Ring Framing type -- **TOKENRING** (or **TOKENRING_SNAP**)

j. Save all of the options.

4. Enter **Start All**.

5. Reboot the NPS/IPS.

6. Provide all of the required installation parameters identified in the checklist provided in Chapter 2 of this guide to your service representative.

In the following illustration, the queue, virtual printer, and specified form are configured with the same name. The user sends a print job that specifies a print queue named Gazette through the Ethernet or Token Ring port to the Gazette queue that is served by the print server. This job is assigned to the Gazette virtual printer on NPS/IPS.

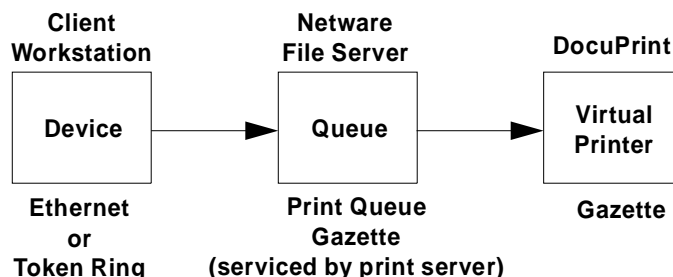| Client Workstation	Netware File Server	DocuPrint
Device	**Queue**	**Virtual Printer**
Ethernet or Token Ring	**Print Queue Gazette (serviced by print server)**	**Gazette**

Figure D-1. DocuPrint NPS/IPS configured as a PSERVER

Configuring DocuPrint as an RPRINTER

The following is a summary of the tasks to perform if you configure the DocuPrint NPS/IPS as an RPRINTER:

1. Perform the following Novell tasks:

   a. Sign on to the Novell workstation as a network administrator.

   b. From PCONSOLE, create a Printer Queue (for example, Gazette) and a Print Server (for example, PGazette).

   c. From the Print Server window, configure a printer for PSERVER using the Printer Configuration option.

   d. Enter any name (for example, Gazette) for the printer. Select **Remote Other/Unknown type** for the printer and save the information.

   e. Define the printer in the Queue Service by highlighting the printer name (for example, Gazette) and pressing **Enter**.

   f. Press the **Insert** key to select the Print Queue (for example, Gazette) you want to bind with PSERVER (for example, PGazette).

   g. Save the information.

2. When configuring NPS/IPS, answer the configuration questions as follows:

   • Remote Printer for Novell Netware -- **<Y>**

   • Use Print Server for Novell Netware -- **<Y>**

   • Name of Novell Print Server -- **PGazette**

   • IPX Internal Network Number **[000000##]** (assigned by network administrator)

   • IPX number of Connected LAN **[000000##]** (assigned by network administrator)

   • Token Ring Framing type -- **TOKENRING** (or **TOKENRING_SNAP**)

3. After installation, change from PSERVER to RPRINTER as follows:

   a. Sign on to privilege as an administrator.

   b. Enter **Configure** to specify the printer configuration.

   c. Select **Option 3**, enter **<N>** to the **Review All Information** question, and type **Novell** to review Novell information.

    d. Remote Printer for Novell Netware -- **<Y>**

    e. Use Print Server for Novell Netware -- **<N>**

    f. Name of Novell Print Server -- **PGazette**

    g. IPX Internal Network Number **[000000##]** (assigned by network administrator)

    h. IPX number of Connected LAN **[000000##]** (assigned by network administrator)

    i. Token Ring Framing type -- **TOKENRING** (or **TOKENRING_SNAP**)

    j. Save all of the options.

4. Enter **Create Virtual Printer Gazette** (must be the same name as the PSERVER printer name).

5. Enter **Start All**.

6. Reboot the NPS/IPS.

7. Perform the following tasks from the Novell server console.

    a. Enter **Load PSERVER PGazette**.

    b. Make sure the PSERVER window displays and Gazette activates and is waiting for jobs.

8. Provide all of the required installation parameters identified in the checklist provided in Chapter 2 of this guide to your service representative.

In the following illustration, the queue, remote printer, and virtual printer are configured with the same name, and the specified printer is set to print duplex. The user sends a print job through the LPT1 port to a queue named DPDuplex that is sent to the DPDuplex, and assigned to DPDuplex virtual printer.

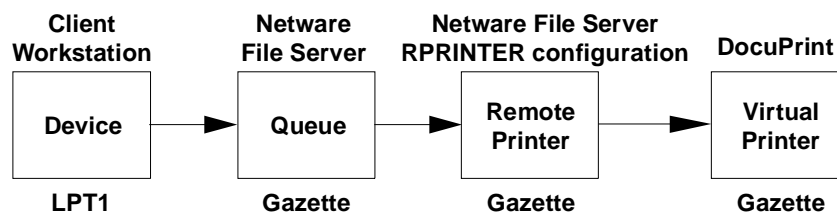| Client Workstation	Netware File Server	Netware File Server RPRINTER configuration	DocuPrint
Device	**Queue**	**Remote Printer**	**Virtual Printer**
LPT1	**Gazette**	**Gazette**	**Gazette**

Figure D-2. DocuPrint NPS/IPS configured as an RPRINTER

Supporting DocuPrint NPS/IPS on the file server

There are a number of tasks you perform on the file server to support the DocuPrint NPS/IPS as either a print server or a remote printer:

- With DocuPrint NPS/IPS as a PSERVER you must allow unencrypted password login on the file server. Enter the following command at the file server console prompt and in the AUTOEXEC.NCF file:

  set allow unencrypted passwords=on

  NOTE: Set this command even if you do not establish a print server password. Novell clients that use encrypted passwords are unaffected by this change and will continue to use encrypted passwords.

- Do not configure the file server to support IPX checksums or NCP packet signatures. Set these options to equal 0 or 1 so that the server performs these options only when the client requests them. The default value is 1.

- Do not set the watchdog interval to less than one minute. Longer intervals may cause the DocuPrint NPS/IPS to be logged out.

- If the print queue contains 250 jobs on a regular basis, set the Maximum File Locks Per Connection to a value greater than 250. The default value is 250.

- Define forms using PRINTDEF with names matching virtual printer names. (Applies only if DocuPrint NPS/IPS is configured as an RPRINTER.)

NOTE: DocuPrint NPS/IPS supports native connection to Novell 3.12 file servers. However, to run DocuPrint NPS/IPS with Novell 4.X servers, the Novell server must be configured to Bindery Emulation.

E. Defining the channel-attached printer to the host

This appendix contains some explanations and sample printer parameters for defining a channel-attached printer to your host, in each PSF environment.

MVS parameters

This section gives examples of printer device parameters and definitions in the MVS mainframe environment using PSF/MVS.

Printer and PSF definitions

The following shows JES and PSF definitions.

- JES2 definitions

    - Functional Subsystem (PSF) Definition

        FSSDEF(FSS1) PROC=APSWPROC,AUTOSTOP=NO, HASPFSSM=HASPFSSM

    - JES2 Printer Definition

        PRT (6) FSS=FSS1,MODE=FSS,PRMODE=(LINE, PAGE,SOSI1),CLASS=F,UCS=0,SEP=YES,SEPDS=NO, CKPTPAGE=100,MARK=YES,UNIT=1E8

- PSF definitions

```
//PRT6 CNTL
//PRT6 PRINTDEV FONTDD=*.FONT300,
//       FONT240=*.FONT240,
//       FONT300=*.FONT300,
//       FDEFDD=*.FDEF,
//       PDEFDD=*.PDEF,
//       OVLYDD=*.OLAY,
//       PSEGDD=*.PSEG,
//       JOBHDR=*.JOBHDR,
//       JOBTRLR=*.JOBTLR,
//       DSHDR=*.DSHDR,
//       MESSAGE=*.MSGDS,
//       PAGEDEF=X06483,
//       FORMDEF=A10111,
//       CHARS=(GT15,GT12)
//       PIMSG=(YES,999),
//       DATACK=BLOCK,
//       BUFNO=29,
//       TRACE=NO
//PRT6 ENDCNTL
```

Device definitions   The following are examples of MVS hardware configuration definition (HCD) printer definition panels. This defines the physical device.

```
+------------- Device / Processor Definition -------------+
|                                                          |
| +-------------------Define Device / Processor----------------+
| |                                                            |
| | Specify or revise the following values.                    |
| |                                                            |
| | Device number  . : 0633          Number of devices . . . . : 1
| | Device type  . . : AFP1-0                                  |
| | Processor ID . . : ELSEG1        IBM 3090-280J Located El Segundo
| |                                                            |
| | Unit address . . . . . . . . . . 33  + (Only necessary when different from
| |                                         the last 2 digits of device number)
| | Time-Out . . . . . . . . . . . . Yes (Yes or No)           |
| | STADET . . . . . . . . . . . . . No  (Yes or No)           |
| |                                                            |
| | Preferred CHPID  . . . . . . . .    +                      |
| | Explicit device candidate list .    (Yes or No)           |
| |                                                            |
| |   F1=Help     F2=Split    F4=Prompt     F5=Reset     F9=Swap     F12=Cancel
| +-----------------------------------------------------------+
|                                                            |
|    F1=Help      F2=Split     F3=Exit      F4=Prompt      F5=Reset
|    F6=Previous  F7=Backward  F8=Forward   F9=Swap        F12=Cancel
+----------------------------------------------------------+
```

Figure E-1. MVS hardware configuration definition panels (example 1)

```
   Goto  Filter  Backup  Query  Help
  ,-------------------- Change Device Definition  ----------------,
  |                                                               |
  | Specify or revise the following values.                       |
  |                                                               |
  | Device number  . . . . . . . : 0633 (0000-FFFF)               |
  | Device type  . . . . . . . . : AFP1-0                         |
  |                                                               |
  | Serial number  . . . . . . .                                  |
  | Description  . . . . . . . . . Art Ford                       |
  |                                                               |
  | Connected to CUs . 0633                                       |
  |                                                               |
  | ENTER to continue                                             |
  |                                                               |
  |  F1=Help     F2=Split     F3=Exit    F4=Prompt     F5=Reset     F9=Swap |
  | F12=Cancel                                                    |
  '---------------------------------------------------------------'

   F1=Help     F2=Split    F3=Exit       F4=Prompt   F5=Reset     F7=Backward
   F8=Forward  F9=Swap    F10=Actions  F11=Add      F12=Cancel
```

Figure E-2. MVS hardware configuration definition panels (example 2)

```
  ,-----------------------------------------------------------------,
  |              Define Device Parameters / Features        Row 1 of 3 |
  | Command ===>                                   Scroll ===> PAGE   |
  |                                                                   |
  | Specify or revise the values below.                               |
  |                                                                   |
  | Configuration ID . : ELSEG1     MVS/ESA Hardware Definitions       |
  | Device number   . . : 0633       Number of devices : 1             |
  | Device type   . . . : AFP1-0                                       |
  |                                                                   |
  | Parameter/  Value    P Req.  Description                           |
  | Feature                                                           |
  | OFFLINE     Yes                Device considered online or offline at IPL |
  | DYNAMIC                        Device supports dynamic configuration |
  | BURSTER     No                 Burster-Trimmer-Stacker             |
  | *****************************Bottom of data*************************** |
  |                                                                   |
  |                                                                   |
  |                                                                   |
  | F1=Help        F2=Split      F4=Prompt     F5=Reset      F7=Backward |
  | F8=Forward     F9=Swap      F12=Cancel                             |
  '-----------------------------------------------------------------'
```

Figure E-3. MVS hardware configuration definition panels (example 3)

For further information on defining your printer, refer to the following IBM documentation.

- *OS/390 Hardware Configuration Definition User's Guide (#SC28-1848)*
- *2/OS Hardware Configuration Definition User's Guide (#SC33-7988)*

Infoprint Manager procedures for Windows NT and Windows 2000

This section explains how to access the Create Printer Wizard in the Infoprint Manager Administration GUI, which allows you to create an actual destination (physical printer) using Infoprint Manager for Windows NT and Windows 2000.

To create a channel-attached printer:

1. On the menu bar, click **Printer**, then **Create**, then **PSF**, then **Channel**.

   *NOTE: The Channel is not shown in the menu by default. To add it, select **Printer**, then **Add/Remove Menu Items**.*

2. Provide information as prompted by the wizard. For assistance, refer to the Infoprint Manager Administration GUI online help.

   *NOTE: From the Model pulldown menu, make sure to select **Infoprint 60** as your printer model.*

3. If you did not enable the printer with the Create Printer Wizard, use the Infoprint Manager Administration GUI to enable it.

For detailed information on the attribute default values set by the wizard, refer to *IBM Infoprint Manager for Windows NT and Windows 2000, Getting Started*.

Infoprint Manager procedures for AIX

There are five versions of PSF/6000 or Infoprint Manager for AIX:

- Versions 1.1, 1.2, and 2.1

    These earlier versions are called PSF/6000.

- Versions 3.1 and 3.2

    These current versions are called Infoprint Manager for AIX.

There are three different methods for creating printers:

- System Management Interface Tool (SMIT)

    All five versions of PSF/6000 and Infoprint Manager for AIX support this method.

- Command line interface

    All five versions of PSF/6000 and Infoprint Manager for AIX support this method.

- Visual System Management (VSM)

    This is a graphical user interface (GUI) supported by Infoprint Manager for AIX versions 3.1 and 3.2 only.

*NOTE: Regardless of the method used, from the Model pulldown menu, make sure to select **Infoprint 60** as your printer model.*

For detailed information on setting the attribute default values using any of these methods, refer to the appropriate section of the document, *IBM Infoprint Manager for AIX, Getting Started*.

VM sample definitions

This section gives an example of printer device parameters and definitions for a channel-attached printer in a mainframe VM environment using PSF/VM.

CNTLUNIT CUNMBR=632,
PATH=16,
PRTOCL=S,
SHARED=N,
UNIT=AFP1,
UNITADD=((32,02))

IODEVICE CUNMBR=632,
UNIT=AFP1,
ADDRESS=(632,02))

Rdevice 0630-0637 Type AFP

For further information, refer the IBM document, *PSF/VM System Programming Guide (#S544-3680).*

VSE sample definitions

This section shows sample parameters for a channel-attached printer in a mainframe VSE environment, using PSF/VSE.

```
* $$ JOB JNH=APSTANO,DISP=L,PRI=3,CLASS=B
* $$ LST CLASS=A,DISP=0,PRI=9
// JOB APSTANO
// OPTION NODUMP
// DLBL IMSYS 'IMSYS'
// EXTENT ,SYSWK6
// DLBL IMSYS 'IMSYS'
// EXTENT ,SYSWK6
  LIBDEF *,SEARCH=(IMSYS.AFP300,
  IMSYS2.PAGELIB,IMSYS2.PARMLIB,IMSYS.PRSABC,
  IMSYS.PR$ADA,IMSYS.PR$ADB,IMSYS.PR$DY8,
  IMSYS2.COMPAREX,IMSYS2.FONT,IMSYS2.FORMLIB,
  PRD2.AFP,IMSYS.PROD,PRD2.AFP240,PRD2.AFP300
// EXEC APTBMIEP,SIZE=APTBMIEP
  X3820 PRINTDEV BUFNO=10
       CHARS=GT12
       CKPTPAGE=100
       DATACK=BLKCHAR,
       FONTPR=NO,
       LOGDEST=LOCAL,
       MRKFRM=NO,
       NOTIFY=YES,
       PIMSG=(YES,0),
       SETUP=FORMS,
       SPBUFFER=8
       PAGEDEF=VO6683,
       FORMDEF=AUTO,
     UNIT=630
```

F. Defining the printer to the host: TCP/IP attachment

This appendix contains instructions, prerequisites, and some sample printer parameters for defining your TCP/IP-attached printer to your host, in each PSF environment.

MVS or OS/390 parameters

This section discusses the parameters and procedures required to define a printer to your host, followed by examples of the parameters required for a Token Ring connection using TCP/IP in a MVS environment.

NOTE: The MVS examples shown are for a Token Ring connection. However, the same parameters will be required for an Ethernet connection using TCP/IP.

Software prerequisites – MVS

On an MVS/ESA or OS/390 host system, you must have the following software to print through PSF on a TCP/IP-attached printer:

- PSF/MVS Version 3, release 2.0, with APAR OW 15599 or later

- MVS Scheduler APAR OW 12236 to support two new PRINTDEV keywords: IPADDR and PORTNO

- TCP/IP Version 3, release 1 or higher, installed and configured on MVS.

You must have these prerequisites installed on your host before you begin the configuration process described in this chapter. Ensure that the manuals for the proper software releases are used.

Network configurations – MVS

The printer is supported in all the following configurations, provided that the software prerequisites are installed.

- Basic configuration in which the MVS host is attached to a LAN using a Token Ring or Ethernet network adapter card

- Remote LAN environment in which there are data communication links between the host and the LAN-attached controller

- Configurations in which the LAN with the printer attached is connected to the host-attached controller using LAN devices such as routers

- Environments with intermediate host systems between the MVS host running PSF and the LAN-attached controller.

NOTE: There may be printer performance and throughput implications with some of these configurations. It is recommended that your network management group be involved with planning this installation.

Configuration steps – MVS

The software configuration process for an MVS or OS/390 environment with TCP/IP consists of six major steps:

1. Configure the printer for TCP/IP at the printer controller

Refer to your *Guide to Configuring and Managing the System* for setting system options.

2. Configure the MVS CCU for the MVS host to MVS

The MVS communications control unit (CCU) could be the 3172, 3174, or 3745 control unit. To configure it to MVS, you can use either a hardware configuration definition (HCD) or an MVS configuration program (MVSCP). If your control unit and LAN are already installed and operational, skip this step.

NOTE: The AFP1 parameter used when channel-attached IPDS printers are defined is not applicable in this configuration. It is the communications control unit (3172, 3174, or 3745) that is being defined to MVS, not the printer's control unit.

3. Configure the PSF printer in JES2 or JES3

This section discusses the procedures for configuring the printer in JES2 or JES3 environments.

Configuring in JES2

To configure the PSF printer in JES2, follow these steps:

1. Locate the JES2 initialization dataset in the JES2 Startup JCL Procedure (JES2 PROC). (This is normally kept in SYS1.PROCLIB, although your system may use a different library.)

   The JES2 PROC has a DD statement (normally HASPPARM), which points to the initialization dataset. (The location of this statement is SYS1.PARMLIB(JES2PARM); however, you should always verify the location on your own system.)

2. Enter the following required commands in the JES2 initialization dataset to define the PSF functional subsystem (FSS):

   • One FSS statement for each PSF functional subsystem

   • One PRTnnnn statement for each functional subsystem application (FSA) under control of the FSS. (This can also be specified as PRINTnn or PRINTERn.)

   The following table lists the JES2 FSS statement parameters to be defined.

Table F-1. JES2 FSS statement parameters

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
FSS parameters					
PROC	None	PSF Startup procedure name/	1 to 8-character alphanumeric string	Specifies name of procedure for starting this FSS. Different FSS statements can refer to the same startup procedure	
AUTOSTOP	NO	Installation preferences	YES or NO	Specifies whether FSS address space is stopped automatically if all FSAs under control of the FSS are stopped.	

Table F-1. JES2 FSS statement parameters (Continued)

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
HASPFSSM	HASPFSSM	JES2 Load module to be loaded into FSS address space	HASPFSSM	Either omit parameter or specify default value of HASPFSSM.	
PRT parameters					
QUEUE	None	Installation output class standards	List of alphanumeric output classes		
COPYMARK	DATASET	Installation preferences	DATASET or JOB or CONSTANT	DATASET: printer will offset-stack or stitch on a dataset boundary. JOB: printer will offset-stack or stitch on a job boundary. CONSTANT: Copymarks are constant; no offset stacking or stitching is done.	
FORMS	None	Forms that will be printed on this printer	1 to 8 form names (each 1 to 8 alphanumeric characters in length)	If WS is F, only output with these form names will be selected for printing on this printer.	
FSS	None	Name of FSS	1 to 8-character alphanumeric string	Required	
MARK	NO	Installation preferences	YES or NO	YES specifies that MARKFORM be created at the end of each job.	
MODE	FSS (if FSS= is coded)	Must be FSS	FSS	MODE=FSS should be specified.	
PRESELECT	YES	Installation preferences	YES or NO	Specifies whether output datasets are preselected for this FSA.	

Table F-1. JES2 FSS statement parameters (Continued)

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
ROUTECDE	None	Installation printer name standards	1 to 4 destination names	If WS if F, only output with these destinations is selected for this printer.	
START	YES	Should be NO for TCP/IP printers.	YES or NO	START=NO should be specified so TCP/IP can be started before the FSS.	
TRKCELL	no	See JES2 SPOOLDEF statement	YES or NO	IBM recommends YES.	
WS	None	Installation preferences	See JES2 Initialization and Tuning Manual.	Consider CL, R, and F. See JES2 Initialization and Tuning Manual for more information.	

Following is an example of the JES2 Initialization Dataset required commands:

Table F-2. **JES2 Initialization Dataset commands example**

FSS (FSS1)	PROC=FSSPROC1,HASPFSSM=HASPFSSM,AUTOSTOP=YES
PRT0001	CLASS=E,FSS=FSS1,MODE=FSS,PRESELCT=YES,
	START=NO,TRKCELL=YES,WS=(Q)

Configuring in JES3

Follow these steps to configure the PSF printer in JES3:

1. Locate the JES3 initialization dataset (commonly known as Initialization Deck) in the JES3 catalogued JCL Procedure. (This is normally kept in SYS1.PROCLIB, although your system may use a different library.)

   The JES3 PROC has a JES3IN DD statement, which points to the initialization dataset. The default initialization deck is in SYS1.SAMPLIB (member JES3IN00); however, you should verify your location by looking at the JES3 procedure.

2. Enter the following required commands in the JES3 initialization deck to define the PSF functional subsystem (FSS):

   - One FSSDEF statement for each PSF functional subsystem

- One DEVICE statement for each functional subsystem application (FSA) under control of the FSS.

The following table lists the JES3 FSS statement parameters to be defined.

Table F-3. JES3 FSS statement parameters

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
FSSDEF parameters					
FSSNAME	None	Installation preferences	1 to 8-character alphanumeric string	Specifies name of the FSS. (Required parameter)	
MSGDEST	JES	Installation preferences	JES or a destination class name	Specifies the console destination class for FSS messages.	
PNAME	None	Name of the FSS procedure	1 to 8-character alphanumeric string	Specifies the procedure for starting this FSS. (Different FSSDEF statements may refer to same procedure.)	
SYSTEM	Same as specified in JUNIT parameter of DEVICE statement	System ID of system the FSS is to run on.	Valid system ID name	Can also be specified as QUEUE=	
TERM	NO	Installation preferences	YES or NO	YES specifies FSS terminates if JES3 global address space is terminated.	
TYPE		TYPE=WTR must be specified	WTR	Specifies FSS is an output writer. TYPE=WTR must be specified.	
DEVICE parameters					
BURST	YES	Installation preferences	YES or NO ,M	,M specifies MARKFORM, which causes printer to offset-stack or stitch jobs, subject to printer's setting and the COPYMARK parameter.	

Table F-3. JES3 FSS statement parameters (Continued)

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
COPYMARK	J	Installation preferences	N or J or C	C: printer will offset-stack or stitch on a dataset copy basis. J: Printer is to increment offset stacking or stitching on a job boundary. N: Copymarks are constant, and no offset stacking or stitching is done.	
DGROUP	None	Installation printer destination naming conventions	1 to 8-character alphanumeric string	Specifies destination processed by this FSA (applicable only if D is specified in the WS parameter).	
DTYPE	None	PRTAFP1	PRTAFP1	Required parameter	
DYNAMIC	NO	Installation printer name standards	YES or NO	DYNAMIC=NO should be specified so JES3 will keep FSA active between transmission of datasets.	
FSSNAME	None	Name of FSA in JNAME parameter	1 to 8-character alphanumeric string	Must match value in FSSNAME parameter of FSSDEF statement.	
JNAME	None	FSSNAME parameter of FSSDEF statement	1 to 8-character alphanumeric string	Must match value in FSSNAME parameter of FSSDEF statement.	
JUNIT	ON	See comments.	(Device address, Main, dest class, ON/OFF)	Device address should not be specified for TCP/IP printers. Main is name of processor the FSS is to run on. Dest class is destination class for FSA messages. ON or OFF specifies whether FSA is initially online or offline.	
MODE	None	Must be FSS.	FSS	MODE=FSS must be specified.	

Table F-3. JES3 FSS statement parameters (Continued)

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
WC	Any class selected	Installation output class standards	List of alphanumeric output classes, each separated by a comma	If CLASS is specified in the Work-selection criterion in the WS parameter, the FSA selects datasets that match values specified here.	
WS		Installation preferences (see note)	Work-selection criterion	Consider CL, R, and F. See Note below and JES3 Initialization and Tuning Reference manual for more information.	

NOTE: The WS parameter CL specifies that datasets with the same class as the WS parameter should be selected. D specifies that only datasets with the same destination as the DGROUP parameter should be selected. F specifies that JES3 is to pass the forms value specified on the DD or OUTPUT JCL statement to the FSA.

Following is an example of the JES3 initialization dataset required commands:

Table F-4. **JES3 initialization dataset commands example**

FSSDEF	TYPE=WTR,FSSNAME=FSSTCP1,PNAME=FSSPROC1,SYSTEM=SYS1,TERM=NO
DEVICE	DTYPE=PRTAFT1,JNAME=PRT7,JUNIT=(,SYS1,,OFF),FSSNAME=FSSTCP1,
	DGROUP=LOCAK, MODE=FSS,PM=(LINE,PAGE,SOSI1),WC=(T),WS=CL,D,F)

4. Configure the printer in PSF/MVS

Follow these steps to configure the printer in PSF:

1. Locate the PSF startup procedure in the JES3 or JES2 startup JCL procedure. This is normally kept in SYS1.PROCLIB, although your system may use a different library.

   The libraries specified by the //PROC00 DD statement normally contains startup procedures for PSF subsystems. The name of the procedure is specified in the initialization dataset (FSS statement PROC parameter in JES2; the FSSDEF statement PNAME parameter in JES3. See the appropriate section in this appendix for clarification).

2. Add a PRINTDEV statement to define the printer in PSF. (See the example below for the general format or the *Print Services Facility for OS/390 Customization* for more information.)

   The table below contains descriptions of the PSF parameters which need to be set for the printer.

Table F-5. PSF/MVS PRINTDEV statement parameters

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
APPLID	None	VTAM APPL statement	1 to 8-character alphanumeric string	Not applicable for TCP/IP-attached printer	
BUFNO		N/A	5 to 100	Not applicable for TCP/IP-attached printer	
FAILURE		Installation preferences	WCONNECT or STOP	If printer is used by other hosts, WCONNECT causes PSF to continuously retry to establish connection with printer.	
FDEFDD	None	Installation preferences	1 to 8-character alphanumeric string	Name of the form definition library DD statement	
FONTDD	None	Installation preferences	1 to 8-character alphanumeric string	Name of font library DD statement. Fonts in this library must match resolution the printer is using.	

Table F-5. PSF/MVS PRINTDEV statement parameters (Continued)

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
FORMDEF	None	Installation preferences	1 to 6-character alphanumeric string	Name of default FORMDEF for printer	
IPADDR	None	Xerox installation	Valid IP address in dotted decimal format, enclosed in quotes	Example: IPADDR='12.345.676.89'	
JOBHDR	None	Installation preferences	1 to 8-character alphanumeric string	Name of OUTPUT statement that defines form and page definition used to format job header separator pages	
JOBTRLR	None	Installation preferences	1 to 8-character alphanumeric string	Name of OUTPUT statement that defines form and page definition used to format job trailer separator pages	
LOGMODE		N/A		Not applicable for TCP/IP-attached printer	
LUNAME		N/A		Not applicable for TCP/IP-attached printer	
MESSAGE	None	Installation preferences	1 to 8-character alphanumeric string	Identifies OUTPUT statement that specifies form and page definitions used to format and print messages.	
MGMTMODE		Installation preferences	OUTAVAIL or DIALIN or IMMED	OUTAVAIL: Requests that PSF start a communication session with printer only when output is available on JES spool. DIALIN or IMMED: Requests that PSF start a communication session with this printer immediately. PSF then looks for output available on JES spool.	
NPRO		N/A		Not applicable to cut-sheet Xerox printers	

Table F-5. PSF/MVS PRINTDEV statement parameters (Continued)

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
OBJCONDD		N/A		Not applicable for TCP/IP-attached printers	
OVLYDD	None			Name of font library DD statement. Fonts in this library must match the resolution the printer is using.	
PAGEDEF	None			Name of default Page Definition for printer	
PDEFDD	None			Name of Page Definition library DD statement	
PIMSG	(YES,16)	Installation preferences	(YES,nnn) or (NO,nnn)	YES: Specifies error messages are always printed. nnn: Specifies maximum number of messages groups generated before job is purged from spool. A value of 0 causes printer to print continuously, regardless of number of errors.	
PORTNO	5001	Controller Set Option command	Valid TCP/IP port number between 5001 and 32767	Applicable only to TCP/IP printers. (Ensure the chosen port number is not in TCP/IP list of reserved port numbers.)	
PSEGDD	None			Name of Page Segment library DD statement. For best results, the images in page segments in this library should match the resolution the printer is using.	

Table F-5. PSF/MVS PRINTDEV statement parameters (Continued)

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
SETUP	No Setup messages issued	Installation preferences	SETUP=FORMS if specified	If specified, causes JES to issue FORMS setup message when a job prints which has a FORMS specification different from job previously printed. This is recommended where there are multiple paper stocks for use on the printer.	
RELINTV				Not applicable to Xerox cut-sheet printers	
RELMODE	None		IDLE, TIME, or NONE	Not applicable to Xerox cut-sheet printers	
TIMEOUT		Installation preferences	REDRIVE or STOP	REDRIVE: When there is a time-out after period specified in DISCINTV parameter, REDRIVE requests that PSF attempt to drive the printer according to MGMTMODE specification. STOP: Forces operator to restart FSA. Note: REDRIVE is recommended for TCP/IP printers that may be shared with other hosts.	
TRACE	NO		YES or NO	Should be used only for debugging PSF-related problems.	

NOTE: To specify a TCP/IP address space name other than the default (TCPIP), code the following EXEC statement in the appropriate PSF writer procedure:

STEP01 EXEC PGM=APSPPIEP,

   PARM=(,,,,tcpip_name), REGION=4096K

where tcpip_name is the name of the TCP/IP address space.

If this parameter is not coded, PSF uses the default name, TCPIP. (For a full description of the PARM parameter, refer to Print Services Facility for OS/390 Customization.)

Table F-6. PSF/MVS PRINTDEV statement example

//PRT277 CNTL //PRT277 PRINTDEV FONTDD=*.FONT01, /* FONT LIBRARY DD */	
//	OVLYDD=*.OLAY01, /* OVERLAY LIBRARY DD */
//	IPADDR='13.240.160.97', /* PRINTER IP ADDRESS */
//	PORTNO=5005 /* PORT NUMBER */
//	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 */
//	BUFNO=29, /* NUMBER OF WRITE DATA BUFFERS */
//	PAGEDEF=X06483, /* DEVICE PAGEDEF DEFAULT */
//	FORMDEF=A10111, /* DEVICE FORMDEF DEFAULT @H3C*/
//	CHARS=(GT15, /* DEVICE */
//	GT12,GT18,GT24), /* DEFAULT FONT SET @H3C*/
//	PIMSG= (YES,999), /* ACCUMULATE DATA SET MESSAGES */
//	DATACK=BLOCK, /* BLOCK DATA CHECKS */
//	TRACE=NO /* BUILD INTERNAL TRACE @H3C*/
// PRT277 ENDCNTL	

5. Configure TCP/IP for MVS for the printer

NOTE: The information in this section is for TCP version 3.2 and 3.3. For version 3.4 or later, refer to the appropriate IBM documentation.

The TCP/IP Profile dataset contains statements that define the parameters used by TCP/IP for MVS address space. The following parameters have special consideration for PSF and the TCP/IP-attached printers.

> *NOTE: It is not necessary to define the printer in TCP/IP for MVS, because the printer acts as a conduit from the MVS system to the LAN. However, some settings in the TCP/IP Profile dataset may need to be altered, depending on your current settings.*

Table F-7. TCP/IP Profile dataset parameters – MVS

Item description	Default	Source of value	Range of acceptable values	Comments	Your value
DATABUFFERPOOLSIZE Data buffers	160	Installation preferences	7 to nnnn, where nnnn is limited by available virtual storage	Specify at least 160 buffers.	
DATABUFFERPOOLSIZE Buffer size	16384	Installation preferences	8192 49152 12288 65536 16384 98304 24576 131072 28672 196608 32768 262144	Specify a buffer size of at least 32768, if possible.	
SMALLDATABUFFER POOLSIZE	0	Installation preferences	0 to nnnn, where nnnn is limited by available virtual storage	Specify at least 256 small data buffers.	
TINYDATABUFFERP OOLSIZE	0	Installation preferences	0 to nnnn, where nnnn is limited by available virtual storage	Specify at least 256 tiny data buffers.	
KEEPALIVEOPTIONS	Interval 120 sendgarbage false	Installation preferences		See Notes.	
GATEWAY max_packet_size	Defaultsize is 576	Installation preferences	Can be from 576 to 67108864, but cannot be larger than value specified on LARGEENVE LOPEPOOLSIZE statement.	Max packet size parameter should be no greater than 4472 bytes in a 4 Mbps LAN configuration, and 17800 in a 16 Mbps LAN configuration. Default MTU value in printer is 2052.	

Considerations for configuring TCP/IP for MVS

Following are some considerations for configuring TCP/IP for MVS:

- To specify a TCP/IP address space name other than the default (TCPIP), code the following EXEC statement in the appropriate PSF writer procedure:

  STEP01 EXEC PGM=APSPPIEP,

     PARM=(,,,,tcpip_name), REGION=4096K

  where tcpip_name is the name of the TCP/IP address space.

  If this parameter is not coded, PSF uses the default name, TCPIP. (For a full description of the PARM parameter, refer to *Print Services Facility/MVS: Diagnosis Guide and Reference.*)

- KEEPALIVEOPTIONS statement: PSF relies on TCP to detect when a connection with the printer 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 KEEPALIVEOPTIONS 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 the NPS/IPS, it is recommended you specify a shorter interval than the default—such as 10 minutes—for the interval between keep-alive transmissions. Also, unless any target host requires that the keep-alive packet contain data, specify SENDGARBAGE FALSE. For example:

  KEEPALIVEOPTIONS INTERVAL 10 SENDGARBAGE FALSE ENDKEEPALIVEOPTIONS

  If you change any of the values in the TCP/IP profile, restart TCP/IP to pick up the changes.

Table F-8. TCP/IP Profile dataset statements example – MVS

ACBPOOLSIZE	1000	
ADDRESSTRANSLATIONPOOLSIZE	1500	
CCBPOOLSIZE	150	
DATABUFFERPOOLSIZE	160	32768
ENVELOPEPOOLSIZE	750	
IPROUTPOOLSIZE	300	
LARGEENVELOPEPOOLSIZE	50	
RCBPOOLSIZE	50	
SCBPOOLSIZE	256	
SKCBPOOLSIZE	256	
SMALLDATABUFFERPOOLSIZE	256	
TCBPOOLSIZE	512	
TINYDATABUFFERPOOLSIZE	256	
UCBPOOLSIZE	100	
KEEPALIVEOPTIONS INTERVAL 10 SENDGARBAGE TRUE ENDKEEPALIVEOPTIONS		
GATEWAY		

; * Network	First hop	Linkname	Packet size	Subnet mask	Subnet value
9	=	BPCLAN	2000	0.255.255.0	0.99.12.0
DEFAULTNET	9.99.12.254	BPCLAN	2000	0.255.255.0	0

References: For information about the TCP/IP profile and the statements described in this section, refer to the following publications:

- *TCP/IP for MVS: Customization and Administration Guide*
- *TCP/IP: Performance Tuning Guide*

6. Test the printer to ensure it prints from the MVS host

Test the printer by one of the following methods:

- Send a job from the host through PSF to print on the printer.

- Ping the printer from your MVS host to ensure MVS can establish a connection with the TCP/IP-attached printer.

Pinging the printer – MVS

To ping the printer from the MVS host, enter one of the following commands:

- At your MVS host, enter the following command at the TSO prompt or from the Interactive System Productivity Facility (ISPF), menu 6:

    PING ip-address

- Enter the following command from any ISPF command line:

    TSO ping ip-address

ip-address specifies the internet protocol (IP) address of the printer.

If the ping is successful:

Table F-9. Example of a successful ping – MVS

EZA0458I Ping V3R1: Pinging host 9.99.12.33

  (Use ATTN to interrupt)

EZA 0463I PING: Ping #1 response took 0.084 seconds.

Successes so far = 1.

NOTE: A successful ping usually indicates that the MVS system can communicate with the printer. However, you could receive a successful ping even if 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. Power off the printer.

2. Wait at least five minutes for TCP/IP to clear the Address Resolution Protocol (ARP) tables.

> *NOTE: If your installation specified a longer interval on the ARPAGE configuration statement in the TCP/IP profile, you may need to wait longer than five minutes. (For information about the ARPAGE statement, refer to the IBM TCP/IP MVS Customization and Administration Guide.)*

3. Enter the ping command again at the MVS system.

   If you receive a successful response to the ping command this time, it means there is a duplicate IP address. Consult your network administrator.

If the ping is unsuccessful:

Table F-10. Example of an unsuccessful ping – MVS

```
EZA0458I Ping V3R1: Pinging host 9.99.12.33

 (Use ATTN to interrupt)

EZA 0464I PING: Ping #1 timed out
```

If your ping is not successful, verify the following:

- The printer is powered on.

- The cables are properly connected between the printer and the LAN.

- The Network Interface Card (NIC) in the printer is functioning properly. (Consult your Xerox service representative.)

- There is proper connectivity to the Multi-station Access Unit (MAU), if one is being used.

- The IP address used to define the printer in PSF is unique in the TCP/IP network.

- The IP address of the MVS system is unique. If not, consult your network administrator to resolve the address problem.

- The Maximum Transmission Unit (MTU) size of the IP packet for the MVS system is equal to the MTU size of the printer. (For information about the values recommended for the MVS system, see the "GATEWAY" statement in table B-8.)

  – To change the MTU size for the MVS system, change the GATEWAY statement in the MVS TCP/IP profile, and restart TCP/IP to activate the changes.

  – If you are running RouteD, the maximum MTU size is the one specified on the BSDROUTINGPARMS statement (MTU).

- The default MTU value in the printer is 2052. To change the MTU size for the printer, refer to the Sun network software documentation.

- If these items are all in order, consult your network administrator about a possible network problem.

Correcting for printer performance issues – MVS

Should you notice any printer performance problems—e.g., through-put speed degradation, check the areas listed in the following table.

Table F-11. **Components to check for printer performance problems**

MVS	On the MVS system, ensure that both the PSF and TCP/IP address spaces are receiving a high level of service, are at a high dispatching priority, and their datasets and the JES2 spool datasets are on DASD volumes that have low competing activity from other applications and from other DASD volumes on the same path.
Printer	Ensure that the Maximum Transmission Unit size (MTU) is as large as possible. A small MTU size increases the number of packets that are transmitted, allowing greater chances of degradation throughout the network. Increasing the MTU size in both TCP/IP for MVS and in the printer may improve printer performance.
LAN	If the printer is on a LAN that also has a large number of other devices attached to it, the high levels of traffic on the LAN can cause printer speed degradation. Consider moving the printer to a LAN that does not have so much activity on it.
LAN-to-host attachment	If the speed of the link connecting the LAN with the printer attached to the MVS system is slow, this could be a bottleneck. This could be a concern with any configuration in which the LAN-attached controller (i.e., 3745, 3172, or 3174) is not directly channel-attached to the host running PSF. This could occur in a Remote LAN configuration as discussed in the Network Configurations section, earlier in this chapter. Review your network configuration diagrams to look for any potential bottlenecks.

References – MVS

The following IBM documents, referenced in this section, can provide additional information on MVS-to-IPDS printer connectivity.

Table F-12. **MVS reference documentation**

Title	Publication number
MVS Collection Online Library Omnibus Edition	SK2T-0710
OS/390 HCD Planning or MVS/ESA Migration Planning: Dynamic I/O Configuration	GC28-1445
OS/390 HCD User's Guide or MVS/ESA Hardware Configuration: Using the Dialog	SC33-6468
Print Services Facility for OS/390 Customization	S544-5622
TCP/IP for MVS: Customization and Administration Guide	SC31-7134
TCP/IP for MVS: Performance Tuning Guide	SC31-7188
OS/390 JES2 Initialization and Tuning Reference	SC28-1792
OS/390 JES3 Initialization and Tuning Reference	SC28-0073

AS/400 parameters

This section describes the process of configuring an AS/400 system to communicate and print using TCP/IP. This process is applicable to either a Token Ring or an Ethernet LAN.

This information applies to all AS/400 RISC models with OS/400 V3R7 (or higher) installed.

Software prerequisites – AS/400

The following prerequisite software packages must be installed on your host system before you begin the configuration process described in the following pages. Ensure that you are using the manuals for the proper software releases.

Table F-13. AS/400 software prerequisites

OS/400	Licensed program	Description	Product option
V3R7	5716TC1	TCP/IP Connectivity Utilities for AS/400	*BASE
V3R7	5716SS1	OS/400—Print Services Facility/400	N/A
V3R2	5763TC11	TCP/IP Connectivity Utilities/400	N/A
V3R2	5763AF1	Advanced Function Printing Utilities/400	N/A

Network configurations – AS/400

The printer is supported in all the following types of AS/400 configurations, provided that the software prerequisites are installed.

- Basic configuration in which the AS/400 is attached to a LAN using either a Token Ring or Ethernet network adapter card

- Remote LAN environment in which there are data communication links between the AS/400 and the LAN-attached controller

- Configurations in which the LAN with the printer attached is connected to the host-attached controller using LAN devices such as routers.

NOTE: There may be printer performance and throughput implications with some of these configurations. It is recommended that your network management group be involved with planning this installation.

Configuration steps – AS/400

Follow these steps to configure your AS/400 to print to a printer connected to the LAN, using TCP/IP.

Configuration worksheet

The following worksheet will help you in planning the printer installation. It describes the key values which you need to supply when planning the AS/400 configuration. All values on this worksheet must be determined before you begin the printer configuration on the host.

Table F-14. AS/400 configuration worksheet for NPS/IPS

Item description	Also known as...	Source	Your value
Device description	DEVD	This is the name of the printer (writer). An Output Queue of the same name is automatically created. Spool files that you place in this Output Queue are directed to the printer.	
Remote location	RMTLOCNAME	Xerox printer software installation. This is the printer IP address.	
Port number	PORT	Use the Set Option command to set the option IPDSTcpPortNumber. The value 5001 works best for IPDS printers.	
PSF configuration	PSFCFG	Same as Device description	

NOTE: It is assumed that your AS/400 is connected to the LAN and all the prerequisite software is installed and configured.

1. Configure the printer for TCP/IP at the printer controller

Refer to the *Guide to Configuring and Managing the System* for the procedure to specify the TCP/IP option.

2. Create the PSF/400 configuration

Follow these steps to configure PSF/400 for the printer.

1. At the AS/400, press <F4> to prompt the CRTPSFCFG command.

2. Key in the parameter values as indicated in the figure below. For parameters with * beside them, refer to the configuration worksheet, earlier in this section.

Table F-15. Create PSF Configuration screen – AS/400

Create PSF Configuration (CRTPSFCFG)		
Type choices, press Enter.		
PSF configuration.........	> XEROXIPS	*
Library................	> QGPL	
User resource library list.	*JOBLIBL	
Device resource library list.... + for more values	*DFT	
IIPDS pass through.......	*NO	
Activate release time.....	*NORDYF	
Release time.............	> *SEC30 or *NOMAX	
Restart timer............	> *IMMED	
SNA retry count..........	10	
Delay time between SNA retries..	90	
Text 'description'........	*BLANK	
Additional parameters....		
Blank page...............	*YES	
Page size control........	*NO	
Resident font............	*NO	
Resource retention.......	*YES	
Edge orient..............	*NO	
Remote location: Name or address........	> '9.9.999.999'	*
TCP/IP port..............	> 5001	*
TCP/IP activation timer...	170	

3. Create the printer device description – AS/400

Follow these steps to create the device description for the printer.

1. At the AS/400, press <F4> to prompt the CRTDEVPRT command.

2. Key in the parameter values as indicated in the appropriate figure below.

   - Table F-16 shows printer description parameters for OS/400 with V3R7 installed.

   - Table F-17 shows parameters for OS/400 with V3R2 installed.

   For parameters with * beside them, refer to the configuration worksheet, earlier in this section.

Table F-16. Create Device Description (Printer) screen for OS/400 with V3R7 installed

```
CREATE DEVICE DESC (PRINTER) (CRTDEVPRT)

Type choices, press Enter.

DEVICE DESCRIPTION.........          > XEROXIPS          *

DEVICE CLASS...............          > *LAN             (New to V3R7)

DEVICE TYPE................          > *IPDS

DEVICE MODEL...............          > 0

LAN ATTACHMENT.............            *IP              (New to V3R7)

ADVANCED FUNCTION PRINTING..          *YES

PORT NUMBER................          > 5001              *

ONLINE AT IPL..............            *YES

FONT:
  IDENTIFIER...............          > 11

  POINT SIZE...............            *NONE

FORM FEED..................            *AUTOCUT

SEPARATOR DRAWER...........            *FILE

SEPARATOR PROGRAM..........            *NONE

  LIBRARY..................

PRINTER ERROR MESSAGE......            *INQ

MESSAGE QUEUE..............            QSYSOPR

  LIBRARY..................            *LIBL
```

**Table F-16. Create Device Description (Printer) screen for
OS/400 with V3R7 installed (Continued)**

ACTIVATION TIMER...........	170	
MAXIMUM PENDING REQUESTS...	6	
PRINT WHILE CONVERTING.....	*YES	
PRINT REQUEST TIMER........	*NOMAX	
FORM DEFINITION	F1C10110	
LIBRARY.................	*LIBL	
REMOTE LOCATION: NAME OR ADDRESS..........	9.9.999.999	*
REMOTE NETWORK IDENTIFIER...	*NETATR	
WORKSTATION CUSTOMIZING OBJECT	*NONE	
LIBRARY.................		

USER-DEFINED OBJECT:
  OBJECT...................
   LIBRARY................
  OBJECT TYPE..............
	> XEROXIPS
	> QGPL
	> *PSFCFG
		* Same as PSF
		configuration

DATA TRANSFORM PROGRAM.....	*NONE	
LIBRARY.................		
TEXT 'DESCRIPTION'.........	*BLANK	

4. Test the printer connection – AS/400

Test the printer by one of the following methods to ensure AS/
400 is able to make a connection with the printer:

- Send a job from the host through PSF to print.

- Ping the printer from your AS/400 system to ensure the AS/
  400 can establish a connection with the TCP/IP-attached
  printer.

Pinging the printer To ping the printer to verify a connection can be made, enter the following command on an OS/400 command line:

PING *'Remote Location'*

'remote location' specifies the internet protocol (IP) address of the printer (refer to the configuration worksheet, earlier in this section).

If the ping is successful:

Table F-17. Example of a successful ping – AS/400

ping 9.9.999.999

Verifying connection to host system LOOPBACK at address 9.9.999.999.

Connection verification 1 took .000 seconds. 1 successful connection verifications.

Connection verification 2 took .000 seconds. 2 successful connection verifications.

Connection verification 3 took .001 seconds. 3 successful connection verifications.

Connection verification 4 took .000 seconds. 4 successful connection verifications.

Connection verification 5 took .000 seconds. 5 successful connection verifications.

Round-trip (in milliseconds) min/avg/max = 0/0/1

Connection verification statistics: 5 of 5 successful (100 %).

NOTE: A successful ping usually indicates that the AS/400 system can communicate with the printer. However, you could receive a successful ping even if the IP address of the TCP/IP-attached printer is a duplicate of another IP address.

If PSF output for this printer prints elsewhere, follow these steps to determine whether the IP address of the printer is unique:

1. Power off the printer.

2. Wait at least five minutes for TCP/IP to clear the Address Resolution Protocol (ARP) tables.

3. Enter the ping command again at the AS/400 system.

4. If you receive a successful response to the ping command this time, there is a duplicate IP address. Consult your network administrator.

If the ping is unsuccessful:

Table F-18. Example of an unsuccessful ping – AS/400

ping 9.9.999.999

Verifying connection to host system TEST at address 9.9.999.999.

No response from host within 10 seconds for connection verification 1.

No response from host within 10 seconds for connection verification 2.

No response from host within 10 seconds for connection verification 3

No response from host within 10 seconds for connection verification 4.

No response from host within 10 seconds for connection verification 5.

Connection verification statistics: 0 of 5 successful (0 %).

If your ping is not successful, verify the following:

- The printer is powered on.
- TCP/IP has been started on the AS/400 (command: STRTCP).
- The cables are properly connected between the printer and the LAN.
- The Network Interface Card (NIC) in the printer is functioning properly. (Consult your Xerox service representative.)
- There is proper connectivity to the Multi-station Access Unit (MAU), if one is being used.
- The IP address used to define the printer in PSF is unique in the TCP/IP network.
- The IP address of the AS/400 system is unique. If not, consult your network administrator to resolve the address problem.

Correcting for printer performance issues – AS/400

Should you notice any printer performance problems—e.g., throughput speed degradation, check the areas listed in the following table.

Table F-19. Components to check for printer performance problems

LAN	If the printer is on a LAN that also has a large number of other devices attached to it, the high levels of traffic on the LAN can cause printer speed degradation. Consider moving the printer to a LAN that does not have so much activity on it.
AS/400 to LAN attachment	If the speed of the link connecting the LAN with the printer attached to the AS/400 system is slow, this could be a bottleneck. Review your network configuration diagrams to look for any potential bottlenecks.

References – AS/400

The following IBM documents, referenced in this section, can provide additional information on AS/400-to-IPDS printer connectivity.

Table F-20. Reference documents – AS/400

Title	Publication number
AS/400 Guide to AFP and PSF	S544-5319
OS/400 Printer Device Programming	SC41-5713
OS/400 TCP/IP Configuration	SC41-5360
OS/400 Work Management	SC41-5306

Infoprint Manager procedures for Windows NT and Windows 2000

This section explains how to access the Create Printer Wizard in the Infoprint Manager Administration GUI, which allows you to create an actual destination (physical printer) using Infoprint Manager for Windows NT and Windows 2000.

To create a PSF TCP/IP printer:

1. On the menu bar, click **Printer**, then **Create**, then **PSF**, then **TCP/IP**.

   *NOTE: If the TCP/IP is not shown in the menu, add it by selecting **Printer**, then **Add/Remove Menu Items**.*

2. Provide information as prompted by the wizard. For assistance, refer to the Infoprint Manager Administration GUI online help.

   *NOTE: From the Model pulldown menu, make sure to select **Infoprint 60** as your printer model.*

3. If you did not enable the printer with the Create Printer Wizard, use the Infoprint Manager Administration GUI to enable it.

For detailed information on the attribute default values set by the wizard, refer to *IBM Infoprint Manager for Windows NT and Windows 2000, Getting Started*.

Infoprint Manager procedures for AIX

There are five versions of PSF/6000 or Infoprint Manager for AIX:

- Versions 1.1, 1.2, and 2.1

  These earlier versions are called PSF/6000.

- Versions 3.1 and 3.2

  These current versions are called Infoprint Manager for AIX.

There are three different methods for creating printers:

- System Management Interface Tool (SMIT)

  All five versions of PSF/6000 and Infoprint Manager for AIX support this method.

- Command line interface

  All five versions of PSF/6000 and Infoprint Manager for AIX support this method.

- Visual System Management (VSM)

  This is a graphical user interface (GUI) supported by Infoprint Manager for AIX versions 3.1 and 3.2 only.

*NOTE: Regardless of the method used, from the Model pulldown menu, make sure to select **Infoprint 60** as your printer model.*

For detailed information on setting the attribute default values using any of these methods, refer to the appropriate section of the document, *IBM Infoprint Manager for AIX, Getting Started*.

Glossary

This glossary contains a list of terms for working with the Xerox DocuPrint NPS/IPS printing system, and a definition of each.

A3 Paper size measuring 297 by 420 mm.

A4 Paper size measuring 210 by 297 mm.

American Standard Code for Information Interchange (ASCII) Standard 7-bit code which represents alphanumeric information. Each alphanumeric character and several nonprinting characters are assigned a binary number, covering 128 possible characters. It is used for information interchange among data processing systems, data communication systems, and associated equipment.

AppleTalk Network communication protocol inherent to the Apple Macintosh operating system and supported by the DocuPrint NPS.

application software Software resident on the host or client workstation used to create print documents.

B4 Paper size measuring 250 by 353 mm.

background job Low-priority job, usually batched, which is executed automatically as system resources become available.

batch Method by which bodies of data are accumulated and grouped by kind before processing.

batch processing Allows for repetitive operations to be performed sequentially on batched data without much involvement of the computer operator.

baud Measurement of data rate in bits per second. This term is used to describe information flow between two devices. Unit of data transmitting/receiving speed is roughly equal to a single bit per second. Common baud rates are 110, 300, 1200, 2400, 4800, and 9600.

binary Numbering system based on 2 rather than 10 and containing only the symbols 0 and 1. Binary is especially well suited for use in computers and related devices since information can be represented with electric pulses (0=off, 1=on). Most computer calculations are binary.

binary digit (bit)	In the binary numbering system, either of the characters 0 or 1. The bit is the basic unit of information with which a computer works. It can take the form of a magnetized spot, an electric pulse, a positive or negative charge, etc. A number of bits strung together represents a character to a computer.

Multipliers are:

1 byte = 8 bits

1 kilobyte (KB) or 1,024 bytes = 8,192 bits

1 megabyte (MB) or 1,048,576 bytes = 8,388,608 bits.

Computer space equivalents are:

1.5 KB = about 1 single-spaced typed page

30 KB = about 20 typed pages

150 KB = about 100 typed pages

bitmap	Electronic definition of an image, comprised of a matrix of picture elements (pixels or dots), where a bit value of one means that the picture element is imaged, and a bit value of zero means that the picture element is not imaged. The number of picture elements in a square area is a function of the display device resolution.
bit mapped	Display image generated bit by bit for each point or dot. A software-driven scanner is used to create characters and/or graphics.
bits per second (bps)	In serial communication, the instantaneous bit speed with which a device or channel transmits a character.
blocking	Process of combining two or more records into a single block of data which can then be moved, operated upon, stored, etc., as a single unit by the computer.
block length	Number of characters or bytes contained in a block of data (the block is treated as a unit within the computer). Block length is usually invariable within a system and may be specified in units such as records, words, computer words, or characters.
boot	To load a program's initial instructions of a program into the computer's memory. These instructions then direct the loading of the rest of the program. Booting may require entry of a few commands at the keyboard or the flip of a switch to begin the process.
break page	*See* header page

buffer	Compartment of memory in which data is stored during transfer from one device to another. Useful for (1) accumulating data into blocks before storage or processing, and (2) for adjusting differences of speed between devices, or between a device and a communicating facility.
bypass transport	Optional module that moves paper from the printer to a finishing device.
byte	Fixed number of bits (in data processing, usually 8) operated upon as a unit. A byte may represent a character, a machine instruction, or some other logical unit of information.
CCU	Customer changeable unit. In the DocuPrint Model 92C, the unit is removed to change the color of the dry ink installed in the printer. Consists of the color developer housing and the dry ink bottle.
CCU changeout cart	Cart used to remove and install the customer changeable unit for changing the color dry ink installed in the printer.
carriage return	Control character that (unless set to be interpreted as a line end) causes the printing system to start printing at the left margin of the current line.
case–sensitive	Treating lowercase and uppercase characters differently.
central processing unit (CPU)	Interprets and executes instructions, performs all operations and calculations, and controls input and output units and auxiliary attachments.
channel	1. In data communications, a path or line that enables two or more devices to communicate (sometimes called a circuit, facility, or link).
	2. In computers, a path for communication between the central processing unit (CPU) and input/output units, or between the CPU and peripheral devices.
character	Single printable letter (A-Z), numeral (0-9), symbol (& % #), or punctuation mark (, . ! ?) used to represent data. Characters can also be nonprinting, such as space, tab, or carriage return.
character cell	Digitized space containing a single character within a font set.
character code	Code representing alphanumeric information, for example, ASCII.
character set	Number of different characters used by a particular device, including alphabetic, numeric, and special characters such as symbols.
characters per inch (cpi)	Designates the number of characters per inch for a particular typeface. Refer to pitch.

client software	Software that manages the submission of print jobs to the Printer Controller.
client workstation	Workstation connected to the network used to create print jobs (documents) and submit them to the printer controller.
command	Statement entered that instructs the system to perform an operation.
communication line	Telecommunication line connecting devices at one location with devices at other locations in order to transmit and receive information.
communication link	Physical means (i.e., data link) connecting one location to another to transmit and receive information.
compatibility	Characteristic of computer equipment permitting one device to use the same information or programs as another device without conversion or code modification.
compile	To translate instructions written in high-level language into machine language for execution by a system.
concatenate	To connect or link in a series, as when files are grouped together for faster processing. Refer to job concatenation mode.
console	Functional unit containing devices used by an operator to communicate with an IOT. It may consist of a display, keyboard, and certain switches or other controls.
control program	An operating system program that manages job flow, input/output processing, and other overall system functions and resources.
daemon	A task that runs continually in conjunction with the UNIX operating system that periodically checks for specific conditions or logical events and performs some action if the conditions are met. The task can be used to display and notify the operator of such conditions.
database	Information to meet specific processing and retrieval needs. Generally applies to integrated file of data, arranged for access by many subsystems.
data communications	Transmission and reception of encoded information over telecommunication lines.
data file	Collection of related data records organized in a specific manner so that each record is similarly structured, e.g., a payroll file set up with one record for each employee, last name first, indicating the rate of pay and all deductions.

data link	Physical means of connecting one location with another for communication, i.e., the communications lines, modems, and controls which transmit information between two or more stations.
data rate	In data communications, the rate at which a channel carries data, measured in bps (bits per second).
data storage	Preservation of data on various media (e.g., tape, disks, magnetic bubble memory, etc.).
data stream	Format of data passed from one device to another.
data transmission	Transmission of coded data over telephone or other telecommunication lines.
DCIM	Data Control Interface Module. The video interface hardware which resides in the SUN workstation (the DCIM replaces the XEPI board).
decomposer	Printer Controller task that translates print data from the PDL command file into a bitmap image of the page to be printed.
default	Predefined value the system uses when another value is not provided.
device	Any piece of hardware other than the CPU (Central Processing Unit).
DFA	Document Feeding and Finishing Architecture. Software that enables third-party feeding and finishing devices to be attached to a Xerox printer to perform pre- and post-processing functions (such as roll-feeding, saddle-stitching, booklet-making, etc.)
diagnostics	Programs used to diagnose problems within the system or to help service personnel pinpoint the source of such problems.
digitize	To express or represent data in digital (binary) form so that it can be processed electronically.
directory	Logical grouping of files and subdirectories that are identified by name. The directory helps organize data on large storage media.
dithering	The process in laser printing which uses dot patterns to simulate shades of gray or tones of a color.
DOS	Disk Operating System. Operating system commonly used on personal computers. *See also* operating system.
dot	Unit of measurement representing a fraction of an inch, for example, 300 dots per inch (dpi). May also be referred to as a picture element (pixel) or spot.

dry ink	Minute particles of resin and carbon toner deposited and fused onto the page to create images. Toner is combined with developer to form the dry ink.
duplex	Ability to send and receive information simultaneously.
duplex printing	Printing on both sides (front and back) of a page. *See also* simplex printing.
electronic publishing	The integrated production of documents on demand, using digitally stored documents, computerized composition, and electronic printing systems.
enabler	Hardware devices or software packages that allow the printer to perform as specified.
Ethernet	Network standard consisting of a coaxial cable or twisted pair and associated components for connecting workstations to each other, to file servers, and to peripherals. This communication system enables workstation users to share information and services.
EtherTalk	Hardware interface and network software for Apple Macintosh computers that provides connection to an Ethernet network.
Extended Binary Coded Decimal Interchange Code (EBCDIC)	Coded character set consisting of 8-bit coded characters. It can accommodate 256 characters.
extension	Portion of a filename that follows a period. in some instances it identifies the file type. For example, .ps specifies a PostScript file.
fault	Condition which prevents proper processing of a print job and requires the intervention of an operator. For example, a paper jam is a fault.
FDL	forms description language. LPS-resident source language used for designing electronic forms. See also FSL; form.
field	Preset place for entering information.
file	Set of records or text that can be stored and retrieved. Organized, named collection of records treated as a unit. For offline, it is the data between the two tape marks. For online, it is the data between banner pages.
file maintenance	Keeping a file up to date by regularly adding, changing, or deleting data.
filename	Name of a file or directory in a command line.
finisher	Any optional output finishing solution, for example, the stitcher/stacker.

firmware	Permanent programs stored in read-only memory (ROM).
fixed disk	Disk drive that is mounted within a computer and is not removable.
fixed font	Font containing characters with fixed spacing.
fixed pitch	Font set in which every character cell has the same width. In reference to character sets, this term describes typefaces in which all character cells are of equal width. Monospaced as opposed to proportional spaced.
fixed spacing	Arrangement of characters on a line so that all characters occupy the same amount of horizontal space.
flag	Small indicator marking the occurrence of an event or the existence of a certain condition while the program is executing.
font	A complete set of alphanumeric characters and punctuation marks, having common characteristics such as style, width, height, and weight.
form	1. Compiled forms source library (.FSL) file. 2. Printed or typed document with blank spaces for inserting information. Specific arrangement of lines, text, and graphics stored in a computer under an identifying name. Page of data that, when preceded by proper commands, is stored on the system disk as a permanent file. It may be merged with variable data by a form start command. See also FDL; FSL.
format	1. Layout of a document, including margins, page length, line spacing, typeface, etc.
	2. In data storage, the way the surface of a disk is organized to store data.
	3. To prepare the surface of a disk for acceptance of data.
form feed	Keyboard/printer control character that causes the printer to skip the top of the next page.
FSL	forms source library. Uncompiled collection of user-created files containing FDL commands. Refer to FDL; form.
fuse	To affix dry ink to paper by heat or pressure or a combination of both.
HCF	High capacity feeder. An optional feeder module containing two feeder trays that work independently with the standard feeder trays 1 and 2. The HCF increases the feeder capacity by approximately 2,000 sheets and allows automatic tray switching and increased uninterrupted printing time.

HCU	Host channel unit. A component of the channel-attached IPS, which provides the interface between the host channel and the IPS controller.
hard disk	*See* fixed disk.
hardware	Physical components (mechanical, magnetic, electronic, etc.) of a system, as opposed to programs, procedures, rules, and associated documentation. The hardware is operated by software and firmware.
header page	Page printed at the beginning of a job that provides information about the print job, such as the name of the document and the job sender.
hexadecimal	Numbering system with a base of 16. In this system, 10 through 15 represented by A through F, respectively.
hierarchy	Relative priority assigned to arithmetic or logical operations that must be performed.
high-level language	Programming language consisting of words and symbols that are close to normal English and, therefore, readily understandable by the user. High-level source languages are used for most commercial programs.
host	Computer accessed by users which serves as a source of high-speed data processing for workstations with less computer power. Commonly referred to as mainframe.
host interface	Connection between network and host computer.
HSB	A printing industry standard color definition model in which all colors are defined in terms of values for hue, saturation, and brightness. Refer to color definition model.
identifier (id)	Characters used to identify or name data and possibly to indicate certain properties of that data.
image area	Area on a physical page that may contain text or graphics.
implementation	Process of installing system hardware and software. Also the process of converting a design into an actual working system.
impressions per minute (ipm)	The number of pages (one side) a printer can print during the space of one minute. Used interchangeably with pages per minute (ppm).
in-front page	A term that refers to the top page of a double-sided sheet.
initialize	1. To prepare the magnetic surface of a blank diskette so that it can accept data.

2. To set all information in a computer system to its starting values (usually the first step is accomplished when a program is booted).

interface Hardware that provides physical connection and electronic communication between two hardware devices.

Internet Protocol (IP) address Refers to an address of any host that uses TCP/IP network protocol.

IOT Image Output Terminal. *See* printer.

IPDS Intelligent Printer Data Stream.

IPS IPDS Printing System.

JDE job descriptor entry. Collection of job descriptions. See also job; JSL.

JDL job descriptor library. Collection of compiled job descriptions. *See also* JSL.

job Print data and attributes required for processing and printing a document.

job size Size of the print master data file measured in bytes.

JSL job source library. Collection of uncompiled job descriptions. *See also* job; JDE; and JDL.

label
1. In data storage, a reference to a file saved on tape or disk, a record indicating the file name or date created, and/or other control information.

2. To set all information in a computer system to its starting values (usually the first step is accomplished when a program is booted).

3. In programming, a name assigned to a particular instruction or portion of a program as a locational reference (the computer translates the label into an address).

landscape page orientation Orientation of print lines or top of an illustration parallel to the long edge of the paper.

language Defined set of characters and symbols combined together by specific rules. Refer to high-level language and low-level language.

laser printing Technology that uses a laser to transfer character forms to a page by direct or indirect means.

library In data storage, a collection of related files or programs.

light emitting diode (LED) Solid substance that glows when a current is passed through it. Often used for indicator lights on disk drives or modems, as well as for displays on other electronic equipment.

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line feed	Control character that (unless set to be interpreted as a line end) causes the printing system to begin printing in the current character position of the next line.
load	To enter data into storage or working registers.
Local Area Network (LAN)	Network connecting computer and peripheral devices through cables.
log	Collection of messages or message segments placed on an auxiliary storage device for accounting or data collection purposes.
logical page	A logical page is defined by an origin location, thus allowing more than one logical page to be placed on a physical page.
long-edge feed (LEF)	The movement of paper through the printer in the direction of the paper length (the longer side of a sheet of paper). *See also* short-edge feed.
low-level language	Language that is close to machine language so that each written instruction in a program can be converted to machine language on a one-to-one basis.
mainframe	Central processing unit (CPU) and memory of a large computer. More often used to denote any large computer of the type that might be used to control a group of smaller computers, terminals, or other devices. Refer to host.
markform	A parameter name for an end-of-job marker in the IPDS data stream.
megabyte (MB)	A unit of approximately one million bytes.
megahertz (MHz)	1. Unit of cycling speed (one million cycles per second) for an electromagnetic wave (in particular, a radio wave).
	2. The sending and receiving stations of a radio wave transmission must be tuned in to the same unit of megahertz.
message	Information passed to the user or to a task within the system. The information is usually associated with an error, fault, or system condition.
MICR	Functionality that produces a Magnetic Ink Character Recognition (MICR) line on negotiable and turnaround documents such as checks and bills. The MICR printing system prints documents using magnetic ink and special fonts to create machine readable information that allows for quick document processing. In general, MICR is used to print accounting and routing information on blank checks and other negotiable documents.

mixed environment	Group of different printing systems at the same location.
modem	Device that converts digital information into an analog signal suitable for sending over analog telecommunication lines. Also converts an analog signal from telecommunication lines into digital information.
module	Cohesive unit within a program. It is consistent in its level and identifiable in terms of loading or with other units.
network	1. System of geographically separate computers, linked to one another over transmission lines.
	2. Communication lines connecting a computer to its remote terminals.
node	Station, terminal, or computer that performs some control operation and influences the operation of the network as a whole.
Novell	Commonly used network communications protocol supported by the DocuPrint NPS.
NPS	Network Printing System
object file	Source file converted into machine language (binary code).
offline	Devices not under the active control of a central processing unit. For example, a computer makes output to a magnetic tape. The tape is then used by an offline printing system to produce printed data. Offline operations are much slower than online operations. Refer to online.
offset	To place pages currently being printed in slightly different positions from previous pages.
offset printing	A widely-used method of commercial and corporate printing, where ink is picked up by a metal or paper plate, passed to an offset drum, and then passed to the paper.
online	Devices under the direct control of a central processing unit, e.g., a printing system in interactive communication with a mainframe. Refer to offline.
operating system	Basic host- controlling program that governs the operations of a computer, such as job entry, input/output, and data management. The operating system is always running when the computer is active. Unlike other types of programs, it does not run to an end point and stop.
orientation	1. In reference to image area, orientation describes whether the printed lines are parallel to the long edge of the paper or the short edge of the paper.

	2. Choice of printing portrait (vertically) or landscape (horizontally).
page orientation	Direction in which data is printed on a report. Refer to landscape page orientation and portrait page orientation.
parsing	To read or interpret a command; build up a parameter list from information within a command.
PC	Personal computer. Family of computers that most commonly run a version of DOS.
PCI kit	Consists of a PCI board and a control unit. Handles all IPDS communications and handshaking with PSF on the host when the NPS/IPS is receiving data over a channel. (Not used when the NPS/IPS is printing data using TCP/IP).
Page Description Language (PDL)	Page description language used to describe the printing of jobs to a laser printing system. PDL describes the input (type, format, characteristics), performs the processing functions (logical processing), and describes the output (type, format, font selection, accounting options) of a print job.
peripheral	Device used with a computer or workstation, usually for input or output. Printers, modems, and the IPS/NPS cartridge tape drives are examples of peripherals.
platform	Combination of hardware and operating system software.
portrait page orientation	Orientation of print lines or the top of an illustration parallel to the short edge of the paper.
PostScript	Page description language developed by Adobe Systems, Incorporated. PostScript describes the input (type, format, characteristics), performs the processing functions (logical processing), and describes the output (type, format, font selection, accounting options) of a print job.
ppm	Pages per minute.
print attribute	Set of attributes available for controlling the processing of a print job. Print attributes include simplex or duplex printing, media selection, collating, stitching, and so on. Print attributes can be sent to the Printer Controller as part of the job, providing automatic job processing.
printer	Component of the DocuPrint Printing System that accepts data from the Printer Controller and prints the document according to the print attributes specified by the user. The printer also provides paper stacking, collating, and optional finishing. "DocuPrint printer" or "printer" refers to the base printer engine (IOT) only, without the Printer Controller and interface.

Printer Controller	Component of the DocuPrint printing system that manages the spooling and processing of print jobs.
Printer Control Language (PCL)	Printer description language defined by Hewlett–Packard Company. PCL describes the input (type, format, characteristics), performs the processing functions (logical processing), and describes the output (type, format, font selection, accounting options) of a print job.
protocol	Formal set of conventions governing the format of data and the control of information exchange between two communication devices.
query	Request for data or other information, entered by an operator while the system is processing.
queue	List of documents waiting to be processed.
Random Access Memory (RAM)	Volatile memory used for temporary storage of data and software commands, used by programs for immediate task processing.
raster data	Binary data, usually consisting of dots arranged in scan lines, according to the print order.
rasterization	The creation of a bitmap image of a page for printing.
raster output scanner (ROS)	Raster output scanner. A motor–driven laser scanning system.
Read-Only Memory (ROM)	Solid-state memory for programs. It cannot be rewritten.
read/write head	A small electromagnet that reads, writes, and erases data in the form of magnetic dots on the surface of an external storage medium, such as a magnetic disk.
real time	To process transactions as they are entered into a system. User and system interchange allow transactions to be processed and the results returned to the user.
resolution	The number of dots per unit. An imaging system converts a character from digitized data into a printed image composed of these tiny dots. The greater the number of dots per inch (i.e., higher the resolution), the clearer the image is produced.
sequencing	Method of ordering messages, records within a file, or statements in a program according to rank or time of entry.
sequential	In numeric sequence, usually in ascending order. As applied to a file organization, describes files in which records are written one after another and cannot be randomly accessed. For example, the first 99 records in a sequential file-access file have to be read before the 100th record is accessible.

short-edge feed (SEF)	The movement of paper through the printer in the direction of the paper width (the shorter side of a sheet of paper).
simplex printing	Printing on one side of the page. *See also* duplex printing.
small computer system interface (SCSI)	An accepted standard for connecting devices to computers.
software	Programs, including operating systems, procedures, utilities, applications programs, etc., written for a system.
software application	*See* application software.
spooling	Process of releasing data from main memory and storing it temporarily until a peripheral device is ready to accept it, e.g., storing text before sending it to a printer.
string	Connected sequence of alphanumeric characters treated as one unit of data by a program.
SunOS	Operating system developed primarily by Sun Microsystems for use on Sun computers and workstations. SunOS provides inherent support for UNIX and for TCP/IP.
syntax	Rules governing the structure of expressions in a programming language.
syntax error	System response to a mistake in the entry of a command.
sysgen	Abbreviated form of system generation.
system administrator	Person responsible for configuring, operating, and maintaining the DocuPrint system, and also for installing client software on network workstations.
system generation	Process whereby the system is made ready to operate. Typically involves selecting the operative parameters and activating the relevant software.
System Network Architecture (SNA)	Total description of logical structure, formats, and protocols of operation sequences for transmitting an information unit through the communication system. Developed by IBM for distributed processing networks.
TCP/IP	Transmission Control Protocol/Internet Protocol Commonly used network communications protocol supported by the DocuPrint NPS.
telecommunications	The transfer of data via telephone lines.
teleprocessing	Data transfer via telecommunication lines for processing among various remote terminals and the central processing unit (CPU).

throughput	In data processing systems, the amount of data that can be processed, transmitted, printed, etc., in a specified unit of time.
Token Ring	Network topology in which a control packet or token is passed from station to station in sequential order. Stations needing access must wait for the token before transmitting data. In a Token Ring, the next logical station receiving the token is also the next physical station.
transaction processing	Method of data processing in which files are updated and results are generated immediately after data entry.
translation	1. In data communications, the conversion of one code to another on a character-by-character basis.
	2. In programming, the function of a language processor which converts a source program from one programming language to another.
transmission speed	In data communications, the rate at which data is passed through communication lines, usually measured in bits per inch (bpi).
two-up	Application that prints two logical pages on one side of a physical page.
ULTRIX	Operating system that runs on DECStations. It consists of a hierarchical system of commands, shells, files, and directories. *See also* operating system.
UNIX	Operating system for computers, usually working in a network environment. UNIX consists of a hierarchical system of commands, shells, files, and directories. *See also* operating system.
user interface (UI)	System for gathering input from a user and presenting data to the user.
virtual page	Page area selected by a forms designer for printing.
virtual printers	Alternate names for the printer which allow different sets of default attributes to be applied to submitted jobs. The operator and system administrator define virtual printer names and the associated set of attributes and values.
workstation	Computer able to process data but designed specifically for interaction with a network.
write	To record data in memory or an external storage medium.
write protection	Data protection feature implemented on magnetic media (e.g., floppy disk) to prevent stored data from being modified, written over, or erased.

xerographic mode   There are two xerographic modes: black mode or highlight mode. Black mode allows printing with black dry ink only, while the highlight mode enables highlight color printing.

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