Xerox DocuPrint NPS/ IPS

Solutions Guide for IPDS Printing

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

WARNING

Adjustments, use of controls, or performance of procedures other than those specified herein may result in hazardous light exposure.

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.

<p style="color:red; text-align:center; font-weight:bold">WARNING</p>

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.

$C\epsilon$

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

Solutions Guide for IPDS Printing

Introduction

The DocuPrint NPS/IPS series of printers is a full family of Xerox production printers that print in an Advanced Function Presentation (AFP) environment. DocuPrint NPS/IPS printers provide a variety of features that add value to enterprise printing operations.

To ensure that you can maximize your investment in Xerox technology, this document provides expanded information about performing specific tasks related to creating and printing applications in the AFP environment. Specifically, this document has been designed to:

- Provide an overview of the Xerox DocuPrint NPS/IPS printers.

- Provide an overview of AFP.

- Highlight valuable features of DocuPrint NPS/IPS printers.

- Describe special considerations that optimize output quality.

- Explain how you can enable value-added features to benefit your business.

- Provide answers to some commonly asked questions.

Intended audience

The primary audience for this document is the systems analyst or application programmer who:

- Is responsible for migrating existing and/or creating new AFP applications to effectively use the unique features of the Xerox DocuPrint NPS/IPS series of printers.

- Defines enterprise production printing goals and objectives.

- Installs, customizes, maintains, and troubleshoots Xerox DocuPrint NPS/IPS printer applications.

- Supports end-user groups in application development and in optimizing the use of the DocuPrint NPS/IPS as a production printing resource.

Document scope and organization

This document provides information for a variety of topics relating to the DocuPrint NPS/IPS software. Some topics are discussed in sufficient detail to allow the reader to complete tasks without additional documentation. Other topics contain key information, then point to detailed documentation so the task may be completed.

This document addresses the capabilities for all NPS/IPS printer models; not all features apply to all models. For example, highlight color is available only on the 4890, 4850, and 92c.

Contents

Below is a brief description of each section in this document:

- The first section, "DocuPrint NPS/IPS overview," provides a brief description of the DocuPrint NPS/IPS printers and sample applications that incorporate the value-added features of these printers.

- Next, "AFP summary" briefly describes the AFP printing environment and architecture.

- The "DocuPrint NPS/IPS system" section provides a more detailed description of the DocuPrint NPS/IPS systems and how they interpret AFP data streams.

- The next section, "DocuPrint NPS/IPS application migration," details the modifications required to migrate your existing applications for printing on the DocuPrint NPS/IPS printers.

- "Incorporating Xerox value-added features" explains how to incorporate the DocuPrint NPS/IPS value-added features into your existing documents.

- The "Commonly asked questions" section provides answers to some of the questions which customers ask about the DocuPrint NPS/IPS printers.

- This guide includes four appendixes that provide:
  - Tables explaining the DocuPrint NPS/IPS printer capabilities for AFP printing.
  - Tables that list some of the resource creation and conversion programs available.
  - Current limitations IPDS printing.
  - An explanation of the AFP print flows for the different host platforms.

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.

<div align="center">

CAUTION

</div>

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

<div align="center">

WARNING

</div>

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

Related publications

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 Languages*
- *Installation Planning Guide*
- *System Overview Guide*
- *Troubleshooting Guide*
- *Solutions Guide for IPDS Printing*
- *Decomposition Service and Tools Guide*
- *Generic MICR Fundamentals 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. The last two digits of the publication number indicate a version; here the version is indicated with "xx." For the most current publications, contact IBM. Many publications are available on their web site.

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

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

Page Printer Formatting Aid/370: User's Guide (S544-5284-xx) 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-xx) 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-xx) 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.

Document Composition Facility: SCRIPT/VS Language Reference (SH35-0070-xx) describes formatting of documents using SCRIPT/VS control words.

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-xx), 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-xx) contains detailed characteristics of IBM's page printers.

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

Advanced Function Presentation Conversion and Indexing Facility: User's Guide (G544-5285-xx) contains information about using the AFP Conversion and Indexing Facility (ACIF).

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

AFP Printing in an IBM Cross-System Environment (GG24-3765-xx) 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-xx) describes the functions and composition of elements sent to printers that support the IPDS architecture.

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

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

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

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

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

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

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

AS/400 Information Directory (GC21-9678-xx) 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-xx) 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-xx) 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-xx) provides information about using InfoPrint Manager for AIX.

Additional information

Documentation related to the DocuPrint NPS/IPS printers is available from Xerox. You can request these publications from your Xerox representative.

Xerox Documentation and Software Services (XDSS) has a web page from which you can order customer documentation. Its address is:

www.XDSS.com

1. DocuPrint NPS/IPS overview

In many instances, the documents your company generates are the only contact you have with your customers. Therefore, you need to be able to use the most effective and high quality printer features available to maintain a competitive edge.

Your company may also produce reports for internal use. Your print shop personnel may work around the clock in order to provide the high volume of documents for distribution throughout the company.

The DocuPrint NPS/IPS printers can make a difference between keeping a customer or losing one, between completing your internal documents before the deadline or missing that deadline.

The DocuPrint NPS/IPS series consists of a full range of Xerox production printers for Advanced Function Presentation (AFP) printing. They can also print PostScript, PCL, TIFF, and ASCII jobs.

If your company prints AFP applications originally created to print on IBM Group 3 compatible printers, you can use any of the DocuPrint NPS/IPS printers to print those applications with little or no modification. In addition, you can incorporate many Xerox printer value-added features into your existing applications, including:

- Data driven color to create powerful business documents.

    - Xerox highlight colors, or full color on the 2060

    - Conditional color applications

    - Color support by third-party tools (from Elixir, ISIS, Lytrod)

    - Personalized and customized documents

- Multiple input trays to improve printer productivity.

    - Up to 6 input trays, including roll to cut sheet feeding device (depending on printer model)

    - Multiple stock applications

- Superior resolution at 300 and 600 dpi to enhance production documents.

- Stitching to finish production.
  - Up to 50 pages stitched per set for the Xerox stitcher/stacker
  - Use of the PSF MarkForm command
  - Use of the PSF JOG command
- Document Feeding and Finishing Architecture (DFA) to support a wide range of third-party document feeding and finishing devices, including roll feed to cut sheet input.
- MICR printing for checks and explanation of benefits (EOBs), on some models.

DocuPrint NPS/IPS printer capabilities

For a summary of printer specifications for the DocuPrint NPS/IPS printer series, refer to Appendix A, or to the *System Overview Guide* for your printer.

Application examples

How can your company benefit from the unique Xerox value-added features available on DocuPrint NPS/IPS printers? Some examples include:

- Highlight or full color conditionally invoked by variable data can offer a competitive advantage.
- Although 240 dpi printing has been acceptable in the past, quality expectations have advanced. The 300 dpi and 600 dpi resolutions can be a key factor in your maintaining a competitive advantage.
- Access to additional input trays can improve throughput and provide application flexibility for complex documents with up to 6 different paper stocks. This access also allows operators to change or load paper stocks without having to stop the printers.
- Support for inline third-party feeding and finishing equipment provides additional document post-print handling.
- Stitching documents speeds up distribution and reduces the occurrences of lost sheets or reports.

- Add to all of this the Xerox reputation for dependability and maintenance.

This section provides examples that incorporate the features in ways you might not have discovered.

Insurance

Consider an example that could be used by an insurance company. You are responsible for printing insurance policies, customer correspondence, premium invoices, and distributing reimbursement checks to clients. Using DocuPrint NPS/IPS ble printers, you can print these documents with ease.

Checks with MICR

For example, you may need to print reimbursement checks that use MICR fonts and print variable information on each check. You could create an application for a check form, either with IBM-supplied utilities or using Elixir or another third-party package, that includes these elements:

- Fixed information (date line, amount lines, payee line, signature line, financial institution name, etc.)

- Variable information (customer name, check number, check amount, signature font)

- MICR line (machine-readable information printed at the bottom of each check).

When printed to the DocuPrint NPS/IPS MICR-capable printers, you can access the Xerox AFP MICR fonts to print the MICR line at the same time the other information is being printed. The MICR applications are securely processed and printed centrally on the production-class DocuPrint NPS/IPS MICR capable printers. This not only saves printing and processing time, it also allows you to use blank security stock.

By combining leading-edge laser technology with exceptional paper-handling capabilities, print speeds up to 180 pages per minute, and advanced system software, the DocuPrint NPS/IPS MICR capable printers deliver a new range of superior high-volume document solutions to the AFP environment.

THIS DOCUMENT HAS A BLUE BACKGROUND ON THE FACE AND AN ARTIFICIAL WATERMARK ON THE BACK - HOLD AT AN ANGLE TO VIEW.

WORLD WIDE ENTERPRISE

The Trust A. Bank Company
Springfield, MI 97664
342-813
7909

VOID

Check Date October 30 1999   Check No. 000001

Pay Exactly *One Thousand Three Hundred Thirty-eight Dollars and 99 Cents*

$***1338.99

Void After 90 Days

L M Bennington III
APT 18C
Pay to the order of:
5512 Hilltop Avenue
Ft. Worth, AR 75044-5512

⑈2753333⑈ ⑊330123453⑊ 1890⑈1234⑈

Custom policy Another document you may be required to print is a multi-page insurance policy that is tailored to each individual customer. You may want to print your company logo in color on the first page, and print your customer's name, the policy cost, and any savings guarantees in color throughout the remaining pages.

For this application, you could use an NPS/IPS highlight color printer. These printers accept the IPDS data stream and print the policies, duplex or simplex, normal or tumble, with full-page highlight color, even in stapled booklets, at up to 92 images per minute. The printed policies are then ready for immediate processing by automated distribution equipment.

How does this functionality benefit your company? By adding highlight color to graphs and charts within the documents, customers can understand the information more easily, thus lessening calls to your company. Better understanding and fewer calls add up to cost savings for you!

You could also create a full-color application for the DocuColor 2060 NPS/IPS.

Manufacturing

For this example, assume you have customers in North America and in Europe. Your customers in North America expect to receive the documentation you provide with your parts on US letter (8-1/2 by 11 inch) paper. However, your customers in Europe have requested that they receive their documentation on A4 paper. In addition, the document covers need to be printed on a card stock heavier than the rest of the pages, and the whole should be a stapled document.

Your application programmers have created an application that can print on either US letter or A4 paper. They also have added a conditional processing statement to check for the country to which the document will be sent. It also includes a condition for the first page to pull from the bin that has the card stock loaded.

Your document also contains many detailed drawings of the various parts you supply. Several of the drawings contain highlight color to show the specific item being discussed in the documentation.

This application requires that the printer be able to:

- Pull stock from multiple bins.

- Print highlight color.

- Stitch the document when complete.

The DocuPrint NPS/IPS highlight color printers can print this type of application easily. You can place US letter paper in tray 1, A4 paper in tray 2, US letter cover stock in tray 3, and A4 cover stock in tray 4. You can select which highlight color to use for the document based on the type of color housing you load into the printer. And, as each document is printed, the printer will staple the document before placing it in the output bin for you to retrieve.

Banking

Many banks now handle mutual fund or financing and investment accounts for their customers. As a result, the customers are requesting more detailed and easier to read statements. The DocuPrint NPS/IPS printers allow you to incorporate highlight or full color printing to highlight critical information that needs to be pointed out to the customer. Also, the higher print resolution of DocuPrint NPS/IPS printers allows you to create high quality color graphics to help the customer better understand the information.

Along with these statements, you can print check image applications running in the AFP environment on the DocuPrint NPS/IPS MICR capable printers at 600 dpi. This functionality provides excellent document quality for your customers, thus helping to improve your customer satisfaction rating.

Current Portfolio Allocation

INVESTMENTS	INVESTMENT ELECTIONS	SHARES OWNED	SHARE PRICE	ENDING BALANCE AS OF 3/31/95
Plaza Equity Income Fund	15%	226.999	23.504	$5,335.38
Plaza Growth Stock Fund	30%	527.947	20.306	$10,720.49
Plaza International Equity Fund	25%	251.663	39.548	$9,952.77
Plaza Bond Fund	30%	410.470	63.370	$26,011.50
Plaza Money Market Fund	0%	N/A	N/A	$0.00
Ending Balance				**$52,020.15**

Allocation by Fund

50%	Plaza Bond Fund
21%	Plaza Growth Stock Fund
19%	Plaza International Equity Fund
10%	Plaza Equity Income Fund
0%	Plaza Money Market Fund

Allocation by Investment Objective

60%	Income
21%	Growth
19%	Aggressive Growth
0%	Capital Preservation

Copyright Advanced Programing Techniques, Inc., Boston, MA 1996
This document was printed on a Xerox DocuPrint 4890 IPS

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Document types

You can create different types of documents using AFP and then print them on DocuPrint NPS/IPS printers. This section describes some of these documents and how the Xerox value-added features can be used.

Policy production

Insurance policies can be very complicated documents to produce. You may choose to use different stocks of paper for different policies, or even within the same policy. With the printer's ability to incorporate multiple paper stocks in one policy package–including ID cards–in a single run, the DocuPrint NPS/IPS printers allow you to create such complicated policies with ease.

The computer system assembles the policy, generates the AFP data stream, and prints it on a DocuPrint NPS/IPS highlight color printer, duplex or simplex, with highlight color at up to 92 images per minute, or full-color on a DC 2060 at up to 60 images per minute. These components combine to produce a finished policy that can be shipped directly to customers, agents, and the home office with little or no human intervention.

EOBs with check

Handling insurance claims can be a costly and complicated process. Sending an explanation of benefits (EOB) separately from a reimbursement check can confuse the customer, which may lead to customer service questions or complaints. To solve this problem, you can create a document that integrates the EOB with a check by extracting data from a host recordkeeping system and client database from platforms such as an IBM S/390 or AS/400.

The AS/400 supports a variety of tools that create AFP forms and documents. You can then transmit the fully-composed print streams to the DocuPrint NPS/IPS MICR-capable printers from the AS/400.

With a Xerox MICR printing system, you can securely generate checks from blank check stock at the same time as you generate EOBs or cover letters. Your application can issue "pulls" from the various input bins for the appropriate stocks. For information on the security features of DocuPrint NPS/IPS, refer to "Security features," in the "Incorporating Xerox value-added features" chapter of this guide.

A variety of inline post-processing and finishing solutions are available from the Xerox finishing partners, allowing you to mail these documents in one envelope. These applications are supported on the DocuPrint NPS/IPS printers via Document Feeding and Finishing Architecture (DFA).

What effect does all this have on your business? Savings to your company as a result of reduced check printing and storage costs and improved customer satisfaction, which in turn reduces your customer support costs!

2. AFP summary

This chapter provides a summary of IBM Advanced Function Presentation (AFP) architecture and the AFP features supported by Xerox DocuPrint NPS/IPS printers.

What is AFP?

AFP is a collection of programs used to format and print documents. Using these programs, you can define the exact placement of elements on a printed page, assign characteristics to the various elements, and instruct the printer to print one or more copies of the document. Data can be placed at any addressable point on the page, a capability known as all-points addressability (APA).

AFP allows you to place these types of data on a page and orient them in different directions:

- Fonts (either proportional, monospaced, or MICR)
- Graphics (plotting-type applications such as CAD/CAM)
- Images (such as logos, signatures, and pictures)
- Bar codes
- Electronic forms
- Formatted pages of text.

AFP resources

You can use different AFP resources to create your document. For example, you may wish to create an application that includes an electronically created form (overlay), variable data, constant data, a signature, and your company logo.

Using AFP programs, you can create applications that include these resources:

- Page definitions
- Form definitions
- Page segments
- Overlays
- Fonts.

For a listing of resource generation packages, refer to appendix B, "Resource creation and conversion programs."

Page definitions (PageDefs)

Page definitions control the formatting of variable data within a document. PageDefs specify the dimensions and print direction of the logical page, provide the formatting instructions for individual lines and specific fields within a line, define the font(s) to be used, define the number of lines for each logical page, call page segments and overlays, specify any color usage, generate bar codes, and apply conditional formatting to specific fields.

Page definitions are typically generated using IBM Page Printer Formatting Aid (PPFA), Elixir AppBuilder for AFP, or ISIS Overview AFP Designer.

Form definitions (FormDefs)

Form definitions control the physical characteristics of the printed page. For example, they specify the position of the logical page on the physical page, whether to print the document in duplex, which overlay to use, which input tray to use, how many copies of the document to print, and whether to use offset-stacking or multiple paper sources. FormDefs can also call overlays that contain page segments to be included within the document.

Form definitions can be used to print N-up, where a page is divided into several partitions. With enhanced N-up, you have control over the size of the partitions and the order of their placement on the page.

Form definitions are typically generated using IBM PPFA, Elixir AppBuilder for AFP, or ISIS Overview AFP Designer.

Page segments

Page segments are mappable raster images that may consist of logos and signatures. You may use either color or black and white page segments in your documents. To include a page segment in a document, you can either include it or reference it in an overlay. You can also call page segments via PageDefs or code them dynamically within an AFP application.

Page segments are typically created or modified using IBM Graphical Data Display Manager (GDDM), AFP Utilities/400, and AFP Windows Driver, Elixir ElixirImage for AFP, or ISIS OverView Font & Image Editor.

Overlays

Overlays are electronic forms that may contain lines, boxes, constant text, and page segments. To include an overlay in a document, you can reference it in a PageDef or FormDef or via a mixed-mode or fully-composed AFPDS application.

Overlays are generated using the IBM Overlay Generation Language (OGL), AFP Utilities/400, and AFP Windows Driver, Elixir ElixirForm for AFP, or ISIS Papyrus Designer. You may also be able to use some of these products to add color to your overlays.

Fonts

Fonts are the characters that make up the text included in a document. AFP uses many different types of fonts, such as compatibility, sonoran (standard), outline, and core interchange. For more information about using fonts with DocuPrint NPS/IPS printers, refer to the chapter, "DocuPrint NPS/IPS application migration."

IBM also offers the AFP Font Collection, which contains over 1000 fonts including Times New Roman, Helvetica, and Courier. These fonts are supplied in raster and outline formats. The raster version fonts come in various sizes and resolutions while the outline fonts are independent of printer resolution.

Fonts can be created or modified using IBM Font Library Services Facility (FLSF), Elixir ElixirFont for AFP, or ISIS OverView Font & Image Editor.

AFP architecture

The AFP system is a sub-architecture of the Systems Application Architecture (SAA). The AFP print platform consists of architected data streams for three areas: applications, print resources, and printers. This structure provides the foundation for keeping the applications independent from specific printer hardware requirements. This independence helps to reduce the cost of application development and maintenance.

Like other SAA architectures, AFP and Intelligent Print Data Streams (IPDS) are components of IBM Open Blueprint architecture. As the successor to SAA, Open Blueprint is a truly open architecture that helps IBM and others deliver integrated, interoperable products and solutions.

AFP combines the data types (resources) described previously to create data streams. This section describes the architectures and data streams as recognized by the DocuPrint NPS/IPS printers.

Object Content Architectures

Documents are made up of different kinds of data, such as text, graphics, images, and bar codes. Object Content Architectures (OCAs) describe the

 structure and content of each type of data format that exists in a document and appears in a data stream.

The object content architectures, also known as transmission objects, are:

- **Bar Code Object Content Architecture (BCOCA)**, which describes a predetermined pattern of bars and spaces, known as bar codes, that represent alphanumeric data in a machine-readable format.

- **Formatted Data Object Content Architecture (FD:OCA)**, which allows you to interchange data that has already been formatted.

- **Font Object Content Architecture (FOCA)**, which describes the structure and contents of fonts. It also allows you to interchange the font descriptions and specify color.

- **Graphics Object Content Architecture (GOCA)**, which describes vector or object-oriented graphics. It also allows you to interchange and present graphics data and specify color.

- **Image Object Content Architecture (IOCA)**, which describes bitmapped image objects, including data compression, gray-scale, encoding, and other recording data. It also allows you to interchange and present images. DocuPrint NPS/IPS supports JPEG compressed IOCA.

- **Presentation Text Object Content Architecture (PTOCA)**, which describes text objects formatted for all-points addressable presentations, including font, text color, and other visual attributes. It also allows you to interchange and present presentation text data, lines, and boxes.

Data streams

Data streams define the structure and content of an application. Three types of data streams used by AFP are:

- **Mixed Object Document Content Architecture (MO:DCA)** data streams, which are generated by an application and are device independent. These data streams describe documents and object envelopes for interchange with other applications and application services.

- **Intelligent Printer Data Stream (IPDS)**, which is a device-bound data stream that has been processed into printer-specific data, normally by PSF. This is the language used by DocuPrint NPS/IPS printers. These data streams perform printer control functions and share job status information.

- **Advanced Function Presentation Data Stream (AFPDS)**, which is an architected presentation function set of MO:DCA. Also known as MO:DCA-Presentation (MO:DCA-P), it consists of data objects and data structures that define a document layout.

While there are other data streams associated with AFP documents, you will use the MO:DCA and IPDS data streams most frequently when printing AFP jobs to DocuPrint NPS/IPS printers. You can also print AFPDS to DocuPrint NPS/IPS printers, but the data stream must be converted to IPDS before being submitted.

Data towers

What makes a printer an IPDS printer? IPDS printers have these features:

- Implementation of a subset of the Device Control command set

- Implementation of one or more of these IPDS command sets and their corresponding "tower"

    – PT1, PT2, and PT3 (text)

    – IM/1 (uncompressed images)

    – IO/1 (compressed images)

    – DR/1 and DR/2 (graphics)

    – BC/1 (bar codes)

- Generation of IPDS exceptions according to a set of predefined IPDS rules

The DocuPrint NPS/IPS printers are compliant with the IPDS data towers. For more information on the data and resource towers implemented in DocuPrint NPS/IPS, refer to the section on "Object Content Architectures."

DocuPrint NPS/IPS also supports object containers. These containers allow non-AFP objects like EPS and JPEG files to be used in IPDS documents. This allows for portability between platforms and provides another way to include images in a document. EPS files provide a way to include color in a document.

NOTE: Most hosts do not yet support JPEG in object containers.

PSF platforms

You have several options for connecting your DocuPrint NPS/IPS printers to the host. Each platform determines how IBM Print Services Facility (PSF) program interacts with the DocuPrint NPS/IPS printer.

DocuPrint NPS/IPS supports PSF 3.2. This is the version required for full color printing on the DocuColor 2060 NPS/IPS.

PSF is a print driver and resource manager that resides on the host. You can connect the host system to printers either locally or remotely using any of the platforms shown in this table.

Table 2-1. **Supported PSF levels**

Platform	Operating system	Minimum supported PSF level[a]
Mainframe (System/370 or System/390)	MVS	PSF/MVS V3.1
	VM	PSF/VM V2.1
	VSE	PSF/VSE V2.2
AS/400	OS/400	PSF/400 V4.4
RS/6000	AIX	InfoPrint Manager V3.1[b]
PS/2	Windows NT	InfoPrint Manager NT V1.1

a. The minimum levels listed are for TCP/IP connectivity using either Token Ring or Ethernet.
b. IBM withdrew PSF/6000 and PSF for AIX from marketing. You must use InfoPrint Manager as it is the IBM replacement product. DocuPrint NPS/IPS supports InfoPrint Manager to a functionality level equivalent to PSF for AIX.

Mainframe connections

You may use several different formats to connect your mainframe to the DocuPrint NPS/IPS printer. The various connection formats are described and pictured in this section.

Note that on this platform, the PSF control functions are IPDS emitters only.

Direct bus and tag

The simplest connection format is the direct bus and tag. For this solution, the printer is connected directly to the host via bus and tag cables.
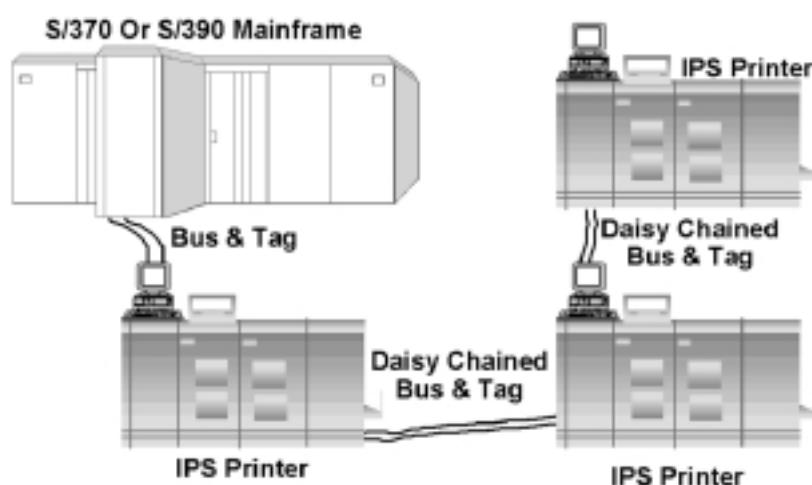
ESCON connection

This format uses fiber optic cable and the ESCON protocol as the channel connection to the host. Using this solution, the printer is connected to an IBM 9034 Type 1 converter. The converter is then connected to the System/390 mainframe through a fiber optic serial cable.
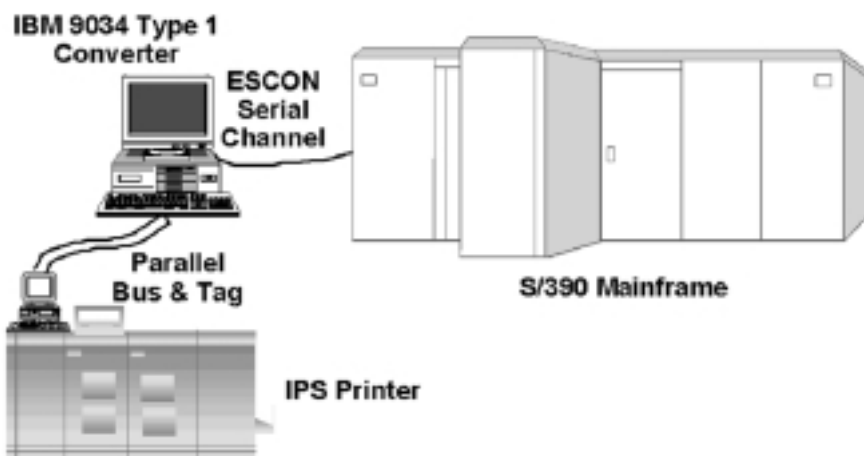
Remote connection: channel extender

For the channel extender connection, the printer is connected directly to the channel extension device. The channel extender is then connected to another channel extender through telecommunication lines. Finally, the upstream channel extender is connected to the System/370 or System/390 mainframe.

Channel extenders allow for long distance communication between the host mainframe and the DocuPrint NPS/IPS printers. In addition, channel extenders also have these characteristics:

- No spooling of jobs

- Remote operator can control jobs via a 3270 session with the host

- No resource storage.
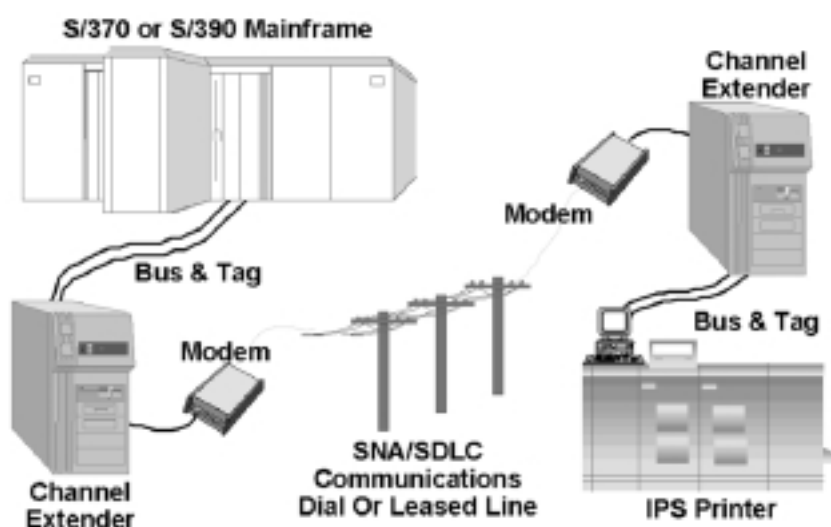
Remote connection: BARR/RJE

Using the remote BARR/RJE connection, the printer is attached to a PC containing BARR software and hardware. The PC is connected to a Front End Processor (FEP) through telecommunication lines. The FEP is then attached to the System/370 or System/390 mainframe.

For DocuPrint NPS/IPS printers, the BARR software supports remote connectivity, such as Remote Job Entry (RJE). The remote operator can communicate to the host, and the host operator can communicate with the remote device.

The BARR/RJE spooler can accept data from multiple sources and drive multiple printers simultaneously.
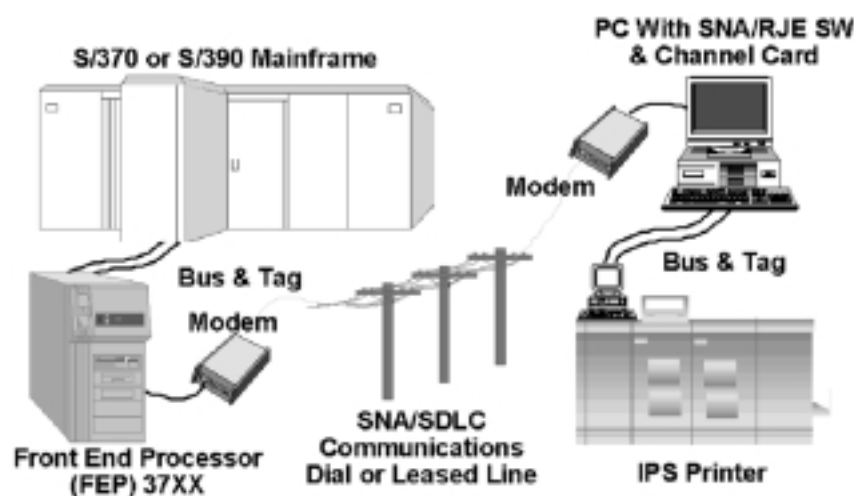
TCP/IP connection: Ethernet

For TCP/IP connectivity via an Ethernet, the mainframe is connected to either a 3172 or 3745 IBM control unit. The control unit is connected to a router, which in turn connects the various workstations and printers on the LAN.

Each device (mainframe, control unit, router, workstation, printer) must have an Ethernet card installed in the device.
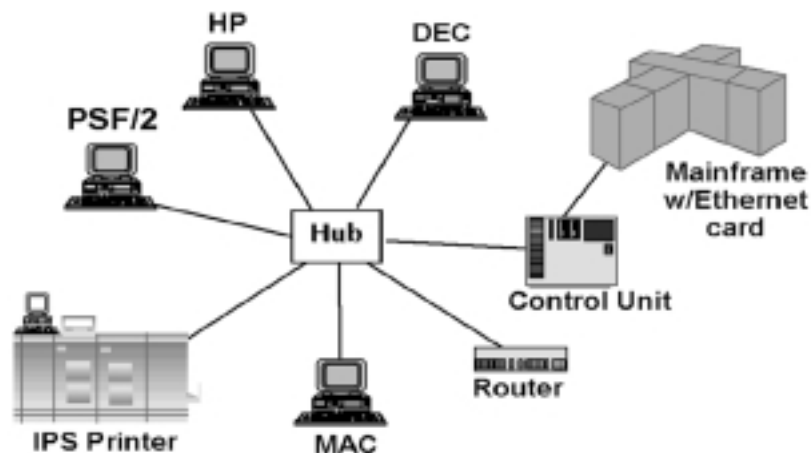
TCP/IP connection: Token Ring

For TCP/IP connectivity via a Token Ring, the mainframe is connected to a 3174 or 3745 IBM control unit. The control unit is connected to a modular access unit (MAU), which acts as the Token Ring. The MAU connects the router, workstations, and printers to the Token Ring.

Each device on the Token Ring (mainframe, control unit, router, workstation, printer) must have a Token Ring card installed in the device.
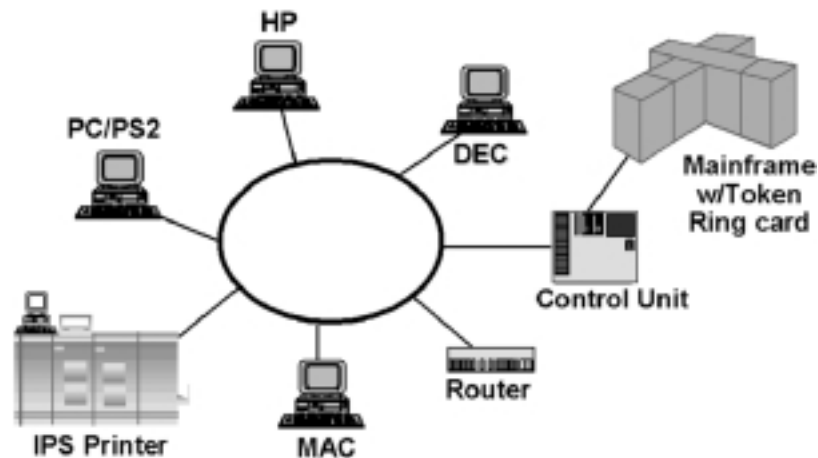
AS/400 connections

The AS/400 Host is similar to the larger mainframe host types. On this platform, the PSF control functions are IPDS emitters only. PSF/400 accepts MO:DCA-P data streams, as well as SNA Character String (SCS) data streams with Data Description Specification (DDS), IPDS, and line data. It outputs only IPDS data streams.

The Advanced Function Printing Utilities (AFPU) allow you to create formatting objects called Printout Format Definition (PFD). AFPU uses PFD objects as formatting resources when printing a database file. Note that a PFD is not the same as a page definition.

The primary application software programs used by PSF/400 are OfficeVision/400 and WordPerfect/400. You can also use the AFP Print Suite which contains tools for creating AFP applications on the AS/400. These tools are:

- Advanced Print Utility (APU)

- PPFA for AS/400

- AFP Toolbox.

AS/400 remote connection

AS/400 does not use a direct Bus & Tag connection. Instead, you must set up a remote PSF/2, PSF for AIX, or BARR/AFP connection.

An AS/400 channel connection requires either BARR/AFP or a PS/2. BARR/AFP uses an LU 6.2 connection to carry real-time, bi-directional traffic from the host to IPDS Group 3 printers. The LU6.2 connection can be either SDLC or Token Ring. Because the IPDS protocol allows the printer to feed its status back to the host in real time, BARR/AFP does not spool the AFP data. Instead, jobs are printed as they are received from the host.
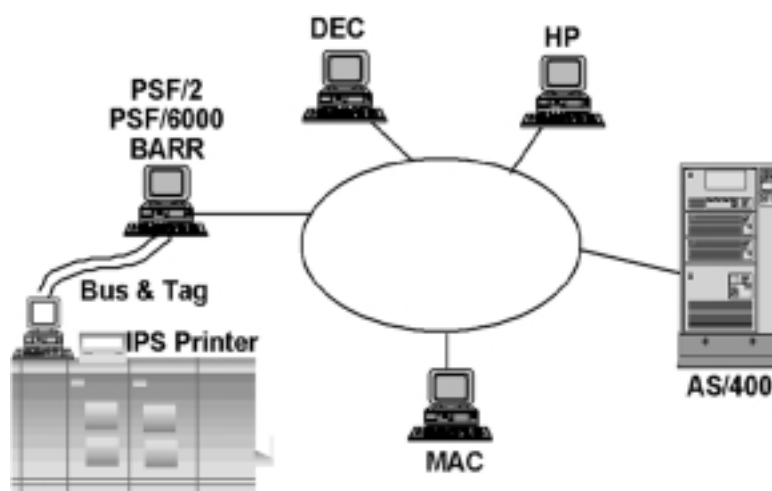
TCP/IP connection: Ethernet

For the Ethernet TCP/IP connection, you must have an Ethernet card installed inside the AS/400. A router directs the jobs being run on the Ethernet to the appropriate device.
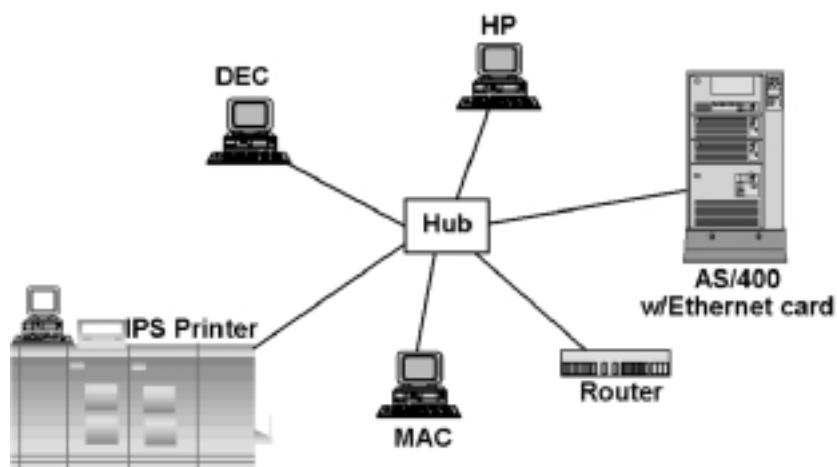
TCP/IP connection: Token Ring

For the Token Ring TCP/IP connection, you must have a Token Ring card installed inside the AS/400. A router directs the jobs being run on the Token Ring to the appropriate device.
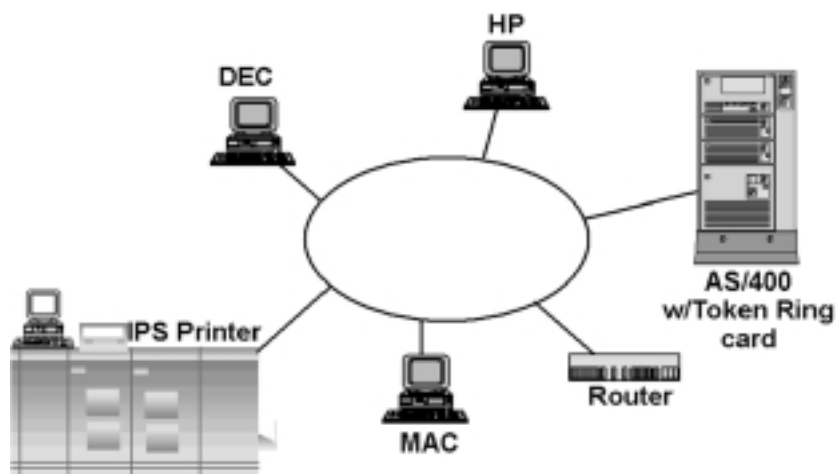
RS/6000 connections

The RS/6000 connections are remote connections. You may connect your RS/6000 system to the DocuPrint NPS/IPS printers using one of the options described in this section.

The following sections apply to the InfoPrint Manager V 3.1 as well as PSF/6000, and PSF for AIX systems.

NOTE: PSF for AIX has been incorporated into the InfoPrint Manager V 3.1 product. As of December 1998, PSF/6000 and PSF for AIX were no longer marketed by IBM as a separate product. Complete support of PSF for AIX will be withdrawn by January 31, 2001.

InfoPrint Manager stand-alone connection

The simplest way to connect your DocuPrint NPS/IPS printers to an RS/6000 is through a stand-alone system. If you choose this connection, you may need to offload your resources and data streams from the host and upload them onto the RS/6000 system. Once loaded onto the RS/6000, you can print AFP documents to the DocuPrint NPS/IPS printer through InfoPrint Manager.

TCP/IP connection: Ethernet

For the Ethernet TCP/IP connection, you must have an Ethernet card installed inside the RS/6000. A router directs the jobs being run on the Ethernet to the appropriate device.
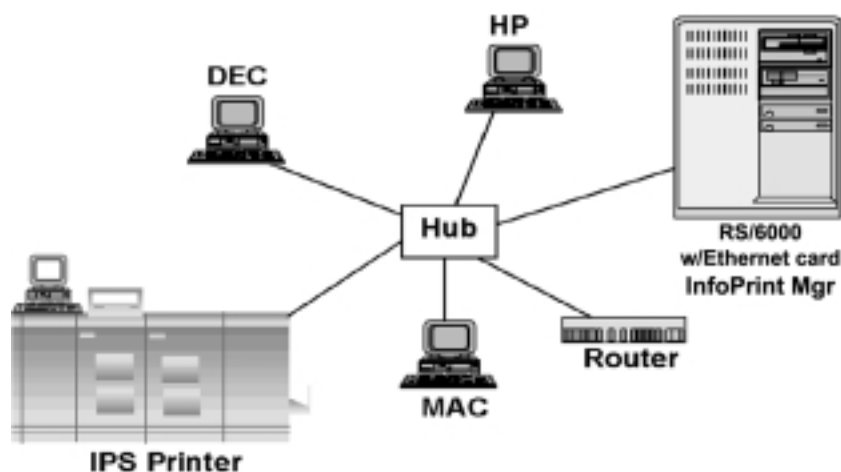
TCP/IP connection: Token Ring

For the Token Ring TCP/IP connection, you must have a Token Ring card installed inside the RS/400. A router directs the jobs being run on the Token Ring to the appropriate device.
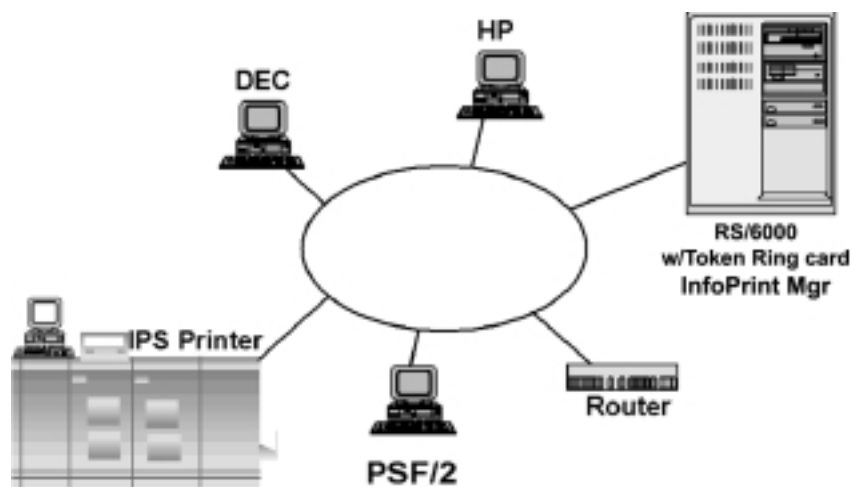
3. DocuPrint NPS/IPS system

This chapter provides an overview of the DocuPrint NPS/IPS series. It describes the features, functions, and limitations of this product.

The DocuPrint NPS/IPS printers provide concurrent printing of PostScript, PCL, TIFF, and ASCII jobs from networked workstations, as well as IPDS printing from a host. This section focuses on IPDS printing capabilities.

DocuPrint NPS/IPS summary

The DocuPrint NPS/IPS printers are true IPDS printers, emulating an IBM Group 3 IPDS page printer. The DocuPrint 96 MICR, 4635 MICR, and 180 MICR NPS/IPS are similar to an IBM 3828 MICR printer. The DocuPrint NPS/IPS printers are IPDS compliant.

DocuPrint NPS/IPS printers allow you to access Xerox feature enhancements as permitted by the available IPDS commands.

Hardware

A DocuPrint NPS/IPS printer consists of these components:

- A Host Control Unit (HCU) or Channel Interface between the host and the printer controller.

  NOTE: If you plan to use the TCP/IP Token Ring or Ethernet connections, a channel interface is not used.

- A Sun workstation running modified Solaris operating system and NPS/IPS software.

  NOTE: Note that the Ethernet connectivity hardware is delivered as an integral part of the Sun. If you wish to use the Token Ring connectivity, you must order the Token Ring board separately.

- An image output terminal (IOT). The IOT is the actual printer hardware system.

Software

The DocuPrint NPS/IPS software resides on the printer controller. It includes all required software components:

- Input, imager and output processes
- IOT device driver
- Print engine monitor process
- Test pattern process
- User interface.

No additional software is required on the host to implement the DocuPrint NPS/IPS series printers.

Processing overview

The IBM data stream is passed directly to the printer controller and interpreted by the software installed on the controller. The software converts the drawing orders to bitmap images.

The bitmap images are delivered to the printer by the controller software, which also manages jam recovery and local user interface functions.

DocuPrint NPS/IPS printing environment

The AFP and IPDS environment uses resources and variable data to print a document. This information, along with device (printer) control information, is handled by Print Service Facility (PSF), the IBM device driver for the system.

The intelligence of the page formatting commands and structuring is performed on the host by an application and, ultimately, by PSF.

Additional printing environments do exist, for example PReS from PrintSoft. Other environments are supported provided they are fully compliant with IBM specifications.

DocuPrint NPS/IPS printers

The DocuPrint NPS/IPS printers include these models:

- 2060 (full color)
- 180
- 180 MICR
- 96
- 96 MICR
- 4050
- 4090
- 4635
- 4635 MICR
- 4850 (highlight color)
- 4890 (highlight color)
- 92C (highlight color).

If you are using NPS/IPS extension software on a DocuPrint EPS 2000 Series printer model, this manual applies to the NPS/IPS capabilities. Models 100, 115, and 135 correspond in functionality to the 4635, and printer model 155 corresponds to the 180.

Concurrent dual mode

If your applications require you to print both IPDS and PostScript, PCL, TIFF, or ASCII data streams but you do not have enough volume to support two production printers, the DocuPrint NPS/IPS printers provide a total solution. You can print either PostScript, PCL, TIFF, or ASCII data streams from a network or IPDS data streams to a single printer.

Organizations that may wish to use the concurrent dual mode capability are:

- Those interested in native PostScript and PCL printing as opposed to using data stream conversion software packages.
- Those with an established AFP/IPDS environment and are planning to migrate to a client server. You may need production printing capabilities both during and after the transition.

- Companies that are interested in printing network-based applications in the off-peak printing time available on the mainframe-attached AFP production printer.

- Organizations that must support both AFP mainframe environments and newer network-based applications that require high-volume transaction printing.

While printing IPDS jobs, PostScript, PCL, TIFF and ASCII jobs queue at the printer controller. When PostScript, PCL, TIFF and ASCII jobs are printing, you can send an IPDS job to the controller.

If you need to control when network PDL jobs print, you can use virtual printer attributes Priority and Hold to control when particular types of jobs print. For example, if you print mostly IPDS jobs, and you want to be able to release PostScript jobs at certain times, set up a virtual printer for the PostScript jobs, and then use the **Release Documents** command when you want to allow the PostScript jobs to print. Refer to the *Guide to Managing Print Jobs*.

DocuPrint NPS/IPS architecture

DocuPrint NPS/IPS printers function in all IBM environments running the current level of PSF software. Figure 3-1 shows the overall architecture for IPDS printing. Each element is defined below:

- The IBM host is connected to the printer controller using either of these connections:

  – Token Ring or Ethernet, which connect the host directly to the controller through a TCP/IP connection.

  – Bus and tag, which connects to the channel interface. The output is transferred to the controller.

  Daisy-chaining to other devices is also supported except on the RS/6000.

- The Xerox software, which resides on the printer controller, creates the rendered bit stream for transmission to the Xerox printer.
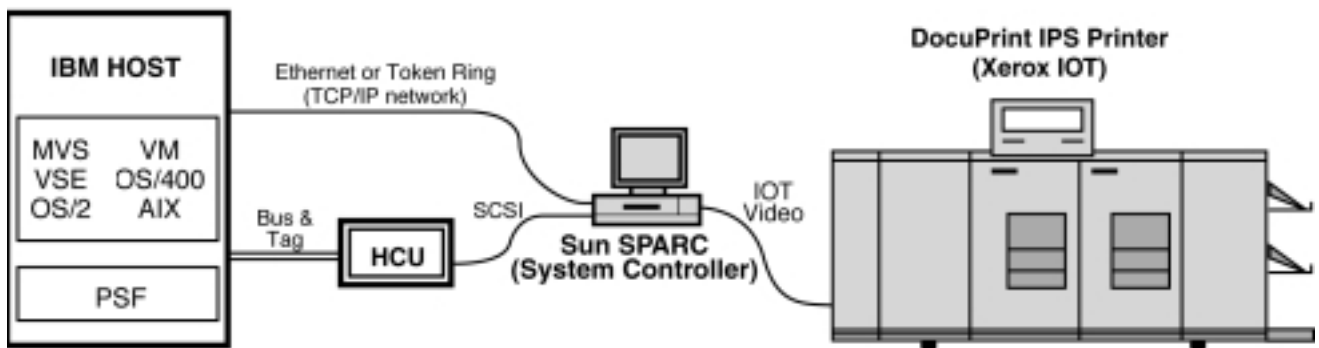
Figure 3-1. DocuPrint NPS/IPS printer components

IPDS command sets and towers

A command set is a collection of architecture constructs and associated values. Command sets can be defined across or within subsets. The DocuPrint NPS/IPS printers are compliant with the IPDS command sets and data towers.

These command sets have corresponding towers. The following figure shows the data and resource towers and their associated command sets.
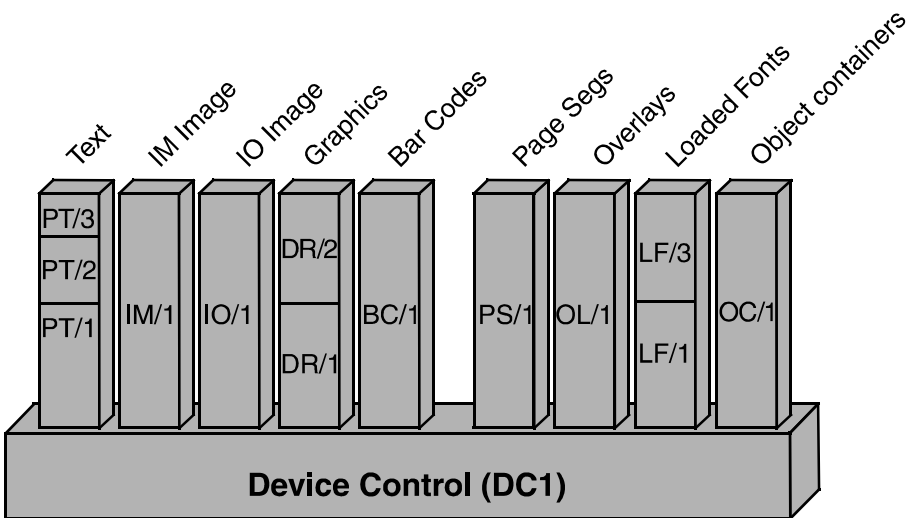
Figure 3-2. Towers and command sets

During initialization, the IPDS command sets are communicated to PSF by the Acknowledge Reply to the Obtain Printer Characteristics command. The DocuPrint NPS/IPS responds to PSF with the data tower and resource tower command sets. These command sets are part of the Device Control function set (DC1), which is composed of commands and an acknowledge protocol. The commands set up the logical page environment and communicate device controls. The acknowledge protocol transmits printer characteristics, status, resource information, and error information to PSF.

Data towers

The following sections define the command sets for the data towers.

Text function set – PTOCA (PT1, PT2, and PT3)

The text command set is composed of the IPDS command for presenting text information in a page, a page segment, or an overlay. The lowest level of this support is known as PT1. The next level, PT2, allows the use of Overstrike, Underscore, and Temporary Baseline Move (for superscript and subscript). Then comes PT3 which includes an additional extended text color selection method.

IM Image function set (IM/1)

The IM-image command set contains the commands for presenting image raster data on a logical page, a page segment, or an overlay.

IO Image function set – IOCA (IO/1)

The IO-image command set also contains the commands for presenting image raster data on a logical page, a page segment, or an overlay.

The Write Image 2 command within the IO/1 command set carries data defined by the IOCA FS10, FS92, and FS45 subsets. Refer to *Image Object Content Architecture Reference* for a description of IOCA Function Sets.

Graphic function set – GOCA (GR/1)

The graphics command set contains the IPDS commands and data controls for presenting graphics pictures on a page, page segment, or an overlay.

The Write Graphics command within the GR/1 command set carries data defined by the GOCA DR/2VO subset. Refer to Graphics Object Content Architecture Reference for information about GOCA DR/2VO.

Bar Code function set – BCOCA (BC/1)

The bar code command set contains the command and controls for presenting bar code information on a page, page segment, or an overlay. The IPDS printer uses these commands to print bar code symbols from user-created data.

The Write Bar Code command within BC/1 command set carries data defined by the BCOCA BCD/1 subset. Refer to Bar Code Object Content Architecture Reference for a description of BCOCA bar code symbol data and the BCD/1 subset.

Resource towers

The following sections define the command sets for the resource towers.

Page Segment function set (PS/1)

The page segment command set allows frequently accessed user data to be stored by name within the printer. Page segments are merged with the pages during printing.

Overlay function set (OL/1)

The overlay command set allows frequently accessed user data to be stored within the printer. An overlay is defined within a logical page presentation space. Overlay logical pages are either merged with a page's logical page on the medium presentation space (page overlay), or merged directly onto the medium presentation space (medium overlay).

Loaded Font function set (LF/1, LF/3)

The loaded font command set is used for graphic character placement in logical pages and describes the commands used to download and manage font information at the printer.

An LF/1-type coded font consists of a fully described font plus font indexes, or several fully-described font sections plus font indexes for each section.

An LF/3 type coded font consists of an Adobe Type 1 or CID-keyed outline font paired with an AFP Code Page.

Object Container function set (OC/1)

The object container command set is used to provide an AFP wrapper for non-AFP data. DocuPrint NPS/IPS supports EPS (Encapsulated PostScript) and JPEG objects. Objects can be included inline with the page, or downloaded in "Home State" for later inclusion on a page (similar to Page Segments).

Product capabilities

This section describes the capabilities of the DocuPrint NPS/IPS printers.

User interface

Each DocuPrint NPS/IPS printer controller provides a user interface that you use to place the printer online, configure the system, and start or stop print jobs.

The controller user interface allows you to access various printer features, such as:

- Set up paper trays
- Print sample documents and test patterns
- Define the system configuration
    - Channel address and mode
    - Color extraction (4850/4890/92C only)
    - Enable or disable the modem (optional)
    - MICR mode printing (96 MICR, 4635 MICR, and 180 MICR only)
    - Printer resolution (240, 300 or 600 dpi)

For complete information on the system commands and functions, refer to the *Guide to Managing Print Jobs* and the *Guide to Configuring and Managing the System* distributed with your printer.

Printer emulation

The system emulates an IBM Group 3 page printer (for example, the 3825 or 3827 printer) with the Advanced Function Image and Graphics (AFIG) option, a separate feature from IBM that directly processes IOCA FS10 images and GOCA DR/2V0 vector graphics. Xerox distributes the DocuPrint printers with support for the IOCA and GOCA data towers as a standard feature; you need not purchase these options separately.

During initialization, the printers communicate information to PSF in response to IPDS commands. The Xerox-specific printer features are enabled by sending the appropriate information from the printer to PSF in response to the 'Sense Type and Model' and 'Obtain Printer Characteristics' IPDS commands. The following sections provide further explanation of these commands.

Sense Type and Model (STM) command

When an STM command is issued by the host, the DocuPrint NPS/IPS printer responds that it is a Group 3 page printer. It also sends information to PSF about the printer, for example what printer model it is. The command streams that follow after this information may also inform PSF of any required device controls or other information.

Obtain Printer Characteristics (OPC) command

The 'Obtain Printer Characteristics' command allows PSF to query the printer about the additional features and functions which it supports. For example, a printer may pass information back to PSF stating that it supports a specific level of GOCA, certain device controls, can print color, has a specific resolution, or other information. Both the IBM Group 3 and DocuPrint NPS/IPS printers return this same type of information to PSF. However, the information provided by the DocuPrint NPS/IPS printers describes more features based on the additional features offered by these printers.

Remote printing solutions

You can connect DocuPrint NPS/IPS printers to an IBM host in many ways. The simplest solution is Direct Bus & Tag or TCP/IP (Token Ring or Ethernet). Other possible connections, such as SNA/SDLC and LAN (other than TCP/IP Token Ring or Ethernet), require a Bridge to Bus & Tag. Some of the possible solutions are:

- BARR/AFP

- BARR/RJE

- PSF/2

- InfoPrint Manager/PSF for AIX

    Note: InfoPrint Manager provides functions equivalent to PSF for AIX. Although PSF for AIX is no longer marketed by IBM, many sites may still use it.

This table shows the various remote connections and their capabilities:

Table 3-1. **Remote solution summary**

Solution	Spooling	Operator control	Resource storage	Transforms	Printer types
Channel Extender	No	Local to Host only	No (network bandwidth)	No	All
BARR	No	Local and Host	No (network bandwidth)	No	All
InfoPrint Manager/PSF for AIX Direct	No	Local to Host only	No	Yes	IPDS, PCL, and PPDS
InfoPrint Manager/PSF for AIX using MVS download facility[a]	Yes (first page out)	Local to Host only	Yes	Yes	IPDS, PCL, and PPDS

a. You must have MVS TCP/IP Version 3 Release 1 running on your system to use this facility.

4. DocuPrint NPS/IPS application migration

Now that you know more about AFP and how the DocuPrint NPS/IPS printers work, you can start printing your AFP applications to DocuPrint NPS/IPS printers. This chapter explains the steps required to modify an existing AFP application for printing to a Xerox DocuPrint NPS/IPS printer.

Where do application resources reside?

Resources reside in one or more libraries on the host system. For example, on a mainframe, you may store the page segments in a page segment library, the overlays in an overlay library, and so on. On an AS/400 or RS/6000, however, you may have one library that contains all resource files.

If you use a mainframe platform, Xerox recommends that you store your font resources in two separate libraries: one for 240 pel resolution fonts and one for 300 pel resolution fonts. This storage method should prevent overwriting fonts that have the same names but different resolutions.

If you use a platform that allows different file naming extensions, such as the RS/6000, you may store both 240 pel and 300 pel fonts in the same library. However, you should make sure that the different resolutions have different file extensions. For example, you might name font GT10 at 240 pel resolution IBMGT10.240; at 300 pel resolution, you might name this font IBMGT10.300.

To obtain optimal printer output quality, Xerox recommends that you use 300 dpi or pel resources. Note, however, that the DocuPrint 180 has enhanced resolution that gets good results from 240 pel resources.

IBM recommends that you use outline fonts. Outline fonts are independent of printer resolution.

Resource creation packages and programs

You can use any of several resource creation packages and programs to create new AFP resources or convert your existing AFP resources for use by DocuPrint NPS/IPS printers. This section lists some of the packages and programs offered by IBM, Elixir, ISIS, Lytrod, and PReS. For a brief listing of more products, refer to Appendix B, "Resource creation and conversion programs".

IBM

As part of the AFP architecture, IBM provides several products which you can use to create resources. Some of these products are explained in this section.

IBM AFP Font Collection

The IBM font collection offers over 1000 fonts in various formats that can be used on all AFP printers. Type Transformer can be used to convert any Adobe Type 1 font into raster or outline AFP font. FontLab can be used to design or modify fonts.

Overlay Generation Language (OGL)

This product allows you to create the overlays (electronic forms) used in your applications. It defines the constant text, lines, boxes, and shading elements that make up the electronic form. You can also include page segments in the overlay.

Graphical Data Display Manager (GDDM)

This product is a collection of programs used to edit graphics and images, create composite documents, and convert files to different formats.

Page Printer Formatting Aid (PPFA)

PPFA is a batch utility that generates the page definitions and form definitions used in your AFP applications. You can use this program to specify how the printer controls will process the physical sheet of paper and how the data should appear on the logical page. You can also specify colorization commands for text or overlays within the PageDef.

IBM AFP Windows Printer Driver

The IBM Windows Printer Driver allows you to convert a form created in any Windows application into a compiled OGL. This product also allows you to create page segments. The IBM AFP Windows Printer Driver also supports the basic AFP colors.

Elixir

Elixir provides a suite of products to convert your existing AFP resources for use on DocuPrint NPS/IPS printers. Each of these products is explained in the following sections. You can purchase most of these applications through Xerox.

Elixer Opus

Elixer Opus helps you automatically insert targeted information into your documents and dynamically generate marketing and follow-up communications based on customer profiles in your database.

With Opus you can edit forms and overlays, drag-and-drop records and fields, import images, select font attributes, add conditional logic, and specify how you want your pages printed. This functionality is supported in any language, color or format.

Elixir Desktop and Converters for AFP

The Elixir Desktop and Converters for AFP provide an integrated set of tools for conversion and file management activities:

- The Elixir Converters for AFP program makes it easy for you to load your existing AFP resources into Elixir's WYSIWYG (What You See Is What You Get) editing tools. Elixir then converts the resources to the appropriate Elixir generic interchange file formats while still preserving the unique AFP attributes. From there, you can convert the resource to any number of formats, depending on your needs. You can also add color to the resources.

- The Elixir Desktop for AFP is an integrated, icon-based, operating environment for customers who use Elixir's AFP software. It features point and click operation of any Elixir application, linking DOS applications to icons to simplify the loading process. You can also access the Elixir AFP conversion software and utilities through the Converter icon.

Each of the following applications works in conjunction with this product to create a total document creation solution.

ElixirFont for AFP

ElixirFont for AFP is a WYSIWYG tool used to create and edit fonts. It works in conjunction with the Elixir Desktop and Converters for AFP to give you full control over AFP font components, such as coded fonts, character sets, and code pages. Using this product, you can perform precise pel editing, resize fonts, and control all font metrics of character sets and code pages.

ElixirForm for AFP

ElixirForm for AFP is a WYSIWYG tool used to create and revise monochrome or full color forms for printing on DocuPrint NPS/ IPS and other printers. It allows you to personalize your existing AFP by adding color to any element of the form. You can also import AFP-format fonts and images to include in the form.

ElixirImage for AFP

ElixirImage for AFP is a WYSIWYG tool that gives you the power to create and maintain images on your personal computer. After you import page segment, IOCA, TIFF, or PCX images into the Elixir Desktop and Converters for AFP and convert them to the Elixir interchange format, you can use ElixirImage for AFP to edit all or part of the image. This product also includes drawing tools specific to the AFP environment to help with your editing.

Elixir AppBuilder for AFP

Once you've created or modified your resources, you can combine them into a document using the Elixir AppBuilder for AFP. This program allows you to create and edit AFP PageDefs and FormDefs on-screen instead of through a character-based editing tool. Using this program, you can set up complex field and record processing jobs by dragging fields and records into position on forms. You can import most existing PPFA-formatted PageDefs and FormDefs for editing. When the document is finished, you can output it to PPFA source or compiled PPFA format.

Lytrod Software

Proform Designer is a full-featured forms designer that supports AFP.

It supports monochrome, highlight color, and full color documents. The Windows 95, WYSIWYG design environment is instantly familiar and simple to navigate. Customizable toolbars provide quick access to all of Proform Designer's drawing, formatting, and text editing tools. Easily access TrueType fonts and import graphics (PCX, TIFF, GIF, JPEG, BMP).

Proform Designer's user-friendly GUI makes form design easier than ever and allows simple drag-and-drop operations for data placement allowing interaction between static and variable form elements.

Proform Designer provides an efficient and cost-effective solution by replacing the need for purchasing preprinted forms. Inventory, obsolescence and distribution costs of preprinted forms are eliminated. Forms can be dynamically modified and enhanced as the need arises both quickly and easily. Proform Designer's robust interface allows creation of a wide variety of applications, such as OMR (scannable) forms, invoices, statements, claims, tax forms, ID cards and much more. In many cases, current producers of electronic forms can import their forms and resources into Proform Designer for future manipulation without redesigning their applications.

ISIS

ISIS provides two different product families to create, edit, and print AFP resources and documents:

- The ISIS OverView product family, which runs on a PC and connects to the mainframe via 3270 emulation session or the ISIS APPC module

- The Papyrus Document System which runs on multiple platforms and builds on the AFP architecture.

OverView AFP Designer

A program developed for AFP only, the OverView AFP Designer offers integrated development of an AFP application with multiple forms and PageDef data layout. This program is fully compatible with IBM OGL and PPFA and allows you to display and design using the actual print line-data file visible. The applications can then be printed through AFP on MVS, VSE, VM, AIX, OS/400, OS/2, and Windows platforms.

OverView Font & Image Editor

This program is a PC-based graphical editor for AFP fonts that supports the editing and generation of AFP fonts and page segment objects. It supports bounded box and unbounded box fonts in 240 dpi and enables the editing of characters, code pages, and coded fonts. It also includes double-byte character sets and 300 dpi support. The Image Editor includes a TIFF conversion utility.

OverView AFPDS Compiler

This feature is like having your own mainframe on your desktop. It completely emulates the functionality of the IBM OGL/370 and PPFA/370 products while enabling 300 dpi and color support for overlays. This product runs on OS/2 and various Window platforms.

OverView Digitizer Pad Support

This program is an optional software feature that provides an interface for industry standard CAD drawing pads. It operates in parallel with the mouse, providing accurate position information from the existing form. As you digitize the form, the system creates OGL source code which can be printed without requiring a conversion.

OverView PageEXEC

PageEXEC is a stand-alone or PSF/2-integrated program component that executes the IBM PageDef description and converts a line data file to an AFPDS document file. It provides complete PSF functionality in an OS/2 environment, and also provides functionality of PSF/MVS and PSF/6000 transparently on the OS/2 platform. This product is also compatible with IBM's AFP Conversion and Indexing Facility (ACIF), allowing you to generate the TLE index of a document.

Papyrus Designer

This product allows you to develop document applications using visual and graphical techniques. Papyrus Designer runs on your PC, allowing you to create forms, bar code applications, images, overlays, and page layouts. It incorporates the functionality of OverView AFP Designer for forms and PageDef design and the development component for multi-page statements.

Papyrus DocEXEC

DocEXEC formats the high quality, data-driven, multi-page documents you created using Papyrus Designer. The source code created is upwardly compatible to PageDefs. It allows for field placement, variable data merge, color support, dynamic chart generation, as well as other useful features. This product runs on MVS/ESA, AIX, OS/2, and Windows systems. You can print documents to AFP, Xerox Metacode, and PCL 4/5 printers.

Papyrus Host/Server/Client

You can also use the Papyrus Host/Server/Client components to manage, view, and print distributed document applications. You can also use these products to convert Windows documents to AFP.

GMC PrintNet

PrintNet is a suite of software modules that are separated into two main components; document development and print driver modules. This architecture allows for any PrintNet layout to be resolution, printer, and platform independent.

PrintLayout

PrintLayout is the main GMC program for layout design. It utilizes a true WYSIWYG graphical interface, and automates scripting, programming, overlay generation, barcode creation, and all job resources, independent of printer type, platform or resolution.

- **PrintProof**—This module provides a live data, dot for dot, WYSIWYG proofing capability on your screen. This module had troubleshooting tools and the ability to print to any Windows driven printer, at your target production printer's resolution.

- **PrintJob**—This module associates your data file with the layout (print job) so you only have to select a "One File" for printing. This keeps job selection at the production level simple and error free.

- **PrintLayout Support Modules for Resource Customization**—Although almost all job resources are automatically generated in PrintLayout, the following utilities are included with a standard license:

  - **PrintImage**—The utility that creates variable signatures, logos, maps, etc., as fonts from graphics.

  - **PrintFont**—The font conversion module that is used to create customized character sets.

PrintManager

The GMC printer drivers that generate the actual production job via a spool file or a direct connection to the production printer. The pages are generated quickly and efficiently to optimize the output device's rated speed. There is a different driver for each printer protocol, enabling the layout to be device, resolution, and platform independent.

PReS

PReS (Printer Resource Software) is a software product designed to make the formatting and printing of variable data a simple task. PReS is a family of products which supports a range of electronic printers from desktop PCL and Web Press/InkJet printers through to high-speed channel-attached devices from various manufacturers.

PReS runs on widely used personal computer platforms, including Microsoft Windows. Unlike the other packages in this section, PReS does not normally create resources such as page segments, overlays, etc. for use with PSF, but generates and then uses these resources via its own Print Control software. However, PReS can also be used to generate AFP data for subsequent printing by PSF.

PReS consists of the following utilities:

- **TRF Editor**—This utility is used to edit and maintain standard letter text. For example, it provides "boiler plate" texts to be selected and merged with the variable data at the time of printing.

- **Script Editor**—The Script Editor defines a series of steps and procedures in a user-friendly language, using a range of instructions specifically designed for speedy print data editing, manipulation, formatting, and control options. The script is compiled for the appropriate printer and this enables scripts to be tested on desktop PCL printers before going into production on IPDS printers.

- **Print Control**—PReS Print Control provides job and printer control during the production printing process. It includes many features designed to give the operator the simplest techniques for directing the mode and activity of the printer. Prompts may be fed to PReS Print Control from the Script, for example, to indicate which stock to load. Stops, starts, restarts, and file positioning are easily controlled.

The following utilities complement PReS:

- **TransFont**—This utility allows printer fonts to be created for the target printer from TrueType, PostScript, and Raster outlines. It also allows for these fonts to be edited and manipulated. Fonts may also be migrated from one printing environment to another with character re-mapping, re-scaling, and different resolution options.

- **TransForm**—This utility accepts input in the form of PCX, TIFF, and other printer graphic formats such as Xerox IMG and IPG files. It also accepts data from word-processing and DTP programs for conversion to graphic files for the target printer. The images can be rotated, resolution changed, and rescaled.

Fonts

This section describes the actions you may need to perform to make your fonts available for use with the DocuPrint NPS/IPS printers. Review each section to determine if it applies to your site.

Printer-resident fonts versus downloading fonts

PSF can access fonts two ways:

- Referencing them from the host system
- Referencing them from the printer.

DocuPrint NPS/IPS supports double-byte fonts. Printer resident fonts are not supported. There is a default font.

IBM AFP font collection

IBM delivers a standard set of 240 and 300 pel fonts with their printers. If your current printer only supports 240 pel, you may not have installed the 300 pel fonts. You may choose to purchase the IBM Font Collection which contains over 1,000 fonts in various formats and resolutions.

Xerox recommends that you upgrade to the 300 pel font libraries since these fonts provide better print quality on most DocuPrint NPS/IPS printers. If you have a DocuPrint 180 NPS/IPS, however, you may continue to use the 240 dpi fonts since both the 240 and 300 dpi fonts print with a high print quality due to the enhanced resolution marking engine.

The following sections provide information on the various types of fonts provided by IBM.

Sonoran fonts

Sonoran fonts are proportional fonts, available in Serif, Sans Serif, and Petite formats. They are available in both 240 and 300 pel resolutions.

Sonoran fonts are the only AFP typographic font available for the original version of PSF. If you are a long-time AFP customer, you will most likely have purchased these fonts. If you plan to continue using Sonoran fonts for printing to DocuPrint NPS/IPS printers, make sure that you use the 300 pel version for the best resolution quality.

The use of Core interchange fonts is recommended over using Sonoran fonts.

Compatibility fonts

The Compatibility fonts provide compatibility with IBM 3800 Model 1 printer technology and impact printer technology. These fonts are available in both 240 and 300 dpi format and are generally used for applications printed to 3800 printers.

If you plan to convert your continuous form documents to cut sheet format, make sure that you use the 300 pel version for the best resolution quality.

Core interchange fonts

IBM distributes an additional set of fonts, known as core interchange fonts, which consist of Courier, Helvetica, and Times New Roman. These fonts are based on the Adobe Type Manager (ATM) Type 1 format. If you no longer wish to use Sonoran or Compatibility fonts, you should replace them with the core interchange fonts.

Core interchange fonts are available in both 240 and 300 pel resolution, as well as outline format. If you plan to use these fonts for printing to DocuPrint NPS/IPS printers, make sure that you use the 300 pel version for the best resolution quality. If you plan to use a DocuPrint 180 NPS/IPS, use of the 300 pel version is optional.

Data 1 fonts

The Data 1 fonts are fixed pitch fonts at 12.3 cpi used with early AFP applications. These were the recommended fonts for use when converting line printer stock tab applications to 8.5 by 11 inch paper. Data 1 fonts are distributed in 240 pel resolution.

IBM now distributes PSF with the Gothic font, GT13. This font replaces the existing Data 1 fonts. You may change your application to reference this font.

Using the Core interchange fonts is recommended over Sonoran fonts in order to achieve compatibility with other print environments where Adobe fonts are used (such as Windows and Macintosh environments).

Outline fonts

Outline fonts contain the instructions on how to draw the font rather than the raster image. Because of this, outline fonts are printer resolution independent. They can be purchased in the IBM AFP Font collection.

240 versus 300 pel libraries

Because both types of font resolution files may use the same file names, Xerox recommends that you store your 240 pel and 300 pel fonts in two separate libraries. We also recommend that you place the following fonts in a separate library:

- Any fonts that you have created or modified

- Fonts you purchased from a third party

- Special fonts, such as the Xerox E13B MICR fonts, that you received from Xerox.

Placing these fonts in a separate library will prevent any of your existing fonts from being overwritten if they have the same name as these fonts.

Custom fonts

If you require special character sets or need to add new characters to an existing character set, you may choose to create custom fonts for your site. When using these fonts to print applications on DocuPrint NPS/IPS printers, you may need to:

- Identify your custom fonts by comparing a listing of fonts on your system to the listing of fonts distributed by PSF. You may also wish to compare the resource libraries that contain the 240 pel and 300 pel character sets to determine if any custom fonts reside in these libraries.

- Create and implement a 300 pel version of the font.

NOTE: Note that, if you are converting from an IBM 3800 printer, you may need to convert your unbounded box custom fonts to bounded box fonts.

Font conversion

You may need to convert some or all of your fonts for use with the DocuPrint NPS/IPS printers. Follow these steps to convert your existing fonts.

1. Identify the fonts that require conversion.

2. Use a font conversion tool or a resource conversion service to create the 300 pel fonts. Examples are:

   - APSRCF30, a PSF utility for 240 to 300 pel conversion

   - Font editors, such as Elixir or ISIS programs

   - Font services, such as Statice Fonts or COPI

   - Xerox Font Center

   - FontLab font designer.

3. Implement the new character set(s) into the 300 pel libraries and test them.

Setting resolution for IPDS printing

When setting resolution for IPDS printing, it is important to consider two settings, input resolution and output resolution.

- The input resolution is the resolution the controller reports to the host. This is equivalent to the resolution setting on the IPS 7.2 GUI. Set input resolution using the **Set Option IPDSDefaultResolution** command to set the system default, or by using the **IPDSResolution** attribute on the virtual printer used for the job.

- The output resolution is the resolution of the page image created for the printer. Set output resolution using **Set Option DefaultResolution** command to set the system default, or by using the **Resolution** attribute on the virtual printer used for the job.

NOTE: For the 2060, the only output resolution you can use is 600 dpi.

With IPS 7.2, the output resolution was either automatically set to a best-fit value or was set to 600 (if Disable Hardware Scaling was turned on). With NPS/IPS, you must explicitly set the output resolution.

If the IPDSResolution is set to 600, NPS/IPS sets the "support all font resolution flag" in the initial conversation with the host. In 7.2, this was achieved with the "-f" flag. Not all host software properly supports this flag. If you have host software that does not support the flag, but you wish to print at 600 dpi to support high-resolution images, set the IPDSResolution to 240 or 300 and Resolution to 600. The system uses 240 or 300 fonts from the host for text, but processes images at 600 dpi.

Here are some examples of how you would set the resolution values to match what you had set in 7.2:

Table 4-1. **IPS 7.2 settings and NPS/IPS settings**

Printer	IPS 7.2 setting	NPS/IPS IPDSResolution	NPS/IPS Resolution
DP180	240	240	240
4850	240	240	300 (the only choice)
4635	240	240	600 (for better output)
Any printer	300	300	300
DP180	240 Disable Hardware Scaling ON	240	600
DP180	300 no -f option	600	600
DP180	600 -f option on	600	600

Page segments

The print quality of the page segments you currently use with AFP may depend on how they were created originally. For example, you may have created a page segment at 240 pel resolution but, when it is converted to 300 dpi, it may not look like it did originally. However, a different page segment created at 240 pel resolution may look the same when converted and printed.

To determine if you need to convert your page segments, print a test document to the DocuPrint NPS/IPS printer. Look at the document to decide if the print quality is acceptable. If so, you may continue using the page segment without making any changes. However, if the print quality is not satisfactory, you should recreate it at 300 dpi.

The DocuPrint NPS/IPS printers support printing up to 32,511 page segments per print job.

Overlays

You may print your existing overlays to DocuPrint NPS/IPS printers without conversion with two exceptions:

- For overlays that include inline images, you must convert those images to 300 dpi before printing; otherwise, the print quality will not be consistent.

- For overlays that include the PATTERN command, the command may reference either an image within an overlay or a special symbol not available in distributed fonts. You can need to recreate the image or special font to have an identical appearance on a 300 dpi printer. You can use a font or image editing tool to recreate the document at 300 dpi.

IBM has distributed a PTF for OGL (UW78384) that allows you to specify a 300 dpi font library when creating an overlay. This change causes OGL to create overlays with a PGD value of 1440 dpi (if you specify a 300 dpi font library). This allows for more exact text placement when using the overlay with a 300 dpi printer. Note, however, that the IM images created by OGL shading commands remain at 240 dpi.

The DocuPrint NPS/IPS printers support printing up to 32,511 overlays per print job.

Images

When you print AFP documents that contain 240 pel images to DocuPrint NPS/IPS printers set to run in 300 dpi mode, PSF converts the IM images to IOCA image format. Using the Resolution attribute and IPDSResolution attribute to specify how you want the system to handle resolution.

The print quality of any images you currently use with AFP may depend on how they were created originally. For example, you may have created an image at 240 pel resolution but, when converted to 300 or 600 dpi, it may not look like it did originally. However, a different image created at 240 pel resolution may look the same when converted and printed.

For more information on specifying resolution, refer to the *Guide to Managing Print Jobs* and the *Guide to Configuring and Managing the System.*

The DocuPrint NPS/IPS printers use an algorithm to convert 240 pel images to 300 or 600 dpi. To determine if this internal conversion will produce the quality of output you require, print a test document to the DocuPrint NPS/IPS printer. Look at the document to decide if the print quality is acceptable. If so, you may continue using the image without making any changes. However, if the print quality is not satisfactory, you should either regenerate or rescan the image at 300 dpi.

GOCA image resolution

While GOCA data consists mostly of resolution-independent drawing orders, it can contain raster images. GOCA raster images appear in some applications because historically they have been easier to color in a PSF environment. Unfortunately, there is no definitive information in IPDS to let the printer controller know the resolution used when these images are created so that it can do the proper scaling as it does with IOCA images. For this reason, the controller needs to be told what resolution to use for GOCA raster images. In IPS 7.2, the controller used the GUI resolution value. For NPS/IPS, this value is set separately. Use Set Option IPDSGOCAResolution to specify the desired resolution (240, 300, 600) for GOCA images. This option only applies to applications that use raster images within GOCA objects. For these applications, it is very important that this option be set correctly. The images will print in the wrong size if it is not.

Pixel doubling

If you print applications that include images consisting of single-pel lines, the 4050 and 4090 printers automatically convert those single-pel lines to double-pel lines. This process, known as "pixel doubling," accommodates the imaging technology of these printers and ensures optimum output quality of the document.

Mixed plex jobs

DocuPrint NPS/IPS supports Mixed Plex jobs. That is, the printer controller can receive jobs that contain simplex, duplex, or a mixture of both simplex and duplex pages within a job.

Mixed Plex enables the system to switch plex modes (simplex to duplex and vice versa) within a job. In the AFP environment changing plex modes in the middle of a document is allowed and common.

Jobs that contain both simplex and duplex pages are printed without a printer cycle-down. However, when switching from duplex to simplex within a job, the printer may dead cycle to clear the paper path of all duplex sheets before feeding the first simplex sheet.

Users can avoid dead cycles when switching from duplex to simplex by using the DelaySimplexSwitch option. There are several ways to affect plex.

If you have programmed applications to use stock from specific input trays using FORMDEFs, you should pay close attention to the attributes given to the printer input trays. Media (tray) attributes can be set to simplex or duplex. Each individual tray can be defined to contain media defined as simplex or duplex using the "type" field of the media attribute. (Refer to the *Guide to Managing Print Jobs* and the *Guide to Configuring and Managing the System* for specific directions on defining media and setting tray configurations.)

The DelayDuplexSwitch and DelaySimplexSwitch options are also available. Refer to your *Guide to Configuring and Managing the System* for further information on these options.

Continuous form to cut sheet conversion

If you try to print the same application on both an IBM 3800 printer (continuous form) and a DocuPrint NPS/IPS printer (cut-sheet), your output may appear in the wrong orientation or extend off the edge of the page. These problems occur because the page origin on the IBM 3800 printer is different from all other IPDS printers, including the DocuPrint NPS/IPS printers:

- For DocuPrint NPS/IPS printers and all other cut-sheet printers (both IBM and Xerox), the origin is at the top left corner of a portrait page

- For IBM 3800 printers, the origin is at the top left corner of the leading edge.

As a result, you may need to modify your existing AFP resources to account for this difference, whether you are changing from a 3800 to another IBM continuous feed printer, such as the 3900 or 3835, or to any IBM or Xerox cut sheet printer.

The required changes are based on the current page rotation and presentation specified in the FormDef or PageDef for documents printed on continuous form printers. For example, if you have documents that use 11 by 17 inch paper, you may need to change the rotation in order to print the application correctly.

Another option is to use the IPDSContinuousEmulation option on the DocuPrint printers. This allows you to rotate the print 90° and allows it to print correctly, without having to make any application changes. Use the **Set Option** command to do this. Refer to the *Guide to Configuring and Managing the System* for further information on this command.

The following figure illustrates the difference between the two page origins:
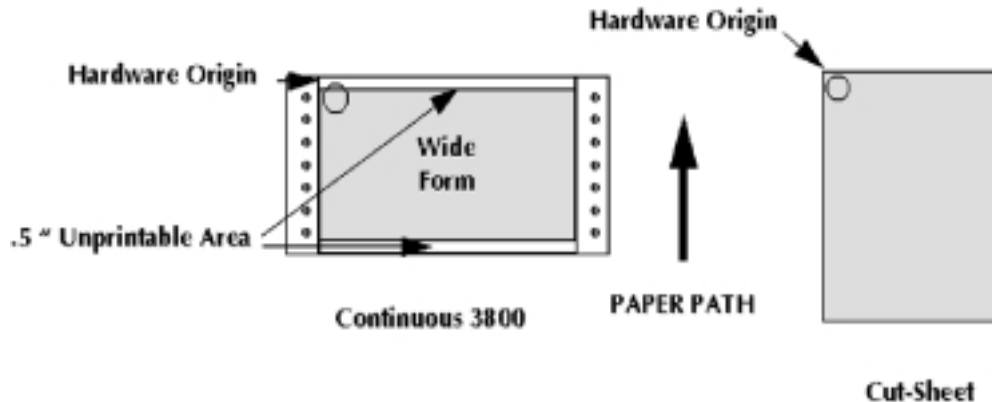
Converting 3800 applications

Continuous forms are fed into a 3800 printer either of two ways: wide feed (long edge first) or narrow feed (short edge first). While the DocuPrint NPS/IPS printers feed the paper long edge first (wide feed), the orientation is based on a narrow feed. Therefore, if you are migrating an application originally created for the IBM 3800 that uses narrow forms, you should not have to make any changes to your AFP resources because the 3800 hardware origin will match the DocuPrint NPS/IPS origin.

However, if you are migrating applications originally created for the IBM 3800 that use wide forms, you must modify the AFP resources to use the new hardware origin:

- For DCF output, you can specify a logical device type appropriate for cut-sheet printers; for example, you might specify 3820 or PG3A.

- For line-mode applications, you must use a PageDef formatted for cut-sheet printers.

  For example, when creating a PageDef for an IBM 3800 printer with wide forms, landscape data is formatted using the DIRECTION ACROSS operand in the PAGEDEF or PAGEFORMAT command, while portrait data uses DIRECTION DOWN. However, when creating a PageDef for any other printer, including the DocuPrint NPS/IPS printers, landscape data is formatted using DIRECTION DOWN or UP, while portrait data uses DIRECTION ACROSS.

  DIRECTION UP is recommended for compatibility between cut-sheet and continuous form printers.

In lieu of modifying the applications, you can print the job using the IPDSContinuousEmulation option on the printer.

Converting other IBM continuous form applications

Other IBM continuous form printers, such as the 3900 or 3835, are more compatible with cut-sheet printers than the 3800. The 3900 and 3835 automatically adjust their hardware origin to match the portrait origin of cut sheet printers, regardless of whether wide or narrow forms are loaded. In other words, the hardware origin is always the top left corner of a portrait page, just as it is for cut-sheet printers. As a result, most applications originally created for continous forms printers will require no changes when migrating to a cut-sheet printer such as the DocuPrint NPS/IPS.

CAUTION

If you use either EZ-Letter or ASAP to create your applications and you are a licensed user, you must perform either of these actions:

- *Download the most current software release from their web page (www.accessaba.com)*

- *FTP the most current software release from their FTP site (ftp.accessaba.com).*

Form definitions using PRESENT and DIRECTION

Many applications include AFP resources originally created for a 3800 printer; they are modifed to print on a printer such as the 3900 or 3835, using the PRESENT and DIRECTION operands of the FORMDEF command to adjust the hardware origin to match that of the 3800 application. This adjustment allows you to print 3800 applications on the 3900 or 3825 printers without modification.

In addition, some applications include the PRESENT and DIRECTION keywords for new applications for a continuous form printer to achieve the desired page layout.

These applications present a problem in the OS/390 environment. PSF will normally ignore these values when sending a job to a cut-sheet printer and send all jobs as if PRESENT PORTRAIT, DIRECTION ACROSS had been specified. It is important to note that this is not a problem with the DocuPrint NPS/IPS controller. This is the normal operation of PSF for OS/390 and any customer migrating from a continuous form printer to a cut-sheet printer regardless would encounter it. If you encounter this problem, you should do one of the following:

- If all of the jobs are landscape, use **Set Option IPDSContinuousEmulation** to force the DocuPrint NPS/IPS default orientation to be landscape. However, if there is a mix of portrait and landscape jobs, this may be a problem as the operator must switch this option back and forth for different jobs.

- Include N_UP 1 in your FormDefs. PSF passes on the PRESENT and DIRECTION information to all printers including cut-sheet for any FormDef that uses N_UP. This works even with older versions of PSF. This method can cause problems if this application is also printed on a continuous form printer that is using Cut-Sheet Emulation (CSE) as any N_UP specification will turn off CSE.

- Include the CUTSHEET YES parameter in your FormDef. This signifies to PSF that cut-sheet printers should receive the PRESENT and DIRECTION information but does not have any of the undesirable side effects of N_UP. It also does not affect the printing of the application on a continuous form printer. With this parameter in place, the application can be printed on continuous form and cut-sheet printers interchangeably.

5. Incorporating Xerox value-added features

The DocuPrint NPS/IPS series allows you to take advantage of many Xerox value-added features. These features include full color, highlight color, paper handling, and paper tray selection, enhanced resource resolution, and guaranteed MICR printing.

This chapter provides instructions for incorporating the Xerox value-added features into your existing documents.

Document attributes

DocuPrint NPS/IPS architecture offers the unique capability of applying document attributes to your print jobs. Some, like IPDSResolution, Resolution, and Media, affect the way your job will print. Combined with the power of the virtual printer, document attributes give you more flexibility than any other AFP printer. Refer to the *Guide to Managing Print Jobs* for more information on using document attributes and virtual printers.

Adding color

AFP supports almost all of the functionality of a Xerox high-end printer, including full color and highlight color. You can add color to lines of data, fields within lines of data, overlays, and page segments within your document using any variety of programs.

Adding color to your documents can dramatically change its effect on customers.

- The DocuPrint 4850, 4890, and 92C NPS/IPS printers print black plus one of ten solid highlight colors: cyan, magenta, cardinal, violet, brown, ruby, royal, green, blue, and red. They can also print a variety of shades or tints of any of these color.

- The DocuColor 2060 NPS/IPS prints full color documents.

NOTE: You should be aware that the same application will produce different color output when printed on a highlight color printer as compared to a full color printer.

The DocuPrint NPS/IPS printer can also accept the IOCA color spaces in the extended controls, referred to as the "4E" color triplets. The color triplets include Highlight Color, Standard OCA Color, RGB, CYMK and CIE-LAB. The system supports JPEG compressed IOCA.

Highlight Color allows the processing of a shaded area, which specifies a percentage of a Highlight Color and a percentage of black.

Standard OCA Color allows for the specification of a standard color space.

RGB, CYMK and CIE-LAB are accepted, but for highlight color are converted to a 50% Highlight Color. Future enhancements will resolve these color spaces by determining the luminance of the given color and substituting a Highlight Color space with the closest luminance.

This section describes the steps required for adding color to your document, either for the text, page segments, or overlays.

Tips for full-color printing

If you are using a DC 2060 full color printer, there are some things you should be aware of:

- Ensure that the version of tools you use for document creation (for example, OGL) supports full color applications.

- Use PSF version 3.2.

- You can use full color images to add color to documents. DocuPrint NPS/IPS supports EPS and JPEG images in object containers.

- There are simple utilities that allow you to wrap your EPS and JPEG images for use in the AFP environment. Ask your Xerox representative for more information on how to obtain these utilities.

- DocuPrint NPS/IPS supports the five color models available in AFP: OCA, RGB, CMYK, Highlight, Cie-lab.

Color mapping for highlight color printers

Before printing your AFP document, you specify which color to treat as the highlight color using the MapColor attribute. For example, if the document contains references to the AFP color BLUE, specify "blue" as the MapColor. Then, when the document is printed, any objects specified as AFP BLUE print in the highlight color. Any other colors referenced in the data stream print as a shade of the highlight color. Refer to the *Guide to Managing Print Jobs* for more information about the MapColor attribute.

Color mapping is also important when using a highlight ink color that is not defined by IBM (for example, cardinal), or when using an IBM color call for which Xerox does not have an ink (for example, yellow).

Variable and constant data

This section explains how to add color to variable and constant data using either PPFA or ElixirForm for AFP (version 3.11c).

Using PPFA

To add color to any constant or variable text in your application, modify the PageDef for the application as follows:

- To colorize a field of print data in a PageDef, add the COLOR parameter to the FIELD statement. For example:

  FIELD START 1 LENGTH 32 POSITION 255 175 COLOR RED

- To colorize a line or series of lines of text in a PageDef, add the COLOR parameter to the PRINTLINE statement. For example:

  PRINTLINE REPEAT 3 CHANNEL 1 POSITION 0 0 COLOR RED

- To use the new highlight and full color models for lines or text, predefine the color before use:

  DEFINE CLR1 COLOR HIGHLIGHT 1 COVERAGE 65

  DEFINE CLR2 COLOR RGB 10 15 35

  FIELD START 1 LENGTH 32 POSITION 255 175 COLOR CLR2

- You can also specify the color information within the PRINTLINE or FIELD command:

PRINTLINE REPEAT 3 CHANNEL 1 POSITION 0 0 RGB 10 15 35

Using DCF

You can add color to text in a DCF/Script document by adding the .DF (define font) keyword to the document. For example:

.DF GT10 TYPE('SONORAN' 10) COLOR RED

NOTE: If you add the COLOR command to the .DF keyword, you must also update your Logical Device Table and Physical Device Table to support color.

Define your own colors using the .cr control word:

.cr clr1 RGB 10 15 35

Using Elixir Desktop for AFP

To add color to an existing line of black text, follow this procedure:

1. With the left mouse button, select the "up arrow" key in the tool box.

2. Move the mouse to the first character you wish to colorize and click the right mouse button.

3. Click on the ink box with the left mouse button. The system displays the color selections at the bottom of the screen.

4. Select the color you wish to use with the left mouse button.

   The line of text changes from black to the selected color.

To add color text on a new form, select the "Add Text" icon then select the color you wish to use. When you begin typing, the text will appear in the selected color.

Conditional processing

Conditional processing allows an action to be taken dependent on a field in the input data. You can use conditional processing to determine whether certain elements on a page will print in color.

For example, you can:

- Specify that the first page of a statement be printed with a color logo and the remaining pages be printed without the logo

- Specify that certain fields be printed in color on some copies and printed in black on other copies of documents

- Print customer statements with a color overlay and logo, but print the internal copy in black on plain white paper

- Print the due date and amount due in red if the bill is past due.

To specify conditional processing in your AFP document, specify the CONDITION command in either the copy group or page format, depending on what element(s) you wish to change.

Example:

You use two different page formats with your documents:

- PF1, which includes your company logo in color

- PF2, which includes your company logo black and white.

When you print statements to send to customers, you can select PF1 to print the logo in color and enhance the look of the document. However, when printing internal documents, you may wish to lower printing costs, and thus select PF2 to print the black and white logo.

For this example, your PageDef may look something like this:

```
PAGEDEF LTRLOGO
.
PAGEFORMAT PF1 WIDTH 11 IN HEIGHT 8.5;
  PRINTLINE REPEAT 25 CHANNEL 2;
  .
  OVERLAY LOGOC SIZE 2 3 OFFSET .25 1;
  CONTROL REPLACE;
  FONT FONT1 A0557C;
  SEGMENT LOGO ROSLGOC;
  .
  CONDITION cond1
    START 2 LENGTH 1
    WHEN EQ 'B'
    BEFORE SUBPAGE
      NULL PAGEFORMAT PF2;
  .
PAGEFORMAT PF2 WIDTH 11 IN HEIGHT 8.5;
  PRINTLINE REPEAT 25 CHANNEL 3;
  .
  OVERLAY LOGOB SIZE 2 3 OFFSET .25 1;
  CONTROL REPLACE;
  FONT FONT1 A0557C;
  SEGMENT LOGO ROSLGOB;
  .
  CONDITION cond2
    START 2 LENGTH 1
    WHEN EQ 'C'
    BEFORE SUBPAGE
      NULL PAGEFORMAT PF1;
  .
```

When condition B exists, the system uses the PAGEFORMAT PF2. When condition C exists, the system uses the PAGEFORMAT PF1.

For a complete description of conditional processing, refer to the IBM *PPFA/370 User's Guide and Reference* (S544-3700).

Overlays

The IBM Overlay Generation Language (OGL) compiler supports color for fonts, rules, patterns, and other commands. You can also generate color overlays using utility programs or third-party packages. These colorized overlays can then be printed on DocuPrint NPS/IPS printers. Colors can either be specified using the standard AFP colors (RED, BLUE) or using a named color previously created using the DEFINE COLOR command.

Utilities You can add color to certain overlays by running utilities provided by either IBM or Xerox. For example, you can use the IBM supplied PL/1 program provided with DCF (DCFPPOVL).

Third-party packages Several third-party packages exist that allow you to add color to overlays. Some of these are:

- IBM AFP Driver
- Elixir
- ISIS.

Using Elixir Desktop for AFP

When you use Elixir to convert an image to an overlay, make sure that you have selected either GOCA or IM as the image type and the "embed page segments" option. By embedding the page segments in the overlay, you reduce the number of files that need to be managed, and you can change the color directly within the form. Also, you only need to upload the .OVE and any referenced fonts to the host for printing.

Because the DocuPrint NPS/IPS printers support file compression for IM objects, Xerox recommends that you use IM objects instead of GOCA objects when creating embedded page segments. If you choose IM objects as the embedded page segment, the output of the .OVE file is significantly smaller.

As an alternative, you may choose to reference an external page segment instead of embedding the page segments. You may then use the GOCAPSEG DOS utility (from Elixir) to change the image into a color page segment in GOCA format.

Lines and borders

OGL supports color using the DRAWRULE, DRAWMASK and DRAWBOX commands.

Example:

DRAWRULE...COLOR BLUE

You can use either OGL, DCF/Script or ElixirForm for AFP to colorize lines and borders in your document. This section explains the procedures for both products.

Using DCF/Script

To colorize lines or borders in a DCF/Script document, add the .DR (define rule) keyword to the document. For example, to create a red line that is .6 millimeters (mm) long, add this command:

.DR HEAD1 WEIGHT .6MM COLOR RED

NOTE: If you add the COLOR command to the .DR keyword, you must also update your Logical Device Table and Physical Device Table to support color.

Using Elixir Desktop for AFP

To colorize existing black lines and borders, follow this procedure:

1. With the left mouse button, select the "up arrow" key in the tool box.

2. Move the mouse to the object you wish to colorize and select it using the right mouse button.

3. To change the border of the object, select the pencil icon.

   The system displays the eight color selections at the bottom of the screen.

4. Select the color you wish to use with the left mouse button.

   The line changes from black to the selected color.

To draw a new color graphic object in your form, select all of the ink and shaded patterns before you draw the object. Select the "draw box" icon, then draw the object.

Shading and shaded form boxes

OGL supports color using the DRAWBOX, PATTERN and DRAWRULE commands. This also includes the background color of a DRAWBOX.

Example:

DEFINE RED1 COLOR OCA RED;

PLACE PATTERN...COLOR RED1

You can also add color by using third-party tools. Some of the tools you can use are:

- IBM AFP Windows Print Driver (with some Windows applications)
- Elixir Desktop and Converters for AFP
- ISIS Overview AFP Designer

Using Elixir Desktop for AFP

To change the shading pattern or fill color of existing black boxes and circles, follow this procedure:

1. With the left mouse button, select the "up arrow" key in the tool box.
2. Move the mouse to the object you wish to colorize and select it using the right mouse button.
3. To change the fill color of the object, select the ink fill icon.

   The system displays the eight color selections at the bottom of the screen.
4. Select the color you wish to use with the right mouse button. Note that you can change the shaded patterns by clicking on the shaded pattern box and selecting one of the OGL screen patterns or OGL standard patterns.

   The object changes from black to the selected color.

To draw a new color-filled graphic object in your form, select all of the ink and shaded patterns before you draw the object. Select the "draw box" icon, then draw the object.

Stitching

The DocuPrint NPS/IPS stitcher function integrates into AFP using either of these methods:

- The MarkForm facility stitches documents at the job boundary (including banner pages)

- The output stacker jogging facility stitches documents when a new copy group or subgroup is encountered.

The stitching options are supported for the DocuPrint 4050, 4090, 4850, 4890, and 2060 NPS/IPS printers.

MarkForm facility

The MarkForm facility was originally implemented for cut-sheet printers to put a black mark on the edge of the separator pages. Operators could then easily spot the marks in a stack of paper, making it easier to separate jobs.

You specify a MarkForm in the PSF printer attributes for the printer definition. The command can then be modified just as you would any other printer attribute, for example, by using operator commands:

- In an MVS/JES2 environment, use the MODIFY command to change the MarkForm option by specifying the JES2 command $TPRTn, MARK=Y, where n is the printer number

- For a PSF/2 system, specify the MarkForm option in the printer settings dialog box.

You may wish to change the defaults for the printer so it uses the correct MarkForm setting when you IPL or reboot the system.

Offset stacking facility

Offset stacking allows you to separate a report into "documents." The printer jogs the output bin as each portion of a report is printed. This command can be used for both cut sheet and continuous feed printers.

You specify offset stacking in either the FORMDEF command or the COPYGROUP subcommand of a FORMDEF:

- Specify JOG YES to stack pages in the specified copy group offset from the previous copy group

- Specify JOG NO to stack pages in this copy group in line with the previous copy group.

MICR applications

You can print documents that include MICR fonts on the DocuPrint 96, 4635, and 180 MICR NPS/IPS printers. Xerox provides the DocuPrint NPS/IPS MICR font kit which includes the E13B and the CMC-7 MICR fonts, MICR diagnostic forms and installation instructions. These fonts are loaded into your 300 dpi font library and used for all MICR applications printed on the MICR printers.

While other printers may also print MICR applications, they do not guarantee their printing and product quality. Xerox stands behind the performance of Xerox MICR laser printers and the Xerox benchmark MICR inks. We will assist our customer in investigating and resolving bank-reported MICR performance or reject rate problems. If we are unable to resolve the issues, we will reimburse the customer for fees they are required to pay to their bank for excessive rejects of checks printed after Xerox was notified of the problem, and where it is verified by Xerox that Xerox MICR materials or printer-related check defects are the cause of the imposition of the fees.

Use of a non-Xerox E13B and CMC-7 MICR font is not supported and will invalidate the Xerox Check Performance Guarantee. Any Xerox cost incurred in this regard may be billed to the customer.

MICR printing on the DocuPrint MICR NPS/IPS printers

You can print your existing MICR applications that were originally created for an IBM 3828 MICR printer on the DocuPrint 96, 4635, and 180 MICR NPS/IPS printers. This printer accesses the Xerox AFP MICR fonts to print the MICR characters required for the document. All other font resources for MICR applications printing must be supplied at 300 dpi resolution.

Xerox E13B and CMC-7 MICR fonts

Xerox provides its own version of AFP MICR fonts for use with the DocuPrint 96, 4635, and 180 MICR NPS/IPS printers. This version is fully compatible with the IBM version of the AFP MICR fonts. The T1001032 code page include these fonts:

- X0AE13 (E13B font)
- X0AT13 (E13B test font)
- X0LE13 (Landscape E13B)
- X0LT13 (Landscape test font).

The T1001033 code page includes this font: X0ACMC (CMC-7 font).

NOTE: Note that the landscape versions of the E13B font are for the 3828 printer only. These fonts are included for compatibility. Also note that the CMC-7 font contains both portrait and landscape orientations.

The Xerox AFP MICR fonts include all E13B and CMC-7 characters. In addition, the E13B fonts include these characters:

- Xerox symbol
- Dollar sign
- Version identifier
- 1-, 2-, 4-, 8-, 16-, 32-, 38-, and 64-pel spaces.

For information on installing the Xerox AFP MICR fonts, refer to Installing Xerox AFP MICR Fonts (720P24482) and MICR Fundamentals Guide (720P14081).

To implement the Xerox AFP MICR fonts in your existing IBM MICR application, perform the steps from the following appropriate section.

Existing IBM MICR implementation

1. Install the Xerox MICR fonts on the host AFP system.

2. Ensure that all other fonts used for MICR applications have been converted to 300 dpi and loaded into the 300 dpi font library.

3. Substitute the Xerox 300 dpi AFP MICR fonts for the line-named IBM originals.

4. Add the new library to the DocuPrint NPS/IPS font library concatenation.

5. Because the names of the Xerox AFP MICR fonts are the same as the IBM AFP MICR fonts, be careful not to overwrite the original IBM fonts. You may need to reference them at a later date.

New MICR implementation

1. Install the Xerox MICR fonts on the host AFP system.

2. Use the X0AE13, X0AT13, and/or X0ACMC fonts in your applications.

3. Refer to the code page/character set descriptions in the IBM manuals and Xerox supplements.

4. Ensure that the MICR strings are contiguous. For example, if you have a string of MICR font text and you insert a non-MICR font in the middle of that string, the MICR font spacing will not be accurate when printed.

Custom MICR font application

1. Install Xerox MICR fonts on the host AFP system.

2. Substitute the Xerox MICR fonts for your existing custom MICR fonts.

3. Modify the code page, if necessary.

4. Use the unchanged Xerox MICR character set to ensure integrity of the Xerox Check Performance Guarantee.

Existing Xerox MICR font application

1. Install Xerox MICR fonts on the host AFP system.

2. Remove the '!' spacing from text strings. This character was required for correct spacing in previous MICR technology. However, the new set of MICR fonts uses relative metric technology that inserts blank pel spacing automatically after every two characters.

3. Code a PageDef to select the E13B and/or CMC-7 font for MICR strings.

MICR application resources

In order to print your MICR documents on a DocuPrint NPS/IPS printer, you must have all of the resources used in the application resident on your host system. You must also have the Xerox AFP MICR fonts installed on your system.

Security features

PSF has a security feature that allows you to download MICR fonts to a MICR printer only. The DocuPrint MICR NPS/IPS printers also support this feature.

The DocuPrint MICR NPS/IPS printers do not support these features of the Xerox 4635MX Laser Printing System:

- Security and audit features
- Bar code reader option.

Input and output tray processing

To understand how to map input bins in the IPDS data stream to the physical trays in the printer, refer to the *Guide to Managing Print Jobs*. In essence, the administrator creates a virtual printer with a media list specifying the required stock.

Feeding and finishing

The Document Feeding and Finishing Architecture (DFA) feature enables the DocuPrint NPS/IPS printers to support specific options for third-party feeding and finishing devices, including:

- The ability to map the Roll-Feed and downstream finishing devices to AFP input trays and output bins selected from an AFP medium map or host JCL.

- The ability to map Finishing Function 1 (FF1) and FF2 to a Medium Modification ID in the Select Medium Modification (SMM) command. When DocuPrint NPS/IPS finds a match between a modification ID in the SMM command and the number mapped to a finishing function, it will apply that finishing function to the current sheet until the next SMM command is encountered. Two vendors who supply finishing devices are Baldwin-Davlin and Roll Systems; both use the FF1 signal to control document stitching.

- Support for end-of-set and end-of-job DFA signals.

- Recovery from a set boundary following finishing device jams, etc.

- The ability to define DFA set and job boundaries from an AFP application as specified by the JOG OFFSET and MarkForm commands (similar to current stitching support).

- Setting global DFA processing parameters such as maximum and minimum set size and segment ordering.

DFA is supported on the 180, 4635, 96, and 4890. This table provides additional notes for the DocuPrint NPS/IPS printers that support DFA functionality:

Table 5-1. **DFA support**

DocuPrint NPS/IPS	Additional notes
180 and 180 MICR	If a Roll Systems roll-to-cut sheet feeder is attached, no input enablement kit is required. However, you can attach the feeder to the back of the feeder/ stacker modules. This replaces the feeder in that module. The stacker is still functional. If a bypass transport is attached, you can have a maximum of three feeder/stacker modules only. Set Recovery and Sheet Recovery are supported.
4635 and 4635 MICR	If a roll-to-cut sheet feeder is attached, you must also have an Input Enablement Kit. Also, you can have maximum of three feeder/stacker modules only. If a bypass transport is attached, you can have a maximum of three feeder/stacker modules only. Set Recovery and Sheet Recovery are supported.
4890	If a roll-to-cut sheet feeder is attached, paper tray 2 is used. Also, an Input Enablement Kit is not required. Set Recovery and Sheet Recovery are not supported.

NOTE: Note that the following functions are not supported by any DocuPrint NPS/IPS printers:

- *Automatic restart of the printer after clearing a "full" condition of the finishing device*

- *The LCDS (Xerox data stream) equivalent of Segment Management.*

Contact your Xerox Account Representative to determine which third-party feeding and finishing devices are supported for your DocuPrint NPS/IPS printing system.

6. Commonly asked questions

This chapter provides answers to questions frequently asked about the DocuPrint NPS/IPS printers by Xerox customers.

How do the DocuPrint NPS/IPS printers compare to the XPAF solution?

The Xerox Printer Access Facility (XPAF) is a host-based software program that prints AFP data streams (AFPDS), as well as SYSOUT, line-mode, DJDE, XES, page-formatted, PCL, and pass-through data streams on Xerox production, distributed, and mid-range printers. Thus, XPAF and DocuPrint NPS/IPS printers can coexist in the same environment, which provides you with more flexibility when implementing Xerox printing systems solutions.

How do I power on the DocuPrint NPS/IPS printer components?

The correct power-on sequence for the DocuPrint NPS/IPS printers is to power on the IOT, then the HCU (if used), then the printer controller. This power-on sequence ensures that all features of the printer are accessible when you begin printing.

The trays on my 4635 are not always accessible. Why?

Before you power on the printer controller, you must make sure that all trays on the 4635 printer are in a "ready" state (for example, loaded with paper). Otherwise, the trays are not accessible by the system.

I need to print PostScript, PCL, and IPDS data streams. Does Xerox have a solution for this?

The DocuPrint NPS/IPS is a dual mode system that supports both the AFP and PostScript/PCL environments. This option allows you to schedule print jobs for your printers based on need.

What is the Diagnostic Lockout feature on the DocuPrint 180 NPS/IPS?

The Diagnostic Lockout feature allows your Xerox Service Representative to access the programs required for running diagnostics on your DocuPrint 180 NPS/IPS printer. As part of the Full Service Maintenance Agreement (FSMA), Xerox provides these levels of diagnostics:

- Basic, which provides minimal diagnostic support
- ValueAdded, which includes Basic diagnostics and provides expanded diagnostic capabilities.

In addition, Time and Material (non-FSMA) customers may purchase an annual Right To Use for Basic Diagnostics.

To activate the Diagnostic Lockout feature, the service engineer enters an authorization code. This code, when combined with a valid host serial number and IOT serial number (provided internally by the system), activates an encryption system that unlocks the system diagnostics.

While the system is in diagnostic mode, users cannot issue operator commands or other system processing commands. This restriction prevents the user or service engineer from being injured while working on the system.

When the diagnostics have been completed, the system reverts to the locked diagnostic mode, and the printer may be used for normal printing.

What is Sixth Sense Technology?

Sixth Sense Technology is a user-friendly suite of tools that allow service personnel to connect with a customer system and evaluate its performance while the system is being used. The Customer Service Engineer (CSE) can troubleshoot problems remotely, transfer, apply, and remove patches remotely, and, if an on-site call is required, arrive with the solution to fix the problem.

Customer benefits of using this technology include:

- Diagnostic help and identification of required parts before the service visit
- Planned visits based on known problems and/or replacement of wear-out items
- Customer self-maintenance to provide faxed replacement change to trained operators.

Using Sixth Sense Technology, CSEs can access your system's diagnostic data remotely using a regular telephone line almost as if they were at the printer controller.

For security reasons, the customer maintains control of the modem connection, and may leave the modem disconnected. Also, the customer provides a password for access to Sixth Sense Technology using the modem.

A. NPS/IPS printer capabilities

This appendix summarizes the Xerox value-added features available on the DocuPrint and DocuColor NPS/IPS printers.

NPS/IPS printer specifications

Table A-1. **NPS/IPS printer specifications: general**

	Max. print speed (ipm)	Color support	Resolution (dpi)	Max. print volume (per month)	Supported paper sizes
2060	60	Full color	600 x 600	100,000	Inches: 8.5 x 11 to 11 x 17 MM: 216 x 279 to 279 x 432, including A3
96 96 MICR	96	No	600 x 600	3,000,000	Inches: 7.4 x 10 to 14 x 17 MM: 259 x 254 to 356 x 432, including A4, A3, JB4
180 180 MICR	180	No	600 x 2400	6,000,000	Inches:7 x 10 to 14 x 17 MM: 203 x 254 to 356 x 432, including A4, A3, JB4
4050	50	No	300 x 300	750,000	Inches: 8 x 10 to 8.5 x 14 MM: 203 x 254 to 216 x 356, including A4
4090	92	No	300 x 300	2,000,000	Inches: 8 x 10 to 8.5 x 14 MM: 203 x 254 to 216 x 356, including A4
4635 4635 MICR	135 154 (7x10)	No	600 x 600	4,000,000	Inches: 7 x 10 to 14 x 17 MM: 178 x 254 to 356 x 432, including A4, A3, JB4
4850	50	Highlight color	300 x 300	750,000	Inches: 8 x 10 to 8.5 x 14 MM: 203 x 254 to 216 x 356, including A4
4890	92	Highlight color	300 x 300	1,300,000	Inches: 8 x 10 to 8.5 x 14 MM: 203 x 254 to 216 x 356, including A4
92C	92	Highlight color	600 x 600	1,300,000	Inches: 8 x 10 to 8.5 x 14 MM: 203 x 254 to 216 x 356, including A4

NPS/IPS printer specifications: input trays and feeding options

Table A-2. **NPS/IPS: input trays and feeding options**

	Number of input trays	**Input tray capacity (20 lb/80 gm paper)**	**Third-party feeding**
2060	1 (Main)	500	
	2 (Aux)	500	
	3 (Aux)	2200	
	4 (HCF)	2500	
96 96 MICR	1 (Main)	1,100	Roll feed is available through tray 3
	2 (Aux)	600	
	3 (HCF[a])	2,600	
	4 (HCF1)—optional	2,600	
180 180 MICR	1 (Main)	1,100	Roll feed is available through tray 3
	2 (Aux)	600	
	3 (HCF)	2,600	
	4 (HCF1)	2,600	
	5 (HCF1)—optional	2,600	
	6 (HCF1)—optional	2,600	
4050	1 (Main)	1,000	None
	2 (Aux.)	500	
	3 (HCF)—optional	1,000	
	4 (HCF1)—optional	1,000	
4090	1 (Main)	1,000	None
	2 (Aux.)	500	
	3 (HCF1)—optional	1,000	
	4 (HCF1)—optional	1,000	
4635 4635 MICR	1 (Main)	1,100	Requires Input Enablement Kit
	2 (Aux.)	600	
	3 (HCF1)	2,600	
	4 (HCF1)	2,600	
	5 (HCF1)—optional	2,600	
	6 (HCF1)—optional	2,600	

Table A-2. **NPS/IPS: input trays and feeding options (Continued)**

	Number of input trays	Input tray capacity (20 lb/80 gm paper)	Third-party feeding
4850	1 (Main)	1,000	None
	2 (Aux)	500	
	3 (HCF1)—optional	1,000	
	4 (HCF1)—optional	1,000	
4890/92C	1 (Main)	1,000	None
	2 (Aux)	500	
	3 (HCF1)—optional	1,000	
	4 (HCF1)—optional	1,000	

a. HCF=High Capacity Feeder

NPS/IPS printer specifications: output trays and finishing options

Table A-3. **DocuPrint NPS/IPS printer specifications: output trays and finishing options**

	Number of output bins	Output tray capacity (20 lb/80 gm paper)	Optional stitcher/ stacker	Third-party finishing
2060	HCS—optional	3500	No	
	HCSS—optional		Yes	
96 96 MICR	Sample Tray	100	No	Requires programmable bypass transport
	Purge Tray	100		
	1 (HCS[a])	2,500		
	2 (HCS1)—optional	2,500		
180 180 MICR	Sample Tray	100	No	Requires programmable bypass transport
	Purge Tray	100		
	1 (HCS)	2,500		
	2 (HCS1)	2,500		
	3 (HCS1) - optional	2,500		
	4 (HCS1) - optional	2,500		

Table A-3. **DocuPrint NPS/IPS printer specifications: output trays and finishing options**

	Number of output bins	Output tray capacity (20 lb/80 gm paper)	Optional stitcher/ stacker	Third-party finishing
4050	Dual Bin Stacker 1 Dual Bin Stacker 2 or Stitcher/Stacker	750 750 2,000 (unstitched) 50 (per stitched set)	Yes	Not supported
4090	Dual Bin Stacker 1 Dual Bin Stacker 2 or Stitcher/Stacker	750 750 2,000 (unstitched) 50 (per stitched set)	Yes	Not supported
4635 4635 MICR	Sample Tray Purge Tray 1 (HCS1) 2 (HCS1) 3 (HCS1) - optional 4 (HCS1) - optional	100 100 2,500 2,500 2,500 2,500	No	Requires programmable bypass transport
4850	Dual Bin Stacker 1 Dual Bin Stacker 2 or Stitcher/Stacker	750 750 2,000 (unstitched) 50 (per stitched set)	Yes	Not supported
4890/92C	Dual Bin Stacker 1 Dual Bin Stacker 2 or Stitcher/Stacker	750 750 2,000 (unstitched) 50 (per stitched set)	Yes	Requires bypass transport

a. HCS = High Capacity Stacker

B. Resource creation and conversion programs

This table lists several of the resource creation and conversion programs available to users.

Software	Vendor	Used for	Input	Output	Xerox equivalent	OS supported
Overlay Generation Language (OGL)	IBM	Overlay generation	OGL source code	Overlays	HFDL	MVS, VM, VSE, AIX
Page Printer Formatting Aid (PPFA)	IBM	Resource generation and formatting	PPFA source code	FormDefs and DefPages	JSL	MVS, VM, VSE, AIX
Print Management Facility (PMF)[a]	IBM	Resource generation		FormDefs, PageDefs, and fonts		MVS, VM
IBM Font Collection Type Transformer FontLab	IBM	Font collection, creation, and editing	Fonts	Fonts	FontEditor	MVS, VM
Graphical Data Display Manager (GDDM)	IBM	Page segment generation		Page segments		MVS, VM
Document Composition Facility (DCF)	IBM	Document composition and indexing		AFPDS		MVS, VM, VSE
Elixir Desktop for AFP	Elixir	Resource conversion and generation		Fonts, overlays, page segments, FormDefs, PageDefs		DOS Windows
OverView Product Family	ISIS	Document composition Resource conversion and generation	Fonts, images, AFPDS, line data	Fonts, overlays, page segments, FormDefs, PageDefs		Windows 3.1/95/NT, OS/2

Software	Vendor	Used for	Input	Output	Xerox equivalent	OS supported
Advanced Function Presentation Utilities (AFPU/ 400)	IBM	Resource generation		Overlays, PFDs (similar to PageDefs), fonts, page segments		OS/400
DisplayWrite 370 (DW/370)	IBM	Document generation		Line data		MVS, VM, VSE
AFP Conversion & Indexing Facility (ACIF)	IBM	Data stream conversion and indexing	Line data	AFPDS		MVS, AIX
Font Scaling Utility	IBM	Font scaling	Fonts	Fonts		MVS, VM, VSE
Print Services Manager (PSM)	IBM	LAN print manager				AIX
PSF/Direct	IBM	Bypass spool		IPDS		OS/2
AFP Workbench[b]	IBM	Viewing	AFPDS, FAX, scanned data	WYSIWYG		AIX, DOS Windows
AFP Toolbox	IBM	Application development		Structured fields in data		MVS
AFP Windows Print Driver	IBM	OGL PAGESEG and document creation	Forms from any Windows application	Object OGL or PAGESEG AFPDS	HFDL	Windows (3.1, 95, and NT)
AFP OnDemand	IBM	Document archival and retrieval	AFPDS, line data, PS/PDF, ASCII, CCITT G3/4, TIFF, JPEG			AIX
PReS	PrintSoft of Australia	Mail merge	Text and graphics, variable data	Xerox Metacode, IPDS, PCL, PostScript		DOS Windows (95 and NT)

Software	Vendor	Used for	Input	Output	Xerox equivalent	OS supported
CrocoDoc	Elixir	Document composition	Variable data, overlays, fonts, logos, images	AFPDS, Xerox Metacode, PCL, PostScript, XGF, PDF		Windows NT
PSF/MVS	IBM	Print Services Facility	AFPDS, line data	IPDS		MVS
PSF/VM	IBM	Print Services Facility	AFPDS, line data	IPDS		VM
PSF/VSE	IBM	Print Services Facility	AFPDS, line data	IPDS		VSE
PSF/400	IBM	Print Services Facility	AFPDS, IPDS, line data, SCS	IPDS		OS/400
AFP PrintSuite For PSF/400	IBM	Advanced Print Utility PPFA AFP Toolbox SAP R/3 AFP Print	SCS	IPDS		AS/400
InfoPrint Manager PSF for AIX[c]	IBM	Print Services Facility	AFPDS, line data, PostScript, PCL, ASCII	IPDS, PCL, PPDS		AIX
PSF/2[d]	IBM	Print Services Facility	AFPDS, PostScript, ASCII	IPDS, PCL, PPDS		InfoPrint Manager for NT
EZ-Letter	Group 1 Software	Document generation		AFPDS		
DOC1	Group 1 Software	Document composition		AFPDS, Metacode, PCL		

Software	Vendor	Used for	Input	Output	Xerox equivalent	OS supported
DocuFlex	Image Sciences ,Inc.	Document composition Document conversion Resource creation Document archival and retrieval	Line data, AFPDS, Metacode	AFPDS, Metacode, PCL		
Papyrus Document System	ISIS	Document composition	Line data, AFPDS	AFPDS, IPDS, Metacode, PCL		MVS, AIX, OS/2, Windows 3.1/95/NT

a. IBM stopped supporting this product as of December 31, 1995. They recommend that customers use PPFA as a replacement.

b. Native mode documents only.

c. PSF for AIX is no longer marketed by IBM. InfoPrint Manager is the replacement product.

d. Does not support page definitions.

C. Limitations for IPDS printing

While the NPS/IPS printers allow you to perform many print functions, there are some features that they do not support. This section lists some of those limitations.

Color limitations

Xerox highlight color printers, the DocuPrint 4850, 4890, and 92C printers, support all 10 highlight colors that are distributed by Xerox. Note, however, that since you can install only one highlight color unit at a time, you can print only black plus a variety of shades of that highlight color. You cannot print all 10 colors on one page with these printers.

Also, highlight color printers do not support custom colors. For example, if your company logo uses a specific Pantone blue and you have the blue housing installed in the printer, the logo will not print with the specified Pantone blue color; it will print using the standard blue toner.

Use the full-color 2060 printer for multiple colors on a page. The 2060 can outprint millions of colors, so it is easier to approximate a specific color.

The 2060 printer is not Pantone-certified.

Shading

When you print a document that contains shaded IM images at 240 dpi to a printer with 300 dpi resolution, the image must be scaled to the 300 dpi resolution. As a result, the shading may appear differently. You should either recreate or rescan the image at 300 dpi to get the correct shading values.

If your document contains shaded objects created via an overlay creation tool, you may have to adjust the level of shading via that tool. Note that OGL is only capable of creating 240 dpi shading patterns.

Printing documents created in WordPerfect

PSF does not allow you to print documents directly from WordPerfect. However, you may convert the source WordPerfect document to AFP format. Some conversion tools are:

- AFP driver (from WordPerfect)
- Graphics Commander (by Image Sciences, Inc.)
- Print Commander (by Image Sciences, Inc.)
- AFP Windows Print Driver (IBM).

D. AFP print flows

This appendix shows the AFP print flows for the different environments supported by PSF. These print flows apply to both PSF and the DocuPrint NPS/IPS printers.

Mainframe data flows

In the mainframe environment, you may install PSF in three operating system environments: MVS, VM, and VSE. These operating systems may run on either a System/370 or System/390 mainframe. The following sections describe the AFP print flows for each environment.

MVS print flow

The following figure and steps illustrate the flow of data in an MVS environment.
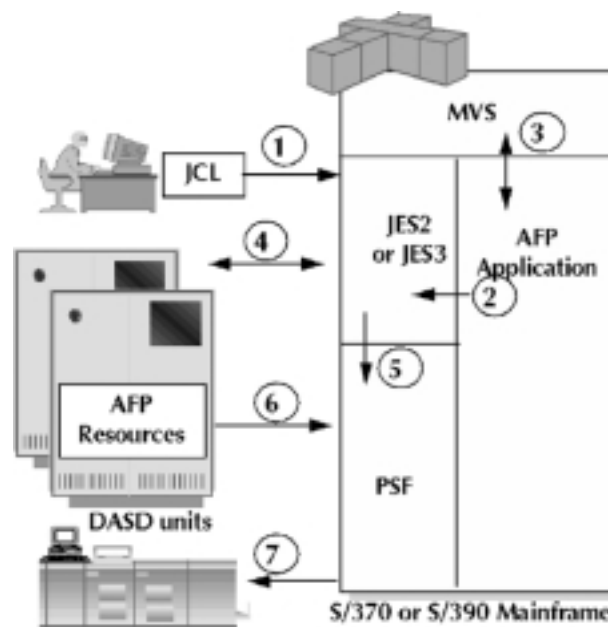
Figure D-1. MVS print flow

1. JCL is submitted to JES.

2. JES receives the job, then prepares and schedules the job for processing.

3. JES passes control to the operating system for job execution.

4. Output is spooled to a JES spool file.

5. PSF acquires the job from the JES queue.

6. PSF identifies and retrieves any necessary AFP resources stored on DASD. PSF then composes the data stream to IPDS.

7. PSF directs the output to the printer. The IPDS printer then prints the data.

   When PSF is finished, the job is purged from the JES queue.

MVS print flow for a remote printer via InfoPrint Manager

The following figure and steps illustrate the data flow for a remote printer in an MVS environment in which data is transmitted using InfoPrint Manager.
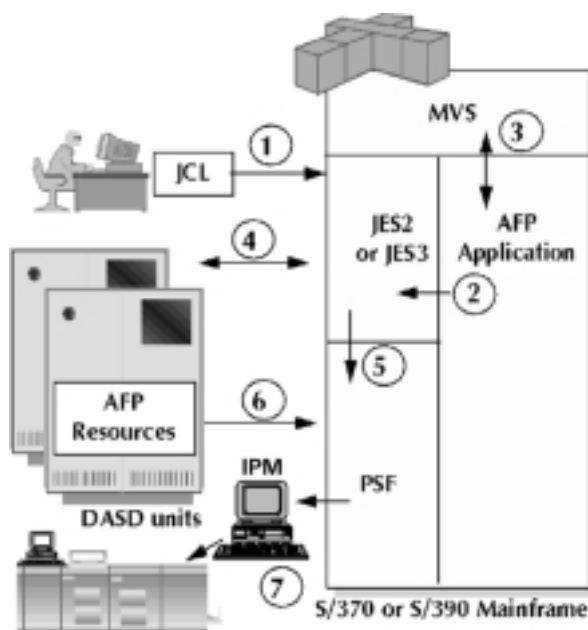
Figure D-2. MVS print flow for remote printer using PSF/2

1. JCL is submitted to JES.

2. JES receives the job, then prepares and schedules the job for processing.

3. JES passes control to the operating system for job execution.

4. Output is spooled to a JES spool file.

5. PSF acquires the job from the JES queue.

6. PSF identifies and retrieves any necessary AFP resources stored on DASD. PSF then composes the data stream to IPDS.

7. PSF directs the output to InfoPrint Manager via VTAM. With PSF DIRECT, the document is routed directly to the printer and not spooled on InfoPrint Manager.

VM print flow

The following figure and steps illustrate the flow of print data in a VM environment.
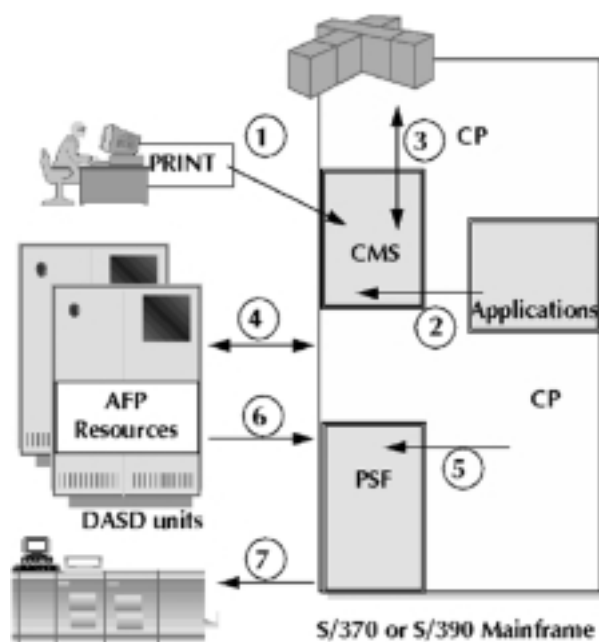
Figure D-3. VM print flow

1. CMS print command is issued.

2. CMS writes to a virtual printer.

3. CP intercepts the command and data.

---

4. CP spools the data to DASD.

5. When the specified printer is available according to job control parameters, CP schedules the job to PSF.

6. PSF identifies and retrieves any necessary AFP resources stored on DASD.

7. PSF composes the data stream into IPDS and directs the output to a printer.

VSE print flow

The following figure and steps illustrate the print data flow in a VSE environment.
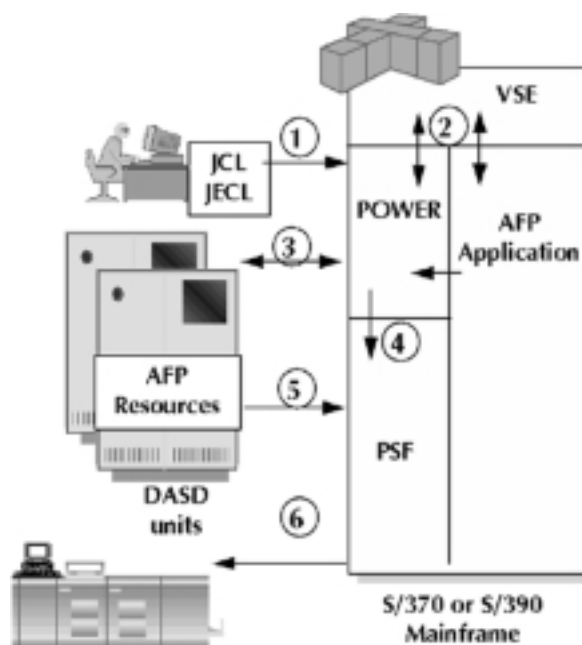
Figure D-4. VSE print flow

1. The job is submitted to POWER.

2. POWER schedules the job for execution.

3. When the job is finished, POWER spools the output.

4. When a printer is available and the print criteria are met, POWER submits the data to PSF.

5. PSF identifies and retrieves any necessary AFP resources stored on DASD.

6. PSF directs the output to a printer. After PSF is finished, the job is purged from POWER.

AS/400 data flow

PSF/400 accepts MO:DCA-P data streams, as well as SCS data streams with DDS, IPDS, and line data. The following figure and steps illustrate the print data flow in an AS/400 environment.
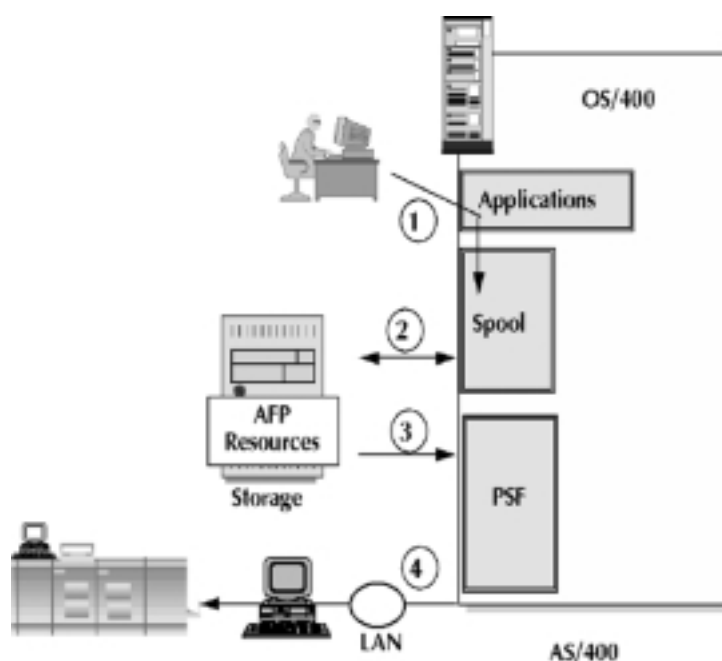
Figure D-5. OS/400 print flow

1. An application creates the print output.

2. OS/400 spools the output to DASD.

3. When the specified printer is available according to the job parameters, PSF identifies and retrieves any necessary AFP resources stored on DASD.

4. PSF composes the data stream into IPDS and directs the output to the printer.

RS/6000 data flow

The RS/6000 connection accepts ASCII, ditroff, MO:DCA-P, PCL 5e, EUC (Extended UNIX commands), DBASCII (double-byte ASCII), 1403 line-mode (EBCDIC) data, PostScript level 2 and 3, SAP ABAP line data, and SAP OTF data streams. In turn, it outputs IPDS, PostScript (from AIX or BSD attached printers), PPDS, and PCL 4/5/5c data streams.

To create resources in the RS/6000 environment, you may use the PPFA/6000 program. The RS/6000 connection supports both AFP and non-AFP printers, and enables printer sharing between System/390 and AIX systems.
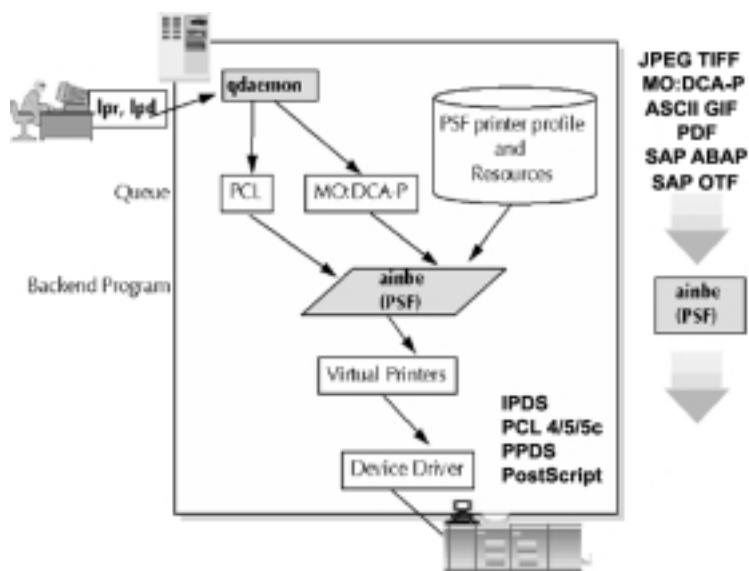
Figure D-6. AIX print flow

1. An application creates the print output.

2. An lpr or lpd command is issued to transfer the output into the qdaemon.

3. The qdaemon determines what the input data stream to PSF is. If required, the qdaemon transforms the data stream to the necessary format.

4. When the specified printer is available according to job control parameters, the qdaemon schedules the job to PSF. This PSF task is identified as "ainbe" on the RS/6000.

5. PSF identifies and retrieves any necessary AFP resources stored on DASD.

6. PSF (ainbe) composes the data stream into IPDS and directs the output to a virtual printer, which in turn writes the data to a device driver on the IPDS printer.

InfoPrint Manager for Windows data flow

The InfoPrint Manager for Windows connection accepts ASCII, MO:DCA-P, PDF, PCL, and PostScript 1 data streams. In turn, it outputs IPDS, PPDS, and PCL 4/5 data streams.
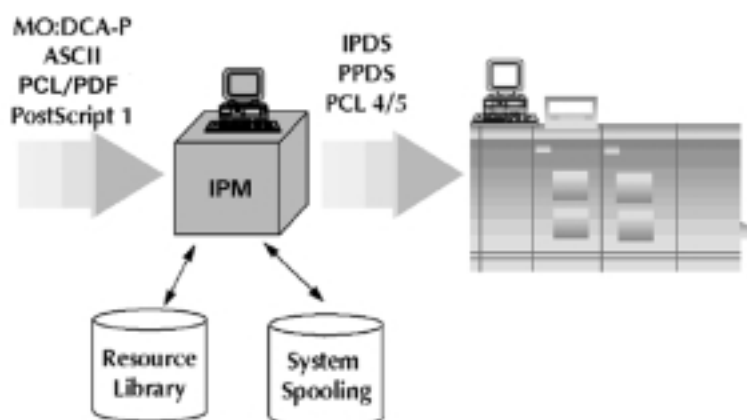
1. An application creates the print output.

2. The print job is submitted for printing.

3. When the specified printer is available according to the job parameters, InfoPrint Manager identifies and retrieves any necessary AFP resources from the resource libraries.

4. PSF composes the data stream into IPDS and directs the output to the printer.

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