InfoPrint 4000 and
3900 Advanced Function Printers

IBM

Introduction and Planning Guide

InfoPrint 4000 and
3900 Advanced Function Printers

Introduction and Planning Guide

> **Note!**
>
> Before using this information and the product it supports, be sure to read the general information under "Notices" on page ix.

Contents

Figures

Tables

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Preface

This publication introduces and summarizes the functions of the

- IBM 3900 Advanced Function Printers Models 0W1/0W3
- IBM 3900 Advanced Function Duplex Printing System Models D01/D02
- IBM 3900 Advanced Function Wide Duplex Printing System Models DW1/DW2
- IBM InfoPrint 4000 High Resolution Duplex Printing System (3900 Models DR1/DR2)
- IBM InfoPrint 4000 Models IS1, IS2
- IBM InfoPrint 4000 Models ID1/ID2
- IBM InfoPrint 4000 Models ID3/ID4
- IBM InfoPrint 4000 Models IR1/IR2
- IBM InfoPrint 4000 Models IR3/IR4

This publication also contains information to help you prepare for installing and using your printer.

The first portion of this publication is written for executives who are thinking about buying an InfoPrint 4000 or 3900 Advanced Function Printer. The remainder of the publication is for the planning team that is responsible for installing the printer and preparing it for regular operation.

About This Publication

This publication contains the following chapters:

"Chapter 1. Introduction" on page 1 gives an overview of the InfoPrint 4000 and 3900 Advanced Function Printer characteristics and basic concepts.

"Chapter 2. The Advanced Function Printers Characteristics" on page 23 describes the InfoPrint 4000 and 3900 Advanced Function Printer functions and features in detail.

"Chapter 3. Organizing the Planning Team" on page 39 describes the installation planning team and specifies the tasks for which each team member is responsible.

"Chapter 4. Preparing the Processing Environment" on page 45 describes requirements associated with channel attachment, pattern storage, and Advanced Function Presentation licensed programs.

"Chapter 5. Preparing the Physical Environment" on page 57 specifies the InfoPrint 4000 and 3900 Advanced Function Printer environmental, electrical, and space requirements.

"Chapter 6. Configuring the Simplex Models" on page 77 provides worksheets on which you can record your configuration choices.

"Chapter 7. Configuring the Duplex Models" on page 85 provides worksheets on which you can record your configuration choices.

"Chapter 8. Forms Identification Work Sheets" on page 95 provides worksheets to record form identification names and their characteristics.

"Chapter 9. Configuration Information Descriptions" on page 99 describes the configuration options for the InfoPrint 4000and 3900 Advanced Function Printers that can be defined at installation time.

"Chapter 10. Obtaining Supplies" on page 121 lists supplies used in the InfoPrint 4000 and 3900 Advanced Function Printers and describes how to order them.

"Chapter 11. Selecting and Testing Forms" on page 125 describes the basic requirements for forms used in the InfoPrint 4000 and 3900 Advanced Function Printers and describes methods for evaluating them.

"Appendix. Acronyms and Abbreviations" on page 129 defines abbreviations used in InfoPrint 4000 and 3900 Advanced Function Printers publications.

Terms

In InfoPrint 4000 and 3900 Advanced Function Printers publications, the terms *forms* and *paper* have specific meanings. *Forms* refers to the media on which the printer can print.Forms can be blank paper, preprinted paper, adhesive labels, cards, or any other printable material. *Paper* refers to a specific fiber-based material used to make forms.

For definitions of other terms, see "Appendix. Acronyms and Abbreviations" on page 129 and "Glossary" on page 133. These comprehensive reference tools contain not only terms used in this publication, but also terms, abbreviations, and acronyms from other publications in the InfoPrint 4000and 3900 Advanced Function Printers Library.

InfoPrint 4000 and 3900 Advanced Function Printers Library

The following additional InfoPrint 4000 and 3900 Advanced Function Printers publications are available:

- *IPDS Handbook for Printers that Use the Advanced Function Common Control Unit*, G544-3895, which contains technical information about the host-to-printer data stream, and exception reporting.
- *Forms Design Reference for Continuous Forms Advanced Function Printers*, G544-3921, which describes the characteristics of forms and special-use media, and their effects on 3900 Advanced Function Printer performance.
- *3900 Duplex and Wide Duplex Operator's Guide*, G544-3920, which describes the procedures required to operate the Models D01/D02 and Models DW1/DW2.
- *3900 Simplex and Wide Simplex Operator's Guide*, G544-3951, which describes the procedures required to operate the Models 0W1/0W3.
- *IBM InfoPrint 4000 Operator's Guide*, S544-5428, which describes the procedures required to operate the Models IS1 and IS2, Models DR1/DR2, Models ID1/ID2, Models ID3/ID4, Models IR1/IR2 and Models IR3/IR4.

Related Publications

An extensive listing of available publications is included in *Advanced Function Presentation: Printer Information* G544-3290.

For more information about Advanced Function Presentation, refer to *Guide to Advanced Function Presentation* G544-3876.

Contact your IBM marketing representative for information concerning the InfoPrint 4000and 3900 Advanced Function Printers, their manuals, or associated licensed programs.

What's New in This Publication

The following additions and changes were made to the sixth edition of this book. Changes are marked with a revision bar in the left margin.

- Changed information for various printer configuration items (see "Chapter 6. Configuring the Simplex Models" on page 77, "Chapter 7. Configuring the Duplex Models" on page 85, and "Chapter 9. Configuration Information Descriptions" on page 99).

- Changed information relating to printer supplies (see "Chapter 10. Obtaining Supplies" on page 121).

- Miscellaneous technical updates throughout the book.

Chapter 1. Introduction

> **Chapter Overview**
>
> This chapter presents the characteristics of the InfoPrint 4000 and 3900 Advanced Function Printers. For readers not familiar with nonimpact, all-points-addressable printers, this chapter also defines some basic page-printing concepts.

Printer Characteristics

The InfoPrint 4000 and 3900 family of printers are nonimpact, all-points-addressable printers. These printers use a laser, electrophotographic print technology, and Advanced Function Presentation (AFP) licensed programs to create high-quality text and graphics printer output.

Nonimpact printing, combined with all-points addressability, allows graphics and many different type sizes and styles to appear on a single page. Text, images, and electronic overlays can be placed at any defined point on the page areas on which the printer can print. The printers can be used for text, image, graphics, optical character recognition (OCR), and bar-code printing[1]. See Table 1 on page 3 for the print resolution (PEL) of each model.

Using a duplex printing system, the output of the printers can have print on both sides of a form. The system consists of two printer engines in series, each printing on one side of the form with the forms inverted between them. You can use one or both of the printer engines in the system for simplex printing applications[1].

The printers use continuous-forms in a variety of sizes, styles, and weights, including preprinted forms and some adhesive labels (see Table 1 on page 3 for more information). The printers use an automatic assist for loading most forms. After printing, the forms may be stacked in the printer stacker or processed by an optional postprocessing device.

Up to three preprocessing and postprocessing device interfaces can be installed on the printer, except Models ID2, ID4, IR2, and IR4 which can have two interfaces installed. This provides additional input and output capabilities beyond the standard forms input source and output stacker on the printer.

- On a duplex system, two preprocessing/postprocessing device interfaces are standard, one in each system printer. Two additional preprocessing/ postprocessing device interfaces, per printer can be installed as optional features on Models DR1/DR2, ID1, ID3, IR1, and IR3. One additional interface can be installed on Models ID2, ID4, IR2 and IR4.
- On a Model 0W1 simplex system, there are no standard interfaces. Device interfaces are available as features, for a maximum of three on each printer.
- One interface is standard on each of the Models IS1 and IS2 simplex systems.
- See "Configuring Preprocessing or Postprocessing Devices or Interfaces" on page 116 for more information.

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1. Simplex printing is not supported on printers running in Print On Demand (POD) mode.

An Advanced Function Common Control Unit (AFCCU) controls the printing system, whether you select a duplex or simplex configuration. With the duplex models, the AFCCU is attached to the second printer engine in the configuration. The AFCCU is based on IBM's recognized RISC technology and in the standard configuration includes:

- Memory

  32MB for the 0W1/0W3 Models

  64MB for the D02, DW2, IS1, and IS2 Models

  128MB for the ID2 and ID4 Models

  256MB for Model DR2

  512MB for Model IR2

  1GB for Model IR4

- An Extended Graphics adapter (XGA) touch-sensitive monitor used as an operator console
- Host Attachment choices that include:
  - System/370 parallel channels
  - ESCON channels
  - Token Ring TCP/IP (Transmission Control Protocol/Internet Protocol) Local Area Networks (LAN)
  - Ethernet TCP/IP LANs
  - FDDI (Fiber Distributed Data Interface) TCP/IP LANs.

  (See "Host System Attachment Choices" on page 33 for more information.)

Performance enhancements, such as the Advanced Function Image and Graphics (AFIG) feature, are integral to the AFCCU design. Consequently, the AFCCU provides levels of performance meeting or exceeding those provided on the 3900 Model-001 with the Decompression Performance Enhancement (DPE) and the Improved Memory Performance (IMP) features. Additionally, the AFCCU extends the scaling performance enhancement for compressed images to all scaling factors, enabling the printing of compressed images at significantly higher levels of performance.

Most models of the printer can be used in MVS, VM, VSE, OS/2, AIX/6000, and OS/400 operating environments, and can be channel-attached to many different processors. For additional information, see "Host System Attachment Choices" on page 33.

InfoPrint 4000 and 3900 Printer Specifications

Table 1 on page 3 summarizes the specifications for the various printers in the InfoPrint 4000 and 3900 Advanced Function Printer families.

Table 1. InfoPrint 4000 and 3900 Printer Specification Summary

Model	Mode	Resolution (PEL)	Print Speed (IPM)	Basis Paper Weights		Forms Width		Forms Length	
				g/m²	lbs	Min. mm (in.)	Max. mm (in.)	Min. mm (in.)	Max. mm (in.)
0W1	Simplex	240	229/354 [1]	60-160	16-42	229 (9)	457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013)
0W1 w/310 IPM Feature	Simplex	240	310/480 [1]	60-105	16-28	229 (9)	457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013)
0W3	Simplex	240	150/232 [1]	60-160	16-42	229 (9)	457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013)
D01/D02 [2]	Duplex [6] Dual Simplex [7] Dual Simplex [8]	240 240 240	300/464 [1] 150 232	68-105 60-160 60-160	18-28 [10] 16-42 16-42	229 (9) 165 (6.5) 165 (6.5)	406 (16) 406 (16) 406 (16)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013)
D01/D02 [3]	Duplex [6] Dual Simplex [7] Dual Simplex [8]	240 240 240	300/464 [1] 229 354	68-105 60-160 60-160	18-28 [10] 16-42 16-42	229 (9) 165 (6.5) 165 (6.5)	406 (16) 406 (16) 406 (16)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013)
DW1/DW2 [4]	Duplex [6] Dual Simplex [7] Dual Simplex [8]	240 240 240	300/464 [1] 150 232	68-105 60-160 60-160	18-28 [10] 16-42 16-42	305 (12) 229 (9) 229 (12)	457 (18) 457 (18) 457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013)
DW1/DW2 [5]	Duplex [6] Dual Simplex [7] Dual Simplex [8]	240 240 240	458/708 [1] 229 354	68-105 60-160 60-160	18-28 [10] 16-42 16-42	305 (12) 229 (9) [9] 229 (12) [9]	457 (18) 457 (18) 457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013)
DR1/DR2	Duplex [6]	600	300/464 [1]	68-105	18-28	305 (12)	457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013) [12]
IS1	Simplex	240/300	229/354 [1]	60-160	16-42	204 (8)	457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013)
IS2	Simplex	240	310/480 [1]	60-105	16-28 [10]	204 (8)	457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013)
IS2 with Feature 9324	Simplex	240/300	324/501 [1]	60-105	16-28 [10]	204 (8)	457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013)
ID1/ID2	Duplex [6] Dual Simplex [7]	240/300 240/300	458/708 [1] 229/354 [1]	68-105 60-160	18-28 [10] 16-42	229 (9) 204 (8)	457 (18) 457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013) [13]
ID3/ID4	Duplex [6] Dual Simplex [7]	240/300 240/300	648/1002 [1] 324/501 [1]	68-105 60-160	18-28 [10] 16-42	229 (9) 204 (8)	457 (18) 457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013) [13]
IR1/IR2	Duplex [6] Dual Simplex [7]	480/600 480/600	300/464 [1] 150/232 [1]	68-105 60-160	18-28 16-42	305 (12) 305 (12)	457 (18) 457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013) [12]

Table 1. InfoPrint 4000 and 3900 Printer Specification Summary (continued)

Model	Mode	Resolution (PEL)	Print Speed (IPM)	Basis Paper Weights		Forms Width		Forms Length	
				g/m²	lbs	Min. mm (in.)	Max. mm (in.)	Min. mm (in.)	Max. mm (in.)
IR3/IR4	Duplex [6]	480/600	458/708 [1]	60-105	16-28	305 (12)	457 (18)	76.2 ± 0.3 (3.0 ± 0.013)	356 ± 0.3 (14.0 ± 0.013) [12]
	Dual Simplex [7]	480/600	229/354 [1]	60-105	16-28	305 (12)	457 (18)		

Notes:

1. Print Speed stated in 1-up mode/2-up mode. (See notes 7 and 8 for more information.)

2. Without Dual Simplex Speed Switch feature or with feature set at 150 IPM.

3. With Dual Simplex Speed Switch feature set to 229 IPM.

4. Without High Speed (458 IPM) Duplex feature or with feature set at 150 IPM.

5. With 458 IPM Duplex feature set at 229 IPM.

6. The Print speed for Duplex is the total system speed (2 printers). The Print speed for dual simplex lists individual printer speed (either Printer 1 or Printer 2).

7. 1-up mode (assuming an 8½-inch length page, measured in the forms process direction).

8. 2-up mode (assuming an 11-inch length page, measured in the forms process direction).

9. When using the High Speed (458 IPM) feature in simplex DW1 forms width is 229 (9) to 457 (18) and DW2 forms width is 305 (12) to 457 (18).

10. The maximum paper weight for duplex printers running in simplex mode should be 105 g/m² (28 lb) on Printer 2 and 160 g/m² (42 lb) on Printer 1.

11. Maximum form length is 635 ± 0.3 mm (25 ± 0.013 in.) when used with preprocessing and postprocessing devices.

12. Maximum form length is 711 ± 0.3 mm (28 ± 0.013 in.) when used with preprocessing and postprocessing devices.

Simplex Printers

Components

Simplex printing systems include the following:
- Printer engine
- Advanced Function Common Control Unit (AFCCU). This unit includes:
  - Operator Alert assembly
  - Power Control panel
  - IBM's RISC technology processor
  - XGA touch-screen operator console
  - System interconnection electronics and cables
  - Preprocessing/postprocessing device interfaces.

Printing Methods

Simplex printing refers to printing on one side of a form. *Duplex* printing refers to printing on both sides of a form.

The continuous forms can be threaded various ways:
- From the forms input area of the printer to the output stacker of the printer
- From the forms input area of the printer to a postprocessing device at the output of the printer
- From a preprocessing device ahead of the printer to a postprocessing device at the output of the printer.

Up to three preprocessing/postprocessing devices may be connected to the printer. For more information on preprocessing/postprocessing devices see "Preprocessing and Postprocessing Device Interfaces (Optional)" on page 36.

The printer attaches to a host system through the AFCCU, which controls the printer.

See allowable configuration in "Configuration for a Simplex Printing System" on page 9.

Duplex Systems

Components

The major component of a InfoPrint 4000 or 3900 Advanced Function Duplex
Printing System is a pair of printers, hereafter referred to as a Duplex Printing
System.

Note: Only like numbered models may be installed together, that is, 3900 Models
D01 and D02; 3900 Models DW1 and DW2; InfoPrint 4000 Models DR1 and
DR2; InfoPrint 4000 Models ID1 and ID2; InfoPrint 4000 Models ID3 and
ID4; InfoPrint 4000 Models IR1 and IR2, or InfoPrint 4000 Models IR3 and
IR4.

Any of the Duplex Printing Systems can be used for simplex and duplex printing
applications[2].

In this publication the first printer is called Printer 1, and the second printer is
called Printer 2.

Printer 1

Printer 1 includes the following:
- Printer engine
- Printer Utility Module (PUM). This unit includes:
  - Operator Alert assembly
  - Power Control panel
  - System interconnection electronics
  - Preprocessing/postprocessing device interfaces.

Printer 2

Printer 2 includes the following:
- Printer engine
- Advanced Function Common Control Unit (AFCCU). This unit includes:
  - Operator Alert assembly
  - Power Control panel
  - IBM's RISC technology processor
  - XGA touch-screen operator console
  - System interconnection electronics and cables
  - Preprocessing/postprocessing device interfaces.

Buffer/Flipper Unit

This unit guides the paper path from the first printer to the second printer in a
dual-printer configuration. The unit allows the forms to take the following paths
from the first printer to the second printer:
- Straight through path (inline) with 180° inversion
- Left 90° path with 180° inversion.

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2. Simplex printing is not supported on printers running in Print On Demand mode.

The unit turns the forms over (flips) so the other side of the forms can be printed by the second printer.

Urge Unit

This unit assists in feeding forms from the Buffer/Flipper Unit under the printer into the tractor-feed area of the printer. This power-driven roller assembly is on the floor in the forms input area of Printer 2. The continuous forms are threaded through the unit.

Note (All Models except Models ID3/ID4): If an urge unit is supplied with any preprocessing equipment, the IBM-supplied single-roll urge unit is installed on Printer 1 and the vendor supplied urge unit on Printer 2.

Note (Models ID3/ID4): If an urge unit is supplied with any preprocessing equipment, the IBM-supplied double-roll urge unit is installed on Printer 2 and the vendor supplied urge unit on Printer 1.

Duplex System Printing Methods

Duplex: Prints on both sides of a form.

Simplex: Prints on one side of a form.

You can operate these printers as follows:
- **Duplex**: Uses both printers (Printer 1 prints on one side of the form and Printer 2 prints on the other side of the form).
- **Simplex**: Uses both printers as in duplex operation, but prints only with one printer; forms pass through the other printer[3].
- **Dual Simplex**: Uses both printers separately in simplex mode; each printer is independent of the other and can print different jobs at the same time[3].

Duplex Printing

Duplex printing is achieved by arranging both printers in series, separated by a Buffer/Flipper Unit, in a configuration that takes the continuous forms exiting from the first printer through a Buffer/Flipper Unit that turns the forms over (inverts them) before threading them through the second printer. The first printer in the paper path prints one side of a form; the second printer in the paper path prints the other side of the form.

Allowable printer system configurations are inline (see "Inline Configuration for a Duplex Printing System" on page 10), or a left 90° angle (see "Left Angle Configuration for a Duplex Printing System" on page 11). Only a Buffer/Flipper Unit may be installed between Printer 1 and Printer 2.

The forms path can be:

- From the forms input area of Printer 1 through to the output stacker of Printer 2

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3. Simplex printing is not supported on printers running in Print On Demand mode.

- From the forms input area of Printer 1 through to a postprocessing device at the output of Printer 2
- From a preprocessing device ahead of Printer 1 through to a postprocessing device at the output of Printer 2.

When running duplex printing applications, both printers in the configuration are operating at the same IPM. The total speed or IPM of the subsystem is then twice the IPM of an individual printer, counting both the front and back sides of the forms. As an example, with the High Speed Duplex Feature (458 IPM) 3900 Models DW1 and DW2 each operate at 229 impressions per minute. The total speed of the subsystem is then up to 458 IPM, counting both the front and back sides of the forms.

Up to three preprocessing/postprocessing devices may be connected to each printer in the configuration (except Models ID2, ID4, and IR2, each of which has Side 1/Side 2 Verify in place of one preprocessing/postprocessing device).

Both printers in the configuration attach to a host system through the AFCCU, which controls both printers simultaneously and is physically attached to Printer 2 in the configuration.

Simplex and Dual Simplex Printing

The configuration shown in "Left Angle Configuration for a Dual Simplex Printing System" on page 12 supports *simplex* (single-sided) printing as follows:

- Simplex — Continuous forms are threaded completely through both printers and the Buffer/Flipper Unit (with or without flipping) with single sided printing accomplished in either printer under host system control.

  The forms path can be:
  - From the forms input area of Printer 1 through to the output stacker of Printer 2
  - From the forms input area of Printer 1 to a postprocessing device at the output of Printer 2
  - From a preprocessing device ahead of Printer 1 through to postprocessing device at the output of Printer 2.
- Dual Simplex — Both printers in the configuration can run independent simplex applications[4].

  The forms path in each printer can be:
  - From the forms input area of the printer to the output stacker of the printer or to a postprocessing device at the output of the printer
  - From a preprocessing device ahead of the printer to a postprocessing device at the output of the printer.

  Each printer can have its own set (up to three) of preprocessing and postprocessing devices.

Both printers in the configuration attach to a host system through the AFCCU, which controls both printers independently and is physically attached to Printer 2 in the configuration.

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4. Simplex printing is not supported on printers running in Print On Demand mode.

Configuration for a Simplex Printing System

1 – Optional preprocessing device

2 – AFCCU

3 – 3900 Model 0W1 or 0W3; InfoPrint 4000 Model IS1 or IS2

4 – Optional postprocessing device

Inline Configuration for a Duplex Printing System

1 – Optional preprocessing device attached to Printer 1

2 – Printer Utility Module (PUM) attached to Printer 1

3 – Printer 1

4 – Buffer/Flipper Unit

5 – AFCCU attached to Printer 2

6 – Printer 2

7 – Optional postprocessing device attached to Printer 2

Left Angle Configuration for a Duplex Printing System

1 – Optional preprocessing device attached to Printer 1

2 – Printer Utility Module (PUM) attached to Printer 1

3 – Printer 1

4 – Buffer/Flipper Unit

5 – AFCCU attached to Printer 2

6 – Printer 2

7 – Optional postprocessing device attached to Printer 2

Left Angle Configuration for a Dual Simplex Printing System

1 – Optional preprocessing device for Printer 1

2 – Printer Utility Module (PUM) attached to Printer 1

3 – Printer 1

4 – Optional preprocessing device for Printer 2

5 – Optional postprocessing device for Printer 1

6 – AFCCU attached to Printer 2; controls both printers in the configuration.

7 – Printer 2

8 – Optional postprocessing device for Printer 2

Basic Page-Printing Concepts

The printer expands your printing ability to include new functions, such as in-house publishing, image printing, and electronic forms creation. These special uses are made possible by IBM's Advanced Function Presentation (AFP) licensed programs[5]. The AFP programs let you put text, image, graphics, and bar codes at any defined point on a page. This ability is called *all-points addressability*.

Some printers print a single line as a unit. This process is known as *line printing*. The printer and AFP create and print an entire page as a unit. This approach, known as *page printing*, increases your flexibility in designing pages.

Combining Text with Images

Many companies use system printers to generate memos, reports, invoices, and listings. This output often consists of text combined with simple charts or diagrams that include limited graphics.

In systems with Advanced Function Presentation programs installed, IBM advanced function printers can print illustrations in your documents. For example, the program can combine business graphs and drawings with text for use in manuals and reports.

Figure 1 on page 14 shows how images can include line drawings, graphics, designs, special symbols, and company logos. You can print them alone or with text, and you can print more than one image on a single page.

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5. A licensed program is any separately-priced program that has an IBM copyright and is offered to customers under the terms and conditions of the Agreement for IBM Licensed Programs.

Figure 1. Combined Images and Text

Orienting Text and Images on a Page

With an advanced function printer, you can print text and images in any of four orientations on a page, as shown in Figure 2.
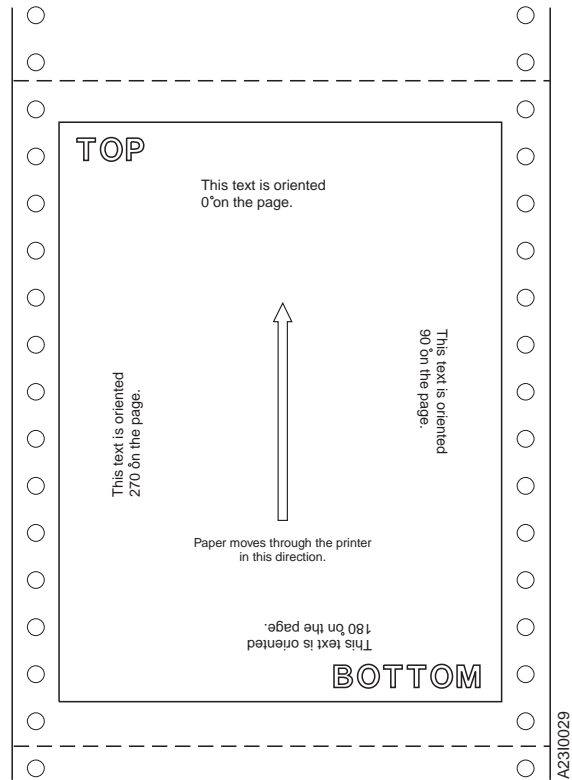
Figure 2. Available Orientations

Portrait Orientation

Text and images printed parallel to the shorter side of the forms are in a *portrait* orientation.
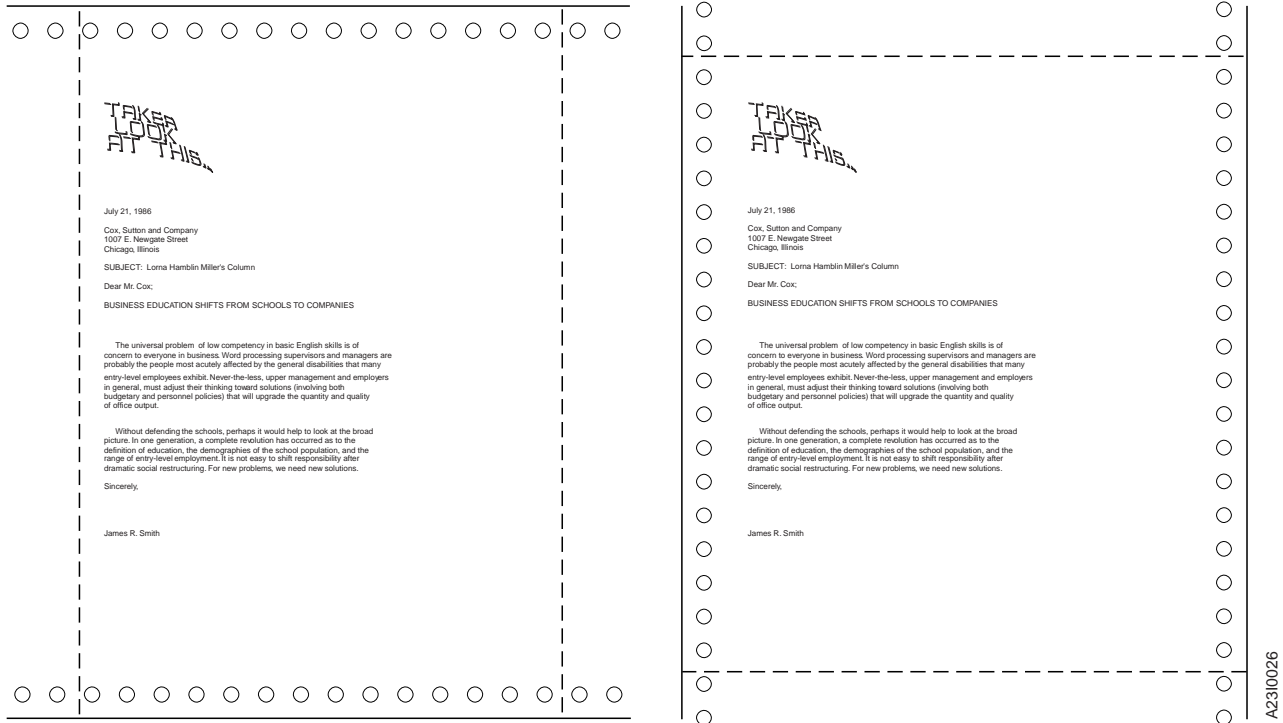
Figure 3. Portrait Orientations

Landscape Orientation

Text and images printed parallel to the longer side of the forms are in a *landscape* orientation.

Figure 4. Landscape Orientations

Normal and Tumble Duplex

By using a combination of printing directions and orientations, you can put a document together in four different ways. Figure 5 shows documents printed with normal duplex. Notice that the pages are printed in the portrait orientation for Document A and in the landscape orientation for Document B.
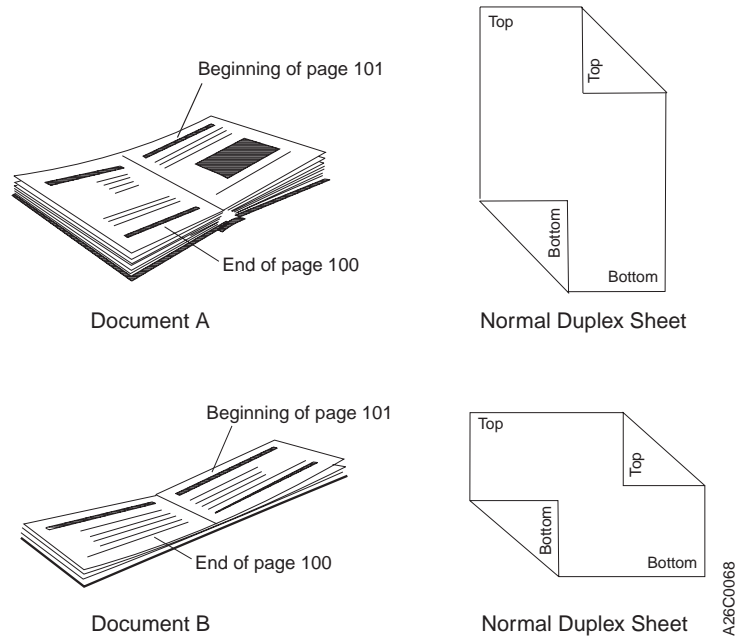
Figure 5. Normal Duplex

Figure 6 on page 18 shows documents printed with tumble duplex. Notice that the pages are printed in the portrait orientation for Document C and in the landscape orientation for Document D.

Document C   Tumble Duplex Sheet

End of page 100
Beginning of page 101

Top
Bottom
Top
Bottom

Document D   Tumble Duplex Sheet

End of page 100
Beginning of page 101

Top
Bottom
Top
Bottom

A26C0069
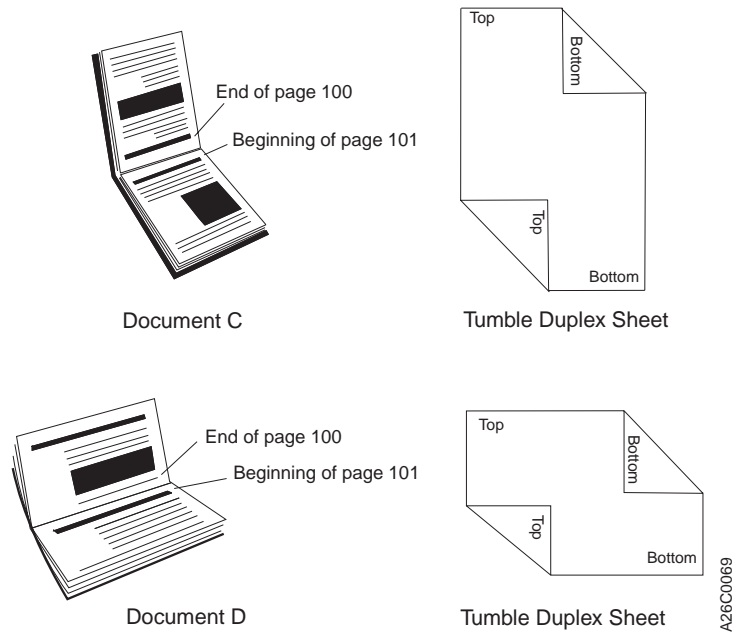
Figure 6. Tumble Duplex

Advanced Function Image and Graphics

The Advanced Function Image and Graphics facility within the AFCCU allows the
printer to directly process IOCA (Image Object Content Architecture) images, and
GOCA (Graphics Object Content Architecture) data, as described in the *IBM
Intelligent Printer Data Stream Reference*, S544-3417.

Improved processing occurs with the use of compressed images or vector graphics
data in the GOCA format by reducing demand on attachment data transfer and
host storage.

When the printer decompresses images or rasterizes vectors instead of the host
system, host system processing cycles are reduced. These data stream functions
also allow the printer to perform scaling operations or resolution correction of
scanned images.

Multiple-Up Printing

Basic N-Up Page Positioning

With N-Up Page Positioning, you can print up to four pages in partitions on one
side of a form, which enables you to print much more data on a form, saving
printer-usage costs, paper, and storage space. See Table 2 on page 32 for a listing of
Print Services Facility (PSF) software that supports N-Up printing. Figure 7 on
page 19 is an example of 2-up printing.
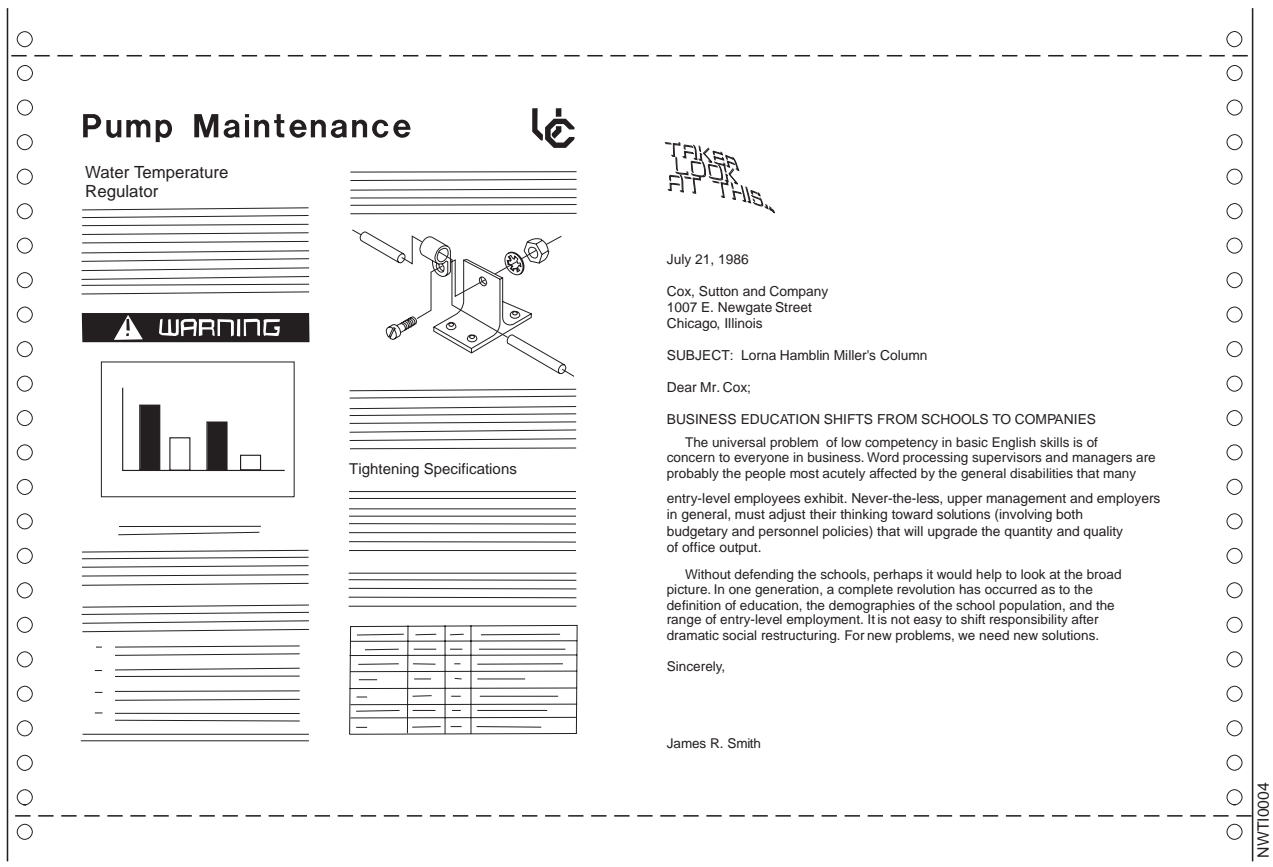
Figure 7. 2-Up Printing

Enhanced N-Up Page Positioning

With Enhanced N-Up Page Positioning, you can place up to four pages at any location on a form—both sides of the form for duplex systems— in any orientation, and of any size. Refer to the appropriate PSF publication for your system for more information. See Table 2 on page 32 for a listing of PSF software that supports Enhanced N-Up printing.

Cut Sheet Emulation

Cut Sheet Emulation (CSE) is an option on the printer console that automatically invokes an Enhanced N-Up arrangement to emulate 2 side-by-side sheets of cut paper. Duplex jobs print page 2 on the back of page 1 and page 4 on the back of page 3. CSE provides for different page arrangements to accommodate different postprocessing requirements. Pages can be placed sequentially from left to right or right to left and right side up or upside down.

CSE requires support in Print Services Facility (PSF). The console option for CSE has no effect unless the printer has a PSF that supports CSE. See Table 2 on page 32 for a listing of PSF software that supports CSE printing. For more information on PSF, refer to the appropriate PSF publication.

Note: Cut Sheet Emulation applies to PSF/MVS only.

When the CSE option is enabled, all jobs sent to the printer print 2-up, side by side except when:

- N-Up Page Positioning is specified in the form definition. In this case, the N-Up specification is used and CSE is ignored.
- The PSF print driver enables page-size verification and disables CSE for pages that do not fit 2-Up.

Options for Multiple-Up Printing

With Page Positioning and Cut Sheet Emulation (CSE) to choose from, you now have several options for formatting multiple-up application pages on a single printer sheet:

- Multiple-Up defined in the page definition resource
- N-Up defined in the form definition resource
- Cut Sheet Emulation selected at the operator console.

Applications printing simple line data that use the same formatting for each page can easily be handled with traditional multiple-up. They can be handled as well by N-Up Page Positioning and Cut Sheet Emulation if they do not require more than 4 pages for N-Up or more than 2 for CSE on printers that support N-Up and CSE.

CSE can be used whenever the desired output is 2 pages of equal size side by side on the same sheet. CSE is especially useful for moving applications from 8.5 x 11 in. forms to 2-up printing on 11 x 17 in. forms. No change is required to the AFP form definition resource to enable CSE 2-Up printing. The same form definition can be used for printing 1-up on 8.5 x 11 in. forms or 2-up on 11 x 17 in. forms.

N-Up Page Positioning is needed for applications that required pages of different sizes or page positioning other than 2-up side by side. Instructions must be placed in the form definition for N-Up printing.

Using Stored Information

Several types of stored information are used when printing data on an Advanced Function Printers. For example, your company logo often appears in your printed output. You can code this logo one time, and then store it in a library where it is available to any authorized person.

IBM Advanced Function Printers use information from resource libraries. A *resource* is a collection of stored data that can be used in a printing job. Some resource libraries contain control information that converts data from line printing to page printing. Examples of this type of library include:

- Form definition libraries, that contain the specifications to describe how pages of data are placed on the physical media
- Page definition libraries, that contain the specifications to describe how line data is placed into pages.

Other resource libraries contain information that the program uses to compose pages. Examples of this type of library include:

- Font libraries, which contain characters to be printed.
- Page segment libraries, which contain images and graphics.
- Overlay libraries, which contain collections of unchanging data that can contain images, text, or combinations of both.

Instead of using preprinted forms, you can use electronic overlays to put boxes, lines, shading, text, and logos on a page. Using electronic overlays can result in significant savings in forms cost and storage space, as well as operator time required to load and unload preprinted forms. Also, you can change electronic overlays more quickly and without paying the scrap charges you have when you change preprinted forms.

Although IBM provides some of these resources for common uses, Advanced Function Presentation licensed programs enable your company to customize its own resources. See "IBM Advanced Function Presentation Software" on page 52 for more information about these programs.

Enhanced Toner Loading

Enhanced toner loading is standard on all printers except Models D01/D02.

This facility allows the operator to add toner to the printer while it is operating. The operator is prompted by an operator console message that the toner supply is low.

Optional Features

The IPM numbers for the features discussed below are based on 8.5-inch length for 1-up pages and 11-inch length for 2-up pages.

310 IPM Feature

The 310 IPM feature is applicable only to Model 0W1. With this feature, you can print up to 310 IPM in 1-up mode and 480 IPM in 2-up mode.

Dual Simplex Speed Switch Feature

The Dual Simplex Speed Switch feature is applicable only to Models D01/D02. With this feature, you can run simplex mode at either 229 IPM or 150 IPM.

458 IPM Feature

The 458 IPM feature is applicable only to Models DW1/DW2. With this feature the DW1/DW2 can run at 229 IPM in 1-up simplex mode (458 IPM in dual simplex mode) or 708 IPM in 2-up duplex mode. Without this feature, the DW1/DW2 maximum throughput is 150 IPM in 1-up simplex mode or 464 IPM in 2-up duplex mode.

Mark Perforations on Perfless Paper

This feature prints a page boundary mark on perfless paper where the perforations between pages would normally be. These marks enable the alignment of postprocessing equipment to the exact top of the page.

When this feature is enabled, a mark approximately 25 mm (1 inch) long by 3 pels wide is printed on every page, with the top of the mark being the exact top of the page. This mark appears on all pages, including threading and NPRO pages. This mark is not moved by print adjust.

For printers in dual simplex mode, each printer is enabled or disabled separately.

This feature is available on all printers at code version x.x or higher.

Move Mark Forms

This feature prints 20 marks along the perforations at the top and bottom edges of the header and trailer pages instead of the standard 5 marks. Also, the longer mark pattern is printed at the side of the pages rather than the center. This allows easier separation of print jobs.

This feature can be enabled or disabled by the key operator. For printers in dual simplex mode, each printer is enabled or disabled separately.

This feature is available on all printers at code version x.x or higher.

Chapter 2. The Advanced Function Printers Characteristics

> **Chapter Overview**
>
> This chapter describes the characteristics, functions, and features of the printer, and describes some of the characteristics that distinguish it from the 3900 Model 001 and the IBM 38*xx* printer family. It also contains hardware and software requirements for incorporating the printer into your operating and application environments.

The printers provide high-performance, high-quality printing in large-scale data-processing and print on demand environments. They receive data through IBM's Intelligent Printer Data Stream (IPDS).

Printing Speed

Printing speed and options are defined in Table 1 on page 3.

The following conditions affect the actual performance in your installation:

- Configuration of the printer
- Number of characters per page
- Number of imbedded control commands
- Number of fonts, bar codes, and images per page
- Performance of the controlling computer
- Channel activity

See "Performance Considerations" on page 50 for additional information.

AFCCU Processor Performance Options

- RISC Technology Processor – Standard on all models
- Performance Enhancement RISC Technology Processor – Optional for Duplex Printing Systems (standard on Models DR1/DR2, ID3/ID4, IR1/IR2, and IR3/IR4).

  Selecting the performance enhancement processor improves processing performance over a wide range of applications. Customers with highly complex applications containing very dense text or compressed and complex images, or customers that use dual simplex mode extensively will benefit using this option.

Print Material

The size limitations and options for InfoPrint 4000 and 3900 printer forms are listed in Table 1 on page 3.

The printer can print on many special-purpose materials, such as preprinted forms and some adhesive labels. The inks, papers, adhesives, and other components that make up these special materials must withstand the printer's fusing temperature

and mechanical action; therefore, be sure to thoroughly test any preprinted forms and adhesive labels you plan to use for your printing applications.

Note: Printing on adhesive labels is supported only in simplex mode.

The *IBM Forms Design Reference for Continuous Forms Advanced Function Printers* contains information to help you select print materials. Work closely with your IBM marketing representative while you are selecting what kinds of forms and special-purpose materials to use. Your marketing representative can give you technical help, share information from other successful printer users, and help you design your own labels and special materials. Refer to "Chapter 11. Selecting and Testing Forms" on page 125 for more information.

Basis weight is the weight in pounds of a ream (500 sheets) of paper cut to a given standard size. In most environments, 75 g/m^2 (20-pound) forms usually perform best for the printers. The basis weights for the various models of printers is listed in Table 1 on page 3.

The stacker on these printers can stack forms from 7 to 14 inches (178 to 356 mm) long. You also can stack forms of less than 7 inches if you fold them correctly. For instructions for printing on various size forms, see "Continuous Forms" on page 125.

When using **fanfold forms in duplex printing mode**, use a postprocessing device behind Printer 2 instead of the printer's stacker. This prevents stacking problems caused by the occasional loss of the fold direction memory after the paper travels through both printers and the Buffer/Flipper Unit.

Print Quality

You can access some of the printer's print-quality controls from the operator panel. The Operator's Guide for your printer describes how to use the contrast and forms-selection controls on the printer control panel to adjust print quality.

The forms you use and the composition of your logical pages significantly affect the quality of your printer's output. To ensure printing legibility in your application, test small fonts and special characters, such as logos, bar codes, and OCR fonts, in your application. See "Chapter 11. Selecting and Testing Forms" on page 125 and the *IBM Forms Design Reference for Continuous Forms Advanced Function Printers* for important information about this type of testing.

Print Quality Enhancement

The Print Quality Enhancement facility within the printer consists of three items: edge smoothing, fine fidelity protection, and boldness control.
- *Edge Smoothing*: This is smoothing along the edges of diagonal lines. This function provides more defined and crisp character and graphics images. If selected, additional smoothing algorithms are applied when 240 and 300 PEL raster font data is printed. This option applies only to InfoPrint 4000 Models IR1/IR2 and Models IR3/IR4.
- *Fine Fidelity Protection*: Protects fine details in the print. It avoids filling in the single-pel white areas but develops the solid areas.

- *Boldness Control*: Controls print boldness, independent of the contrast setting. This allows you to change the print boldness to compensate for other changing conditions within the printer without affecting the solid area darkness.

Printer Resolution

Original IBM 3900 printers had a single printer resolution: 240 DPI. This is the resolution of the printhead. Raster fonts used for printing on 3900 printers must match the resolution of the printhead. A 240 DPI printers requires 240 DPI raster fonts. Outline fonts can also be used on all 3900 AFCCU printers. These fonts have no resolution, but are built in the printer to the printhead resolution. Because they provide resolution independence, outline fonts should be used whenever possible. However, applications designed using custom raster fonts, or raster fonts for which no outlines are available, require these raster fonts for printing.

The InfoPrint 4000 printers offer additional resolution options:
- Switchable printers: Many models can be manually switched between 240 DPI and 300 DPI or between 480 DPI and 600 DPI. See Table 1 on page 3.
- IPDS Resolution Acceptance (600 DPI only).
- Font Enhancement mode.

If your printer has these additional resolution options, you need to plan operator procedures for selecting the correct options for your job mix.

240/300 Switchable Printers

If your printer has a 240/300 DPI switchable printhead, you will need operator instructions on when and how to switch between the two different resolutions. If all your jobs are developed at a single DPI, for example 240 DPI, you may want to keep the printer at 240 DPI resolution all the time. However, if you have some jobs for 240 DPI and some for 300 DPI, you will need to have some way of separating the jobs by resolution and of notifying the operator when to change the resolution on the printer. This change is done from the printer console by selecting the CONFIGURE PRINTER option for Printhead Resolution. The printer normally takes less than 1 minute to complete this operation.

When switching printer resolution, the operator must also switch the libraries for raster fonts. Only 240 DPI raster fonts can print at 240 DPI; only 300 DPI raster fonts can print at 300 DPI. Steps for switching the libraries depend on the PSF software that is driving the printer. For more information, see the appropriate PSF system programming guide.

If your PSF is PSF/MVS 2.2 with APAR OW27622 for Multiple Resolution support, you can set up the PSF printer definition so that the font libraries switch automatically when the printer resolution is changed. See the APAR documentation for details.

480/600 Switchable Printers

If your printer has a 480/600 DPI switchable printhead, you have the same considerations as for a 240/300 switchable printer, plus some additional considerations. Review the procedures for 240/300 switchable printers described above. In 480 DPI resolution, the printer reports to PSF that it is a 240 DPI printer.

It accepts 240 DPI raster fonts and automatically scales them to 480 DPI. From an operational and application standpoint, it is no different than a 240 DPI switchable printer.

Note that there are no 480 DPI raster fonts supplied by IBM, nor does IBM recommend that you create or use 480 DPI raster fonts. You should use only 240 DPI raster fonts or outline fonts with 480 DPI printhead resolution.

For printers with 480/600 switchable printheads, IBM recommends that jobs that use 240 DPI raster fonts be printed with the 480 DPI printhead, rather than with the 600 DPI printhead. Because scaling 240 to 480 DPI is a simple matter of doubling the dots, both appearance and performance of 240 DPI jobs may be better at 480 DPI resolution than at 600 DPI.

When your printer is in 600 DPI mode, you have a new capability: the option to specify IPDS Resolution mode.

IPDS Resolution Acceptance (600 DPI Only)

With the latest AFCCU code on a 600 DPI InfoPrint 4000 printer, or a 480/600 Switchable InfoPrint 4000 printer switched to 600 DPI resolution, the operator is presented with a pop-up window for selecting an IPDS resolution. The choices are:
- 240 DPI
- 300 DPI
- 600 DPI
- Automatic

The operator selects an option from this screen. The printer reports the option selected to PSF.

240 DPI and 300 DPI IPDS Resolution Mode

When a 600 DPI printer is set in 240 DPI IPDS resolution mode, it reports to PSF that it is a 240 DPI printer. PSF can then send 240 DPI raster fonts to the printer without receiving an error. The printer automatically scales the 240 DPI raster fonts (and all other resources) to 600 DPI for printing. When the printer is set in 300 DPI IPDS Acceptance mode, it reports to PSF that it is a 300 DPI printer. PSF can then send 300 DPI fonts to the printer without receiving an error. Operational considerations for switching between 240 and 300 DPI IPDS resolution mode are the same as those for switching between 240 and 300 DPI on a 240/300 switchable printer. See "240/300 Switchable Printers" on page 25.

However, unlike a 240/300 DPI switchable printer, the print resolution is actually 600 DPI. Applications using outline fonts can take full advantage of the 600 DPI resolution in either acceptance mode. The printer renders the outlines at full 600 DPI resolution.

Note that if the printer has both a 480 DPI printhead and a 600 DPI printhead, it is generally preferable to print 240 DPI jobs using the 480 DPI. See "480/600 Switchable Printers" on page 25.

600 DPI IPDS Resolution Mode

When a printer is set in 600 DPI IPDS Resolution mode, it reports to PSF that it is a 600 DPI printer. PSF does not send 240 or 300 DPI raster fonts to the printer. It

sends outline fonts only. Although technically the printer could accept 600 DPI raster fonts, IBM does not supply 600 DPI raster font and does not encourage you to use 600 DPI raster fonts. At 600 DPI, outline fonts are the recommended font technology.

Note that setting the printer in 600 DPI IPDS mode does not provide any benefit over either 240 or 300 DPI IPDS mode. In all cases, the resolution at which the data is printed is 600 DPI. Also in all cases, outline fonts are accepted and rendered at 600 DPI. The only difference between a 600 DPI printer set in 240 DPI IPDS mode or in 600 DPI IPDS mode is that when the printer is in 600 DPI IPDS mode, it cannot receive and print 240 DPI raster fonts.

Automatic IPDS Resolution Mode

The final IPDS resolution mode is "Automatic". When a 600 DPI printer is in Automatic IPDS resolution mode, the printer reports to PSF that it is capable of accepting any font resolution. This allows PSF to send 240 DPI raster fonts, 300 DPI raster fonts, or outline fonts to the printer without requiring the operator to change any printer configuration options on the console. Jobs needing 240 DPI fonts can be intermixed with those needing 300 DPI fonts.

Using Automatic mode can simplify operating procedures for enterprises with jobs requiring resource resolutions. However, if the printer has a 480/600 switchable printhead, you need to weigh this advantage against possible improvements in throughput and print clarity of 480 DPI for jobs formatted using 240 DPI resources. See "480/600 Switchable Printers" on page 25.

Note: Automatic IPDS Resolution mode requires updates to PSF to enable it to respond to and take advantage of this printer capability. Do not select this mode unless you have PSF capable of Multiple Resolution support. PSF/MVS 2.2 with APAR OW27622 has this support. See the APAR documentation for details.

Font Enhancement Mode (480 and 600 DPI Only)

On 480/600 switchable printers or 600 DPI printers with the latest AFCCU code, operators are presented with a pop-up window to select whether font enhancement is desired. The window presents two options:
- Single-byte font enhancement (YES|NO)
- Double-byte font enhancement (YES|NO).

The pop-up window appears when the operator selects 480 DPI printhead resolution or IPDS Resolution for 600 DPI printhead resolution. Specifying YES causes the printer to initiate additional smoothing algorithms for 240 DPI and 300 DPI raster fonts when they are printed with the 480 or 600 DPI printhead. For most cases, selecting YES results in better print quality. However, because print aesthetics are subjective, this enhancement can be turned off for either single-byte or double-byte fonts or both by specifying NO. Specifying Yes to this option should have little or no impact on printer performance.

AFP Resource Resolution

For InfoPrint 4000 and 3900 AFCCU printers, raster fonts are the only print objects or resources that are strictly resolution dependent.[6] Other AFP resources are resolution independent. Form definitions and page definitions do not depend on printer resolution. Overlays and page segments that contain images and text formatting designed at a specific resolution are automatically adjusted by the printer to the correct resolution. However, this adjustment sometimes causes formatting differences. Images and text for which exact positioning is important print best at the resolution for which they were designed. For this reason, you may want to maintain separate resolution libraries of critical resources such as page segments and overlays that contain very precise formatting or logos or signatures for which the highest quality print is required. The Multiple Resolution support in PSF/MVS 2.2 provides the capability to automatically select from the correct resolution library. See documentation for PSF/MVS APAR OW27622.

Forms Handling

You can load forms manually or with the automatic forms loading feature.

Automatic Forms in Duplex Configurations:

Automatic forms loading applies only to an individual printer. Autoload does not completely thread the whole system but is used to load Printer 1 and Printer 2. The forms must be manually threaded through the buffer/flipper unit.

Preheat Control

The preheat control allows the operator to vary the temperature of the preheat platen of the printer. It is intended to enhance the fusing of adhesive labels and heavy-stock forms.

Splicing Station

The splicing station on the printer allows you to splice a new supply of forms to the trailing edge of the previous supply of forms without having to re-load the forms through the printer.

Print Area

The printer can print to the horizontal page perforations and within 12.7 mm ($\frac{1}{2}$ inch) of either vertical (tractor-hole) edge of the form. See Figure 8 on page 29.

Print quality may be degraded when printing near folding perforations, an internal perforation, or any cut in the form. To ensure correct operation and print quality, maintain the following distances:

- From non-folding and internal perforations: 1.27 mm (0.05 in.)
- From folding perforations: for text, OCR, and bar codes: 8.5 mm (0.33 in.); for images and solid-area fill: 12.7 mm (0.5 in.)

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6. Currently there is also a resolution dependence in certain GOCA objects that include image definition within GOCA.

• From binder holes and cuts: 2.54 mm (0.1 in.).

Refer to the *IBM Forms Design Reference for Continuous Forms Advanced Function Printers*and "Chapter 11. Selecting and Testing Forms" on page 125 for more information.

Do not use forms that
have printing between
the tractor holes

Vertical (tractor-hole)
Edge

Horizontal Page
Perforations

12.7 mm
(0.5 in.)

12.7 mm
(0.5 in.)

R4CI0056
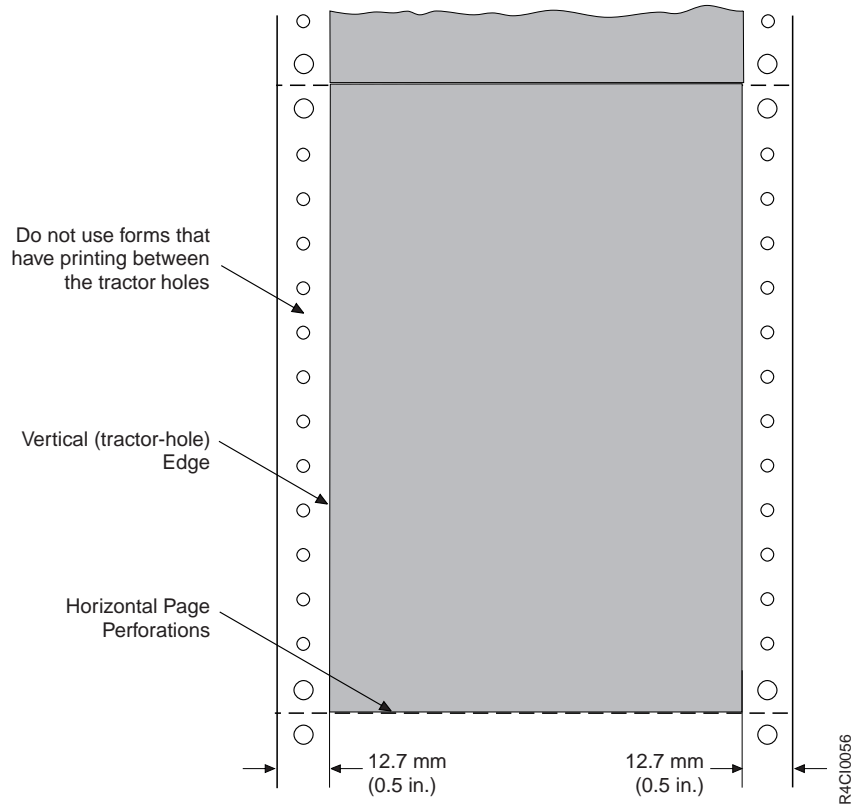
Figure 8. Printable Page Area

Control Unit Processor Memory

Available control unit processor memory for the printers is as follows:
- **Models 0W1/0W3** – Standard is 32MB. You can order an additional memory increment of either 32MB or 64MB for a maximum of 96MB.
- **Models D01/D02** and **Models DW1/DW2** – Standard is 64MB. You can order an additional memory increment of 64MB for a maximum of 128MB.
- **Models DR1/DR2** – the standard and maximum control unit processor memory is 256MB.
- **Models IR1/IR2** – the standard and maximum control unit processor memory is 512MB.
- **Models IR3/IR4** – the standard and maximum control unit processor memory is 1GB.
- **Models IS1/IS2** – Standard is 64MB. You can order an additional memory increment of either 32MB or 64MB for a maximum of 128MB.
- **Models ID1/ID2** – Standard is 128MB. You can order an additional memory increment of either 64MB or 128MB for a maximum of 256MB.
- **Models ID3/ID4** – Standard is 128MB.

Most applications do not need additional memory, but complex applications probably will. Complex applications may print several combinations of fonts, images, page segments, or overlays on each page. Before printing a page of data, the printer must have enough storage in the page buffer to accommodate all the fonts and images appearing on that page.

For printers offering additional memory, ask your IBM marketing representative for assistance in determining if you need additional storage for your planned applications.

Touch-Screen operator console

The touch-screen operator console is the primary way you input information to the printer and receive status and error messages from the printer in any of several different languages. Both the printer operator and the service representative use this console.

You use this operator console to set up and operate the printer. Some of the things you can do from the console are:
- Change printer configurations
- Change host system channel attachment configurations
- Change preprocessing/postprocessing device configurations
- Define forms to be used in the printer.

Power Control

Simplex Models

The power control panel on the AFCCU frame allows you to select either remote or local power control for the printer and the control unit independently.

When either the printer or control unit Local/Remote switch is set to Local, you can control power for that element from the power control panel. When a Local/Remote switch is set to Remote, you can control power for the AFCCU from the controlling computer system and power for the printer from the AFCCU.

The power control panel also contains an Emergency Power Off switch that drops power to all elements controlled by that panel.

Duplex Models

A power control panel on both the printer utility module (PUM) frame on Printer 1 and the Advanced Function Common Control Unit (AFCCU) frame on Printer 2 is used to select either remote or local power control for each printer in the configuration and the control unit independently.

When either a printer frame, the AFCCU frame, or the PUM frame Local/Remote switch is set to Local, power for that element is controlled by power switches on the same power control panel as the Local/Remote switch. When a Local/Remote switch is set to Remote, power for the AFCCU is controlled from the controlling computer system, and power for either printer or the PUM is controlled from the AFCCU.

Each power control panel also contains a system Unit Emergency switch that drops power to all elements controlled by that panel.

Software Requirements

Two modes of operation are available on certain models of the IBM 3900 and InfoPrint 4000 printers:
- Print On Demand (POD) mode
- IPDS mode (Production Print Mode).

Different printers execute in different modes:
- InfoPrint 4000 Models DR1/DR2 operate in POD mode only.
- InfoPrint 4000 Models IR1/IR2 and IR3/IR4 operate in either POD mode or IPDS mode.
- All other 3900 and InfoPrint 4000 models printers operate in IPDS mode only.

Print on Demand

Print On Demand (POD) mode uses a separate POD server. Dual simplex printing is not supported in POD mode. When the printer is operating in POD mode, the POD software server formats all print data to compressed IPDS images before sending the data to the printer. Although IPDS can be sent to a printer that is in POD mode, IPDS processing takes longer than in traditional IPDS mode. Consequently, the printer will not achieve the same performance level that is possible when traditional IPDS Mode is used.

For more information about Print on Demand (POD) Services, refer to *Print on Demand Executive Summary and Planning Guide*, G544-3876 and *Print on Demand User's Guide*, G544-5325.

See your IBM marketing representative for more information about the hardware and software required for print on demand.

IPDS Mode (Production Print Mode)

IPDS mode—sometimes referred to as traditional or full IPDS mode—supports duplex printers in both duplex and dual simplex mode. IPDS mode requires one of the host licensed Print Services (PSF) products shown in Table 2 on page 32.

Each software environment has specific operating system and AFP program requirements. For a list of the programs that are required for a particular environment, refer to the corresponding Print Services Facility (PSF) publications listed in *Advanced Function Presentation: Printer Information*, G544-3290. Also see "Advanced Function Presentation Licensed Programs" on page 52 for a listing of AFP software.

If the printer is connected to a POD server while in IPDS mode, the printer does not attempt to save pages on the printer. This may cause the printer to run slower when it is printing multiple copies of a document than it would in POD mode or when it is printing a document that would have been previously saved in POD mode.

Table 2. Software Support for the Respective Attachments and Functions

AFP Licensed Program	S/370 Parallel Channel	ESCON Channel	Token Ring or Ethernet TCP/IP	FDDI TCP/IP	Select Medium Modifi-cation (SMM)	Basic N-Up	Enhanced N-Up	Cut Sheet Emulation
PSF/MVS	Yes	Yes	Yes (See Note)	No	Yes	Yes	Yes	Yes
PSF/VM	Yes	Yes	No	No	No	Yes	Yes	No
PSF/VSE	Yes	Yes	No	No	Yes	Yes	Yes	No
PSF/2 [1]	Yes [2]	No	Yes	No	No	No	No	No
PSF/400	No	No	Yes	No	No	Yes	Yes	No
PSF for AIX	No	No	Yes	Yes	Yes	Yes	Yes	No
InfoPrint Manager	No	No	Yes	No	Yes	Yes	No	No

Notes:

1. PSF/2 is not supported on Models ID3/ID4.
2. Requires additional CPU cycles and may not yield acceptable throughput for data-intensive print applications. (D01 and D02 only): For this support, submit a Request for Price Quotation (RPQ).

Contact your IBM marketing representative for details about ordering these configurations and features.

Application Environment

In IPDS mode, the printer supports IBM's Advanced Function Presentation (AFP) licensed programs. These programs let application developers take advantage of many special kinds of printing, including bar code and optical character recognition (OCR) output.

The printer supports FOCA (Font Object Content Architecture), which allows printing with outline fonts. Outline fonts give you more choices of fonts with substantially less storage requirements.

The printer prints optical character recognition (OCR) characters and bar code applications and most standard OCR fonts and bar code BCOCA (Bar Code Object Content Architecture) formats.

The printer processes advanced function printing functions. These functions use the Intelligent Printer Data Stream (IPDS) to drive the printer. Refer to the *IBM Product Description*, G544-3895, or the *Intelligent Printer Data Stream Reference*, S544-3417, for more information. Also see "Advanced Function Presentation Licensed Programs" on page 52 for a listing of AFP software. Refer to Table 3 on page 33 for a listing of printer model choices as they relate to channel/adapter attachment choices.

Host System Attachment Choices

Models DR1/DR2 attach only to a Print on Demand (POD) server. For more information concerning the hardware and software required for print on demand, refer to *Print on Demand Executive Summary and Planning Guide*, G544-3876 and *Print on Demand User's Guide*, G544-5325.

InfoPrint 4000 and 3900 printers executing in IPDS mode can attach to the following processing systems with the indicated attachment choices:

Table 3. Host Processing Systems and Attachment Choices

Host System	S/370 Parallel Channel	ESCON Channel	Token Ring or Ethernet TCP/IP LAN	FDDI TCP/IP LAN	S/370 Channel Emulator/A Adapter
IBM 4361	0W1/0W3 D01/D02 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4				
IBM ES/4381	0W1/0W3 D01/D02 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4				
IBM ES/3090 (Note 1) (Note 3)	0W1/0W3 D01/D02 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4 IR1/IR2 IR3/IR4	0W1/0W3 D01/D02 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4 IR1/IR2 IR3/IR4			
IBM ES/9000	0W1/0W3 D01/D02 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4 IR1/IR2 IR3/IR4	0W1/0W3 D01/D02 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4 IR1/IR2 IR3/IR4			
S390 Multiprise 2000, G3 Enterprise, Parallel Enterprise Server	0W1/0W3 D01/D02 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4 IR1/IR2 IR3/IR4	0W1/0W3 D01/D02 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4 IR1/IR2 IR3/IR4			

Table 3. Host Processing Systems and Attachment Choices (continued)

Host System	S/370 Parallel Channel	ESCON Channel	Token Ring or Ethernet TCP/IP LAN	FDDI TCP/IP LAN	S/370 Channel Emulator/A Adapter
IBM ES/9370/ 9371 (Note 2)	0W1/0W3 D01/D02 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4				
PS/2			0W1/0W3 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4 IR1/IR2 [4] IR3/IR4		0W1 D01/D02
AS/400			0W1/0W3 DW1/DW2 IS1, IS2 ID1/ID2 ID3/ID4 IR1/IR2 [4] IR3/IR4		0W1
RISC System/6000			0W1/0W3 DW1/DW2 DR1/DR2 IS1, IS2 ID1/ID2 ID3/ID4 IR1/IR2 [4] IR3/IR4	IR1/IR2 IR3/IR4	D01/D02 0W1

Notes:

1. Attaches to Models 180J and above, except for Model 250, and to 9000T.
2. A High-Speed Printer Adapter is required when connecting to the Micro Channel on the ES/9371.
3. For ESCON, only model 3090J is supported.
4. IR1/IR2 supports Token Ring TCP/IP, but not Ethernet TCP/IP.

All printers have two ports.

You can intermix these attachments in any combination of two, except that you cannot have two TCP/IP attachments.

See "Chapter 4. Preparing the Processing Environment" on page 45 for more information about system and channel-attachment requirements.

System/370 Channel Attachment

The channel attachment is to a single-byte wide block multiplex System/370 parallel channel. You can connect it as follows:

- Directly to a host system System/370 channel
- To the remote end of an IBM 3044-II Fiber Optic Channel Extender

- To the remote end of an IBM 9034 ESCON Converter.

You can attach one System/370 channel adapter and one of the following:
- A second System/370 channel adapter
- An ESCON channel adapter
- A Token-Ring TCP/IP adapter
- An Ethernet TCP/IP adapter.

When you order a second System/370 channel adapter, a **Two-Channel Switch** function is provided which maintains a connection with either channel as a single device control unit with an interface switch. The Two-Channel Switch function supports either static or dynamic channel switching modes (operator selectable) for both channels:
- **Manual mode** – In manual mode, you can enable only one channel interface. You can connect the two interfaces to two channels on the same processing unit, on tightly-coupled processing units (units controlled by the same operating system), or on independent (uncoupled) processing units.

  Note: Select Manual Mode if either or both attachments are from a PS/2, a RISC System/6000, or an AS/400 (does not apply to Model 0W3).
- **Dynamic mode** – In dynamic mode, you can enable both channel interfaces by using the Two-Channel Switch as a dynamic interface switch. Both interfaces must be connected to two channels either on the same processing unit or on tightly-coupled processing units (processing units controlled by the same operating system).

When you install the second System/370 channel feature for the **Two-Channel Switch** function, an optional **Remote Channel Enable/Disable** feature is also provided. With this feature, you can remotely enable and disable directly-connected System/370 channels.

Enterprise Systems Connection (ESCON) Channel Attachment

You can attach to an ESCON channel as follows:
- Directly to a host system ESCON channel
- To the remote end of an IBM 9032/9033 ESCON Director
- To the remote end of an IBM 9036 ESCON Remote Channel Extender.

You can attach one ESCON channel adapter and one of the following:
- A second ESCON channel adapter
- A System/370 channel adapter
- A Token-Ring TCP/IP adapter
- An Ethernet TCP/IP adapter
- A FDDI adapter.

Adding a second ESCON adapter allows dynamic channel switching mode with tightly coupled channels and/or processing units.

Local Area Network (LAN) Attachments

You can attach the printer to either Token Ring TCP/IP (Transmission Control Protocol/Internet Protocol) or to Ethernet TCP/IP with host systems running ES/9000, PSF/2, PSF/400, or PSF for AIX.

You can attach one Token Ring adapter and one of the following:
- An ESCON channel adapter
- A System/370 channel adapter.

You can attach one Ethernet adapter and one of the following:
- An ESCON channel adapter
- A System/370 channel adapter.

FDDI Attachment

You can attach the printer to FDDI TCP/IP with a host system running PSF for AIX.

You can connect the FDDI attachment as follows:
- Directly to an RS/6000 processor
- 8260 Multiprotocol Intelligent Switching Hub attached to an RS/6000 processor.

You can attach one FDDI adapter and one of the following:
- An ESCON channel adapter
- A System/370 channel adapter.

Preprocessing and Postprocessing Device Interfaces (Optional)

Preprocessing and Postprocessing Device Interfaces allow you to attach special equipment to help automate the handling of forms input or forms output (or both) to the printer. Preprocessing equipment is on the forms input side (for example, a roll feed) and postprocessing equipment is on the forms output side (for example, a folder, burster, trimmer, stacker, take-up roll, and MICR or color printer).

Each of the InfoPrint 4000 and 3900 Advanced Function Printers has three interface ports. These ports may be equipped with Preprocessing/Postprocessing (Pre/Post) or Advanced Function Postprocessing (AF Post) interfaces.

- **Preprocessing/Postprocessing** (Pre/Post) – Attaches most types of preprocessing and postprocessing equipment, such as: continuous forms stackers, envelope inserting equipment, and roll-feed equipment.

  Pre/Post is standard on 3900 Models DW1/DW2, and InfoPrint 4000 Models IS1, IS2, DR1/DR2, ID1/ID2, ID3/ID4, IR1/IR2, and IR3/IR4.

- **Advanced Function Postprocessing** (AF Post) – Attaches only postprocessing equipment that requires architected software and communications control, such as: printers using non-electrophotographic technology, MICR impact printers, or selectable color printers. Only one AF Post interface can be installed on each printer.

  Advanced Function Postprocessing is not available on Models DR1/DR2.

  IPDS supports the Select Medium Modifications (SMM) command which is used to invoke processing options through the Advanced Function Postprocessing interface. SMM support is not available on all PSF platforms. See Table 4 on page 52 and Table 2 on page 32 for PSF support details.

In the Duplex Models – Port 1 in each printer has a Preprocessing/Postprocessing interface, which is standard. You may select optional Pre/Postprocessing or Advanced function postprocessing interfaces to equip Ports 2 and 3.

In the 0W1 Simplex Models – All three interfaces are selectable.

In the IS1 and IS2 Simplex Models – One interface is standard and two are selectable.

Things to Remember About Pre/Postprocessing Equipment:

1. When using preprocessing equipment, be sure that attachment cables do not interfere with forms under the printer. See "Space Requirements – Duplex Models" on page 65 or "Space Requirements – Simplex Models" on page 62 for cable placement.

2. When using 18-inch (457-mm) wide paper, the distance between the back edge of the paper and the back of the machine is about 0.25 inches (0.6 cm). This means that some of the powered-assist rollers (urge units) used with other IBM printers may not work across the entire spectrum of the 3900 family of printers. Be sure to discuss this with your pre- or postprocessor vendors.

3. The Preprocessing/Postprocessing interface feature and the Advanced Function Postprocessing interface feature on a printer perform functions identical to the same features available on the 3900-001. However, because of hardware differences, you cannot interchange features from the 3900-001 printers, amongst the other models.

4. Be sure that any preprocessing or postprocessing devices you order operate at the same speed (IPM) as the printer.

5. **With Duplex Configurations** – To avoid static drag between the paper and the floor, IBM recommends that you install a conductive floor plate in front of each urge unit between the printer leveling pads. The floor plate is connected to the printer frame with a grounding strap. Normally, preprocessor vendors supply these plates. The plate should be approximately 61 cm x 152 cm x 0.71 mm (2 ft x 5 ft x 0.028 in.).

Refer to "Configuring Preprocessing or Postprocessing Devices or Interfaces" on page 116 for more information concerning the Pre/Postprocessing interfaces.

Reliability, Availability, and Serviceability

The printer is designed to ensure maximum reliability, availability, and serviceability. The following elements reflect this:

- **Message Display**

  The operator console windows and the display on the printer operator panel display messages in the language of your choice:
  - U.S. English
  - Spanish
  - French
  - German
  - Japanese
  - Italian
  - Brazilian Portuguese
  - Chinese Simplified
  - Chinese Traditional.

These messages give status information, request operator intervention, and guide operators through procedures that have more than one step. Help functions are available for most operations.

- **Error Log**

  Sensors and microcode detect faults in the printer. Information about faults is displayed to the operator and logged on the control unit hard disk for use in correcting problems.

- **Traces**

  The AFCCU can perform several kinds of traces. It can record detailed information about the printer and AFCCU activities and communications with the host system. The operator starts and stops traces.

- **Print Samples**

  The AFCCU can print several output print samples. You can print these print samples whenever necessary to sample print quality, solve problems, adjust the printer, or test the printer's functions.

Data Security

The printer has the following data security features:

- The controlling computer cannot retrieve any data after sending it to the printer.
- After printing the last page, the printer cannot print any data that remains in the page buffer.
- The printer removes images that remain on the photoconductor.
- The control unit accepts commands from the controlling computer system to erase all residual print data and fonts from its storage.
- Characters stored in the page buffer are difficult to interpret because the printer translates them from 8-bit EBCDIC (extended binary-coded decimal interchange code) characters to another form.

If many of the printing applications for your company are confidential, consider placing the printer in a controlled-access area. Then, by using special print classes, you can control when sensitive data is printed.

Resident Fonts

The printer supports the following contents of the IBM Strategic Font Set:

- IBM Core Interchange Resident Scalable Font Set
- 4028 Compatibility Resident Font Set
- IBM Coordinated Resident Font Set
- DBCS Resident Raster Font Set
- DBCS Resident Scalable Outline Font Set

For more information on fonts, see Chapter 3 of the *IPDS Handbook for Printers That Use the Advanced Function Common Control Unit*, G544-3895.

Chapter 3. Organizing the Planning Team

> **Chapter Overview**
>
> This chapter describes tasks for each planning team member and identifies additional resources to which team members can refer. Because printer operators participate in the daily operation of the printers, their duties are also in this chapter.

The first step in preparing to install the printer is to select a planning coordinator. This person is responsible for organizing and managing a project team to plan, order, and install the printer and, if necessary, the Advanced Function Presentation (AFP) programs.

A typical planning team includes the following members:
- Planning coordinator
- Physical planner
- System programmer
- Application programmer.

You may also want to include representatives from end-user areas as part of the planning team. Their input can be valuable in determining requirements for advanced printing functions and special-purpose materials.

Planning Coordinator

Throughout the planning phase, the planning coordinator meets with the planning team and the IBM installation planning representative to ensure that all pre-installation tasks are proceeding smoothly. "Implementation Plan" on page 41 is a checklist of these planning tasks.

The planning coordinator should read all the chapters in this publication to help the other team members prepare for the printer. The planning coordinator should also be familiar with the other manuals in the InfoPrint 4000 and 3900 Advanced Function Printers Library (see "InfoPrint 4000 and 3900 Advanced Function Printers Library" on page xiv).

In addition to the tasks described in this publication, the planning coordinator should consider related issues, such as:

- **Training** – Who needs to be trained on the printer, AFP, or print on demand? Who conducts the training sessions? When will training be scheduled?
- **Testing** – Who performs the printer, AFP, or print on demand tests? What applications should we test? What forms should we test? How can we conduct testing without affecting production schedules?
- **Implementation** – How will the printer be phased into production? What applications will use the printer first?
- **Documentation** – Which local procedures do we need to change? Who is responsible for changing local written procedures? Who needs copies of IBM hardware and software manuals?

- **Supplies** – How large should the initial printer supply order be? What is the local procedure for ensuring that supplies are kept in stock?

Physical Planner

The physical planner is typically an industrial engineer or a supervisor. Physical planners determine the location for the printer and prepare a layout plan. They are responsible for ensuring that the printer's environmental, electrical, and space requirements are met, and that the location is convenient for printer operators and customer engineers.

IBM offers special assistance with physical planning. Contact your IBM marketing representative for information.

"Chapter 5. Preparing the Physical Environment" on page 57 is directed primarily toward physical planners. It includes a physical planning work sheet and a site-preparation checklist.

System and Application Programmers

System and application programmers typically plan for and order the required Advanced Function Printing licensed programs.

System programmers are responsible for:
- Ensuring that host channel cables, System/370, ESCON, Token Ring, FDDI, Ethernet, and any channel extenders, converters, multi-station access units, transceivers, or switching boxes required in the host attachment configuration are available for installation
- Installing and testing the licensed programs
- Incorporating the printer into the system configuration.

Information about system requirements for the printers is in *Guide to Advanced Function Presentation*, G544-3876, and *Advanced Function Presentation: Printer Information*, G544-3290.

Application programmers create and modify application programs that interact with the licensed programs. Application programmers participate in testing forms and applications. "Chapter 11. Selecting and Testing Forms" on page 125 and the *Forms Design Reference for Continuous Forms Advanced Function Printers* contains information related to testing.

If you are a system or application programmer, read Chapter 4. Preparing the Processing Environment for information about planning for installing licensed programs, and "Chapter 7. Configuring the Duplex Models" on page 85 for information about selecting printer options.

Operator

Printer operators perform the following day-to-day tasks for the printer:
- Responding to the printer's operational needs, such as loading forms and clearing forms jams

- Replenishing the printer's supplies, such as toner, developer mix, fuser oil, oiler belt, toner collector bottle, and fine filter
- Performing routine cleaning
- Checking print quality
- Running traces
- Splicing forms (if required).

The Operator's Guide, supplied with each printer, contains general operating procedures, and is the primary reference book for printer operators. Printer operators should also read "Supplies" on page 121 for information about printer supplies.

Implementation Plan

This checklist contains many of the major tasks that must be performed before and during the printer's installation. Use this checklist as a basis for developing your own detailed implementation project plan.

Fifteen Weeks before Delivery

The *planning coordinator*:
1. Identifies the members of the planning team.
2. Orders the printer.

   Note: If you are ordering Models IR1/IR2, ensure that the InfoPrint Multiple Printer Controller (MPC) and InfoPrint Manager software are also ordered.
3. Orders the IBM Advanced Function Presentation licensed programs.
4. Verifies the order for the appropriate channel cables, System/370, ESCON, TCP/IP, and for any required channel extender, converter, or switching hardware boxes in the channel interface.
5. Prepares a plan for selecting and testing forms for use with the printer.

The *physical planner*:
1. Determines the location for the printer and arranges for any changes to the site. Ensures that the site will have conductive flooring.
2. Identifies the delivery route for the printer.
3. Prepares a space layout plan.
4. Determines who will install the electrical wiring and outlets.
5. Determines the type of electrical attachment and ground-fault circuit protection to be used.

The *system programmer*:
1. Determines the Advanced Function Presentation licensed programs needed.
2. Creates a conversion plan for line-printer data and electronic overlays.

The *application programmer*:
1. Identifies the applications that must be changed for migration to the printer.

2. Prepares a detailed plan for converting and testing applications that will be used with the printer.

Ten Weeks before Delivery

The *planning coordinator*:
Meets with the IBM installation planning representative to review the planning process.

The *physical planner*:
Schedules the installation of electrical wiring and outlets.

The *system programmer*:
1. Determines the administrative procedures for using Advanced Function Presentation licensed programs.
2. Begins installing and testing the Advanced Function Presentation licensed programs in the computer system.

Eight Weeks before Delivery

The *planning coordinator*:
Orders initial supplies for the printer.

The *physical planner*:
Ensures that the electrical wiring and outlets are being installed on schedule.

Six Weeks before Delivery

The *physical planner*:
1. Reviews site-preparation progress with the IBM installation planning representative.
2. Reminds the IBM service representative to order the CE Toolkit. See "CE Toolkit" on page 62 for ordering information.

Four Weeks before Delivery

The *physical planner*:
1. Completes installing and testing of electrical wiring and outlets.
2. Completes all site preparation.
3. Verifies that a forklift will be available to uncrate the printers.

   Note: Uncrate the printers at the installation.

Arrival of the Printer

The *planning coordinator*:
Contacts the service representative and arranges to have the printer installed.

The *system programmer*:
Completes tests of the Advanced Function Presentation licensed programs, including the IBM-supplied installation verification procedures.

The *physical planner*:

1. Unpacks the printer and inspects it for external damage.
2. Moves the printer to the prepared site.

Chapter 4. Preparing the Processing Environment

> **Chapter Overview**
>
> This chapter contains specific information to help system programmers plan for integrating the printers into the existing processing environment. The basic hardware, software, and application requirements for the printer are described in "Host System Attachment Choices" on page 33 and "Application Environment" on page 32.

Channel and Local Area Network Attachments

The IBM 3900 and InfoPrint 4000 printers support a variety of attachments:

- ESCON channel
- System/370 parallel channel
- Token Ring TCP/IP
- Ethernet TCP/IP
- FDDI TCP/IP

See "Host System Attachment Choices" on page 33 for specifics on printers and host systems that support each of these attachments.

The IBM 3900 and InfoPrint 4000 printers support up to two attachments. The two attachments may be the same (for example, two ESCON channels) or mixed (for example, one ESCON and one Token Ring). The exception is that the printer can have only *one* TCP/IP attachment of any type. You cannot have two Token Ring attachments; two Ethernet attachments; or two FDDI attachments; or a combination of TCP/IP attachments (for example, one Token Ring attachment and one Ethernet attachment).

For duplex systems operating in dual simplex mode, only one attachment is needed to connect the two simplex engines to the system. Although the system consists of two printer engines, it is driven by a single control unit. The two simplex engines require two contiguous addresses on an ESCON or parallel channel (beginning with an even-numbered address). When the printing system is operating in duplex mode, the printers can use one of these addresses or a separate address on the same channel.

When the printing system is printing in dual simplex mode, each printer engine can use a different attachment to the same or different systems. For example, Printer 1 can be printing jobs from an MVS system attached through an ESCON channel, while Printer 2 is printing jobs from an AIX system attached through a Token Ring.

When the printing system is printing in duplex configuration, only one attachment can be active at any given time. If both attachments are to the same system—or to a tightly-coupled system—and the attachments are of the same type (for example, both are ESCON or parallel channels), switching between the two attachments can be performed dynamically by the host system. If the attachments or hosts

differ—or the hosts are not tightly-coupled— switching must be performed manually by the operator. The printer must be disabled from the current system and attachment before it can be enabled to the other attachment.

As you plan the type and transfer mode for your channel-attachment configuration, refer to the system reference manual for your host system.

Verify with your planning coordinator that the desired attachment cables and any converter or extender hardware boxes are ordered when the printer is ordered.

System/370 Channel Attachment

You can configure System/370 channels to use either DC Interlock (double-tag) mode, or Data-Streaming mode.

You can configure Data-Streaming mode for one of the following transfer rates:
- 1.9MB per second
- 2.7MB per second
- 3.4MB per second (3.0MB per second for PCI control unit)
- 4.5MB per second.

Use the highest data-streaming mode rate supported on the attaching host system.

When connecting directly to a System/370 channel, you can locate the printer at a maximum distance of 122 meters (400) feet from the channel if it is the only control unit on the interface. For each additional control unit ahead of the printer on the channel, the maximum distance is reduced by 4.57 meters (15 feet).

You also can connect the printer to the remote end of either an IBM 3044-II Fiber Optic Channel Extender or an IBM 9034 ESCON Converter to extend the maximum channel length by up to 3 kilometers (1.875 miles).

Note: Connection through a 3044-II is limited to the IBM 4361, ES/4381, ES/9370, and 3090 processing systems only.
The IBM 9034, with either an IBM 9032 or 9033 ESCON Director, further extends the maximum channel length by up to 6 kilometers (3.750 miles) with one 9032/9033 in static connection mode (with RPQ approval), or by up to 9 kilometers (5.625 miles) with two 9032/9033 in static connection mode (with RPQ approval).

The Extended Distance Feature (XDF) on the 9032/9033 ESCON Directors also extends the distance. Submit an RPQ if you require the XDF. The RPQ approval specifies the maximum distance allowed for your environment.

The following figure shows the details of the above connection options, with the distance extensions shown on the Host System side of the diagram.
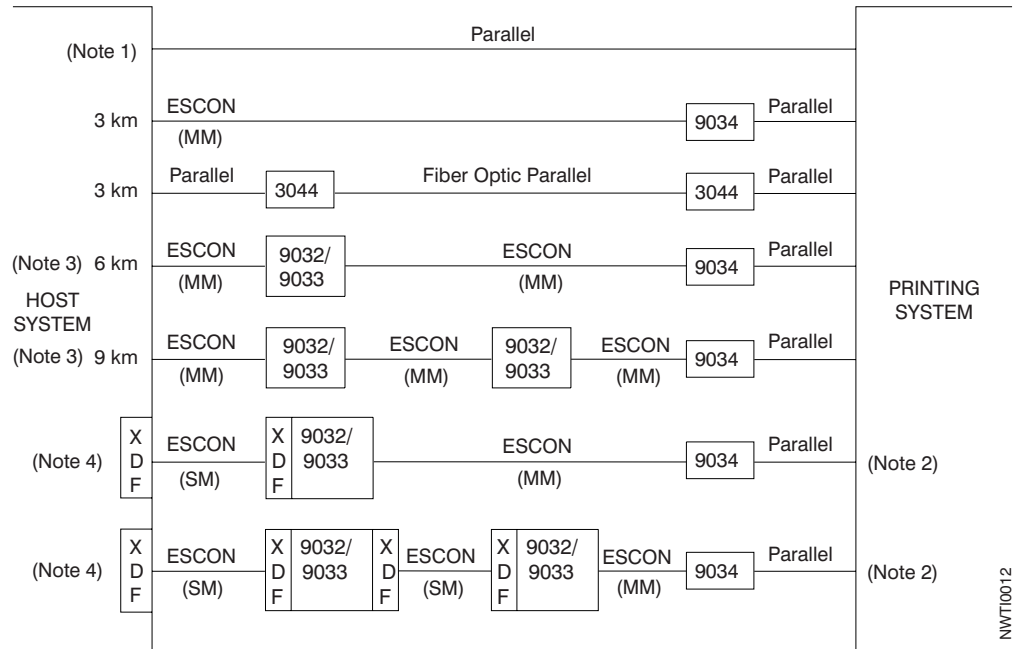
Figure 9. System/370 Parallel Channel Attachment Options

Notes:

1. 61 meters (200 feet) maximum from PS/2 or RISC System/6000 (Models 0W1 and D02 only) 122 meters (400 feet) maximum from 4361, 4381, ES/3090, ES/9370, or ES/9000

2. When XDF in used in the interface, set the transfer mode between the 9034 and the printer to DC Interlock mode. To keep the performance acceptable, ensure that the cable length between the 9034 and printer is less than 100 feet.

3. RPQ approval is required for this configuration and distance.

4. RPQ approval is required and specifies the maximum distance for the environment.

5. SM = Single Mode (Laser Driver - 20 km maximum distance); MM = Multi Mode (LED Driver - 3 km maximum distance).

ESCON Channel Attachment

When connected directly to an ESCON channel, the printer can be a maximum distance of 3 kilometers (1.875 miles) from the channel. Either an IBM 9032 or 9033 ESCON Director provides connectivity to additional host systems and also extends the maximum channel length as follows:

- Up to 6 kilometers (3.750 miles) with one 9032 or 9033 ESCON Director
- Up to 9 kilometers (5.625 miles) with two 9032 or 9033 ESCON Directors.

The Extended Distance Feature (XDF) on the 9032 or 9033 ESCON Director also extends the maximum channel length as follows:

- Up to 23 kilometers (14.375 miles) with one Director
- Up to 43 kilometers (26.875 miles) with two Directors.

The IBM 9036 ESCON Remote Channel Extender (Models 1 or 2) extends the interface across common carrier fiber optic connections. You can use one, two, or three 9036 extenders for a maximum distance of 43 kilometers.

Figure 10 shows the details of the above connection options.


```
HOST                                                                    PRINTING
SYSTEM                                                                   SYSTEM

3 km    ─────────────────── ESCON (MM) ───────────────────

6 km    ── ESCON (MM) ──[9032/9033]── ESCON (MM) ──

9 km    ── ESCON (MM) ──[9032/9033]── ESCON (MM) ──[9032/9033]── ESCON (MM) ──

23 km   [XDF]── ESCON (SM) ──[XDF 9032/9033]── ESCON (MM) ──

43 km   [XDF]── ESCON (SM) ──[XDF 9032/9033 XDF]── ESCON (SM) ──[XDF 9032/9033]── ESCON (MM) ──

26 km   ── ESCON (MM) ──[9036 MOD 1]── CC (SM) ──[9036 MOD 1]── ESCON (MM) ──

43 km   [XDF]── ESCON (SM) ──[9036 MOD 2]── CC (SM) ──[9036 MOD 1]── ESCON (MM) ──

43 km   ── ESCON (MM) ──[9036 MOD 1]── CC (SM) ──[9036 MOD 2]── CC (SM) ──[9036 MOD 1]── ESCON (MM) ──

23 km   [XDF]── ESCON (SM) ──[9036 MOD 1]── ESCON (MM) ──
```

Figure 10. Serial Channel Attachment Options

Note:

CC = Common Carrier Fiber Optic Connection (SM)

SM = Single Mode (Laser Driver - 20 km maximum distance)

MM = Multi Mode (LED Driver - 3 km maximum distance).

ESCON Multiple Host Environment

With ESCON, a single ESCON attachment can be shared between multiple LPARS or system images. However, the printer cannot be shared between multiple PSF hosts at the same time. Operational procedures must be put in place to take the printer off-line to the existing PSF host before bringing it on-line to another PSF. Otherwise, unpredictable print results can occur.

The printer ESCON configuration option for Multi-Host Environment insures that an operator cannot inadvertently vary the printer on-line to multiple PSF hosts simultaneously. This allows sharing of ESCON attachments without concern that operator error could cause print problems. Use of the Multi-Host Environment option requires support for printer ASSIGN and UNASSIGN in both the operating system and PSF. Operating system support is provided in OS/390 V1R3.0 (which may be VM guests) and higher. PSF support is provided in PSF 3.1.0 for OS/390 and higher, and also with APAR OW29992 to PSF/MVS 2.2. Do not enable the

printer configuration option for Multiple-Host Environment unless all hosts connected to the printer support printer ASSIGN and UNASSIGN. Otherwise, PSF cannot access the printer.

To allow access by a different PSF host, the operator must drain the printer and vary it off to one host before varying it on to the second host. A second host trying to vary on the printer is denied access with a notice that the printer is assigned elsewhere. The printer cannot be successfully varied on to the second host until the operator drains and varies it off to the first host. For more information on PSF/MVS ASSIGN and UNASSIGN support, see PSF for OS/390 Customization, or the documentation for APAR OW29992 to PSF/MVS 2.2.

Token Ring TCP/IP Local Area Network

You can attach the printer to a host token ring through IBM token-ring cabling with the IBM Token Ring High-Performance Adapter. The adapter is installed in the printer's AFCCU. The AFCCU can attach to either a 16Mbit/sec or a 4Mbit/sec Token Ring Local Area Network. The attachment conforms to IBM's Token-Ring Network Original Equipment Manufacture Interface. The following documents comprise this interface:

- *IBM Cabling System Technical Interface Specification*, GA27-3773
- *IBM Local Area Network Technical Reference*, SC30-3383
- *IBM Token-Ring Area Network Architecture Reference*, SC30-3374
- *Token-Ring Access Method and Physical Layer Specification*, IEEE Standard 802.5-1989.

The printer can be a maximum of 100 meters from the 8228 Multistation Access Unit or 8230 Control Access Unit. For more information, refer to 8228 and 8230 publications.

You can increase the distance to the 8228 by using either the 8220 or 8219 Optic Fiber Repeater. For more information, refer to 8220 and 8219 publications.

Ethernet TCP/IP Local Area Network

You can attach the printer to a host Ethernet through the Integrated Ethernet LAN adapter. The adapter is installed in the printer's AFCCU. The AFCCU can attach to the following:

- Standard Thick (10Base5) Ethernet coaxial cable. If the printer is the last device on this cable, use a customer-supplied 50-Ohm terminator.
- Thin (10Base2) Ethernet coaxial cable.

  For this connection, use a coaxial 'T' connector. If the printer is the last device on this cable, use a customer-supplied 50-Ohm terminator.
- 10BaseT with Transceiver.

FDDI Local Area Network

You can attach the printer to a host FDDI through the FDDI Single Station fiber adapter. The adapter is installed in the printer's AFCCU. The attachment complies with the following:

- Fiber Network Interface specifications of ANSI X3T9.5 and X3T9.12
- FDDI Station Management SMT 7.3 from the ANSI X3T9 technical committee.

Models IR1/IR2 of the InfoPrint 4000 printer can be located a maximum distance of 2 kilometers from the 8260 Multiprotocol Intelligent Switching Hub or RS/6000 processor using 62.5/125 micron multimode fiber. For more information, refer to 8260 publications.

The FDDI adapter cable PN 19G4867 (20 meters in length) is included with the printer. This 62.5/125 multimode fiber cable has a Subscriber Connector (also referred to as a SC connector) on each end. There are similar cables with other part numbers that can be ordered in addition to the one that is shipped with the machine. These cables have lengths of 2, 4, 6, 10 meters, and custom lengths. They can be ordered by calling 1-800-388-7080.

Attention

Because FDDI cables are made of a fiber optic material, you should consider the following limitations when planning the location of a printer with FDDI connections:

- Do not place the FDDI cables where they can be walked on.
- Do not route the cables where they could be pinched between a door and its frame.
- Do not place the printer in a place that requires a tight bend in the FDDI cable.
- Route the cable so that it lies flat, with no twists or knots.

For other cable types, contact IBM Connectivity Service through your IBM Marketing Representative.

Performance Considerations

This section contains questions for system programmers to answer when planning for the channel-attachment configuration and for Advanced Function Presentation licensed programs.

- How much and what kind of data will be printed?

  A printed page can consist of different types of text, images, overlays, and fonts. The combination of information on the page determines the time needed to prepare the data for printing. Jobs with little text and no image or graphics are processed faster than jobs with complex pages that may include scaling and image decompression.

- Will multiple page of data be printed per sheet?

  If an application uses N-Up Page Positioning or Cut Sheet Emulation (CSE), you will be increasing the number of pages printed per minute. For example, for a printer with a maximum throughput of 229 simplex 8.5-in. forms per minute, changing the application to print 2-Up 11-in. forms increases the maximum throughput to 354 simplex pages per minute. If the application is duplex, the maximum throughput is doubled to 708 pages per minute.

  Increasing the throughput increases the amount of data per minute being transferred to and processed by the system and the printer. System and channel loads may need to be reevaluated and adjusted to allow for the increased processing and transfer requirements. Increasing the number of pages per minute also intensifies processing based on page count, such as Checkpointing. Consider increasing the Check Point interval for applications using N-Up, CSE, or duplexing.

- How busy is the system?

  Several things affect the performance of the system and directly affect communication with the printer:

  – Speed of the computer system
  – Amount of available storage
  – Importance of tasks assigned in the system
  – Control program used to drive the printer.

  Plan your system so that it can adjust to the change and growth of your company.

Consider the following issues while setting up your channel-attachment configuration:

System/370 Attachment

- Transfer rates in DC Interlock mode have a greater reduction as cable distance increases than does Data-Streaming mode.

  Note: For best performance, use data-streaming mode.
- Different processor channels have different rates of transfer depending on the channel number. Refer to the system reference manual for your host system for data-transfer rates. Not all channels support data-streaming mode.
- Set the missing-interrupt handler (MIH) for 13 minutes or more.
- When attached to an IBM 3044–II Fiber Optic Channel Extender or an IBM 9034 ESCON Converter, configure the printer for one of the data-streaming transfer modes and not the DC Interlock transfer mode.

  Note: An exception to the above is when XDF is used in the interface with the distance between the host and the printer exceeding 10 km, then use the DC Interlock transfer mode. See Note 2 in Figure 9 on page 47.
  For any 3044–II restrictions on transfer rate, refer to the 3044–II publications.

- Using data chaining with data-streaming mode can cause an overrun condition. For more details, see the channel or system library publication for your computer system, and *System/370 Principles of Operation*. (IBM PSF does not use data chaining.)
- Before attaching the printer to non-IBM equipment (such as channel extenders), ensure that the equipment supports the printer. The equipment vendor can answer your questions about configuration options and other channel-attachment issues.

ESCON Attachment

The ESCON channel is the strategic replacement for the System/370 parallel channel. It provides improvements in data rate, physical path length, cable space requirements, and overall system connectivity.

Set the missing-interrupt handler (MIH) for 13 minutes or more.

Direct-Attach

You can use the printer as a direct output device (direct-printing) when attached to an MVS host system. When using the printer in direct-printing mode, PSF/MVS provides exclusive use of the printer for a particular application. The application with direct control of the printer cannot take advantage of system-assisted restart, data set checkpointing, multiple data set processing, or use of operator commands to control the printer.

Advanced Function Presentation Licensed Programs

Some Advanced Function Presentation (AFP) licensed programs are required for operating the printer; others are optional.

The planning team should work with the end-user community to determine which optional advanced functions are needed. Using the *Guide to Advanced Function Presentation* may be helpful during this process. That publication contains a summary of Advanced Function Presentation, its concepts, products, and benefits. It contains an introduction to Advanced Function Presentation and describes how the licensed programs can meet your specific needs.

IBM Advanced Function Presentation Software

Determining the printing needs of your company and selecting the software that best meets these needs are important steps in improving your printing operations. Refer to *Guide To Advanced Function Presentation* G544-3876, for a description of available AFP software.

You need to order Print Services Facility (PSF) licensed programs for the operating system of each host to which your printer will be attached. Table 4 lists the PSF licensed programs that IBM requires for use with its Advanced Function Printers.

Contact your marketing representative for the minimum PSF levels and prerequisites and limitations that apply for supporting the printer.

Table 4. Advanced Function Presentation Software Summary

AFP Programs	Purpose	Licensed Program Number						
		PSF/MVS	PSF/VM	PSF/VSE	PSF/2	PSF for AIX	PSF/400	InfoPrint Manager
PSF Print Services Facility	Provides device support for advanced function printing.	5695-040	5684-141	5686-040	20G0732	5765-505	5763-SS1	5648-A35
Note: Program 5738-SS1 can operate the Model 0W1 and Models D01/D02 when attached through PSF/2 Distributed Print Facility to the channel emulator.								

Optical Character Recognition and Bar Code Applications

You can use the printer for optical character recognition (OCR) and bar code applications.

Because of variations in OCR readers and bar-code scanners, be sure that you test the printer OCR and bar code output with the actual readers and scanners that

you use in your processing environment. "Testing Forms and Applications" on page 127 has more information related to testing OCR and bar code output.

For more information about OCR and bar-code printing, refer to:

- *Forms Design Reference for Continuous Forms Advanced Function Printers*, G544-3921
- *About Type: IBM's Technical Reference for 240-Pel Digitized Type*, S544-3516
- *Bar Code Fonts User's Guide*, S544-3190
- *Bar Code Object Content Architecture Reference*, S544-3766.

See your IBM marketing representative to obtain these publications.

All of the printers support OCR-A and OCR-B fonts.

IBM supports three methods for processing bar codes:
- Bar Code Object Content Architecture (BCOCA), which is IBM's strategic method
- Document Composition Facility (Program 5748-xx9)
- Bar Codes and Optical Character Recognition Fonts (Program 5688-021).

BCOCA Support

All of the PSFs process BCOCA objects once the objects are generated. IBM supplies the following BCOCA generators:
- Advanced Function Printing Utilities/400 (57xxAF1)
- OS/400 Data Description Specification (DDS)
- Page Printer Formatting Aid (PPFA) (5688–190)
- Advanced Print Utility for AS/400
- Advanced Function Printing Toolbox

Other platforms require non-IBM generators to produce BCOCA objects.

BCOCA supports the following bar code types:

Table 5. Bar-Code Type and Modifier Combinations for AFCCU Printers

Bar Code Type	Modifier
X'01': 3-of-9 Code	X'01' and X'02'
X'02': MSI	X'01' through X'09'
X'03': UPC/CGPC, Version A	X'00'
X'05': UPC/CGPC, Version E	X'00'
X'06': UPC, 2-Character Supplemental	X'00'
X'07': UPC, 5-Character Supplemental	X'00'
X'08': EAN 8 (includes JAN short)	X'00'
X'09': EAN 13 (includes JAN standard)	X'00'
X'0A': 2-of-5 Industrial	X'01' and X'02'
X'0B': 2-of-5 Matrix	X'01' and X'02'
X'0C': Interleaved 2-of-5	X'01' and X'02'
X'0D': Codabar	X'01' and X'02'
X'11': Code 128	X'02'

Table 5. Bar-Code Type and Modifier Combinations for AFCCU Printers (continued)

Bar Code Type	Modifier
X'16': EAN, 2 Digit Add-on	X'00'
X'17': EAN, 5 Digit Add-on	X'00'
X'18': Postnet	X'00' through X'03'
X'1A': RM4SCC	X'00'
X'1B': Japan Postal Bar Code	X'00' and X'01'

Document Composition Facility (Program 5748-XX9)

Codabar

Code 3 of 9

Industrial 2 of 5

Matrix 2 of 5

Interleaved 2 of 5

MSI

European article numbers (EAN) 8 and 13, which include Japanese article number (JAN) Short and Standard

Universal product codes (UPC) A and E, which include Canadian grocery product code (CGPC)

Bar Codes and Optical Character Recognition Fonts (Program 5688-021)

Code 39

Industrial 2 of 5

Matrix 2 of 5

Interleaved 2 of 5

MSI

European article numbers (EAN) 8 and 13, which include Japanese article number (JAN) Short and Standard

Universal product codes (UPC) A and E, which include Canadian grocery product code (CGPC)

Installing and Verifying

The system programmer installs and verifies the AFP programs before the printer is installed. Licensed programs include test procedures to ensure that the software is installed correctly.

At installation, the application programmer creates the resources (form definitions, page definitions, electronic overlays, and page segments) that will be in the resource libraries.

Conversion

With the availability of Advanced Function Presentation, you may want to review your general approach to printed output to get maximum benefit from the new functions. Your application development staff may want to begin planning for this conversion effort before the printer is installed. Typical tasks to consider include:

• Changing font character sets

- Converting line-printer applications to page-printer applications
- Converting preprinted forms to electronic overlays
- Creating new applications by using electronic overlays
- Enhancing existing applications to take advantage of printer functions
- Investigating applications that have special programming requirements, for example, printer Direct-Attach.

Chapter 5. Preparing the Physical Environment

> **Chapter Overview**
>
> This chapter describes the environmental, power, physical, and space requirements that are necessary before you install the printers. It includes an installation-planning worksheet and a physical-planning worksheet. The audience for this chapter is the physical planner and the system programmer.

Environmental Requirements

Consider the following requirements as you select the location for your printer:

- Temperature and humidity

  Extremes of temperature and relative humidity can affect forms and adversely affect machine performance. These affects may include forms jams and unacceptable print quality. Operate the printer within the following ranges of temperature and humidity:

  > Temperature: 18–24°C (65–75°F)
  >
  > Relative Humidity: 40%–60%

  This ensures the best machine performance and print quality for machines that print continuously for periods of four hours or more.

- Ventilation.

Dust and other contamination can cause machine faults. The printer operates best in an air-conditioned computer room with year-round humidity control and predominately recirculated, filtered air. Refer to the *IBM General Information Manual: Installation Manual—Physical Planning*, GC22-7064, for details about ventilation requirements for other IBM equipment.

Human-health considerations dictate that appropriate ventilation be supplied to the printer area. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) recommends a minimum of 0.42–0.57 cmm (15–20 cfm) per person of outdoor air make-up during human occupancy (ASHRAE 62–1989). Adherence to IBM pre-printed forms recommendations and provision of appropriate ventilation should preclude the development of adverse human-health effects because of outgassing and emissions from preprinted forms. Refer to *Forms Design Reference for Continuous Forms Advanced Function Printers* for more information about selecting preprinted forms and using them safely.

Environmental Impact

Consider the heat and sound generated by the printer when selecting its location.

Heat/Power

The heat dissipation values in the following table apply equally to a Model 0W1 without the 310 IPM Feature installed, a Model DW1, a Model DW2, a Model ID1, a Model ID2, or a Model IS1.

Table 6. Heat Dissipation and Power for Model 0W1 (without the 310 IPM Feature), Models DW1/DW2, Models ID1/ID2, and Model IS1

	Idle Ready Mode		Printing		
	50 Hz	60 Hz	50 Hz	60 Hz	
			42 lb	20 lb	42 lb
kVA	3.5	3.4	11.5	8.8	11.9
kW	3.0	2.8	11.3	8.7	11.7
kBTU/Hr	10.2	9.6	38.6	29.7	39.9
Notes:					
1. 50 Hz printing may be expected to operate within 10% of the 60 Hz values.					

The heat dissipation values in the following table apply to a Model 0W1 with the 310 IPM Feature installed, a Model IS2, a Model ID3, or a Model ID4.

Table 7. Heat Dissipation and Power for Model 0W1 with 310 IPM Feature Installed, Model IS2, and Models ID3/ID4

	Idle Ready Mode		Printing		
	50 Hz	60 Hz	50 Hz	60 Hz	
			42 lb	20 lb	42 lb
kVA	3.5	3.4	N/A	10.8	N/A
kW	3.0	2.8	N/A	10.4	N/A
kBTU/Hr	10.2	9.6	N/A	36.9	N/A
Notes:					
1. 50 Hz printing may be expected to operate within 10% of the 60 Hz values.					

The heat dissipation values in the following table apply equally to either a Model 0W3, a Model DR1, a Model DR2, Model IR1, or a Model IR2.

Table 8. Heat Dissipation and Power for Model 0W3, Models DR1/DR2, and Models IR1/IR2

	Idle Ready Mode		Printing		
	50 Hz	60 Hz	50 Hz	60 Hz	
			42 lb	20 lb	42 lb
kVA	3.6	3.5	9.9	7.5	10.1
kW	3.1	2.9	9.7	7.3	9.9
kBTU/Hr	10.6	9.6	32.7	24.5	34.0
Notes:					
1. 50 Hz printing may be expected to operate within 10% of the 60 Hz values.					

The heat dissipation values in the following table apply equally to either a Model IR3 or Model IR4.

Table 9. Heat Dissipation and Power for Models IR3/IR4

	Idle Ready Mode		Printing		
	50 Hz	60 Hz	50 Hz	60 Hz	
			42 lb	20 lb	42 lb
kVA	3.5	3.4	N/A	9.0	N/A

Table 9. Heat Dissipation and Power for Models IR3/IR4 (continued)

	Idle Ready Mode		Printing		
	50 Hz	60 Hz	50 Hz	60 Hz	
			42 lb	20 lb	42 lb
kW	3.0	2.8	N/A	8.7	N/A
kBTU/Hr	10.2	9.6	N/A	30.7	N/A

Notes:

1. 50 Hz printing may be expected to operate within 10% of the 60 Hz values.

Sound

The upper limits for sound level, for all the printers, are as follows. Operating levels are measured during continuous running with 20-pound forms.

Table 10. Sound Levels

	L_{WAd} (see note 1)		$<L_{pA}>_m$ (see note 2)		I	T
	Printing (bels)	Idle (bels)	Printing (dB)	Idle (dB)		
60 Hz	8.8	7.8	65	58	Y	Y
50 Hz	8.8	7.8	65	58	Y	N

Notes:

1. L_{WAd} is the sound power emission level.
2. $<L_{pA}>_m$ is the mean value of the space-averaged sound pressure emission levels at one-meter positions.
3. I is impulsive noise.
4. T is prominent tones.

Physical Requirements

Consider the electrical requirements for the printer when selecting its location.

Normal Precautions to Prevent Fire

Because the forms and toner used in the IBM printer can burn, take precautions to prevent fire. These precautions include common-sense measures, such as keeping potentially combustible materials (for example, curtains and chemicals) away from the printer, and providing adequate ventilation and cooling.

Power

Ensure that you have an electrical outlet that supports 12 kVA and meets the power requirements listed in Table 11 on page 60 for each printer. This outlet must supply 3-phase power and be able to disconnect power from each printer, such as:

- A compatible plug and receptacle installed near each printer.
- A circuit breaker that breaks all live poles for each printer. This circuit breaker must be dedicated to the printer and be within easy reach.

Table 11. Electrical Requirements

Country	AC Voltages			Wiring Information	Phase	Circuit Rating
	Nominal	Minimum	Maximum			
U.S. Canada	60 Hz/208 60 Hz/220 60 Hz/230 60 Hz/240	60 Hz/187 60 Hz/198 60 Hz/207 60 Hz/216	60 Hz/229 60 Hz/242 60 Hz/252 60 Hz/264	4-wire power cable with three phases and ground. Neutral is not required.	3	60 Amperes
Japan	50 Hz/200 60 Hz/200	50 Hz/180 60 Hz/180	50 Hz/220 60 Hz/220	4-wire power cable with three phases and ground.	3	60 Amperes
Europe	50 Hz/380 50 Hz/400 50 Hz/415	50 Hz/342 50 Hz/360 50 Hz/374	50 Hz/418 50 Hz/440 50 Hz/456	5-wire power cable with three phases, ground, and neutral. Direct connection of neutral to ground required.	3	25 Amperes
Attention: The 50-Hz 380/400/415 Volt version does not support non-earthed neutral and impedance-grounded neutral power distribution systems. Installation on an impedance-grounded neutral power system (IT Power System) could result in failures of motors and transformers in the printer.						

Power Cable and Receptacle

An AC power cable is supplied with all printers. This cable measures 427 cm (14 feet), except for printers installed in Chicago, Illinois, U.S.A., where the power cable measures 183 cm (6 feet).

U.S. and Canada

The printer uses cords with Hubbell plugs (IBM part number 53F1722, or IBM part number 53F1723 for printers installed in Chicago; both include the cord and Hubbell plug type 460P9V05). Provide either of the following Hubbell connector or receptacle (or equivalent) for this plug:

460C9V05
> Connector (inline)

460R9V05
> Receptacle (mounts on a wall or rail)

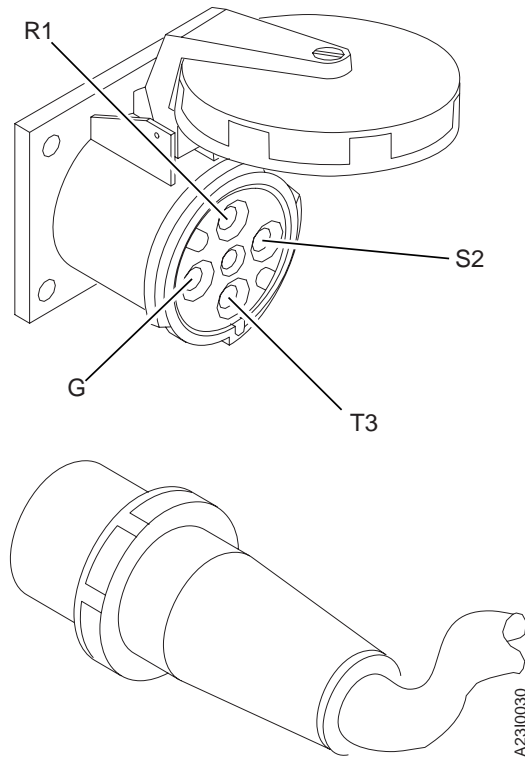Figure 11 on page 61 shows a Hubbell cord, plug, and receptacle.

Figure 11. Hubbell Plug and Receptacle. Positions for phase connectors R1, S2, T3, and ground (G) are shown.

All Other Countries

The power cable is supplied without a plug. Provide the appropriate plug and compatible receptacle.

Understand the electrical standards for your country, and use only an approved plug. Your IBM marketing representative has information on the voltage requirements in your country.

For more information about voltage requirements and for Hubbell part numbers, refer to the *IBM General Information Manual: Installation Manual—Physical Planning*, GC22-7064.

Vacuum Cleaner

Ensure that the vacuum cleaner used to clean the printer meets the following requirements:
- All attachments or tools that are connected to the vacuum cleaner through which paper dust, toner, or developer mix pass are nonconductive.
- Vacuum-cleaner motor cooling *must* be separate from the vacuum line so that these same substances do not contact the electrical brushes of the vacuum-cleaner motor. Filtering the vacuum line and allowing the filtered air to cool the motor is not safe.

CE Toolkit

Remind the IBM service representative to order the CE Toolkit. For ordering information, refer to these RETAIN tips:

- For 3900 printers, refer to H125431.
- For InfoPrint 4000 printers, refer to H137066.

Space Requirements – Simplex Models

Figure 12 on page 63 shows the dimensions of the printer, space and service clearance, and power cable and channel cable locations for Models IS1 and IS2.

The minimum size for Channel Cable Access opening is 8 x 8 in. (200 x 200 mm).

Figure 13 on page 64 shows the dimensions of the printer, space and service clearance, and power cable and channel cable locations for Models 0W1 and 0W3.

The figure contains the following labels and dimensions:

3049 (120)

1016 (40)

890 (35)

1143 (45)

508 (20)

Channel Cable Access

532 (21)

2362 (93)

3736 (147)

1829 (72)

2420 (95)

1892 (74)

660 (26)

Maintenance Area

864 (34)

975 (38)

930 (37)

Leveling Pad
Power Cable
Caster

English measurements in inches are shown in parentheses.

NWTI0003
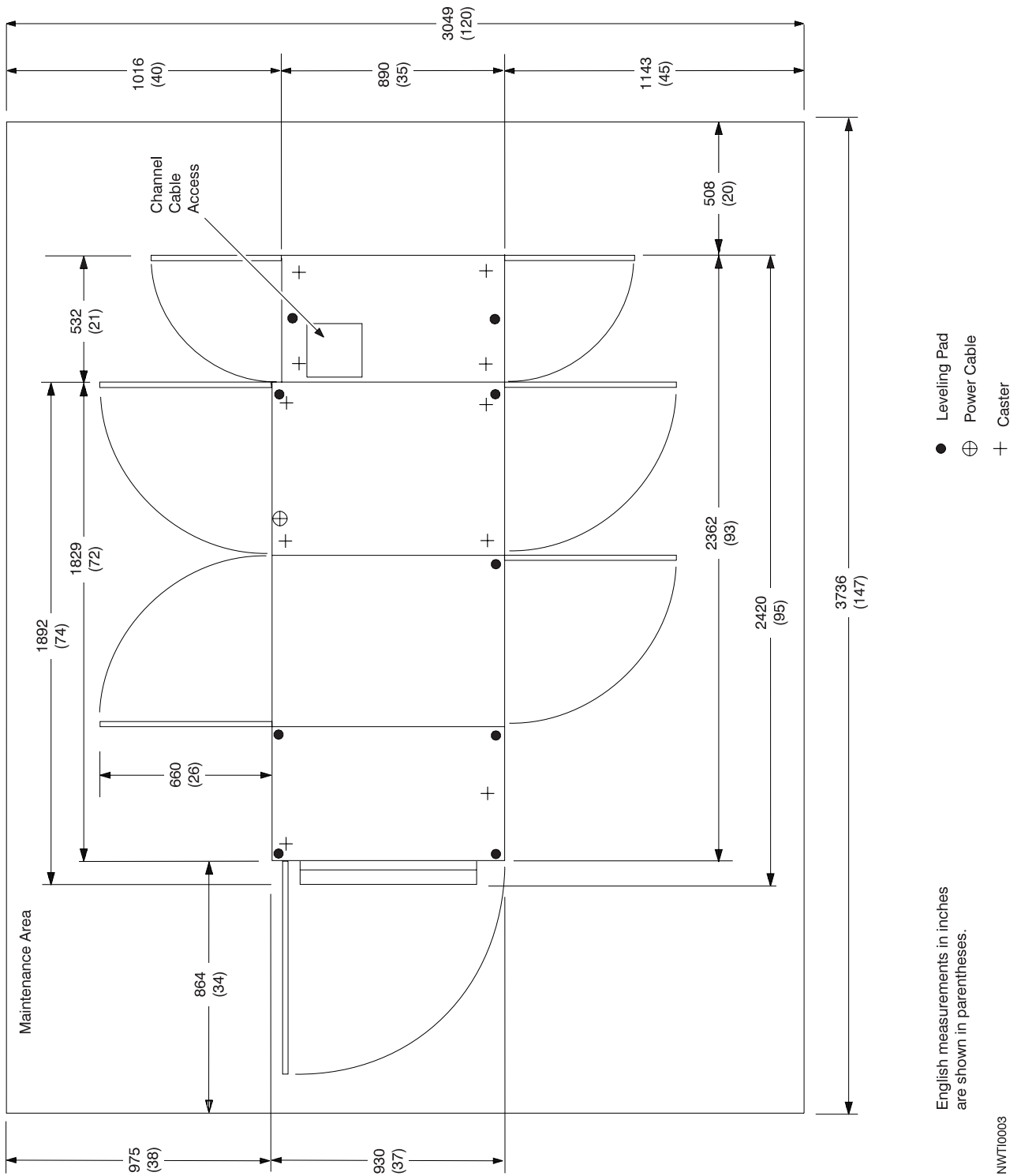
Figure 12. Dimensions, Service Clearance, Power cable, and Cable Locations—Models IS1 and IS2
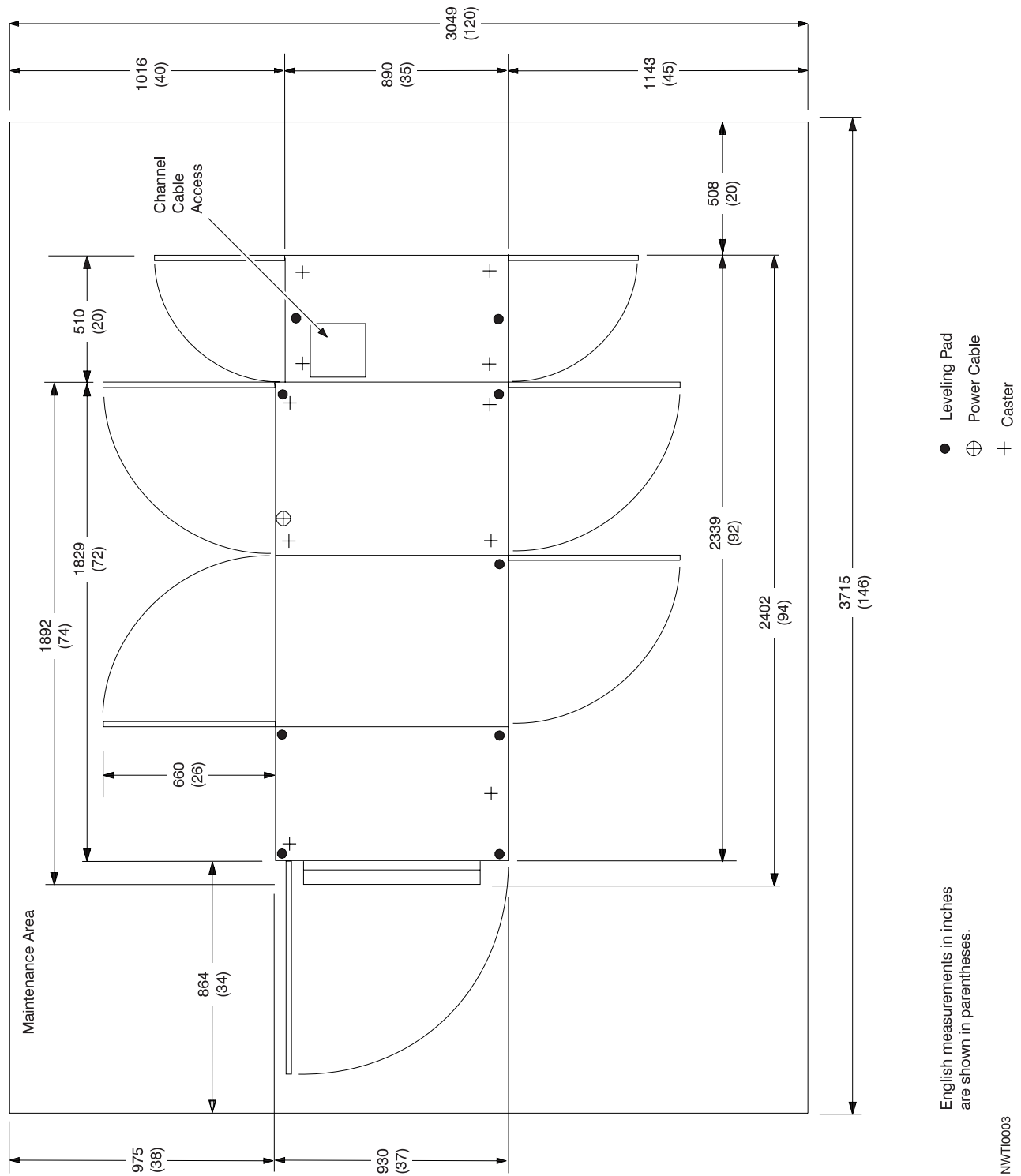
Figure 13. Dimensions, Service Clearance, Power cable, and Cable Locations—Models 0W1 and 0W3

Channel Cable Access

Leveling Pad
Power Cable
Caster

English measurements in inches
are shown in parentheses.

Maintenance Area

3049 (120)
1016 (40)
890 (35)
1143 (45)
508 (20)
510 (20)
1829 (72)
1892 (74)
2339 (92)
2402 (94)
3715 (146)
660 (26)
864 (34)
975 (38)
930 (37)

NWTI0003

Space Requirements – Duplex Models

The dimensions of the Duplex Printing System and the Buffer/Flipper Unit **1** , the optimum separation of the units, the service clearance around the allowable configurations of these units, and the power cable and channel cable locations are shown in Figure 14 on page 66 and Figure 13 on page 64 for Models D01/D02 and DW1/DW2, in Figure 16 on page 68 and Figure 17 on page 69 for Models DR1/DR2, ID1/ID2, and IR1/IR2, and Figure 18 on page 70 and Figure 19 on page 71 for Models ID3/ID4.

Notes:

1. The minimum size for Channel Cable Access opening is 200 x 200 mm (8 x 8 in.).
2. Models DW1/DW2 are shown. On Model D01 and Model D02, the depth of the printer is 890 mm (35 in.); all other dimensions and clearances are the same.
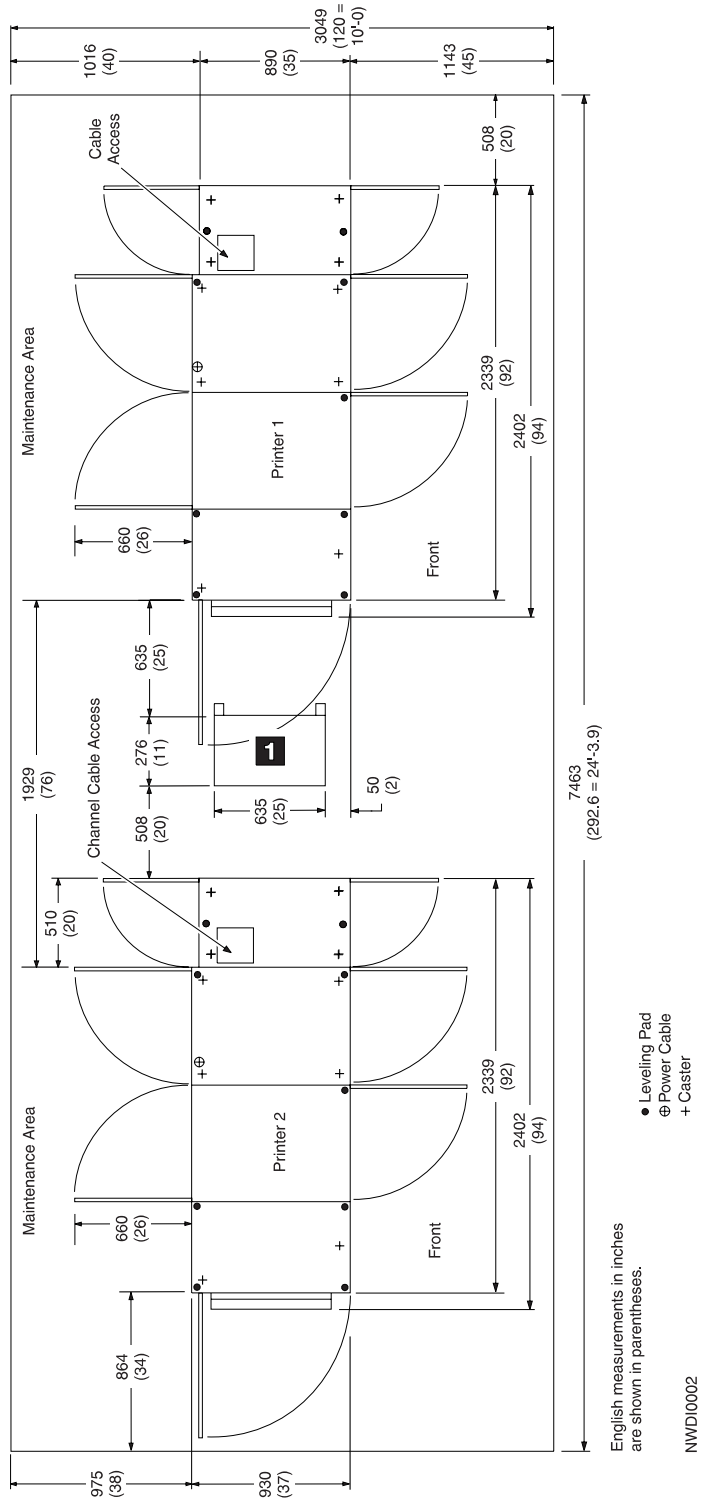
Figure 14. D01/D02 and DW1/DW2 Inline Configuration
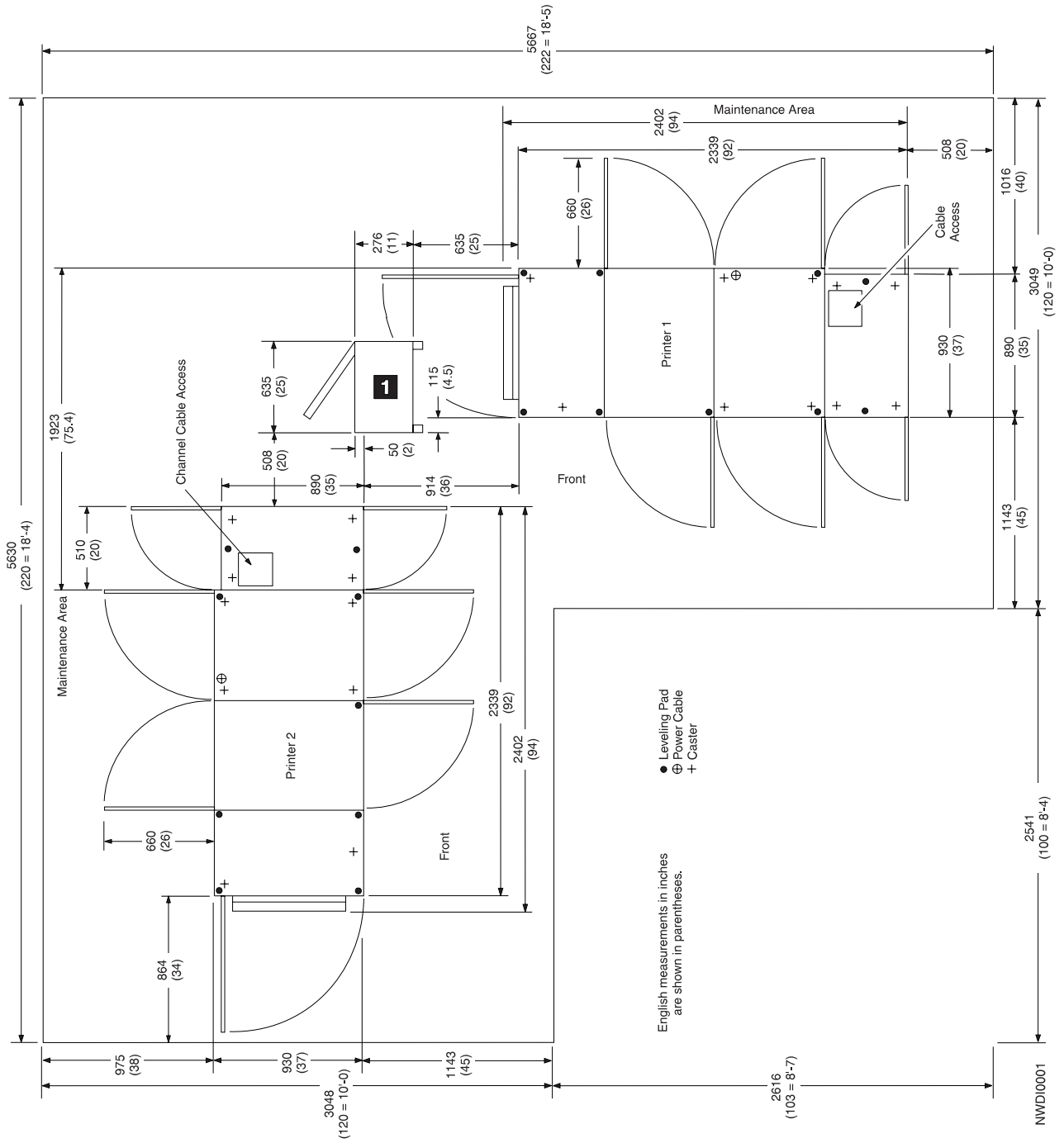
Figure 15. D01/D02 and DW1/DW2 Left Angle Configuration
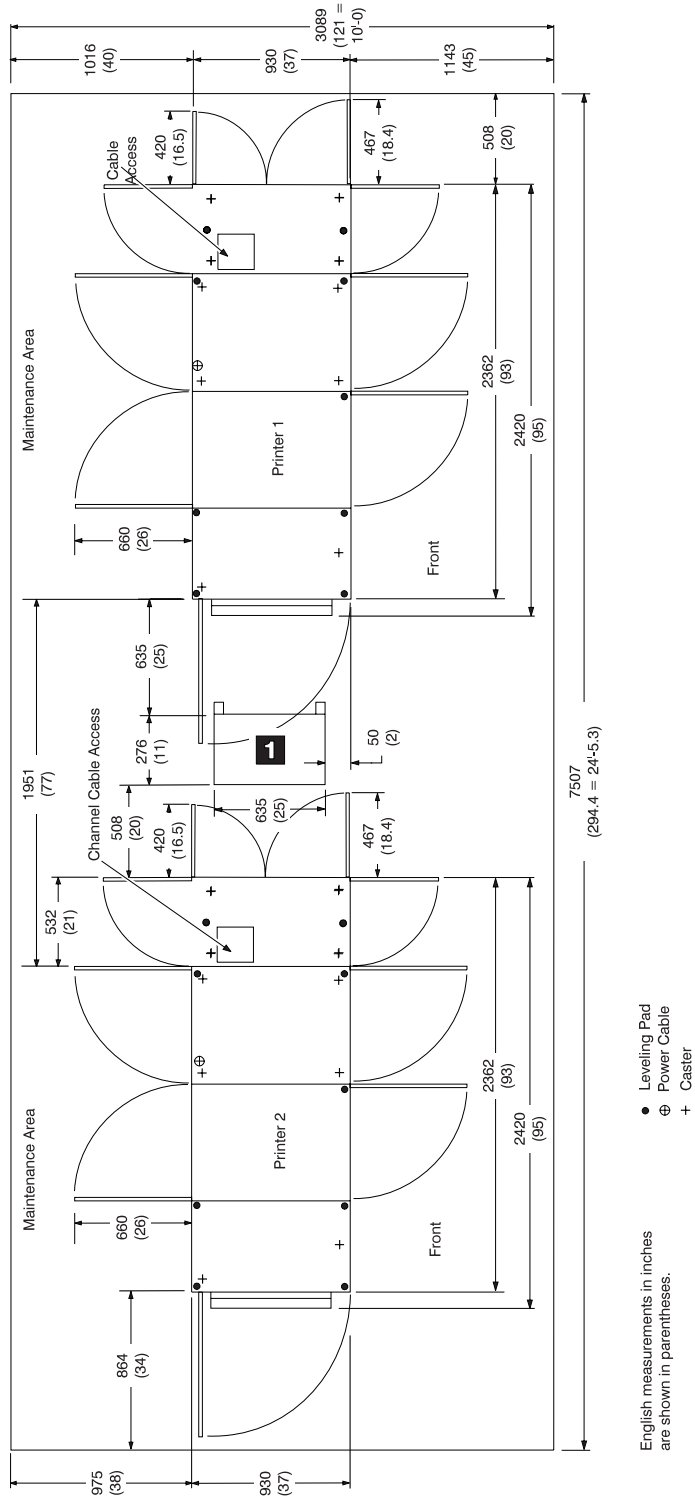
Figure 16. DR1/DR2, ID1/ID2, IR1/IR2, and IR3/IR4 Inline Configuration
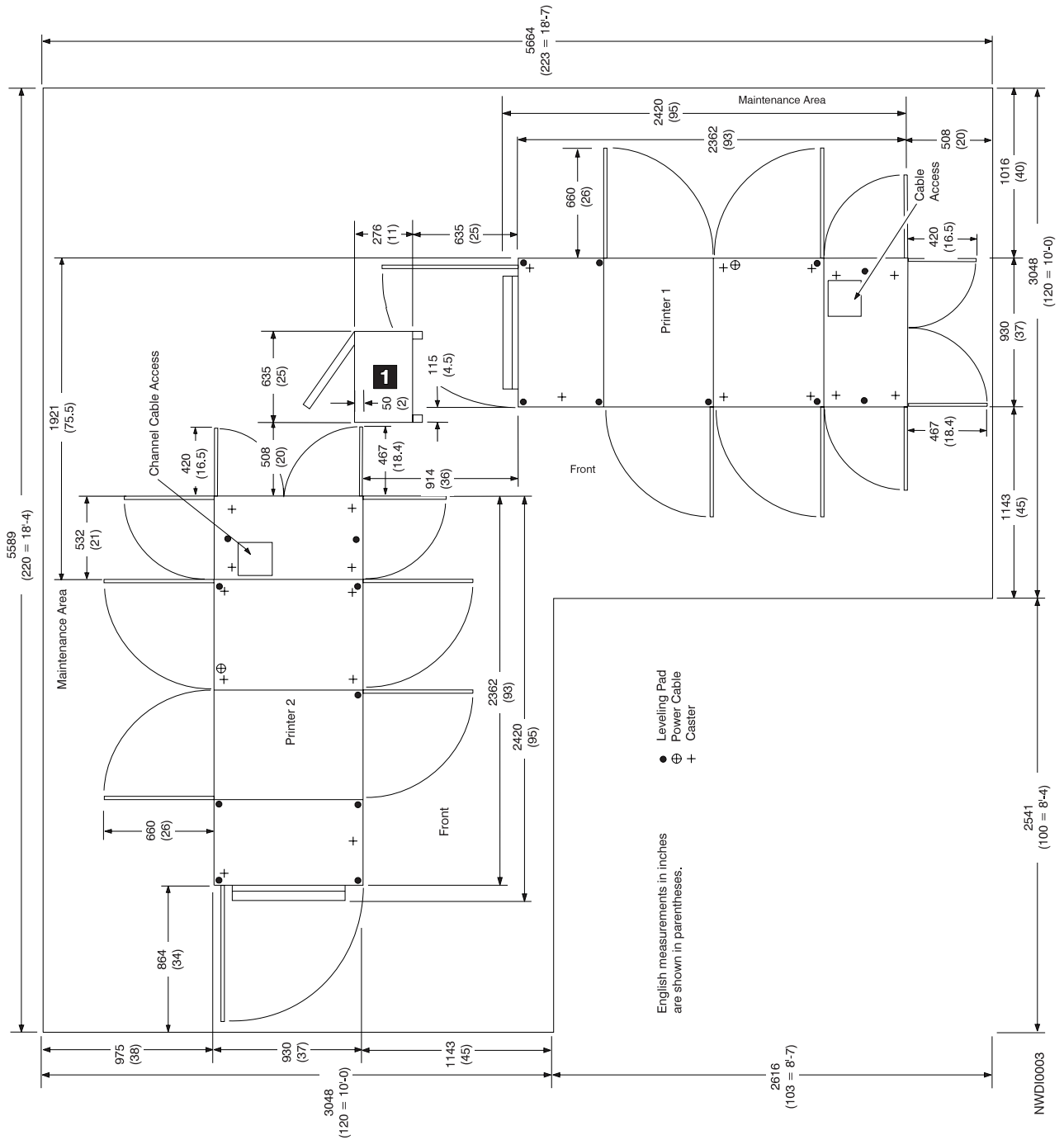
Figure 17. DR1/DR2, ID1/ID2, IR1/IR2, and IR3/IR4 Left Angle Configuration

Figure 18. ID3/ID4 Inline Configuration

Figure 19. ID3/ID4 Left Angle Configuration

Physical Layout

As you plan your physical layout, be sure to:

- Install the printer away from the main traffic pattern. Allow space for operators and service representatives to perform their tasks. This space should not extend into walkways.

- Install the printer in a location that is convenient for the operator. For example, consider whether the planned location is close to printer supply storage areas and to output distribution areas.
- Allow 210 cm (83 inches) between the floor and the lowest permanently attached object above the printer, such as a light or a cable rail. This layout gives printer operators and service representatives space in which to work.
- For the **simplex models** allow 116 cm (40 inches) between any outside surface of the printer and an adjacent wall to prevent ambient heat rise.
- For the **duplex models** allow 152 cm (60 inches) between any outside surface of the printer and an adjacent wall to prevent ambient heat rise. If the specified clearance cannot be achieved, see "Installation Requirements" on page 74.

Shipping Notes

As you plan for the arrival of the printer, note that:
- Each printer is shipped on two separate pallets: one pallet for the printer frame and a second pallet for the AFCCU (or PUM) frame. For sizes and weights, see Table 12 and Table 15 on page 73.

- In addition to the pallets, one or two additional cartons are shipped with the printer. These cartons contain options and miscellaneous hardware necessary to install the printer.
- Check the route that the printers must travel from your loading dock to the location where they will be installed to ensure that they fit through the doorways and halls. The printers are **wider than a standard doorway.**
- Use the Physical Planning template, GX22-7140 for service clearances and raised floor cutouts.

Physical Dimensions

The dimensions of the printer frames, control units, Buffer/Flipper Unit are shown in Table 12, Table 13, and Table 14 on page 73.

Table 12. Approximate Frame Physical Dimensions and Weights Uncrated – 3900 Models D01/D02 and DW1/DW2

Dimension	Print Engine	PUM	AFCCU	Buffer/Flipper Unit
Depth[1]	890 mm (35 in.)	890 mm (35 in.)	930 mm (37 in.)	635 mm (25 in.)
Height	1500 mm (59 in.)	1500 mm (59 in.)	1500 mm (59 in.)	838 mm (33 in.)
Length	1828–1892 mm (72–74 in.)[2]	510 mm (20 in.)	510 mm (20 in.)	276 mm (11 in.)
Weight	948 kg (2077 lb)	107 kg (236 lb)	156 kg (340 lb)	16 kg (36 lb)

Notes:

1. The printers are wider than a standard doorway.
2. The longer dimension is with the stacker table extended.

Table 13. Approximate Frame Physical Dimensions and Weights Uncrated – All InfoPrint 4000 Models *except* ID3/ID4

Dimension	Print Engine	PUM	AFCCU	Buffer/Flipper Unit
Depth[1]	930 mm (37 in.)	930 mm (37 in.)	930 mm (37 in.)	635 mm (25 in.)
Height	1500 mm (59 in.)	1500 mm (59 in.)	1500 mm (59 in.)	838 mm (33 in.)
Length	1828–1892 mm (72–74 in.)[2]	532 mm (21 in.)	532 mm (21 in.)	276 mm (11 in.)
Weight	948 kg (2077 lb)	107 kg (236 lb)	156 kg (340 lb)	16 kg (36 lb)

Table 13. Approximate Frame Physical Dimensions and Weights Uncrated – All InfoPrint 4000 Models *except* ID3/ID4 (continued)

Dimension	Print Engine	PUM	AFCCU	Buffer/Flipper Unit
Notes:				
1. The printers are wider than a standard doorway.				
2. The longer dimension is with the stacker table extended.				

Table 14. Approximate Frame Physical Dimensions and Weights Uncrated – InfoPrint 4000 Models ID3/ID4

Dimension	Print Engine	PUM	AFCCU	Buffer/Flipper Unit
Depth[1]	930 mm (37 in.)	930 mm (37 in.)	930 mm (37 in.)	635 mm (25 in.)
Height	1500 mm (59 in.)	1500 mm (59 in.)	1500 mm (59 in.)	1600 mm (63 in.)
Length	1828–1892 mm (72–74 in.)[2]	532 mm (21 in.)	532 mm (21 in.)	276 mm (11 in.)
Weight	989 kg (2175 lb)	112 kg (246 lb)	153 kg (335 lb)	32 kg (70 lb)
Notes:				
1. The printers are wider than a standard doorway.				
2. The longer dimension is with the stacker table extended.				

Table 15. Printer Frame Physical Dimensions When Crated

Dimension	Simplex Models	Duplex Models
Depth	1080 mm (42.5 in.)	1118 mm (44 in.)
Height	1715 mm (67.5 in.)	1930 mm (76 in.)
Length	2007 mm (79.5 in.)	2032 mm (80 in.)
Weight	1066 kg (2350 lb)	1111 kg (2450 lb)

Physical Attachment Requirements

The system programmer, the IBM installation planning representative, and the physical planner plan the channel-cable route between the controlling computers and the printer.

- For System/370 Parallel Channels — Refer to the *IBM General Information Manual: Installation Manual—Physical Planning*, GC22-7064, for definitions of the cable groups and maximum cable lengths for the printer.

- For ESCON Channels — Refer to *Planning for Enterprise Systems Connections*, GA23-0367, for definitions of the cable groups and the maximum cable lengths for the printer.

- For Token Ring LANs, refer to *IBM Cabling System Technical Interface*, GA27-3773, for cabling information.

- For Ethernet, cabling must meet specifications in *ANSI/IEEE Standard 802.3a, b, c, and e*

- For FDDI, cabling must meet specifications in *IBM Cabling System Optical Fiber Planning and Installation Guide*, GA27-3943.

When you order your printer, also order cables for the System/370 channel, ESCON channel, Token Ring, FDDI, or Ethernet, plus any channel extenders, converters, directors, switching boxes, terminators, or multi-station access units required in the interface. System/370 channel cables for 3800 printers also operate with InfoPrint 4000 and 3900 printers.

Note: There are data transfer rate restrictions (if running in 3.4 or 4.5MB/sec data streaming) when using certain types of 3800 printer channel cables. See your IBM marketing representative for additional information.

Installation Requirements

A service representative installs the printer. However, you are responsible for the following pre-installation tasks:

- Ensure that the environmental, electrical, and space requirements specified in this chapter are met. Use the "Installation Planning Work Sheet" on page 75 to complete this step.

- **With a Duplex Configuration**, if the 60-inch distance between the printer and an adjacent wall cannot be achieved, install air blowers to circulate air between the printer and the wall.

- Work with your IBM marketing representative to ensure that a forklift and forklift operator are available at delivery to remove the printer from its shipping pallet.

  After the printer is removed from the shipping pallet, you can move it on its own casters to the desired location.

  Note: As soon as possible after your printer arrives, unpack it and check for external damage. If the covers are broken, bent, or scratched, work with the shipping contractor and your IBM marketing representative to resolve the problem.

- Inspect the receiving area and the areas through which the printer must be moved. Ensure that no obstacles interfere with moving the printer to its planned location. Consider the following:

  - The forklift needs space in which to operate.

  - Halls and doorways must be large enough for the printer to pass through (see Table 12 on page 72).

  - Hall corners and angles must be large enough to permit the printer to turn.

  - Ramps must have no more than a 13° incline.

  - Elevators and elevator doorways must be able to accommodate the size and weight of the printer and the people who are moving it.

  - Stairs, door sills, floor gaps, and carpeting can make it impossible to roll the printer.

- Ensure that the floor is level within ±1°.

- Ensure that the correct attachment cables and hardware are available for System/370 channels, or ESCON channels, or Ethernet LANs, or Token Ring LANs, or FDDI LANs.

- Ensure that approved electrical outlets with correct power are reserved for the printer, and that they can be reached with the power cables. The approximate locations of the printer power cable and the channel cable areas are shown in Figure 12 on page 63 for simplex printers and in Figure 14 on page 66 for duplex configurations.

- If you are installing the printer on a raised floor, ensure that the access holes in the raised floor are large enough for both the channel cable and the power cable, and ensure that the raised floor panels under the right side (developer side) of the printer are vented (perforated with holes) to prevent internal heat rise.

Installation Planning Work Sheet

Before your printer is delivered, prepare a site installation plan. Use the following worksheet to ensure that all of the pre-installation requirements are met.

Table 16. InfoPrint 4000 and 3900 Advanced Function Printers Installation Planning Work Sheet

Requirements	Meets Requirements:	Needs Attention:	Assigned to:	Date Due:	Date Completed:
Environmental					
Ventilation					
Temperature					
Relative Humidity					
Space					
Layout					
Storage space for supplies					
Clearances					
Delivery rout					
Electrical					
Outlets:					
Can be reached by cables?					
Correctly grounded?					
Meet local and national codes?					
Building branch circuit:					
Correctly grounded?					
Enough power to meet needs?					
Meets local and national codes?					
Host System Attachment					
System/370 channel cables					
ESCON channel cables					
Ethernet cables and connectors					
Token Ring cables and connectors					
DR1/DR2 Print on Demand (POD) server and cables					
FDDI cables and connectors					
Security					

Physical Planning Work Sheet

The physical planner:

- Identifies the location for the printer when the system is ordered
- Plans the electrical wiring and outlet requirements

- Schedules installing and testing of the electrical wiring and outlets before the printer arrives.

Use Table 17 as a work sheet when preparing the site for the printer.

Table 17. InfoPrint 4000 and 3900 Advanced Function Printers Physical Planning Work Sheet

Weeks before Delivery	Task	Assigned to:	Scheduled Completion Date:
15	1. Identify the location for the printer and arrange for any necessary changes to the site. 2. Identify a delivery route to the location of the printer. 3. Prepare a layout plan. 4. Determine the requirements for electrical outlets.	_____ _____ _____ _____	_____ _____ _____ _____
10	1. Install and test the electrical wiring and outlets. 2. Verify that a forklift and operator will be available when the printer arrives.	_____ _____	_____ _____
Arrival	1. Unpack the printer and inspect it for external damage. 2. Move the printer to the prepared site.	_____ _____	_____ _____

Chapter 6. Configuring the Simplex Models

> **Chapter Overview**
>
> This chapter contains worksheets on which you can record your configuration choices for a Simplex Printing System. Fill in a copy of these work sheets and give a copy of the completed form to the service representative when the printer is installed.

You can specify some configurations within the printer and some characteristics of its function. For example, you can select the language in which messages will be displayed. These options are known as *configuration information*.

The printer AFCCU needs to know all of the current configuration information in order to operate the system accurately. Initially, the service representative sets configuration options when the printer is installed. You can change any of the configuration options later if the physical configuration changes or if the operating characteristics change.

Your printers Operator's Guide explains in detail the procedures for changing these configuration options.

You can change all configuration information by using the operator console display windows.

Configuration Work Sheet for Simplex Models

Record your configuration choices on this work sheet, and give a copy of the completed form to the service representative when the printer is being installed. See "Chapter 9. Configuration Information Descriptions" on page 99 for detailed information about each item.

Note: This chapter applies only to simplex printers. This chapter does not apply to duplex printers that are operating in dual simplex mode.

Table 18. Configuration Work Sheet – Simplex Models

Item	Available Values	Selected Value
MESSAGE DISPLAY LANGUAGE:	• US English • Spanish • French • German • Japanese • Italian • Brazilian Portuguese • Chinese Simplified • Chinese Traditional	
CONFIGURE PRINTER:		
Autostart	Yes / No	
PQE boldness	15% to 85% **Note:** CE can set PQE boldness from 0% to 100% from the CE Diagnotics.	
Print counter	(CE Change Only) 0 to 2 000 000 000	N/A
Printhead resolution (not all values are supported on all printers)	240, 300 DPI	
Jam recovery type	• Use Normal Jam Repositioning • Suppress MICR Jam Repositioning • Suppress All Jam Repositioning	
Font usage	Low / Medium / High	
Page segment usage	Low / Medium / High	
Overlay usage	Low / Medium / High	
Overlay cache	Yes / No	
Input buffer size	Low / Medium / High	
Output buffer size	Low / Medium / High	
Direct attach	Yes / No	
NPRO length	0 to 1200 inches	
Auto NPRO at EOF	Yes / No	
Jam recovery point distance	0 to 500 inches	

Line mode enabled (In 240 DPI mode only) If line mode is set to YES, these items appear:
  Default lines per inch
  Pages with job separator mark
	Yes / No
	
	6 / 8 / 10 / 12
	1 – 9	

Logical page increment	0 to 20 pels	
Mark forms on more than one page	Yes / No	
Clear memory for security	Yes / No	
Screen saver timeout	0 to 60 minutes	
Alarm suppression	Yes / No	
Fuser inactivity timer	0 to 9 hours	

Table 18. Configuration Work Sheet – Simplex Models (continued)

Item	Available Values	Selected Value
Eject to front facing enabled	Yes / No	
Form definition order	Yes / No	
Stacker enabled	Yes / No	
Cut sheet emulation	None Normal Left-to-Right Normal Right-to-Left Inverted Left-to-Right Inverted Right-to-Left	
BTS installed	Yes / No	
BTS enabled	Yes / No	
Offsetter installed	Yes / No	
Offsetter enabled	Yes / No	
Offset on mark forms	Yes / No	
3130 bar code compatibility	Yes / No	
Printer preheat temperature	45 – 100 in increments of 5	
Scan factory adjust	(CE Change Only)	N/A
Process factory adjust	(CE Change Only)	N/A
Beam 1 offset adjustment (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9	N/A
Beam 2 offset adjustment (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9	N/A
Beam 3 offset adjustment (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9	N/A
Beam 4 offset adjustment (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9	N/A
Beam 5 offset adjustment (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9	N/A
Machine sequence	(CE Change Only)	N/A
Manufacturing plant	(CE Change Only)	N/A
Date and time	(CE Change Only)	N/A
HOST ATTACHMENTS CONFIGURATION:		
Parallel Channel		
Parallel link A installed	Yes / No	
Parallel link B installed	Yes / No	
Device address	00 to FF (hexadecimal)	
Second channel	Static / Dynamic	
Data transfer protocol	Interlocked / Data Streaming	
Data streaming rate	MCA bus: 1.9/2.7/3.4/4.5 MB/sec PCI bus: 3.0/4.5 MB/sec	
Card 1 position	2 / 4 / Not Installed	Automatically set at power on, cannot be changed.
Card 2 position	2 / 4 / Not Installed	Automatically set at power on, cannot be changed.

Table 18. Configuration Work Sheet – Simplex Models (continued)

Item	Available Values	Selected Value
ESCON Channel:		
ESCON link A installed	Yes / No	
ESCON link B installed	Yes / No	
Device address	00 to FF (Hexadecimal)	
Multi-host environment flag	True / False	
Card 1 position	2 / 4 / Not Installed	Automatically set at power on, cannot be changed.
Card 2 position	2 / 4 / Not Installed	Automatically set at power on, cannot be changed.
Token Ring TCP/IP Configuration:		
Installed	Yes / No	
TCP port	5001 to 65536	
IP address	X.X.X.X where X ≤ 255	
Subnet mask	X.X.X.X where X ≤ 255	
Default gateway address	X.X.X.X where X ≤ 255	
MTU size	60 to 4096	
Hardware address	cannot be changed	
Alternate address	X'0' to X'FFFFFFFFFFFF'	
Ring speed	4 or 16	
Confine broadcast	Yes / No	
Ethernet TCP/IP Configuration		
Installed	Yes / No	
TCP port	5001 to 65536	
IP address	X.X.X.X where X ≤ 255	
Subnet mask	X.X.X.X where X ≤ 255	
Default gateway address	X.X.X.X where X ≤ 255	
Standard MTU size	60 to 1500	
IEEE8023 MTU size	60 to 1492	
Ethernet type	Standard or IEEE8023	
Hardware address	cannot be changed	
Alternate address	X'0' to X'FFFFFFFFFFFF'	
Cable type (For MCA card only. Not available for PCI card.)	10Base2 or 10Base5	
Media Speed	Auto negotiate Speed and Duplex Mode 10 Mbit Half Duplex 10 Mbit Full Duplex 100 Mbit Half Duplex 100 Mbit Full Duplex	
FDDI TCP/IP Configuration:		
Installed	Yes / No	
TCP port	5001 to 65536	

Table 18. Configuration Work Sheet – Simplex Models (continued)

Item	Available Values	Selected Value
IP address	X.X.X.X where X ≤ 255	
Subnet mask	X.X.X.X where X ≤ 255	
Default gateway address	X.X.X.X where X ≤ 255	
MTU size	60 to 4096	
Hardware address	cannot be changed	
Alternate address	X'0' to X'FFFFFFFFFFFF'	
Ring speed	4 or 16	
Confine broadcast	Yes / No	
PRE-PROCESSING/POST-PROCESSING INTERFACE CONFIGURATIONS:		
DEVICE number_____		
Port number	1 / 2 / 3	
Enabled	Yes / No	
Name	1 to 12 alphanumeric characters (including spaces)	
Type	• Coupled Preprocessor • Coupled Postprocessor • Advanced Postprocessor - MICR • Advanced Postprocessor - SMM (Select Medium Modification) • Spot-color Postprocessor	
Characteristics		
Pre/Postprocessor extended NPRO:	0 to 800 inches	
Pre/Postprocessor busy timer:	1 to 999 seconds	
Postprocessor tag type:	• Coupled • RSI Compatible	
Distance to postprocessor	• 24 to 800 inches • 24 to 1200 inches	
Postprocessor error page stop	0 to 50 pages	
Postprocessor verify alignment page stop	0 to 5000 pages	
Pre/Postprocessor baud rate in Kbps	19.2 or 62.5	
Color side	• Color on front	
DEVICE number_____		
Port number	1 / 2 / 3	
Enabled	Yes / No	
Name	1 to 12 alphanumeric characters (including spaces)	

Table 18. Configuration Work Sheet – Simplex Models (continued)

Item	Available Values	Selected Value
Type	• Coupled Preprocessor • Coupled Postprocessor • Advanced Postprocessor - MICR • Advanced Postprocessor - SMM (Select Medium Modification) • Spot-color Postprocessor	
Characteristics:		
Pre/Postprocessor extended NPRO:	0 to 800 inches	
Pre/Postprocessor busy timer:	1 to 999 seconds	
Postprocessor tag type:	• Coupled • RSI Compatible • Advanced	
Distance to postprocessor	• 24 to 800 inches • 24 to 1200 inches	
Postprocessor error page stop	0 to 50 pages	
Postprocessor verify alignment page stop	0 to 5000 pages	
Pre/Postprocessor baud rate in Kbps	19.2 or 62.5	
Color side	• Color on front	
DEVICE number_____		
Port number	1 / 2 / 3	
Enabled	Yes / No	
Name	1 to 12 alphanumeric characters (including spaces)	
Type	• Coupled Preprocessor • Coupled Postprocessor • Advanced Postprocessor - MICR • Advanced Postprocessor - SMM (Select Medium Modification) • Spot-color Postprocessor	
Characteristics:		
Pre/Postprocessor extended NPRO:	0 to 800 inches	
Pre/Postprocessor nusy timer:	1 to 999 seconds	
Postprocessor tag type:	• Coupled • RSI Compatible	
Distance to postprocessor	• 24 to 800 inches • 24 to 1200 inches	
Postprocessor error page stop	0 to 50 pages	
Postprocessor verify alignment page stop	0 to 5000 pages	
Pre/Postprocessor baud rate in Kbps	19.2 or 62.5	
Color side	• Color on front	
DEVICE number_____		

Table 18. Configuration Work Sheet – Simplex Models (continued)

Item	Available Values	Selected Value
Port number	1 / 2 / 3	
Enabled	Yes / No	
Name	1 to 12 alphanumeric characters (including spaces)	
Type	• Coupled Preprocessor • Coupled Postprocessor • Advanced Postprocessor - MICR • Advanced Postprocessor - SMM (Select Medium Modification) • Spot-color Postprocessor	
Characteristics:		
Pre/Postprocessor extended NPRO:	0 to 800 inches	
Pre/Postprocessor busy timer:	1 to 999 seconds	
Postprocessor tag type:	• Coupled • RSI Compatible	
Distance to postprocessor	• 24 to 800 inches • 24 to 1200 inches	
Postprocessor error page stop	0 to 50 pages	
Postprocessor verify alignment page stop	0 to 5000 pages	
Pre/Postprocessor baud rate in Kbps	19.2 or 62.5	
Color side	• Color on front	

Chapter 7. Configuring the Duplex Models

> **Chapter Overview**
>
> This chapter contains worksheets on which you can record your configuration choices for a Duplex Printing System. Fill in a copy of these work sheets and give a copy of the completed form to the service representative when the printer is installed.

You can specify some configurations within the printer and some characteristics of its function. For example, you can select the language in which messages will be displayed. These options are known as *configuration information.*

The printer AFCCU needs to know all of the current configuration information to operate the system accurately. Initially, the service representative sets configuration options when the printer is installed. You can change any of the configuration options later if the physical configuration changes or if the operating characteristics change.

The Operator's Guide for the printer explains in detail the procedures for changing these configuration options.

You can change all configuration information by using the operator console display windows.

Configuration Work Sheet for Duplex Models

Record your configuration choices on this work sheet, and give a copy of the completed form to the service representative when the printer is being installed. See "Chapter 9. Configuration Information Descriptions" on page 99 for detailed information about each item.

Table 19. Configuration Work Sheet – Duplex Models

Item	Available Values	Selected Values		
		Duplex	Simplex	
			Printer 1	Printer 2
MESSAGE DISPLAY LANGUAGE:	• US English • Spanish • French • German • Japanese • Italian • Brazilian Portuguese • Chinese Simplified • Chinese Traditional			
PRINTER CONFIGURATION:				
POD mode (Print on Demand) (for Models IR1/IR2 only)	Yes / No		N/A	N/A
Printer mode	Duplex / Simplex			
Autostart	Yes / No			
PQE boldness for printer 1	15% to 85% **Note:** CE can set PQE boldness from 0% to 100% from the CE Diagnotics.			
PQE boldness for printer 2	15% to 85% **Note:** CE can set PQE boldness from 0% to 100% from the CE Diagnotics.			
Printer 1 counter	(CE Change Only) 0 to 2 000 000 000			N/A
Printer 2 counter	(CE Change Only) 0 to 2 000 000 000		N/A	

Printhead resolution (not all values are supported on all printers) Depending on the value selected, these items appear:
  IPDS resolution
  Font enhancement (single-byte font / double-byte font)
	240, 300, 480, 600 DPI
	
	Automatic, 240, 300, 600 DPI
	Yes / No			

Jam recovery type	• Use Normal Jam Repositioning • Suppress MICR Jam Repositioning • Suppress All Jam Repositioning			
Font usage	Low / Medium / High			
Page segment usage	Low / Medium / High			
Overlay usage	Low / Medium / High			
Overlay cache	Yes / No			
Input buffer size	Low / Medium / High			

Table 19. Configuration Work Sheet – Duplex Models (continued)

Item	Available Values	Selected Values		
		Duplex	Simplex	
			Printer 1	Printer 2
Output buffer size	Low / Medium / High			
Direct attach	Yes / No			
NPRO length	0 to 1200 inches			
Auto NPRO at EOF	Yes / No			
Jam recovery point distance	0 to 500 inches			
Form feed length (duplex mode only)	17 to 250 inches		N/A	N/A
Length of forms between transfer points (duplex mode only)	150 to 800 inches		N/A	N/A
Front sheet sequence (duplex mode only)	Front First / Front Second		N/A	N/A
Verification marks (duplex mode only)	Automatically selected when in duplex mode. Cannot be changed.	N/A	N/A	N/A
Logical page increment	0 to 20 pels			
Clear memory for security	Yes / No			
Screen saver timeout	0 to 60 minutes			
Alarm suppression	Yes / No			
Fuser inactivity timer	0 to 9 hours			
Eject to front facing enabled	Yes / No			
Form definition order	Yes / No			
Stacker enabled	Yes / No			
Cut sheet emulation	None Normal Left-to-Right Normal Right-to-Left Inverted Left-to-Right Inverted Right-to-Left			
BTS installed	Yes / No			
BTS enabled	Yes / No			
Offsetter installed	Yes / No			
Offsetter enabled	Yes / No			
Offset on mark forms	Yes / No			
3130 bar code compatibility	Yes / No			
Printer 1 preheat temperature	45 – 100 in increments of 5			
Printer 2 preheat temperature	45 – 100 in increments of 5			
Scan factory adjust for Printer 1	(CE Change Only)	N/A	N/A	N/A
Process factory adjust for Printer 1	(CE Change Only)	N/A	N/A	N/A
Scan factory adjust for Printer 2	(CE Change Only)	N/A	N/A	N/A
Process factory adjust for Printer 2	(CE Change Only)	N/A	N/A	N/A

Table 19. Configuration Work Sheet – Duplex Models (continued)

Item	Available Values	Selected Values		
		Duplex	Simplex	
			Printer 1	Printer 2
Beam 1 offset adjustment for Printer 1 (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9			
Beam 2 offset adjustment for Printer 1 (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9			
Beam 3 offset adjustment for Printer 1 (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9			
Beam 4 offset adjustment for Printer 1 (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9			
Beam 5 offset adjustment for Printer 1 (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9			
Beam 1 offset adjustment for Printer 2 (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9			
Beam 2 offset adjustment for Printer 2 (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9			
Beam 3 offset adjustment for Printer 2 (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9			
Beam 4 offset adjustment for Printer 2 (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9			
Beam 5 offset adjustment for Printer 2 (only for printers with multi-beam printheads)	(CE Change Only) 0.0 to 15.9			
Machine sequence for Printer 1	(CE change on initial configuration only)	N/A	N/A	N/A
Manufacturing plant for Printer 1	(CE change on initial configuration only)	N/A	N/A	N/A
Machine sequence for Printer 2	(CE change on initial configuration only)	N/A	N/A	N/A
Manufacturing plant for Printer 2	(CE change on initial configuration only)	N/A	N/A	N/A
Date and time	(CE Change Only)	N/A	N/A	N/A
HOST ATTACHMENTS CONFIGURATION:				
Parallel Channel Attachment:				
Parallel link A installed	Yes / No			
Parallel link B installed	Yes / No			
Device address	00 to FF			
Second channel	Static / Dynamic			

Table 19. Configuration Work Sheet – Duplex Models (continued)

Item	Available Values	Selected Values		
		Duplex	Simplex	
			Printer 1	Printer 2
Data transfer protocol	Interlocked / Data Streaming			
Data streaming rate	MCA Bus: 1.9 / 2.7 / 3.4 / 4.5 MB/sec PCI Bus: 3.0 / 4.5 MB/sec			
Card 1 position	2 / 4 /Not Installed	N/A	N/A	N/A
Card 2 position	2 / 4 /Not Installed	N/A	N/A	N/A
ESCON Channel:				
ESCON link A installed	Yes / No			
ESCON link B installed	Yes / No			
Device address	00 to FF			
Multi-host environment flag	True / False			
Card 1 position	2 / 4 / Not Installed	N/A	N/A	N/A
Card 2 position	2 / 4 / Not Installed	N/A	N/A	N/A
Token Ring TCP/IP Configuration:				
Installed	Yes / No			
TCP port	5001 to 65536			
IP address	X.X.X.X where X ≤ 255			Match Printer 1
Subnet mask	X.X.X.X where X ≤ 255			Match Printer 1
Default gateway address	X.X.X.X where X ≤ 255			Match Printer 1
MTU size	60 to 4096			
Hardware address	cannot be changed			
Alternate address	X'0' to X'FFFFFFFFFFFF'			
Ring speed	4 or 16			
Confine broadcast	Yes / No			
Ethernet TCP/IP Configuration:				
Installed	Yes / No			
TCP port	5001 to 65536			
IP address	X.X.X.X where X ≤ 255			Match Printer 1
Subnet mask	X.X.X.X where X ≤ 255			Match Printer 1
Default gateway address	X.X.X.X where X ≤ 255			Match Printer 1
Standard MTU size	60 to 1500			
IEEE8023 MTU size	60 to 1492			
Ethernet type	Standard or IEEE8023			
Hardware address	cannot be changed			

Table 19. Configuration Work Sheet – Duplex Models (continued)

Item	Available Values	Selected Values		
		Duplex	Simplex	
			Printer 1	Printer 2
Alternate address	X'0' to X'FFFFFFFFFFFF'			
Cable type (For MCA card only. Not applicable to PCI card.)	10Base2 or 10Base5			
Media Speed	Auto negotiate Speed and Duplex Mode 10 Mbit Half Duplex 10 Mbit Full Duplex 100 Mbit Half Duplex 100 Mbit Full Duplex			
FDDI TCP/IP Configuration:				
Installed	Yes / No			
TCP port	5001 to 65536			
IP address	X.X.X.X where X ≤ 255			Match Printer 1
Subnet mask	X.X.X.X where X ≤ 255			Match Printer 1
Default gateway address	X.X.X.X where X ≤ 255			Match Printer 1
MTU size	256 to 4352			
Hardware address	cannot be changed			
Alternate address	X'0' to X'FFFFFFFFFFFF'			
Confine broadcast	Yes / No			
PRE-PROCESSING/POST-PROCESSING INTERFACE CONFIGURATIONS:				
DEVICE Number_____				
Printer number	1 / 2		N/A	N/A
Port number	1 / 2 / 3			
Enabled	Yes / No			
Name	1-12 alphanumeric characters (including spaces)			
Type	• Coupled Preprocessor • Coupled Postprocessor • Advanced Postprocessor - MICR • Advanced Postprocessor - SMM (Select Medium Modification) • Spot-color Postprocessor			
Characteristics:				
Pre/postprocessor extended NPRO:	0 to 800 inches			
Pre/postprocessor bsy timer:	1 to 999 seconds			

Table 19. Configuration Work Sheet – Duplex Models (continued)

Item	Available Values	Selected Values		
		Duplex	Simplex	
			Printer 1	Printer 2
Postprocessor tag type:	• Coupled • RSI Compatible			
Distance to postprocessor	• 24 to 800 inches • 24 to 1200 inches			
Postprocessor error page stop	0 to 50 pages			
Postprocessor verify alignment page stop	0 to 5000 pages			
Pre/postprocessor baud rate in Kbps	19.2 or 62.5			
Color side	• Color on front • Color on back			
DEVICE Number_____				
Printer number	1 / 2		N/A	N/A
Port number	1 / 2 / 3			
Enabled	Yes / No			
Name	1-12 alphanumeric characters (including spaces)			
Type	• Coupled Preprocessor • Coupled Postprocessor • Advanced Postprocessor - MICR • Advanced Postprocessor - SMM (Select Medium Modification) • Spot-color Postprocessor			
Characteristics:				
Pre/postprocessor extended NPRO:	0 to 800 inches			
Pre/postprocessor busy timer:	1 to 999 seconds			
Postprocessor tag type:	• Coupled • RSI Compatible • Advanced			
Distance to postprocessor	• 24 to 800 inches • 24 to 1200 inches			
Postprocessor error page stop	0 to 50 pages			
Postprocessor verify alignment page stop	0 to 5000 pages			
Pre/postprocessor baud rate in Kbps	19.2 or 62.5			
Color side	• Color on front • Color on back			

Table 19. Configuration Work Sheet – Duplex Models (continued)

Item	Available Values	Selected Values		
		Duplex	Simplex	
			Printer 1	Printer 2
DEVICE Number_____				
Printer number	1 / 2		N/A	N/A
Port number	1 / 2 / 3			
Enabled	Yes / No			
Name	1-12 alphanumeric characters (including spaces)			
Type	• Coupled Preprocessor • Coupled Postprocessor • Advanced Postprocessor - MICR • Advanced Postprocessor - SMM (Select Medium Modification) • Spot-color Postprocessor			
Characteristics:				
Pre/postprocessor extended NPRO:	0 to 800 inches			
Pre/postprocessor busy timer:	1 to 999 seconds			
Postprocessor tag type:	• Coupled • RSI Compatible • Advanced			
Distance to postprocessor	• 24 to 800 inches • 24 to 1200 inches			
Postprocessor error page stop	0 to 50 pages			
Postprocessor verify alignment page stop	0 to 5000 pages			
Pre/postprocessor baud rate in Kbps	19.2 or 62.5			
Color side	• Color on front • Color on back			
DEVICE Number_____				
Printer number	1 / 2		N/A	N/A
Port number	1 / 2 / 3			
Enabled	Yes / No			
Name	1-12 alphanumeric characters (including spaces)			

Table 19. Configuration Work Sheet – Duplex Models (continued)

Item	Available Values	Selected Values		
		Duplex	Simplex	
			Printer 1	Printer 2
Type	• Coupled Preprocessor • Coupled Postprocessor • Advanced Postprocessor - MICR • Advanced Postprocessor - SMM (Select Medium Modification) • Spot-color Postprocessor			
Characteristics:				
Pre/postprocessor extended NPRO:	0 to 800 inches			
Pre/postprocessor busy timer:	1 to 999 seconds			
Postprocessor tag type:	• Coupled • RSI Compatible • Advanced			
Distance to postprocessor	• 24 to 800 inches • 24 to 1200 inches			
Postprocessor error page stop	0 to 50 pages			
Postprocessor verify alignment page stop	0 to 5000 pages			
Pre/postprocessor baud rate in Kbps	19.2 or 62.5			
Color side	• Color on front • Color on back			

Chapter 8. Forms Identification Work Sheets

Chapter Overview

This chapter provides worksheets to record form identification names with their associated characteristics.

Use these sheets to record form identification names with their associated lengths, widths, description, and characteristics. You can define up to 1024 different forms on a simplex printer. On a **duplex system** you can define up to 3072 forms:

- 1024 in duplex mode
- 1024 for each printer in simplex mode.

If you are defining more than 22 forms, make copies of the tables before you fill them out.

You can also use these worksheets to make notes about loading techniques, **Forms Select** settings, adjust print values for both simplex and duplex, and other information you discover as you work with a particular form.

Form Identification Work Sheet

Table 20. Form Identification Work Sheet

Form Number	Definition	With This Value	Notes
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	

Form Identification Work Sheet

Table 21. Form Identification Work Sheet

Form Number	Definition	With This Value	Notes
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	
	Name Width (in millimeters or inches) Length (in millimeters or inches) Description	_____ _____ _____ _____	

Chapter 9. Configuration Information Descriptions

Chapter Overview

This chapter provides detailed information on the configuration choices.
Please note the tables contain information on all possible choices across the
various models. Not all entries are applicable to all models.

You can configure the printer in the categories of information described in the
following sections:

- "Changing the Language of Messages"
- "Configuring the Printer" on page 100
- "Configuring the Host Attachments" on page 107
- "Configuring Preprocessing or Postprocessing Devices or Interfaces" on page 116
- "Defining Forms" on page 118.

Changing the Language of Messages

- From the operator console:
  1. Open the **Options** pull-down menu.
  2. Select the **Change Language** procedure window.

This procedure changes the language used for all text within the operator console
windows, and, except for Japanese, on the printer operator panel display. When
you select Japanese, the printer operator panel displays U.S. English text.

Once you change the language, it remains in effect until changed again with this
procedure.

A selection list box changes available language choices. A scroll bar on the right
side of the box displays additional choices not shown in the box, and highlights
the current choice. The options are:

- U.S. English
- Spanish
- French
- German
- Japanese
- Italian
- Brazilian Portuguese
- Chinese Simplified
- Chinese Traditional.

Configuring the Printer

- From the operator console:
    1. Open the **Configure** pull-down menu.
    2. Select the **Configure Printer** procedure window.

Table 22 describes all configuration items, what each is used for, and the allowable value options for each item. The factory set default value options are <u>underlined</u> or separately specified.

Important! Table 22 lists all configuration items for all models of InfoPrint 4000 printers. Some items may be greyed out or not shown for your particular model of printer:

- Configuration items marked (D) appear only for Duplex systems.
- Configuration items marked (S) appear only for Simplex systems.
- Configuration items marked (POD) appear only for Models IR1/ID2.
- All unmarked items appear for both Duplex and Simplex systems.

Table 22. Printer Configuration Items

Configuration Item	Description	Value Options
Print on Demand mode (POD)	Enables the Print on Demand function of the Models IR1/IR2 and IR3/IR4 printers. If you change the POD Mode, the **Restart** procedure automatically executes a Shutdown procedure.	Yes or <u>No</u>
Printer mode (D)	This entry allows setting whether the duplex system is to be operated in duplex or simplex (dual-simplex) mode. (This item does not apply to Models DR1/DR2. This item does not apply to Models IR1/IR2 or IR3/IR4 when operating in POD mode.) If you change the Printer Mode, the **Restart** procedure automatically executes a Shutdown procedure.	<u>Duplex</u> or Simplex
Autostart	If Yes, all current attachment interface status (enabled/disabled) is saved during a **Shutdown** procedure, and automatically restored at the next power on of the system. Simplex and dual simplex printers are also automatically made Ready at the completion of the power on sequence. The Thread/Align forms procedure must be performed on duplex printers before the system can be made Ready.	Yes or <u>No</u>
PQE boldness for printer 1	This entry allows you to change the vector boldness. The boldness is expressed as a percentage of stroke width.	Range is: 15% to 85%. Default is 50. **Note:** CE can set PQE boldness from 0% to 100% from the CE Diagnotics.
PQE boldness for printer 2 (D)	See entry for printer 1.	See entry for printer 1.
Printer 1 counter	(CE Change Only) The Print Usage Count from the mechanical counter at the rear of the printer may be transferred to this counter, which will then become a new base count in the running "Printer 1 Counter" displayed in the **Printer Status** operator console window.	0 to 2 000 000 000

Table 22. Printer Configuration Items (continued)

Configuration Item	Description	Value Options
Printer 2 counter (D)	(CE Change Only) The Print Usage Count from the mechanical counter at the rear of the printer may be transferred to this counter, which will then become a new base count in the running "Printer 2 Counter" displayed in the **Printer Status** operator console window.	0 to 2 000 000 000
Printhead resolution	This parameter changes the resolution that the printhead in this printer uses. Not all values are supported on all printers.	Valid values are 240, 300, 480, and 600 DPI. The value you select depends on the model of printer that you have.
IPDS resolution	This parameter can only be set when a printhead resolution of 600 DPI is selected.	Automatic, 240, 300, or 600 DPI
Font enhancement	This parameter is used to activate or deactivate the edge smoothing algorithm for raster fonts. Set to No if edge smoothing is not desired.	<u>Yes</u> or No
Jam recovery type	This entry controls under what conditions the host system will automatically retransmit pages after a forms jam has been cleared. • Normal Jam Repositioning - All lost pages are automatically retransmitted and reprinted. • Suppress MICR Repositioning - Lost pages printed with a MICR printer will not be retransmitted. • Suppress All Jam Repositioning - No lost pages will be retransmitted. Any missing or damaged pages must be manually recovered.	• <u>Use Normal Jam Repositioning</u> • Suppress MICR Jam Repositioning • Suppress All Jam Repositioning
Font usage	Font usage allows you to select the amount of memory that the printer's control unit (computer) will use for font management. Select the font usage according to the type of print jobs you run. Select Low font usage for jobs using a normal number of fonts with normal point sizes, but not double-byte fonts. Medium font usage indicates an abnormal SBCS (single-byte character set) printing mode; select it for jobs using a large number of fonts or very large point sizes, but not double-byte fonts. High font usage is primarily for double-byte font jobs.	<u>Low</u>, Medium, or High
Page segment usage	This is used to allocate space for IPDS source for page segments and overlays. Set to Low if the size or number of page segments and overlays is a small. Set to High if the size or number of page segments and overlays is large.	Low, <u>Medium</u>, or High
Overlay usage	This parameter is used to allocate space for a cache of ready-to-print overlays. Set to Low if a few small overlays are used. Set to High if many or large overlays are used.	Low, <u>Medium</u>, or High
Overlay cache	This parameter is used to activate or deactivate overlay caching. Set to No if overlays are not reused multiple times or if overlays are not reused in the same location on subsequent pages.	<u>Yes</u> or No

Table 22. Printer Configuration Items (continued)

Configuration Item	Description	Value Options
Input buffer size	This parameter is used to allocate space for the IPDS data that was just received from the server before being processed by the control unit. Set to Low if pages contain little data or if printing from PSF/MVS on a S/370 channel or an ESCON channel (this is because of the frequent IPDS acknowledgment rate). Set to High if printing pages with large amounts of data (such as large images).	Low, Medium, or High
Output buffer size	This parameter is used to allocate space for ready-to-print pages, including pages between the transfer points of a continuous-forms, duplex printer. Set the value to Low if these conditions are met: • The pages contain little data • This is a simplex printer • This is a duplex printer with a distance between transfer points of less than 400 inches. Set the value to High if these conditions are met: • The pages contain large amounts of data, especially shaded areas • This is a duplex printer with a distance between transfer points of over 400 inches.	Low, Medium, or High
Direct attach	This entry shows if printing is to occur in direct-printing mode when connected to an MVS operating system, with no host-assisted recovery procedures such as retransmission of pages after a forms jam. The host system programmer will inform you whether this entry should be set to **Yes**.	Yes or No
NPRO length	This entry sets an *extra* length that is added to the fixed NPRO length to create a total distance that forms are moved through the printer. This entry can be used when an uncoupled (not functionally attached) post-processing device is installed and it is necessary to extend the NPRO length to be able to easily remove forms at the post-processing device output. If any installed and enabled pre/postprocessing devices have the "Pre/postprocessor Extended NPRO" distance of an enabled pre/postprocessor set to greater than zero, then that distance will take precedence over the "NPRO Length", even if the "NPRO Length" is longer. The "Pre/postprocessor Extended NPRO" distance is set in the **Configure Pre/Post** procedure. If several "Pre/postprocessor Extended NPRO" distances are set, then the longest one takes precedence.	Range of 0 to 1200 inches.
Auto NPRO at End of Forms	This entry indicates whether an automatic NPRO is performed when an End of Forms is detected.	Yes or No

Table 22. Printer Configuration Items (continued)

Configuration Item	Description	Value Options
Line mode enabled If line mode is set to Yes, these items appear: Default lines per inch Pages with job separator mark	Allows the printer to enter the 3800 compatibility mode (line mode). Whenever you change this setting, you must restart the printer. (This item applies only to simplex models and only when the printhead resolution is set to 240 DPI.)	Yes or No 6 / 8 / 10 / 12 range 1 to 9
Jam recovery point distance	This entry sets a distance past the printer fuser sufficient for forms to reach an installed post-processing device, so that those forms will be reprinted following a forms jam recovery. In duplex mode, this distance is measured past the fuser of Printer 2. In dual simplex mode, it is a distance past either Printer 1 or Printer 2. A non-zero value setting assumes that: a post-processing device is installed and enabled, the "Jam Recovery Type" configuration item setting above allows reprinting of pages, and the "Direct Attach" configuration item setting above is **No**.	Range of 0 to 500 inches.
Form feed length (D)	This entry sets the length, in inches, that forms are to be moved forward through Printer 1 when the **Feed Forms** pushbutton is selected during execution of the **Thread/Align Forms** procedure in duplex mode.	Range of 17 to 250 inches. Default is 60 inches.
Length of forms between transfer points (D)	This entry sets the length, in inches, of the forms path length from the alignment mark on the lower transfer station tractors of Printer 1, through Printer 1, across the floor to the Buffer/Flipper Unit, through the Buffer/Flipper Unit, across the floor to Printer 2, under Printer 2 up to the alignment mark on the lower transfer station tractors of Printer 2. This is used during the duplex mode procedure **Thread/Align Forms**. If you are continually feeding paper at either printer in order to get the forms aligned, this configuration item may have to be changed. See "Space Requirements – Duplex Models" on page 65 for physical layout details and dimensions.	Range of 150 to 800 inches. Default is 315 inches.
Front sheet sequence (D)	This entry sets whether the front side of the forms will be printed on Printer 1 or Printer 2 in duplex mode. Front First means that the odd pages (1st, 3rd, 5th,...) of a customer job will print on Printer 1, and the even pages (2nd, 4th, 6th, ...) pages will print on Printer 2. Front Second means just the opposite of Front First. A post-processing device is being used that bursts and stacks the output, the "Front Second" setting will deliver output with the odd number pages facing to the front.	Front First or Front Second

Table 22. Printer Configuration Items (continued)

Configuration Item	Description	Value Options
Verification marks (D)	Indicates if verification marks (numbers) are to be printed on the edge (tractor hole area) of each side of forms. When these marks are printed, it is possible to verify that the forms are synchronized or aligned (the two sides of the form coincide). The verification numbers can be read by the operator. If the number on side 1 of a form matches that on side 2, then the forms are properly synchronized. Multiple copies of the same page will have the same verification mark numbers.	When in Duplex mode, this option is automatically selected and cannot be changed.
Logical page increment	This entry allows expansion of the logical page size for cases where the printed page is larger than the valid InfoPrint 4000 printable area, without errors being set. This case may be encountered when a print job created for a 3800 prints too close to the page edge. The value entered will increase the valid printable area by that number of pels in all directions. Please review your applications to ensure that this setting does not cause loss of data, such as printing on the tractor hole carrier strip that will be trimmed off.	Range of 0 to 20 pels.
Clear memory for security	This entry allows setting of whether residual print data is to be cleared from memory. Clearing memory can result in a delay of up to two minutes before a print job starts. Select **Yes** if a high level of security is required.	Yes or No
Screen saver timeout	This entry allows specifying, in minutes, the idle time before the operator console monitor screen is blanked out. This extends the life of the monitor screen. A value of 0 means the screen saver is not to be used. In dual simplex mode if Printer 1 and Printer 2 are set with different values, the shortest setting time will be used even if the associated printer console is not being used. Touching a blank screen caused by this timeout will restore the display.	0 to 60 minutes. Default is 10 minutes.
Alarm suppression	This entry allows suppression of the Operator Alert alarm tone for error and supply-item actions.	Yes or No
Fuser inactivity timer	This entry sets the time, in hours, of printer inactivity before the fuser is to be turned off. This saves electrical power costs and extends the life of the printer. The fuser will automatically turn on when printing resumes, with a delay until the fuser has reached operating temperature. A value of 0 means that the timer is not being used.	0 to 9 hours. Default is 1 hour.
Eject to front facing enabled	This entry allows accepting or rejecting the Eject to Front Facing (EFF) signals sent by the host. A No value will suppress EFFs. If Yes, the EFF signal from the host will cause a blank page to be inserted between print jobs if the prior job contained an odd number of pages. This option should be set to **No** if either a post-processing device is installed that bursts and stacks output pages, or if Direct Attach is set to Yes.	Yes or No

Table 22. Printer Configuration Items (continued)

Configuration Item	Description	Value Options
Form definition order	When selected, the form definitions will be listed in the order that they were entered.	Yes or No
Stacker enabled	This entry allows setting of whether or not the stacker is to be used. A setting of **Yes** implies that a post-processing device is not being used and that fanfold forms (not roll-feed forms) are being used. However, if a post-processing device is installed and enabled, a **Yes** value is ignored. In duplex mode, it refers only to the Printer 2 stacker. In dual simplex mode, it may refer to either Printer 1 or Printer 2.	Yes or No
Cut sheet emulation	Sheets are divided in half using an imaginary line that is parallel to the tractor strips. Each resulting "half sheet" is treated as if it were a whole sheet running through a cut-sheet printer. None implies the cut-sheet emulation is not enabled. Normal Left-to-Right allows the print data to be placed on the left half-sheet first and then the right half-sheet. The left half-sheet is closest to the operator. The physical orientation of the data is based on the lower-left corner of the paper as viewed from the operator's viewpoint. Normal Right-to-Left allows the print data to be placed on the right half-sheet first and then the left half-sheet. The right half-sheet is furthest from the operator. The physical orientation of the data is based on the lower-left corner of the paper as viewed from the operator's viewpoint. Inverted Left-to-Right allows the print data to be placed on the left half-sheet first and then the right half-sheet. The left half-sheet is furthest from the operator. The physical orientation of the data is based on the upper-right corner of the paper as viewed from the operator's viewpoint. This mode is the "upside down" version of the Normal Left-to-Right mode. Inverted Right-to-Left allows the print data to be placed on the right half-sheet first and then the left half-sheet. The right half-sheet is closest to the operator. The physical orientation of the data is based on the upper-right corner of the paper as viewed from the operator's viewpoint. This mode is the "upside down" version of the Normal Right-to-Left mode.	None, Normal Left-to-Right, Normal Right-to-Left, Inverted Left-to-Right, Inverted Right-to-Left
BTS installed	This entry allows setting whether a Burster/Trimmer/Stacker post-processing device is installed. It does not show whether it is being used.	Yes or No
BTS enabled	This entry allows setting whether an installed Burster/Trimmer/Stacker post-processing device is being used. The host system will not send eject-to-front-facing commands if the BTS is enabled.	Yes or No

Table 22. Printer Configuration Items (continued)

Configuration Item	Description	Value Options
Offsetter installed	This entry allows setting whether an Offsetter post-processing device is installed. It does not show whether it is being used.	Yes or No
Offsetter enabled	This entry allows setting whether an installed Offsetter post-processing device is being used. The host system will send "Alternate Offset Stacker" commands if the offsetter is enabled and the print job contains these commands.	Yes or No
Offset on mark forms	This entry allows setting whether "Alternate Offset Stacker" commands from the host system are passed on to an enabled stacking-type post-processing device for any page containing the Mark Forms.	Yes or No
3130 barcode compatibility	This entry controls whether the printer operates in 3130 Barcode Compatibility mode.	Yes or No
Preheat temperature	Preheat temperature allows adjustment of the preheat platen for optimal fusing of different types of forms. This value is used only if preheat value has been set for the form in Define Forms. The default temperature of the preheat is 80 degrees C.	45 to 100 in increments of 5
Scan factory adjust for Printer 1	(CE Change Only) This is used by service personnel to adjust the scan direction printing registration. See "Registration" in the Printhead section of CARR within the Maintenance Information Manuals.	Range of 0 to 100 units Default is 40 units Unit = 2 pels
Process factory adjust for Printer 1	(CE Change Only) This is used by service personnel to adjust the process direction printing registration. See "Registration" in the Printhead section of CARR within the Maintenance Information Manuals.	Range of 0 to 60 units Default is 15 units Unit = 1 pel
Scan factory adjust for Printer 2 (D)	(CE Change Only) This is used by service personnel to adjust the scan direction printing registration. See "Registration" in the Printhead section of CARR within the Maintenance Information Manuals.	Range of 0 to 100 units Default is 40 units Unit = 2 pels
Process factory adjust for Printer 2 (D)	(CE Change Only) This is used by service personnel to adjust the process direction printing registration. See "Registration" in the Printhead section of CARR within the Maintenance Information Manuals.	Range of 0 to 60 units Default is 15 units Unit = 1 pel
Beam 1 offset adjustment	(CE Change Only). This is used by maintenance personnel to control the vertical alignment or horizontal adjustment of the separate beams of a multi-beam printer. See "AOM Skew" in the Multi-Beam Printhead section of CARR within the Maintenance Information Manuals.	Range of 0.0 to 15.9 Default is 8.0 units Unit = .1 pel
Beam 2 offset adjustment	(See information in *Beam 1 offset adjustment*)	(See information in *Beam 1 offset adjustment*)
Beam 3 offset adjustment	(See information in *Beam 1 offset adjustment*)	(See information in *Beam 1 offset adjustment*)
Beam 4 offset adjustment	(See information in *Beam 1 offset adjustment*)	(See information in *Beam 1 offset adjustment*)
Beam 1 offset adjustment for Printer 2 (D)	(See information in *Beam 1 offset adjustment*)	(See information in *Beam 1 offset adjustment*)

Table 22. Printer Configuration Items (continued)

Configuration Item	Description	Value Options
Beam 2 offset adjustment for Printer 2 (D)	(See information in *Beam 1 offset adjustment*)	(See information in *Beam 1 offset adjustment*)
Beam 3 offset adjustment for Printer 2 (D)	(See information in *Beam 1 offset adjustment*)	(See information in *Beam 1 offset adjustment*)
Beam 4 offset adjustment for Printer 2 (D)	(See information in *Beam 1 offset adjustment*)	(See information in *Beam 1 offset adjustment*)
Machine sequence for Printer 1	(CE Change on Initial Configuration Only) This is the serial number for Printer 1 (7 numeric only characters). Each time the AFCCU hard disk is replaced, this data is lost; the CE must re-enter the serial number found on the rear inside of the AFCCU frame.	N/A
Manufacturing plant for Printer 1	(CE Change on Initial Configuration Only) This is the code for plant of manufacture of Printer 1 (2 numeric only characters). Each time the AFCCU hard disk is replaced this data is lost; the CE must re-enter this code from information saved from the last time Printer Configurations were changed.	N/A
Machine sequence for Printer 2	(CE Change on Initial Configuration Only) This is the serial number for Printer 1 (7 numeric only characters). Each time the AFCCU hard disk is replaced, this data is lost; the CE must re-enter the serial number found on the rear inside of the AFCCU frame.	N/A
Manufacturing plant for Printer 2	(CE Change on Initial Configuration Only) This is the code for the plant of manufacture of Printer 2 (2 numeric only characters). Each time the AFCCU hard disk is replaced, this data is lost; the CE must re-enter this code from information saved from the last time Printer Configurations were changed.	N/A
Date and time	(CE Change Only). This is in the form of mmddHHMM.ssyy. mm=month dd=day HH=hour MM=minute ss=second yy=year	N/A

Configuring the Host Attachments

- From the operator console:
  1. Open the **Configure** pull-down menu.
  2. Select the **Configure Attachments** procedure window.

Attachments include Parallel Channel, ESCON Channel, Token Ring TCP/IP, Ethernet TCP/IP, or FDDI TCP/IP. Table 3 on page 33 defines the host attachments available.

Configuring Parallel Channels

- From the Configure Attachments procedure window:
  1. Select **Parallel Channel: Installed**.
  2. Select the **Configure...** push button.
- The Configure Parallel Channel window appears.

Table 23 lists all configuration items, the purpose of each item, and the allowable value options for each item. The factory set default values are underlined.

Table 23. Parallel Channel Attachment Items

Configuration Item	Description	Value Options
Parallel Link A Installed	Specifies if Parallel Channel Link A is installed.	Yes or No
Parallel Link B Installed	Specifies if Parallel Channel Link B is installed.	Yes or No
Device Address	Specifies the 2-digit hexadecimal channel address which includes the device address. **Notes:** 1. In simplex mode, only one device address is required. In dual simplex mode, each printer requires a unique device address. Printer 1 requires an even number (for example, X'30'); Printer 2 requires the next consecutive number (for example, X'31'). 2. The duplex system does not require a unique number. It can use either of the addresses used for dual simplex Printer 1 or dual simplex Printer 2. However, it is often easier from an operational viewpoint to assign duplex a separate address (so the duplex and simplex printers look like unique devices to the operating system). The general convention in this case is to assign the duplex system the next consecutive address (even) after the address for simplex Printer 2. For example, if you define Printer 1 in dual simplex as X'30', you should then define Printer 2 in dual simplex as X'31', and, optionally, define the complete system in duplex as X'32'. 3. The device addresses specified above must match the device addresses defined to the host PSF software, and in the case of S/390 hosts, the I/O device definitions.	00 to FF (Hexadecimal notation). Default is X'00'
Second Channel	Specifies the switching mode of the Two-Channel Switch: Static or Dynamic Mode. When a second Parallel Channel is installed, a Two-Channel Switch facility is provided. • **Static**–You can enable only one channel at a time. You can connect two interfaces to two channels on the same processing unit, on tightly coupled processing units (units controlled by the same operating system, or on independent (uncoupled) processing units. • **Dynamic**–You can enable both channels at the same time with the two-Channel Switch used as a dynamic interface switch. Connect the two interfaces to two channels either on the same processing unit or on tightly-coupled processing units (units controlled by the same operating system). You cannot select this item unless two channels are installed.	Static or Dynamic
Data Transfer Protocol	Specifies the data transfer mode to be used: DC Interlocked or Data-Streaming. If two channels are installed, both channels use the same protocol.	Interlocked or Data Streaming

Table 23. Parallel Channel Attachment Items (continued)

Configuration Item	Description	Value Options
Data Streaming Rate	Specifies the data rate being used if you select the Data-Streaming Data Transfer Protocol. Use the highest rate that is supported by your system. If two channels are installed, both channels use the same data rate.	• For MCA bus: 1.9MB/sec, 2.7MB/sec, 3.4MB/sec, 4.5MB/sec • For PCI bus: 3.0 MB/sec, 4.5MB/sec
Card 1 Slot Position	The printer sets this entry automatically at power on time if the system senses the presence of a Parallel Channel card. This item is not selectable.	2 or 4 or Not Installed
Card 2 Slot Position	The printer sets this entry automatically at power on time if the system senses the presence of a Parallel Channel card. This item is not selectable.	2 or 4 or Not Installed

Configuring ESCON Channels

• From the Configure Attachments procedure window:

1. Select the **ESCON Channel: Installed**.

2. Select the **Configure...** push button.

• The Configure ESCON Channel window appears.

Table 24 lists all configuration items, what each item is used for, and the allowable value options for each item. The factory set default values are underlined.

Table 24. ESCON Channel Attachment Items

Configuration Item	Description	Value Options
ESCON Link A Installed	Specifies if ESCON Channel Link A is installed.	Yes or No
ESCON Link B Installed	Specifies if ESCON Channel Link B is installed.	Yes or No

Table 24. ESCON Channel Attachment Items (continued)

Configuration Item	Description	Value Options
Device Address	Specifies the 2-digit hexadecimal channel address which includes the device address. **Notes:** 1. In simplex mode, only one device address is required. 2. In dual simplex mode, each printer requires a unique device address. Printer 1 requires an even number (for example, X'30'); Printer 2 requires the next consecutive number (for example, X'31'). 3. The duplex system does not require a unique number. It can use either of the addresses used for dual simplex Printer 1 or dual simplex Printer 2. However, it is often easier from an operational viewpoint to assign duplex a separate address (so the duplex and simplex printers look like unique devices to the operating system). The general convention in this case is to assign the duplex system the next consecutive address (even) after the address for simplex Printer 2. For example, if you define Printer 1 in dual simplex as X'30', you should then define Printer 2 in dual simplex as X'31', and, optionally, define the complete system in duplex as X'32'. 4. The device addresses specified above must match the device addresses defined to the host PSF software, and in the case of S/390 hosts, the I/O device definitions.	00 to FF (Hexadecimal notation). Default is X'00'

Multi-host environment flag	Shows whether a multiple host printer-sharing system exists. (Multi-Host Environment support increases configuration flexibility and simplifies operational procedures for ESCON-attached printers.)
	
	Notes regarding ESCON attachment:
	• Do not enable this flag unless all hosts sharing the printer have:
	    – OS/390 V1 Release 3.0 or higher
	    – PSF ASSIGN/UNASSIGN support (PSF 3.1.0 for OS/390 or APAR OW29992 to PSF/MVS 2.2).
	
	If these conditions are not satisfied, and Multi-Host Environment is enabled on the printer, PSF may not be able to access the printer.
	• The Multi-Host configuration item is available only on printer control units that have newer ESCON adapters. The Multi-Host configuration item is greyed out and not accessible on older control units.
		True or False

Card 1 Slot Position	The printer sets this entry automatically at power on time if the system senses the presence of an ESCON Channel card. This item is not selectable.	2 or 4 or Not Installed
Card 2 Slot Position	The printer sets this entry automatically at power on time if the system senses the presence of an ESCON Channel card. This item is not selectable.	2 or 4 or Not Installed

Configuring Token Ring TCP/IP

- From the Configure Attachments procedure window:
  1. Select the **Token Ring TCP/IP: Installed**.
  2. Select the **Configure...** push button.
- The Configure Token Ring TCP/IP window appears.

Table 25 lists all configuration items, what each item is used for, and the allowable value options for each item. The factory set default values are <u>underlined</u>.

Table 25. Token Ring TCP/IP Attachment Items

Configuration Item	Description	Value Options
Token Ring TCP/IP Installed	Specifies if the Token Ring adapter is installed.	Yes or <u>No</u>
TCP Port	Specifies the TCP socket address of the attachment. **Notes:** 1. Only one address is required for operating a simplex system. 2. In dual simplex mode, each printer requires a unique device address. If you use the default value of 5001 for simplex Printer 1, IBM recommends using 5002 as the value for simplex Printer 2. 3. The duplex printing system does not require a unique port number. It can use either of the TCP port numbers specified for simplex Printer 1 or simplex Printer 2. However, it is often easier from an operational viewpoint to assign duplex a separate TCP port number. If 5001 and 5002 are used for simplex Printer 1 and simplex Printer 2, IBM recommends that the duplex system be assigned TCP port number 5003. 4. The TCP Port numbers specified in the printer configuration must match the PORT numbers assigned in the host PSF system.	5001 to 65536.
IP Address	Specifies the Internet protocol (IP) address of the printer in dotted decimal format. Get this value from your LAN administrator. This value must match the IP address value in the host PSF configuration. This value is unique to a duplex system, and is the same regardless of whether the printer is in duplex or dual-simplex mode.	X.X.X.X where X ≤ 255.
Subnet Mask	Specifies the mask that identifies the local subnet in dotted decimal format. Get this value from your LAN administrator. If you do not have a local subnet, leave this field blank.	X.X.X.X where X ≤ 255
Default Gateway Address	Specifies the IP address of the default gateway in dotted decimal format. Get this value from your LAN administrator.	X.X.X.X where X ≤ 255
MTU Size	Specifies the Maximum Transmission Unit (MTU) – maximum allowable length of IP packets.	60 to 4096
Hardware address	Specifies the TCP/IP Token Ring adapter ROM address.	This address cannot be changed.

Table 25. Token Ring TCP/IP Attachment Items (continued)

Configuration Item	Description	Value Options
Alternate address (Local adapter address)	Sets the unique LAN adapter address for the network. The address must be different from other addresses on the LAN.	X'0' to X'FFFFFFFFFFFF'
Ring Speed	Specifies the ring speed of the network to which the adapter attaches. The value must match the speed of the network or the network may stop operating.	4 or 16
Confine Broadcast	Specifies if broadcast packets (that is, Address Resolution Protocol packets) are enabled to cross bridges to other rings.	Yes or <u>No</u>

Configuring Ethernet TCP/IP

- From the Configure Attachments procedure window:
  1. Select the **Ethernet TCP/IP: Installed**
  2. Select the **Configure...** push button.
- The Ethernet TCP/IP window appears.

Table 26 lists all configuration items, what each item is used for, and the allowable value options for each item. The factory set default values are <u>underlined</u>.

Table 26. Ethernet TCP/IP Attachment Items

Configuration Item	Description	Value Options
Ethernet TCP/IP Installed	Specifies if the Ethernet adapter is installed.	Yes or <u>No</u>
TCP Port	Specifies the TCP socket address of the attachment. **Notes:** 1. Only one address is required for operating a simplex system. 2. In dual simplex mode, each printer requires a unique device address. If you use the default value of 5001 for simplex Printer 1, IBM recommends using 5002 as the value for simplex Printer 2. 3. The duplex printing system does not require a unique port number. It can use either of the TCP port numbers specified for simplex Printer 1 or simplex Printer 2. However, it is often easier from an operational viewpoint to assign duplex a separate TCP port number. If 5001 and 5002 are used for simplex Printer 1 and simplex Printer 2, IBM recommends that the duplex system be assigned TCP port number 5003. 4. The TCP Port numbers specified in the printer configuration must match the PORT numbers assigned in the host PSF system.	
IP Address	Specifies the Internet Protocol (IP) address of the printer in dotted decimal format. Get this value from your LAN administrator. This value must match the IP address value in the host PSF configuration. This value is unique to a duplex system, and is the same regardless of whether the printer is in duplex or dual-simplex mode.	X.X.X.X where X ≤ 255.

Table 26. Ethernet TCP/IP Attachment Items (continued)

Configuration Item	Description	Value Options
Subnet Mask	Specifies the mask that identifies the local subnet in dotted decimal format. Get this value from your LAN administrator. If you do not have a local subnet, leave this field blank.	X.X.X.X where X ≤ 255
Default Gateway Address	Specifies the IP address of the default gateway in dotted decimal format. Get this value from your LAN administrator.	X.X.X.X where X ≤ 255
Standard MTU Size	Specifies the Maximum Transmission Unit (MTU) size. The MTU size for Standard Ethernet type ranges from 60 to 1500.	60 to 1500
IEEE802.3 MTU Size	Specifies the MTU size for IEEE802.3 Ethernet type. The range is from 60 to 1492.	60 to 1492
Ethernet Type	Specifies either the Standard or the IEEE802.3 Ethernet type.	Standard or IEEE802.3
Hardware address	Specifies the TCP/IP Token Ring adapter ROM address.	This address cannot be changed.
Alternate address (Local adapter address)	Sets the unique LAN adapter address for the network. The address must be different from other addresses on the LAN.	X'0' to X'FFFFFFFFFFFF'
Cable type	This is the type of Ethernet cable connector used in the back of the printer. This configuration item is used only for older control units. This configuration item cannot be changed for 10/100 BaseT adapters.	10Base2 or 10Base5

Table 26. Ethernet TCP/IP Attachment Items (continued)

Configuration Item	Description	Value Options

Media Speed	**Notes:**
	
	1. The Media Speed setting is used only if the Ethernet adapter supports configuration of the media speed. If media speed configuration is not supported by the Ethernet adapter, this configuration item is ignored
	
	2. In most cases, the Auto_Negotiation setting should be used. Explicit media mode and speed settings can be used if:
	  • There is very slow Ethernet throughput
	  • The LED indicators are incorrect
	  • The printer cannot be contacted using the Ping command
	
	  Due to different Auto Sensing standards used by manufactures of 10/100 Ethernet adapters, this may cause them to not work correctly in all combinations. The quick way to determine this type of problem is to see if the Duplex and 10/100 indicators are inconsistent between the printer and the switch.
	
	3. Check the LED's on the printer 10/100 Ethernet adapter card when enabled. Note the values for each of the indicators on the adapter.
	  • FDX (Full Duplex) indicator is on when operating in Full Duplex Mode and off when operating Half Duplex.
	  • 100 indicator is on when operating at 100 Megabit and off when operating at 10 Megabits.
	  • RCV (Receive) indicator is on when receiving packets from the network.
	  • ACT (Activity) or LNK (LINK) indicators are on when packets are being received or transmitted over the network.
	
	4. There should be similar indicators on the switch or system that the printer is connected to and their values should be noted. The Full/Half Duplex and 10/100 indicator values must agree between the printer and the switch that the printer is connected to. To resolve this, you must take the switch out of auto negotiation mode and explicitly set the mode and speed at the switch. On the printer, the media mode can be either half or full duplex and the speed can be either 10 or 100 Mbps. These settings must match those of the switch.
		<u>Auto negotiate Speed and Duplex Mode</u>
		10 Mbit Half Duplex
		10 Mbit Full Duplex
		100 Mbit Half Duplex
		100 Mbit Full Duplex

Configuring FDDI TCP/IP

• From the Configure Attachments procedure window:
  1. Select the **FDDI TCP/IP: Installed**.
  2. Select the **Configure...** push button.
• The Configure FDDI TCP/IP window appears.

Table 27 on page 115 lists all configuration items, what each item is used for, and the allowable value options for each item. The factory set default values are underlined.

Table 27. FDDI TCP/IP Attachment Items

Configuration Item	Description	Value Options
FDDI TCP/IP Installed	Specifies if the FDDI adapter is installed.	Yes or No
TCP Port	Specifies the TCP socket address of the attachment. **Notes:** 1. Only one address is required for operating a simplex system. 2. In dual simplex mode, each printer requires a unique device address. If you use the default value of 5001 for simplex Printer 1, IBM recommends using 5002 as the value for simplex Printer 2. 3. The duplex printing system does not require a unique port number. It can use either of the TCP port numbers specified for simplex Printer 1 or simplex Printer 2. However, it is often easier from an operational viewpoint to assign duplex a separate TCP port number. If 5001 and 5002 are used for simplex Printer 1 and simplex Printer 2, IBM recommends that the duplex system be assigned TCP port number 5003. 4. The TCP Port numbers specified in the printer configuration must match the PORT numbers assigned in the host PSF system.	5001 to 65536.
IP Address	Specifies the Internet protocol (IP) address of the printer in dotted decimal format. Get this value from your LAN administrator. This value must match the IP address value in the host PSF configuration. This value is unique to a duplex system, and is the same regardless of whether the printer is in duplex or dual-simplex mode.	X.X.X.X where X ≤ 255.
Subnet Mask	Specifies the mask that identifies the local subnet in dotted decimal format. Get this value from your LAN administrator. If you do not have a local subnet, leave this field blank.	X.X.X.X where X ≤ 255
Default Gateway Address	Specifies the IP address of the default gateway in dotted decimal format. Get this value from your LAN administrator.	X.X.X.X where X ≤ 255
MTU Size	Specifies the Maximum Transmission Unit (MTU) – maximum allowable length of IP packets.	256 to 4352
Hardware address	Specifies the FDDI adapter ROM address.	This address cannot be changed.
Alternate address (Local adapter address)	Sets the unique LAN adapter address for the network. The address must be different from other addresses on the LAN.	X'0' to X'FFFFFFFFFFFF'
Confine Broadcast	Specifies if broadcast packets (that is, Address Resolution Protocol packets) are enabled to cross bridges to other rings.	Yes or No

Configuring Remote Access

You can use these methods to provide remote access to your printer:
- SNMP (Simple Network Management Protocol)
- RMI (Remote Management Interface)
- Modem.

To configure remote access, follow these steps:
1. From the operator console, open the **Configure** pull-down menu.
2. Select the **Remote Access** procedure window.

For additional information, see "Configuring Remote Access" in the *InfoPrint 4000 Operator's Guide*.

Configuring Preprocessing or Postprocessing Devices or Interfaces

- From the Configure pull-down menu:
  1. Select the **Configure Pre/Postprocessors** procedure window.

You may configure and store up to ten defined Pre/Postprocessing devices, but you can enable only three devices at one time on the printer.

Preprocessing/Postprocessing Options For Simplex Models

Models 0W1 and 0W3 – Each has three Preprocessing/Postprocessing interface Ports. You can install from one to three Preprocessing/Postprocessing device interface adaptors (hereafter called **Pre/Post**), or you can install an Advanced Function Postprocessing interface adaptor (hereafter called **AF Post**) alone or in combination with one or two **Pre/Post** interface adaptors. Allowable combinations are shown in Table 28.

Models IS1 and IS2 – Each has an interface adaptor installed as a standard feature that may be used for either a preprocessing or a postprocessing device (**Pre/Post).** One or two additional optional **Pre/Post** device interface adaptors may be installed in Ports 2 and 3, or an optional Advanced Function Postprocessing device interface (hereafter called **AF Post**) may be installed in either Port 2 or Port 3 of each model. Allowable combinations are shown in Table 28.

Table 28. Preprocessing/Postprocessing Interface Options For Simplex Models

Port	Configuration Options							
1	Pre/Post	Pre/Post	Pre/Post	AF Post	AF Post	AF Post	Pre/Post	Pre/Post
2	—	Pre/Post	Pre/post	—	Pre/Post	Pre/Post	Pre/Post	AF Post
3	—	—	Pre/Post	—	—	Pre/Post	AF Post	Pre/Post

Preprocessing/Postprocessing Options For Duplex Models

Each duplex printer has three Pre-processing/Postprocessing interface ports—except InfoPrint 4000 Models ID2, ID4, and IR2, each of which has two interface ports. Port 1 in each printer has an interface adaptor installed as a standard feature, that may used either for a preprocessing or postprocessing device (hereafter called **Pre/Post**). One or two additional optional **Pre/Post** device interface adaptors may be installed in Ports 2 and 3, or an optional Advanced Function

Postprocessing device interface[7] (**AF Post**) may be installed in either Port 2 or 3 of each printer. Models ID2, ID4, and IR2 each uses Port 3 for Side1/Side 2 Verify. Allowable combinations for each printer are shown in Table 29.

Table 29. Preprocessing/Postprocessing Interface Options For Duplex Models

Port	Configuration Options					
1	Pre/Post	Pre/Post	Pre/Post	Pre/Post	Pre/Post	Pre/Post
2	—	Pre/Post	Pre/post	AF Post	Pre/Post	AF Post
3	—	—	Pre/Post	—	AF Post	Pre/Post

Table 30 lists all configuration items, what each item is used for, and the allowable value options for each item. The factory set default values are <u>underlined</u>.

Table 30. Pre/Postprocessing Device Configuration Items

Selectable Field/Item	Description	Value Options
Printer (This item is not displayed for simplex models.)	When the Configure Printer **Printer Mode** configuration item is set to **Simplex** mode, this **Printer** selectable field is grayed out in the **Configure Pre/Postprocessors** window. All devices configured while in **Simplex** mode are automatically configured for the printer associated with operator console you are currently using.	1 or 2
Port	The physical connection between the printer and the pre/postprocessing device.	1 or 2 or 3
Enabled	Enables a device for a port. If a device is already enabled for a specific Port number when you select a device that is also configured for that Port Number, the **Yes** is grayed out so that you cannot attempt to enable a second device for the same Port. An error window appears when the restart procedure to activate this change is complete and either of the following conditions exist: • You attempted to enable a device for a Port Number that does not have an interface adaptor installed or • The adapter has a different type (Pre/Post versus AF Post) adaptor installed than the device type you are enabling.	Yes or No
Pre/Postprocessor Type	Specify a **Coupled** type when the Port to be used has a **Pre/Post** type adaptor installed. Specify an **Advanced Postprocessor** type when the Port to be used has a **AF Post** type adaptor installed. Different types have different **Pre/Postprocessor Characteristics** configuration items listed.	Options Include: • Coupled Preprocessor • Coupled Postprocessor • Advanced Postprocessor - MICR • Advanced Postprocessor - SMM (Select Medium Modification) • Spot-color Postprocessor
Pre/Postprocessor Characteristics		

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7. Models DR1/DR2 do not support AF Postprocessing devices.

Table 30. Pre/Postprocessing Device Configuration Items (continued)

Selectable Field/Item	Description	Value Options
Pre/Postprocessor Extended NPRO (non-process runout).	Listed for all Pre/Postprocessor Types. Extends the NPRO. Enter a non-zero value to extend the fixed NPRO length because of Pre-processing or Post-processing device usage. Setting the "NPRO Length" configuration item under the **Configure Printer** also sets this function. The "Pre/Postprocessor Extended NPRO" value overrides the "Configure Printer NPRO Length" value if both are set to non-zero values.	0 to 800 inches (150)
Pre/Postprocessor Busy Timer	Listed only for "Coupled" Pre/Postprocessor Types. Specifies the length of time in seconds that follows a Pre-processing or Post-processing device going to "Busy" status before the status automatically changes to "Not Ready." The printer does not report "Busy" status to the host system, but does report "Not Ready" status.	1 to 999 seconds (300)
Postprocessor Tag Type	Listed only for "Coupled" Pre/Postprocessor Types. Specify a **Coupled** tag type for all Post-processing devices not manufactured by Roll System, Inc. Specify an **RSI Compatible** tag type for all Post-processing devices manufactured by Roll System, Inc..	• Coupled • RSI Compatible This item is ignored if you are configuring a Pre-processing device interface.
Distance to Postprocessor	Listed only for "Advanced Postprocessor" Pre/Postprocessor Types. If two AF postprocessors are installed, the distance of the second postprocessor must exceed that of the first. If the first postprocessor is a Troy MICR 3900, add an extra 102 inches to the actual measured distance from the printer to the second postprocessor. If the first postprocessor is a Troy MICR 3900 High Speed, add an extra 148 inches to the actual measured distance from the printer to the second postprocessor. For more information, see *Using the IBM 3835 Page Printers and the IBM 3900 Advanced Function Printers with the Troy MICR Printers*, GA32-0261.	• 24 to 800 inches (99) • 24 to 1200 inches (99)
Postprocessor Error Page Stop	Listed only for "Advanced Postprocessor - MICR" Pre/Postprocessor Type.	0 to 50 pages
Postprocessor Verify Alignment Page Stop	Listed only for "Advanced Postprocessor - MICR" Pre/Postprocessor Type.	0 to 5000 pages
Pre/Postprocessor Baud Rate in Kbps	Listed only for "Advanced Postprocessor" Pre/Postprocessor Types.	19.2 or 62.5
Color side	Indicates which side of the sheet the color will be printed on.	• Color on front • Color on back (D)

Defining Forms

From the Configure pull-down menu **SELECT** the **Define Forms** procedure window.

Identify all forms used in the printer to the AFCCU before completing the Load Forms procedure. You can identify and store forms before you attempt to load them into the printer, or you can identify and store them during the Load Forms procedure. Identify forms with a name, page width (in inches or millimeters), and page length (in inches or millimeters). A short description of the form is optional.

Once you identify and store a form, all future uses of that form need only identify the form name during the Load Forms procedure.

Simplex Printers

The printer can store 1024 form names. The following form names are supplied as defaults when the printer is shipped from the factory:

Table 31. Default Forms – Models 0W1 and 0W3 and Models IS1 and IS2

Form Name	Description Length x Width (inches)
Letter	8.5 x 12
Standard	15 x 11
2-Up Letter	2-Up 8.5 x 11 18 x 11
12 x 18	12 x 18
14 x 18	B4 14 x 18

Duplex Systems

The printers can store 1024 form-name definitions in **Duplex** mode, and 1024 form-name definitions in each printer in **Simplex** mode for a total of 3072 form-name definitions for the complete system.

Select the Form Names you want in both **Duplex** and either Printer 1 or 2 **Simplex** modes, and record on all three Form Identification Work Sheets all of the definition data for each form. The following form names are supplied as defaults in each printer when the printer is shipped from the factory:

Table 32. Default Forms – Model D01 and Model D02

Form Name	Description Length x Width (inches)
Letter	8.5 x 11 8.5 x 12 (form)
Legal	8.5 x 14 8.5 x 15 (form)
Half1	Half Letter Size 5.5 x 9.5
Fullsize	11 x 14 Large 11 x 15 (form)
Half2	Half Fullsize 7 x 11

Table 33. Default Forms – All Duplex Models Except Models D01 and D02

Form Name	Description Length x Width (inches)
Letter	8.5 x 12
Standard	15 x 11
2-Up Letter	2-Up 8.5 x 11 11 x 18 (see notes below)
12 x 18	12 x 18 (see notes below
14 x 18	B4 14 x 18 (see notes below)
Note: For the High Speed (229 IPM) Duplex feature, see Table 1 on page 3.	

Most selectable fields on the **Define Forms** window are self-explanatory, but the following fields are not:

Width Specify the total physical form widths (including the 0.5 inch tractor hole carrier strips on either side of the form). For information about the form widths supported by different printer models, see Table 1 on page 3.

Width When entering a value in inches, use a decimal for fractional dimensions (for example, 13.5). When entering a value in millimeters, do not use a decimal point.

Length

Specify the length dimension of the printed output as measured in the process direction (parallel to the tractor holes). You can specify this dimension in millimeters or inches and in lengths from 76 to 432 millimeters (3 to 17 inches). (For Models DR1/DR2 and IR1/IR2, the length can be from 76 to 635 millimeters (3 to 25 inches).)

Note: The printer can stack only forms that are prefolded at lengths between 178 to 356 mm (7 to 14 inches) between fold perforations. To stack printed forms lengths of less than 7 inches or greater than 14 inches, see "Stacking Forms" on page 125.

Specify the length either in millimeters as a whole number or in inches to two decimal places. The printer rounds to the nearest $1/6$-inch the length you enter and displays it on the screen.

Chapter 10. Obtaining Supplies

> **Chapter Overview**
>
> This chapter describes the printer supplies, how you can order and store them, and estimates the quantity of forms (in feet) that each supply item can process.

Supplies

For optimum reliability and print quality use IBM supplies, which are engineered specifically for IBM printers. Use the "IBM Supplies Work Sheet" on page 122 to help you order supplies for the printer before the system is delivered, and to maintain a stock of supplies for continuous operation.

When a printer runs low on a supply item, it displays a status message on the operator console screen, sounds an alarm, and turns on an operator intervention light on top of the printer.

IBM recommends that you keep the following quantities on hand per print engine:

Item	Suggested Quantity
Toner	48 bottles
Developer mix	4 bottles
Fuser oil	4 bottles
Oiler belt	2 belts
Fine filter	2 filters
Splicing tape	72 rolls

The estimated quantities are approximations for planning purposes only, and do not represent a warranty, a guarantee, or a minimum. The actual consumption depends on variables such as machine toner settings, job-stream percent toner coverage, form characteristics, temperature, and humidity.

Also ensure that a toner-certified vacuum cleaner (see page 61) is available for printer operators to use when cleaning the printer.

IBM Supplies Work Sheet

Important Notes Concerning Supplies

Notes:

1. Make sure to use the correct part numbers when you order new supplies. Different models use different supplies (such as toner, developer, fuser oil, oiler belts, and fine filters). Using the wrong developer or toner, for example, causes serious print quality problems and <u>forces a service call</u>.

2. InfoPrint 4000 Models DR1/DR2, IR1/IR2, and IR3/IR4 use an Oiler Wick Roll in place of the Oiler Belt that is used on other models. These models do not use a customer-replaceable oiler belt. The Oiler Wick Roll is replaced by your service representative as part of routine preventative maintenance.

3. The toner bottle can also be used as a waste toner collection bottle.

   Note: Do not reuse waste toner.

4. The yields listed in Table 34 on page 123 are approximations. They are not a warranty or guarantee of minimum life, and are provided only to assist in supplies planning. Analyze your actual usage figures to determine how much of each supply item to stock.

5. Toner yield is affected by several factors, including print coverage, contrast setting, form type, and environment. Yields provided by the following formula are approximate averages only. Toner yield is expressed in impressions per bottle.

   ```
   Yield in impressions per bottle = (16 820 000 × A) ÷ (W × L × C)

   A = 1.71 for contrast setting 1
   A = 1.00 for contrast setting 4
   A = 0.71 for contrast setting 7

   W = Width of impression
   L = Length of impression
   C = Coverage on impression expressed as a percentage
   ```

   For example, on an 8.5 x 11 inch form with a contrast setting of 1 and a coverage of 4%:

   ```
   Yield = (16 820 000 × 1.71) ÷ (8.5 × 11 × 4) = 76 904 8.5×11 impressions
   ```

   Notes:

   a. This toner yield formula is for all printers except Models ID3/ID4, Models IR1/IR2, and Models IR3/IR4. Reduce the yield by 10% for these models.

   b. The number of impressions per bottle is independent of the paper size. For example: 76 904 8.5×11 impressions on 8.5×11 forms. Or: 76 904 8.5×11 impressions on 11×18 forms running 2 up.

6. Fine Filter processing yield is based on 4 square inches of toner coverage per foot of forms with the printer control panel `Contrast` switch in the center (4) position. More dense applications, such as extensive bar codes, or images, or solid area fill, or printing with a higher `Contrast` setting can expect to achieve yields lower than those achieved with the average text page.

7. The life of the absorbent pad for the oil pan in Model DW1, Model ID1, and ID3 varies according to the way you run your printer. In general, the more often the printer is idle, the more often you may need to replace the pad. IBM recommends that you check the absorbent pad weekly. The *Operator's Guide* contains instructions for checking the pad.

   Contact your CE for replacement pads.

Table 34 is a work sheet that lists IBM supplies and their part numbers. Make copies of this work sheet to use when you order supplies.

Table 34. IBM Supplies Work Sheet

IBM Supply Item	Approximate Forms Processed (In Feet)	Part Number	Minimum Order Quantity	Quantity Needed
Toner – All Models (blue lettering on bottle) 1.360-kilogram (3-lb) bottle	See note 5 on page 122	1402822	1 carton (8 bottles per carton)	
Developer Mix – All Models (blue lettering on bottle) 3.5-kilogram (7.7-lb) bottle	Max at 150 IPM: 1 000 000 per bottle Max at 229 IPM: 1 400 000 per bottle Max at 310 and 324 IPM: 1 200 000 per bottle For Models IR3/IR4: 1 000 000 per bottle	1402823	1 carton (2 bottles per carton)	
Fuser Oil (D01 and D02) 1-kilogram (2.2-lb) bottle	700 000 per bottle	6190656	1 carton (1 bottles per carton)	
Fuser Oil (0W1/0W3, DW1/DW2, IS1, IS2, ID1/ID2, ID3/ID4) 1-kilogram (2.2-lb) bottle	700 000 per bottle	1372463	1 carton (1 bottle per carton)	
Fuser Oil (DR1/DR2, IR1/IR2, IR3/IR4) 1-kilogram (2.2-lb) bottle	450 000 per bottle (219 000 per bottle for Models IR3/IR4)	1402819	1 carton (1 bottle per carton)	
Oiler Belt (D01/D02)	At 150 IPM: 1 300 000 per belt At 229 IPM: 1 500 000 per belt	70X7243	1 carton (1 belt per carton)	
Oiler Belt (0W1/0W3, DW1/DW2, IS1, IS2, ID1/ID2, ID3/ID4) (see note 2 on page 122)	At 150 IPM: 1 300 000 At 229 IPM: 1 500 000 At 310 and 324 IPM: 1 700 000	1372459	1 carton (1 belt per carton)	
Oil Pan Absorbent Pad (DW1, ID1, and ID3)	See note 7 on page 122	Contact Service Representative	1 pad (1 pad per pack)	
Fine Filter (D01/D02)	3 900 000 per filter	70X7244	1 carton (1 filter per carton)	
Fine Filter (0W1/0W3, DW1/DW2, DR1/DR2, IS1, IS2, ID1/ID2, ID3/ID4, IR1/IR2, IR3/IR4)	3 500 000 per filter	1372464	1 carton (1 filter per carton)	
Splicing Tape	45 feet of tape per roll	4165880	1 carton (72 rolls per carton)	

Ordering Supplies

You can order supplies directly from IBM or from your Lexmark representative. Your IBM representative can assist you in the procedure for placing your first order of supplies.

Maintenance Supply Items

In the U.S.A., Latin America, and EMEA, the IBM Monthly Maintenance Charge includes the fuser oil, oiler belt, and fine filter. Approximately a 90-day stock of these items are supplied with each printer.

In the U.S.A., you can order these maintenance items by calling 1-800-793-5888 if you have an IBM Maintenance Contract.

Customer-Replaceable Supply Items

There are several methods for ordering supplies:
- You can purchase toner, developer, and other supplies through Lexmark. You can contact Lexmark at 1-800-438-2468 or through any Lexmark International authorized supply dealer.
- You can fax a completed order to Lexmark at 1-800-522-3422.

Warranty Returns

If the supplies you receive are defective, return them to the place of purchase during the warranty period for a free replacement.

Include a copy of your invoice, a description of the problem, print-quality samples, and an estimate of the amount of printing already done with that supply.

This information applies only to supplies purchased in the U.S.A. In other countries, contact your point of purchase for returns information.

Storing Supplies

Store printer supplies in the printer operating environment for at least one day before using them. At other times, you can store supplies in an environment that does not exceed the following requirements:

Temperature
    −25° to 40°C (−13° to 104°F)

Relative Humidity
    5% to 90%

Forms have different storage requirements. Store forms in an area where temperature and humidity are similar to the environment in which they will be used. If forms do not adapt to moisture changes, wrinkles and voids during printing can occur.

Avoid areas of extreme heat or humidity. Extended exposure to these extremes can damage the materials permanently. Relative humidity levels above 65% may reduce print quality.

Chapter 11. Selecting and Testing Forms

> **Chapter Overview**
>
> This chapter reviews the basic requirements for print materials intended for use on an InfoPrint 4000 or 3900 Advanced Function Printer.

To get maximum reliability and print quality from the printer, IBM recommends that you rely on the *Forms Design Reference for Continuous Forms Advanced Function Printers*, your forms supplier, and your IBM marketing representative to help you choose the best forms and special-purpose materials for your applications.

Continuous Forms

The printer generally uses single-ply, fanfold forms with both edges punched for tractor feeding and with horizontal perforations between the sheets. Micro-perforated forms can be used for cleaner cuts between sheets. With appropriate pre-processing and post-processing devices attached, the printer can also use roll-feed forms.

Stacking Forms

The printer can stack forms prefolded from 7 to 14 inches (178 to 356 mm) in length as measured in the process direction (parallel to the tractor holes).

Notes:

1. The prefolded forms length does not have to be identical to the forms length printed (as specified in the printer's define forms). For example: A 3-inch form may have been prefolded with three forms between folds (a 9-inch prefolded length).
2. Roll forms <u>cannot</u> be stacked. For these and other applications you must have suitable post-processing equipment installed and enabled on the printer, which disables the stacker.

Continuous forms are folded and stacked on a stacker table. As the height of the form stack increases, the stacker table lowers until the printing stops or until the stacker is full.

You can adjust the length and width of the stacker to fit the size of forms being used. The two shortest lengths of the common-use sizes, 3½ and 5½ inches, are prefolded two lengths at a time, in folds of 7 and 11 inches, respectively.

The two shortest lengths of ISO sizes, 3½ and 3 inches, are folded two and three lengths at a time, in folds of 7 and 9 inches, respectively. Forms that are 6 inches long are folded in 12-inch lengths.

Special-Purpose Materials

Discuss your special-purpose applications with your forms suppliers and ensure that they understand that the forms are being run on a printer. Before you use new preprinted forms or adhesive labels for production runs, test the jobs that print them to ensure everything works well. Refer to the *Forms Design Reference for Continuous Forms Advanced Function Printers* for more information on labels that can be used with the printer.

Work closely with your IBM marketing representative while you are selecting what kinds of forms and special-purpose materials to use. Your marketing representative can give you technical help, share information from other successful printer users, and help you design your own labels and special materials.

Preprinted Forms

If you are planning to use preprinted forms (for example, your company letterhead), ensure that the ink is designed for nonimpact printing. Certain inks are likely to rub off or smear after they have been heated by the fuser. Remember the following recommendations when selecting ink for preprinted forms:

- Use offset lithography to make preprinted forms for the printer.
- Choose inks that can tolerate the high temperatures in the fuser. Generally, oxidation-cured, oil-based inks withstand high temperatures better than latex inks.
- Allow plenty of drying time (from 1 to 2 weeks) before running preprinted forms through the printer. This is especially important when oil-based inks are used. Drying should take place in a mild environment of 15° to 27°C (60° to 80°F) and 35% to 50% relative humidity.
- Limit the amount of ink on the preprinted forms.
- Limit the use of oxidation retardants on the printing press when oxidation-cured inks are used.
- Choose forms with a surface that absorbs ink well. Avoid forms with a ribbed or heavy surface because they do not absorb ink well.

Adhesive Labels

Note: Adhesive labels cannot be used on duplex systems in duplex mode.

The printer can print on many types of adhesive labels. Use only adhesive labels intended for electrostatic printing applications to prevent:

- Poor fusing
- Toner offsetting in the printed stock
- Peeling labels
- Unreliable feeding and stacking
- Printer contamination.

Storing Print Materials

Store forms and special-purpose materials in an area where temperature and humidity are similar to the environment in which they are used. If forms are allowed to absorb too much moisture, wrinkles and blank spots may result.

Avoid areas with extreme heat or humidity. Extended exposure to these extremes can permanently damage the materials. Also, storing forms in an area where relative humidity is above 65% may result in reduced print quality.

Testing Forms and Applications

An ideal application for the printer would print standard-font text and simple images on plain white paper, 75-g/m² (20-lb) bond. This paper would be manufactured specifically for use in nonimpact printers, and would be free of binder holes, cut-outs, and other cuts. The page layout would keep text and images away from perforations. After leaving the printer, output from an ideal application would be allowed to cool, and would receive minimal handling, rubbing, and creasing.

When it is processing an ideal application, the printer can deliver maximum print quality and reliability. With applications that deviate from the ideal, print quality may decrease, and the need for operator interventions may increase. This does *not* mean that the printer cannot be used for the application; it *does* mean that you need to test the application.

For detailed information on deciding what forms and applications to test and how to test them, refer to *Forms Design Reference for Continuous Forms Advanced Function Printers*, G544-3921.

Appendix. Acronyms and Abbreviations

This list explains the acronyms and abbreviations used in this manual, and in the other manuals that are part of the printer documentation library.

ABIC	Adaptive Bi-Level Image Compression.
ac	alternating current.
AEA	Alternate Exception Action.
AFCCU	Advanced Function Common Control Unit.
AFIG	Advanced Function Image and Graphics.
AFP	Advanced Function Printing.
AFPF	Advanced Function Print Finishing.
AF POST	Advanced Function Post-processing.
ANSI	American National Standards Institute.
APA	All-Points Addressable.
ARQ	Active Record Queue.
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers.
BCOCA	Bar Code Object Content Architecture.
CCW	Channel Command Word.
CE	Customer Engineer (IBM).
CGPC	Canadian Grocery Product Code.
CPGID	Code Page Global Identifier.
CSW	Channel Status Word.
DASD	Direct Access Storage Device.
DBCS	Double Byte Character Set.
DCF	Document Composition Facility.
DPE	Decompression Performance Enhancement.
EAN	European Arictle Numbers.
EBCDIC	Extended Binary-Coded Decimal Interchange Code.
EC	Engineering Change.
ESCON	Enterprise System Connection.
ESMM	End Select Medium Modification.
FDDI	Fiber Distributed Data Interface.
FGID	Font Typeface Global Identifier.
FLSF	Font Library Service Facility.
FOCA	Font Object Content Architecture.
FORMDEF	Form Definition.

GDDM	Graphical Data Display Manager.
GCSGID	Graphic Character Set Global Identifier.
GOCA	Graphics Object Content Architecture.
IBM MMR	Similar to MMR 2-dimensional image compression algorithm.
IEEE	Institute of Electrical and Electronics Engineers.
IHF	Image Handling Facility.
IML	Initial Microcode Load.
IOCA	Image Object Content Architecture.
IPDS	Intelligent Printer Data Stream.
IPM	Impressions Per Minute.
ISO	International Organization for Standardization.
JAN	Japanese Article Numbers.
JES2	Job Entry System 2.
JES3	Job Entry System 3.
KB	Kilobyte (1KB=1 024 bytes).
LAN	Local Area Network.
MB	Megabyte (1MB=1 048 576 bytes).
MICR	Magnetic Ink Character Recognition.
MIH	Missing-Interrupt Handler.
MMR	Modified-Modified READ; 2-dimensional image compression algorithm. Also referred to as TSS Group 4.
MPC	Multiple Printer Controller.
MR	Modified READ; (READ=Relative Element Address Designate) 2-dimensional image compression algorithm. Also referred to as TSS Group 3.
MVS	Multiple Virtual Storage.
MVS/SP	Multiple Virtual Storage/System Product.
NPRO	Nonprocess Runout.
OCR	Optical Character Recognition.
OGL	Overlay Generation Language.
OS/VS	Operating System/Virtual Storage.
PAGEDEF	Page Definition.
PC	Photoconductor.
PEM	Print-Error Marker.
PMF	Print Management Facility.
POD	Print On Demand.
PPFA	Page Printer Formatting Aid.

PQE	Print Quality Enhancement.
PSAF	Print Services Access Facility.
PSF	Print Services Facility.
PUM	Printer Utility Module.
RAM	Random Access Memory.
RPQ	Request for Price Quotation.
SBCS	Single Byte Character Set.
SCSW	Subchannel Status Word.
SDLC	Synchronous Data Link Control.
SMM	Select Medium Modification.
SNA	System Network Architecture.
TCP/IP	Transmission Control Protocol/Internet Protocol.
TCS	Two-Channel Switch.
TSS	Telecommunication Standardization Sector.
UPC	Universal Product Code.
VSE	Virtual Storage Extended.
VSE/AF	Virtual Storage Extended/Advanced Functions.
VSE/SP	Virtual Storage Extended/System Product.

Glossary

The following terms are defined as they are used in printer documentation. If you do not find the term you need, refer to the index or to the *IBM Dictionary of Computing*, SC20-1699.

The following cross-references are used in this glossary:

- Contrast with. This refers to a term that has an opposed or substantively different meaning.
- Synonym for. This indicates that the term has the same meaning as another term, which is defined.
- Synonymous with. This identifies terms that are synonyms for the term that is defined.
- See. This refers to multiple-word terms that have the same last word.
- See also. This refers to related terms that have a similar, but not synonymous, meaning.

A

adaptive bi-level image compression (ABIC). A 4-bit image capable of displaying up to 16 shades of gray.

adhesive label. Special-application material; typically consists of paper labels coated on one side with an adhesive mixture temporarily affixed to backing material. See also *carrier*.

Advanced Function Image and Graphics. A integral facility within the printer to directly process IOCA image and GOCA graphics data streams.

all-points addressability. The capability to address, reference, and position text, overlays, and images at any defined point on the printable area of a page.

application. The use to which an information processing system is put; for example, a payroll application, an airline reservation application, a network application.

application program. A program written for or by a user that applies to the user's work, such as a program that does inventory control or payroll.

application programmer. A person who develops application programs. Contrast with *system programmer*.

auto load. In the printer, the automatic forms threading facility.

B

bar code. A code representing characters by sets of parallel bars of varying thickness and separation that are read optically by transverse scanning.

basis weight. The weight in pounds of a ream (500 sheets) of paper cut to a given standard size for that grade; for example, 25 x 38 inches for book papers, 17 x 22 inches for bond papers, and other sizes for other grades. The basis weight of continuous forms for computer output is based on the size for bond papers.

binder holes. A series of holes or slots punched at set intervals that allows the form to be inserted in a loose-leaf or ring binder.

bond (paper). Paper formulated with at least 80% wood pulp. Bond-paper forms work best in the printer.

C

calender. A process to make paper smooth or glossy by passing it through a series of metal rollers during the last steps of a paper-making machine.

calender cut. Slits, glazed lines, or discolored lines across the paper caused when wrinkles pass through the calender rollers.

caliper. The thickness of forms. This is usually expressed in thousandths of an inch.

carrier. The backing material for labels. Labels consist of the printable material, the adhesive, and the carrier.

chad. (1) The material separated from a data medium when punching a hole. (2) The residue separated from the carrier holes in continuous forms.

change. As used in printer action messages, instructs the printer operator to remove and discard a used component and then install a new one. For example, the CHANGE TONER COLLECTOR message indicates that the operator should take out the toner-collector bottle, throw it away, and put in a new one.

channel command. An instruction directing a data channel, control unit, or device to perform an operation or set of operations.

character. A letter, number, punctuation mark, or special graphic used for the production of text.

character set. (1) A finite set of different characters that is complete for a given purpose; for example, the character set in ISO Standard 646, "7-bit Coded

Character Set of Information Processing Interchange." (2) A group of characters used for a specific reason; for example, the set of characters a printer can print.

check. As used in printer action messages, instructs the printer operator to inspect a component. For example, the CHECK TONER COLLECTOR message indicates that the operator should look at the toner-collector bottle and ensure that it is physically present, in the proper place, and correctly installed.

clear. As used in printer action messages, instructs the printer operator to remove crumpled forms, paper scraps, and other debris from the printer. For example, the CLEAR UPPER TRACTOR message indicates that forms are wedged in the transfer station area, and the operator must remove them before the printer can operate.

coated paper. Paper that has had a surface coating applied to produce smoothness.

Code Page Global Identifier (CPGID). A unique code page identifier that can be expressed as either a two-byte binary or a five-digit decimal value.

configuration. (1) The arrangement of a computer system or network as defined by the nature, the number, and the chief characteristics of its functional units. More specifically, the term configuration may refer to a hardware configuration or a software configuration. (2) The devices and programs that make up a system, subsystem, or network.

configure. The procedure used to customize the printer to a specific operating and communication environment.

connector. A means of establishing electrical flow.

constant data. Data that does not change; for example, the company letterhead and standard text in form letters, or the headings and boxes on a preprinted form. Contrast with *variable data*.

continuous forms. A series of connected forms that feed continuously through a printing device. The connection between the forms is perforated to allow the user to tear them apart.

controlled-access area. An area where access is limited to authorized personnel.

controlling computer. The processing unit to which the printer is attached through a channel interface.

controlling computer system. The data-processing system to which a network is connected and with which the system can communicate.

corner cut. In a form, a cut or opening of any size containing one or more right angles.

corona. A small diameter wire (or wires, depending on the function) to which a high voltage is applied, causing ionization of the air. The ionization creates an electrical charge to perform various functions during the printing process.

cure. The process of drying ink sufficiently for minimum transfer of the ink to any parts of the printer it contacts.

cut. The severed part of a perforation. Cuts are separated by ties. See also *perforation*.

cutout. A part of the form that has been eliminated or perforated for subsequent removal; for example, corner cuts and binder holes.

D

data streaming. A non-interlocked method of data transfer used by the printer channel to decrease data transfer time during write operations.

developed image. The image that has been exposed onto the photoconductor and covered with toner by the developer.

developer mix. A combination of carrier beads and toner in which the beads electrically charge the toner.

diagnostic. Pertaining to the detection and isolation of errors in programs and faults in equipment.

diagnostic mode. The operational mode in which the printer can check itself in case of a malfunction. When the printer is in diagnostic mode, it is not accepting information from the attached controlling computer system. In the printer, only service representatives can use diagnostic mode. Contrast with *print mode*.

direct attach. The environment in which an application program directly allocates the printer.

dishing. The curve a stack of forms takes when folded or refolded at the fold perforation.

diskette. A thin, flexible, magnetic disk enclosed in a protective jacket.

Document Composition Facility (DCF). An IBM licensed program that provides text formatting for the printer.

down fold. Fanfold forms are alternately folded. When fanfold forms are unfolded and held horizontally, a fold is a down fold if it points down from the horizontal surface.

drag. The resistance to forms feeding freely into the printer; for example, the form rubbing against the carton.

duplex printing. A mode of printing on both sides of a form. Contrast with *simplex printing*.

E

electronic overlay. A collection of constant data electronically composed in the controlling computer. Can be merged with variable data on a page during printing. An electronic overlay defines its own environment. It can be in coded form or raster pattern form. See also *preprinted form*.

electrophotographic process. The creation of an image on forms by uniformly charging the photoconductor, creating an electrostatic image on the photoconductor, attracting negatively charged toner to the discharged areas of the photoconductor, and transferring and fusing the toner to forms.

emboss. To press and raise the surface of paper into a design. Embossed paper appears thicker than non-embossed paper, can increase printer wear, and can degrade print quality.

end-of-forms sensor. A sensor that detects when the last sheet of a form enters the printer.

error log. (1) A data set or file in a product or system where error information is stored for later access. (2) A record of machine checks, device errors, and volume statistical data.

ESCON channel. A channel having an Enterprise Systems Connection channel-to-control unit I/O interface that uses serial-by-bit optical cable as a transmission medium.

F

fanfold. Continuous forms that are alternately folded at regular intervals, usually on a perforation.

Fiber Distributed Data Interface (FDDI). An ANSI standard for a 100Mbps LAN using optical fiber cables.

fold memory. The ability of a form to refold at the fold perforation after exposure to heat during the fusing process.

fold perforation. The perforation on which a form is folded during manufacture and refolded after printing. See also *page perforation*.

Font Library Service Facility (FLSF). A licensed program that provides a way to make changes to a font while retaining its correct format, as defined by the architecture and as required by Print Services Facility.

Font Typeface Global Identifier (FGID). A unique font identifier that can be expressed as either a two-byte binary or a five-digit decimal value. The FGID

is used to identify a type style and the following characteristics: posture, weight, and width.

format. (1) The arrangement or layout of data on a data medium. (2) The size, style, type of page, margins, printing requirements, and so on, of a printed page.

forms. The material on which output data is printed, such as paper or adhesive labels. The area between perforations on continuous printer forms. See *electronic overlay* and *preprinted form*.

forms path. The entire route that forms travel during processing. The forms path usually begins where the forms are loaded and ends at the stacker. Synonym for *paper path*.

form definition (FORMDEF). A statement that specifies the attributes of a physical page, such as the number of copies and one-sided or two-sided printing.

fuse. To use heat and pressure to blend toner onto forms to make a permanent bond.

G

graphic. A symbol produced by a process such as handwriting, drawing, or printing. See also *vector graphics*.

Graphic Character Set Global Identifier (GCSGID). A unique graphic character set identifier that can be expressed as either a two-byte binary or a five-digit decimal value.

Graphical Data Display Manager (GDDM). An IBM licensed program that allows pictures to be defined and displayed through function routines.

I

IBM branch office. The local IBM sales office.

IBM installation planning representative. An IBM representative who assists customers in planning and meeting the requirements for installing hardware.

IBM marketing representative. An IBM representative who takes your order.

IBM service representative. An IBM representative who services IBM products in the field.

IBM World Trade Corporation. A subsidiary of IBM that manufactures and markets IBM products outside of the United States of America.

impact printer. A printer in which printing is the result of mechanical impacts. Contrast with *nonimpact printer*.

installation. (1) In system development, preparing and placing a functional unit in position for use. (2) A particular computing system, including the work it does and the people who manage it, operate it, apply it to problems, service it, and use the results it produces.

installation verification procedure. A procedure distributed with IBM licensed programs that tests the newly installed IBM programs to verify that the basic facilities of the programs are functioning correctly.

Intelligent Printer Data Stream (IPDS). Information the system sends to printers that contains decision-making capability. Generally, this information contains basic formatting, error recovery, and character data.

ISO sizes. Pertaining to a set of paper sizes selected from those standardized by the International Organization for Standardization (ISO) for use in data processing.

J

jam. In a printer, a condition where forms have become blocked or wedged in the forms path so the printer cannot operate.

JES2. An MVS subsystem that receives jobs into the system, converts them to internal format, selects them for running, processes their output, and purges them from the system. In an installation with more than one processor, each JES2 processor independently controls its job input, scheduling, and output processing. See also *JES3*.

JES3. An MVS subsystem that receives jobs into the system, converts them to internal format, selects them for running, processes their output, and purges them from the system. In complexes that have several loosely coupled processing units, the JES3 program manages processors so that the global processor exercises centralized control over the local processors and distributes jobs to them via a common job queue. See also *JES2*.

L

landscape orientation. Text and images that are printed parallel to the longer side of the forms. Contrast with *portrait orientation*.

laser (light amplification by stimulated emission of radiation). A device that emits a beam of coherent light.

latent image. In a printer, the invisible image that exists in the sensitized material after exposure but before development.

layout plan. A list of requirements, such as electrical and space, that must be considered before installing the IBM printer.

library. A collection of related files. For example, one line of an invoice may form an item, a complete invoice may form a file, and the collection of inventory control files may form a library. The libraries used by an organization are known as the data bank.

licensed program. A separately priced program that bears an IBM copyright and is offered to customers under the terms and conditions of the Agreement for IBM Licensed Programs.

line printer. A printer that prints a line of characters as a unit. Contrast with *page printer*.

logical page. A presentation space in which the page data is presented.

logo. An identifying emblem, statement, or motto of a company.

M

microcode. In the printer, refers to the microprogramming stored on the control unit hard disk. Microcode is used by the control unit to manage the printer and its functions.

microperforation. Extremely small perforations. After forms are separated, those with microperforations typically have smoother edges than those with regular perforations.

Multiple Printer Controller. Controller used with InfoPrint 4000 printers for on-demand printing. Sometimes referred to as a Print On Demand (POD) server.

Multiple Virtual Storage/System Product (MVS/SP). Consisting of MVS/System Product Version 1 and the MVS/370 Data Facility Product operating on a System/370 processor.

N

nonimpact printer. A printer in which printing is not the result of mechanical impacts. Contrast with *impact printer*.

nonprocess runout (NPRO). An operation that moves forms through the forms path without printing.

O

offset paper. A grade of paper to which sizing is added to resist moisture and surface during printing by ink presses.

operating environment. The physical environment; for example, temperature, humidity, layout, or power requirements.

operating requirements. A list of requirements, such as environmental, electrical, and space, that must be satisfied before the IBM printer can be installed.

Operating System/Virtual Storage (OS/VS). A compatible extension of the IBM System/360 Operating System that supports hardware and the extended control facilities of System/370.

optical character recognition (OCR). Character recognition that uses optical means to identify graphic characters.

orientation. The number of degrees an object is rotated relative to a reference; for example, the orientation of an overlay relative to the page point of origin. See also *text orientation*.

overlay. See *electronic overlay.*

Overlay Generation Language/370 (OGL/370). The licensed program that is used to create electronic overlays.

P

page. An object that contains presentation data. See also *logical page*.

page definition (PAGEDEF). A statement that specifies attributes of a logical page, such as the width of its margins and the orientation of text.

page perforation. The perforation that defines the page of a form. It may or may not be at a fold in the form. A form may have several pages between each fold. See also *fold perforation*.

page printer. A device that prints one page as a unit. Contrast with *line printer*.

Page Printer Formatting Aid/370 (PPFA/370). A licensed program that creates form definitions (FORMDEFs) and page definitions (PAGEDEFs).

pallet. A portable platform for handling, storing, or moving materials.

paper break. A separation, either at a perforation or from a tear, of the continuous-forms paper.

paper path. The entire route that forms travel while they are being processed. The paper path usually begins where the forms are loaded and ends at the stacker. Because not all forms are paper, the term *forms path* is preferred.

parallel channel. A channel having a System/360 or System/370 channel-to-control unit interface that uses parallel cable bus-and-tag as a transmission medium. Contrast with *ESCON channel*.

parameter. A variable that is given a constant value for a specified application and that may denote the application.

partition. In Basic N_Up printing, the division of the medium presentation space into a specified number of equal-sized areas in manner determined by the current physical medium.

PC drum. A hollow cylinder that is covered with photoconductive material.

pel (picture element). (1) An element of a raster pattern; a point where a toned area on the photoconductor may appear. (2) On an all-points-addressable output medium, each pel is an addressable unit. On a row-column addressable output medium, the only pel addressable is the beginning of a character cell.

perforation. A linear series of unconnected cuts in the continuous-forms paper. The interval between cuts is referred to as a tie. The perforation defines either a fold or page boundary. See also *cut*, *fold perforation*, *microperforation*, and *page perforation*.

photoconductor. The material that is wrapped about the drum. The medium for transferring images to paper.

physical planner. The person in an organization who plans the environmental, electrical, and space requirements for your facility.

pixel. See *pel*.

planning coordinator. The person in your organization who is responsible for coordinating all the planning and installation activities for the printer.

plant. A manufacturing location.

point of origin. The location of the first print position on a logical page. The point of origin is usually stated in terms of X and Y coordinates. The point of origin used by a printer can be affected by factors such as printable area and forms orientation.

portrait orientation. Pertaining to a display or hard copy with greater height than width. Contrast with *landscape orientation*.

preprinted form. A sheet of forms containing a preprinted design of constant data with which variable data can be combined. See also *electronic overlay*.

Print Management Facility (PMF). An interactive menu-driven program that can be used to create and modify fonts and to define output formatting for data printed on the printer.

print mode. The operational mode in which information is received from the attached controlling computer system and printed output is produced. Contrast with *diagnostic mode*.

print position. The physical positions of the characters constituting a print line relative to the form.

print quality. The quality of printed output relative to existing standards and in comparison with jobs printed earlier.

Print Services Access Facility (PSAF). A menu-driven, print-parameter selection program for page printers controlled by PSF.

print surface. The side of a form that receives the printed image.

R

raster. (1) In computer graphics, a predetermined pattern of lines that provides uniform coverage of a display space. (2) The coordinate grid that divides the display area of a display device. (3) In the printer Printer Subsystem, an on/off pattern of electrostatic images produced by the laser print head under control of the character generator.

raster pattern. A series of picture elements (pels) arranged in scan lines to form an image.

registration. In printing, refers to the relative print positions of images that are printed at different times. For example, when you process preprinted forms, the registration is good if the new image printed by the printer aligns correctly with the preprinted image. Print that extends beyond box edges and text that overlaps other text are examples of poor registration.

resource. (1) People, equipment, or material used to perform a task or a project. (2) Any facility of a computing system or operating system required by a job or task, including main storage, input/output devices, processing units, data sets, and controller processing programs; for example, page printers use resources such as form definitions, page definitions, and fonts.

reverse heading. A heading where each character is highlighted by reversing the color of the character with its background; for example, changing a black character on a white background to a white character on a black background.

S

scanner. A device that examines OCR, graphics, MICR, or bar-code patterns and generates electrical signals corresponding to the pattern. It sends the signals to a computing device for processing.

screen or screening. In document printing, a sheet of material, usually film, carrying a regular pattern of small dots. When printing, ink adheres only to the dots, and many dots close together appear solid. This method prints large areas of ink on paper but uses much less ink than printing the same area with solid ink.

security paper. Specially formulated paper used for negotiable documents, such as checks, which improves the anti-fraud characteristics of the document.

shift. A scheduled work period. For example, a 24-hour day is often divided into three 8-hour shifts.

simplex printing. Pertaining to printing on only one side of a form. Contrast with *duplex printing*.

sizing. A process where paper is treated to give it resistance against penetration of liquids.

special-purpose materials. Printable items other than blank forms; for example, adhesive labels and preprinted forms.

SRC. See *system reference code*.

stack lean. A measurable slope from the vertical of a stack of forms. Excessive stack lean can cause failures when feeding and refolding forms.

system reference code. A code that contains information, such as a failing field-replaceable unit, for a customer engineer.

system programmer. A programmer who plans, generates, maintains, extends, and controls the use of an operating system, with the aim of improving overall productivity of an installation. Contrast with *application programmer*.

System/370. An upward-compatible extension of the IBM System/360. A large collection of computing system devices that can be combined to produce a wide range of computing systems that share many characteristics, including a common machine language.

T

task. A basic unit of work to be accomplished by a device or an operator.

TCP/IP. Transmission Control Protocol/Internet Protocol. A set of communication protocols that support peer-to-peer connectivity functions for both local and wide area networks.

tensile strength. A measure of the force that the paper forms can withstand without tearing.

text orientation. The position of text as a combination of print direction and baseline direction.

tie. The interval between cuts of a perforation. See also *perforation*.

toner. The material that forms the image on the paper.

trace. (1) A record of the running of a computer program. It exhibits the sequences in which the instructions were executed. (2) To record a series of events as they occur. (3) In the printer, a service representative and customer analysis procedure.

tractor. The mechanism that controls movement of continuous forms by way of holes (see *tractor holes*).

tractor holes. The holes in the side margins on continuous forms. When placed on the tractor pins, the holes maintain printer alignment and registration, and control the movement of the paper.

Two-Channel Switch. A device used with the System/370 channel attachment, that allows an input or output device to be attached to two channels.

U

up fold. Fanfold forms are alternately folded. When fanfold forms are unfolded and held horizontally, a fold is an up fold if it points up from the horizontal surface.

V

variable data. The data that can vary; for example, the names and addresses in form letters.

vector graphics. Computer graphics in which display images are generated from display commands and coordinate data. Contrast with *raster pattern*.

Virtual Storage Extended (VSE). An operating system that is an extension of Disk Operating System/Virtual Storage.

Virtual Storage Extended/Advanced Functions (VSE/AF). The minimum operating system support for a VSE-controlled installation.

void. (1) A missing part of the printed character. (2) A missing piece of a continuous form.

Index

Numerics

Readers' Comments — We'd Like to Hear from You

InfoPrint 4000 and
3900 Advanced Function Printers
Introduction and Planning Guide

Publication No. G544-5427-05

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	☐	☐	☐	☐	☐

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Easy to find	☐	☐	☐	☐	☐
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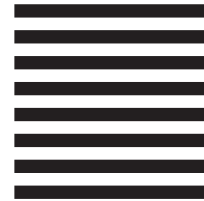Fold and Tape   **Please do not staple**   Fold and Tape

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