

# **Xerox MRP Family**

**4215/MRP, 4219/MRP, 4220/MRP, 4230/MRP**

## **Intelligent Printer Data Stream (IPDS) Configuration and Reference Guide**

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## Installation caution

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Your Xerox Intelligent Printer Data Stream (IPDS) printer is not customer installable. Only a qualified service representative should install the equipment.

Before using your IPDS printer, become familiar with the operating procedures contained in its operator guide.

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## Safety

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**CAUTION:** This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the installation requirements, may cause interference to radio communications.

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### U.S.A.

Your printer has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference. In such cases, the user at his or her own expense is required to correct the interference.

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### U.S. regulations governing the use of facsimile devices

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This equipment complies with Part 68 of the FCC rules. Located on the fax board is a label that contains, among other information, the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. Upon request, you must provide this information to your telephone company.

The REN is useful to determine the quantity of devices you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all, areas, the sum of the RENs of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to your telephone line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area. The REN for this device is 0.8B.

### Canada

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This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian department of communications.

Les present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils de Classe A prescrites dans le reglement sur le brouillage radioelectrique edicte par le ministre des communications du Canada.

### Europe: 50 Hz, 220 to 240 V equipment

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This equipment has been tested and certified in conformance with European commission directive 82/499/ECC and VDE 0871/0875, Class A, relating to radio frequency interference.

## Laser safety

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Your printer complies with appropriate safety standards. Specifically regarding lasers, the equipment complies with laser product performance standards set by governmental, international, and national agencies as a Class 1 laser product. It does not emit hazardous light; the beam is totally enclosed during all phases of customer operation and maintenance.



**WARNING:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

### Warning labels

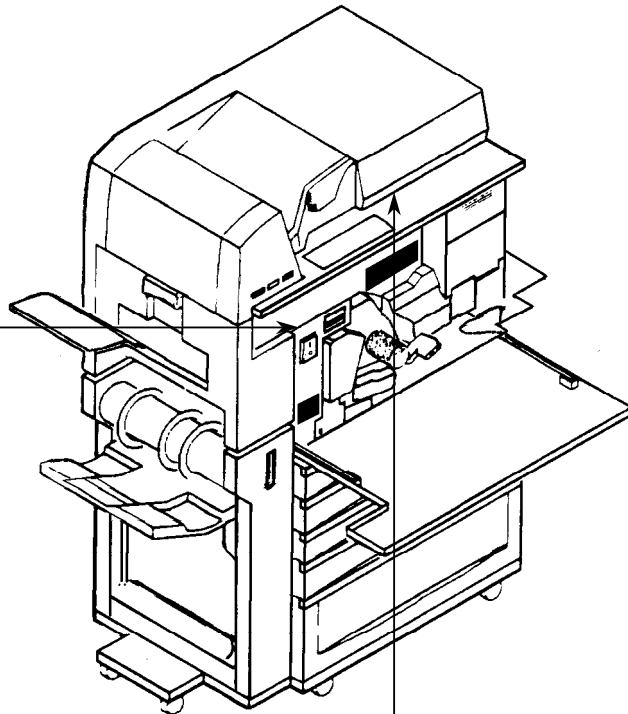
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There are several user accessible Laser Safety Warning labels located on the printer. These are shown on the next two pages.

**DANGER**-invisible laser radiation when open and interlock defeated for service.

**AVOID DIRECT EXPOSURE TO BEAM.**

Instructions for safe service are in **SERVICE MANUAL**.



**CAUTION** INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.  
**ATTENTION** RAYONNEMENT LASER INVISIBLE DANGEREUX EN CAS D'OUVERTURE ET LORSQUE LA SÉCURITÉ EST NEUTRALISÉE.  
 ÉVITER DE S'EXPOSER AU RAYON LASER.

**VORSICHT!** UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT. NICHT DEM STRAHLE AUSSETZEN.

**VARO!** AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.

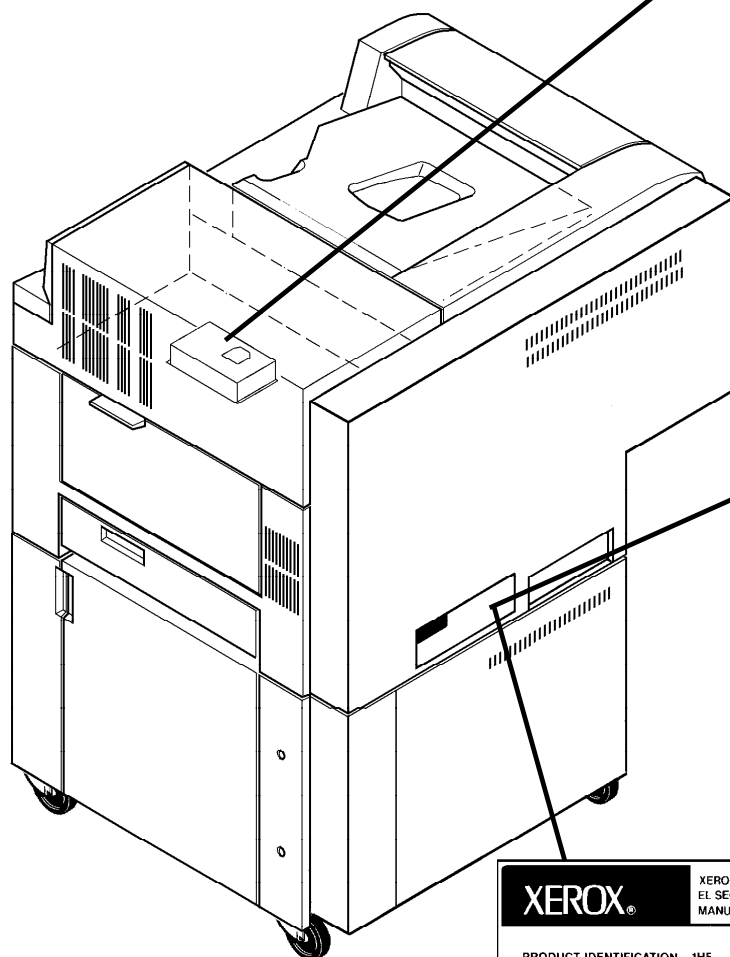
**VARNING** OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRRAR ÄR URKOPPLADE. STRÅLEN ÄR FARLIG.

**ADVARSEL** USYNLIG LASERSTRÅLING NÄR DEKSEL ÅPNES OG SIKKERHETSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.

**ADVARSEL** USYNLIG LASERSTRÅLING VED ÅBNING, NÄR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.




Laser labels on the rear of the machine are either:





# DANGER

INVISIBLE LASER RADIATION WHEN 'ROS COVER2' OPEN, AND WHEN 'ROS COVER1' OR 'ROS COVER3' OPEN.  
AVOID DIRECT EXPOSURE TO BEAM.

50hz.  
Configuration

<b>XEROX</b>		XEROX CORPORATION	
PRODUCT IDENTIFIER		1H7	
VOLTS	220/240V		
AMPERES	6.5A		
HERTZ	50Hz		
CLASSIFIED BY UNDERWRITERS LABORATORIES INC. IN ACCORDANCE WITH I. E. C. PUBLICATION 950. 82 499 EEC			
			
<b>CLASS 1 LASER PRODUCT LASER KLASSE 1</b>			

60hz.  
Configuration

<b>XEROX</b>		XEROX CORPORATION EL SEGUNDO, CALIFORNIA 90245 MANUFACTURED IN JAPAN	
PRODUCT IDENTIFICATION		1H5	
VOLTS	115V		
AMPERES	12A		
HERTZ	60Hz		
 			
<small>CERTIFIED ONLY TO CANADIAN ELECTRICAL CODES CERTIFIÉ UNIQUEMENT DU CODE CANADIEN DE L'ÉLECTRICITÉ SEULEMENT</small>			
<small>THIS PRODUCT COMPLIES WITH REGULATIONS, 21 CFR CHAPTER 1 SUB CHAPTER J SECTION 100.1040 AT DATE OF MANUFACTURE MONTH OF MANUFACTURE</small>			
<small>FEBRUARY 1994 4B09</small>			
<b>CAUTION</b> <small>*OPERATION OF ELECTRICAL EQUIPMENT WITHOUT PROPER ELECTRICAL SERVICE MAY BE DANGEROUS TO OPERATING PERSONNEL. IF THIS EQUIPMENT IS MOVED TO ANOTHER LOCATION, OPERATED FROM ANOTHER ELECTRICAL SOURCE, OR IF ALTERATIONS ARE PERFORMED ON THE PREMISES WHICH COULD AFFECT THE ELECTRICAL SERVICE AND/OR GROUND IN THE BUILDING, CONTACT A LICENSED ELECTRICIAN TO CHECK FOR PROPER ELECTRICAL SERVICE.</small> <b>COMPLIES WITH THE LIMITS FOR A CLASS A COMPUTING DEVICE PURSUANT TO SUBPART J OF PART 15 OF FCC RULES.</b> <small>This Digital Apparatus does not exceed the Class A Limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the Canadian Department of Communications.          Cet appareil numérique est conforme aux limites d'émission de bruits radioélectriques pour les appareils de Classe A stipulées dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada.</small>			

These laser warning labels are placed on panels that cover areas that are not operator serviceable. These panels are not to be removed.

## Operational safety

Your Xerox equipment and supplies are designed and tested to meet strict safety requirements. These include safety agency examination, approval, and compliance with established environmental standards.

Attention to the following information ensures the continued safe operation of your equipment.

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### Do this

Always connect equipment to a properly grounded power source receptacle. If in doubt, have the receptacle checked by a qualified electrician.



**WARNING:** Improper connection of the equipment grounding conductor can result in electrical shock.

Always place equipment on a floor with adequate strength for the weight of the machine.

Always have your service representative move or relocate the equipment.

Always use materials and supplies specifically designed for your Xerox equipment.



**WARNING:** Use of unsuitable materials may result in poor performance and can possibly create a hazardous condition.

Always use a Xerox specified cordset with the Equipment Leakage Current Interrupter (ELCI).

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### Do not do this

Never use an extension cord with the ELCI.

Never use the ELCI where water may enter the casing.

Never attempt any maintenance function that is not specifically described in your Xerox printer documentation.

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

Never override or "cheat" electrical or mechanical devices.

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

**U.S. only:** If you need any additional safety information concerning the equipment or if you need Xerox supplied materials, call the following toll-free number: **1-800-828-6571**.

---

### Approvals and certification

**60 Hz, 115 V**

Listed by Underwriters Laboratories (UL), UL1950. Meets CSA standards, C22.2 NO 950.

**50 Hz, 220 to 240 V**

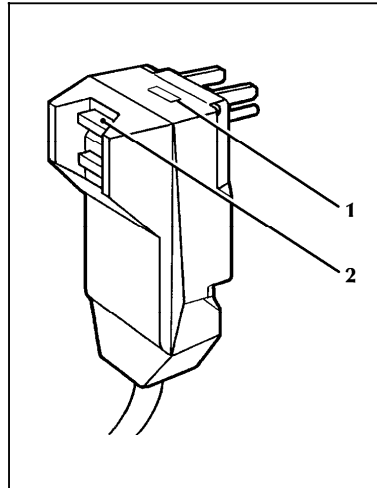
Meets the IEC950 as judged by UL.

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### Safety feature

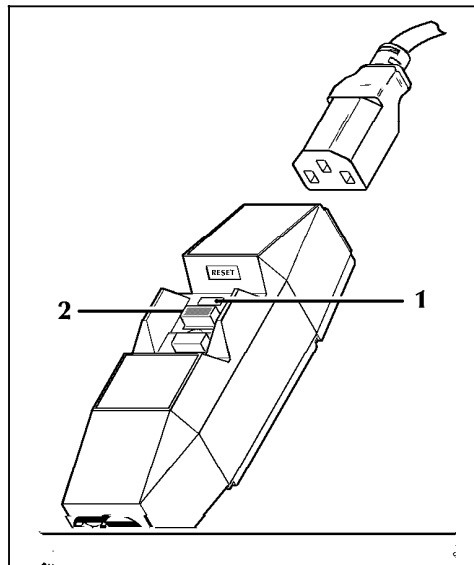
Your printer is equipped with an Equipment Leakage Current Interrupter (ELCI). This device protects the equipment in the event of a malfunction.

### U.S. configuration of ELCI



- 1 Window
- 2 Reset button.

### International configuration of ELCI



- 1 Window
- 2 Reset button.

If power to the printer is interrupted, follow these steps:

1. Locate the safety device, using the U.S. or International Configuration (refer to the appropriate illustration).
2. Check to see if a red flag displays in the window of the safety device.
3. If the red flag does not display, press and release the black Reset button.

The red flag displays and power is restored to the system.

If power is not restored by this procedure or if the device interrupts power to the machine again, call your service representative.



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The *Xerox MRP Family Intelligent Printer Data Stream (IPDS) Configuration and Reference Guide* describes how IPDS is supported on the following Xerox printers: 4215/MRP, 4219/MRP, 4220/MRP, and 4230/MRP.

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## About this manual

This guide provides configuration information and describes how the IBM IPDS command sets are supported on your Xerox printer. It is intended to complement your IBM IPDS documentation.

This guide is for system administrators as well as individuals who are developing or adapting a program using the IPDS system architecture. Before using this guide, become familiar with its contents and conventions.

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## Conventions

This guide uses the following conventions to help you recognize different types of information:



**CAUTION:** Cautions are associated with equipment safety.



**WARNING:** Warnings are associated with the safety of people.

N

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

*italics*

Items are italicized for the following reasons:

- Document and library names (for example, the *Xerox MRP Family Intelligent Printer Data Stream (IPDS) Configuration and Reference Guide*)
- Variable information (for example, *password*).

X

Represents hexadecimal (HEX) code. For example: X'05' or X'25'.

MB

Megabyte.

KB

Kilobyte.

**bold**

Bold text is used for characters you enter and screen options you select (for example, **md \MAKEITDS**).



The Xerox Intelligent Printer Data Stream (IPDS) interface allows your Xerox printer to receive and print using IPDS commands. The IPDS interface allows your printer to emulate any of the following IBM printers:

- IBM LaserPrinter 4028, a 300–pel relative metric (RIMA) printer
- IBM LaserPrinter 3812, a 240–pel fixed metric printer
- IBM LaserPrinter 3816, a 240–pel fixed metric printer

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## Using IPDS with your printer

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Once the IPDS interface card is installed and the system is configured, your printer has the ability to do the following:

- Receive and print IPDS data stream commands.
- Support the following IPDS towers:
  - Device Control
  - Text
  - IM Image
  - IO Image
  - Graphics
  - Bar code
  - Overlay
  - Page Segment
  - Load Font
- Use all–points–addressable (APA) printing for text, graphics, images, or bar codes. This means you can print at any position within the printable area of the page.
- Change fonts within a printed page.
- Use images and vector graphics to produce line drawings, pie and bar charts, graphics, logos, tables, and signatures.
- Create a composite document of text, images, and graphics on each page.
- Electronically store forms and letterheads so they always print in the same typestyle.
- Print the standard set of bar codes including Codabar, Code 128, and POSTNET.
- Process compressed images using one of the following:
  - Modified Consultative Committee on International Telephone and Telegraph (CCITT) Modified Read (MMR) algorithm

- CCITT T.4 G3 Facsimile Two-Dimensional Coding Scheme (G3 MR)
- CCITT T.6 G4 Facsimile Two-Dimensional Coding Scheme (G4 MMR).

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## Page environment

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IPDS creates composite pages (pages with data, graphics, and images) within a hierarchy of presentation spaces:

- Physical page—the paper on which you print information.
- Physical printable page—the area of the paper that is accessible by your Xerox printer. There is a 50-pixel nonprintable area surrounding any IPDS page.
- Logical page—a rectangular area on the physical page. Printing occurs only where the current logical page area intersects the printable area of the physical page.
- Data blocks—rectangular areas placed on the logical page. Data blocks include the following:
  - Graphics data blocks
  - Bar code data blocks
  - IM and IO Image data blocks.

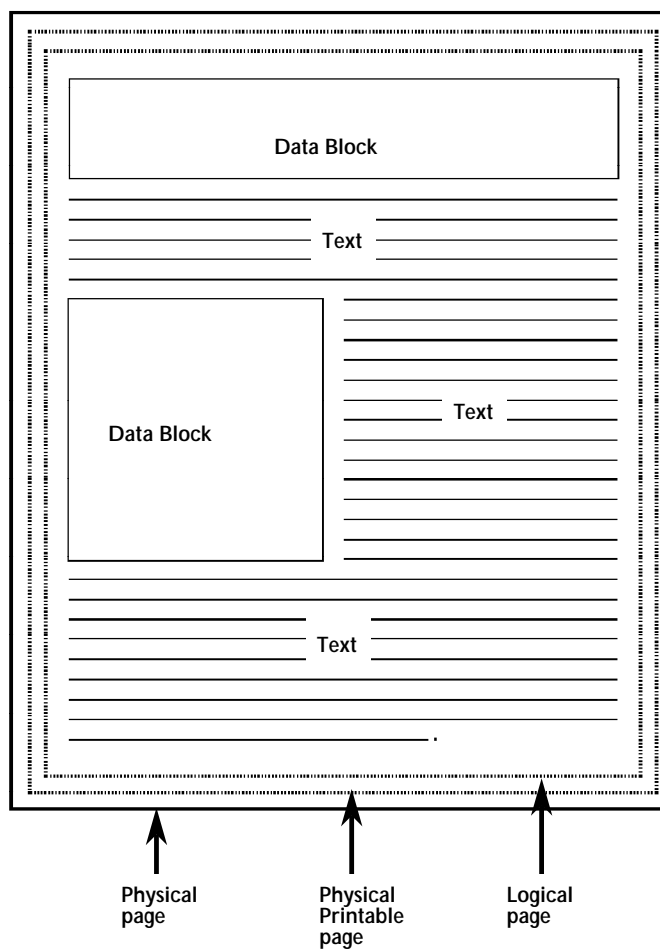
There are no text data blocks. You can position text at any location inside the valid printable area (VPA).

IM images are image objects that are resolution-dependent, bilevel, and cannot be scaled or compressed. IO images are image objects containing Image Object Content Architecture (IOCA) constructs. IO images are resolution-independent, bilevel, and can be scaled or compressed.

You can use various applications to create the source data for each data block and then merge them at the printer to produce an integrated mixed-data page. This allows you to integrate application output rather than use integrated applications.

Figure 1–1 provides an example of the page environment and its presentation spaces.

Figure 1-1. Page environment

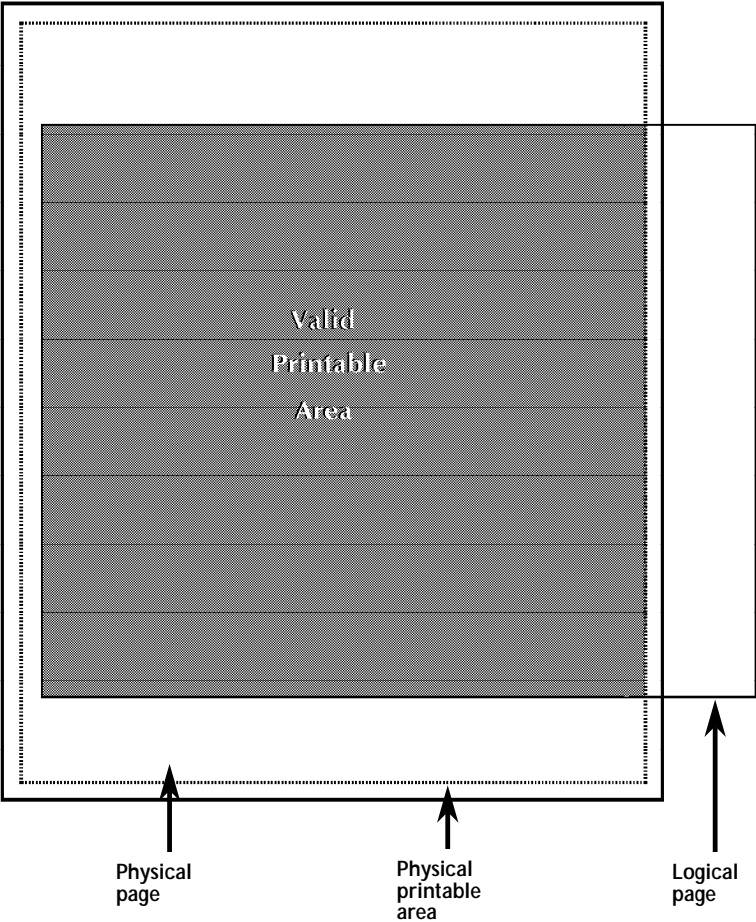


# Valid printable area

The valid printable area (VPA) is the intersection of the current logical page with the printable area of the physical page. Text may be printed at any location in the valid printable area. Printing cannot occur outside of the VPA. Positioning outside of the VPA is possible but generates exceptions.

The host retrieves the printable area of the physical page through the XOH Obtain Printer Characteristics command. The host defines the logical page using the Load Page Descriptor (LPD) command.

Figure 1–2.      **Valid printable area (VPA)**



Some printers have a nonprintable area on the page. Table 1–1 lists the nonprintable area by printer.

Table 1–1.      **Nonprintable area**

Printer	Nonprintable area
Xerox MRP Family printers	50 pixels
IBM 4028	48 pixels
IBM 3812/3816	None



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## Typical applications

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When you use IPDS to produce a document or form, you can incorporate the following elements:

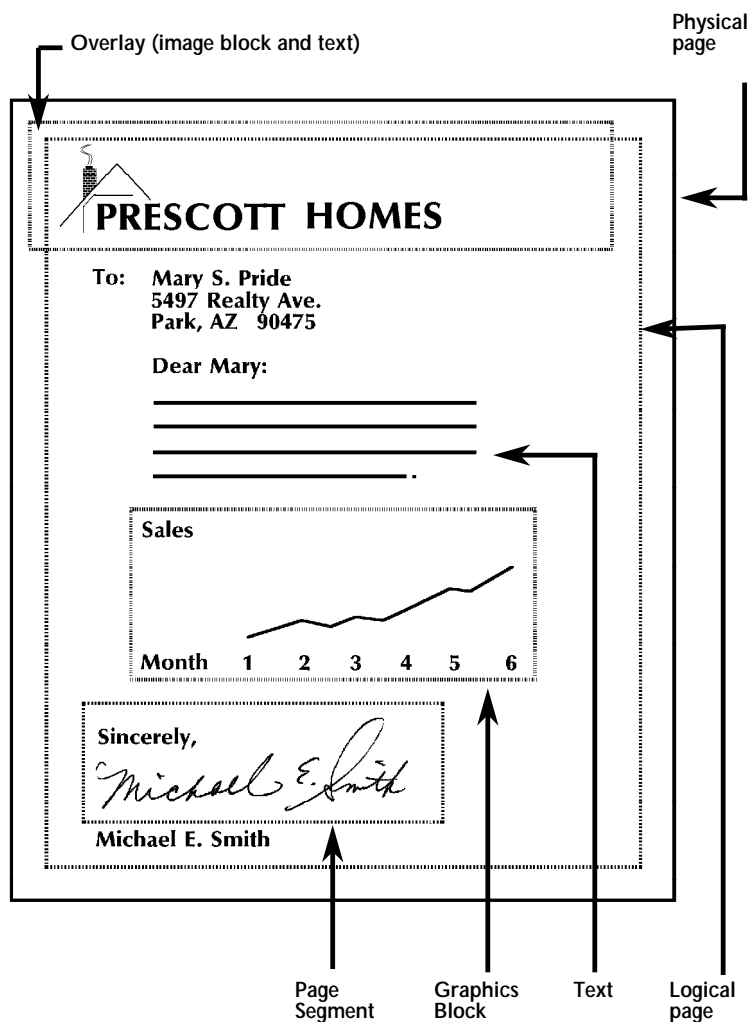
- Text
- Overlays
- Page segments
- Images and graphics
- Bar codes

If you are producing many similar documents, such as a marketing letter where only the customer name and address change, you need to find a quick way to print on letterhead, merge the variable information into the text of the letter, and sign each one. You can use IPDS to do the following functions:

- Create and store the letterhead and signature block in printer memory
- Merge the letterhead with the basic text of the letter
- Merge the signature block
- Use different types for the letterhead and different parts of the letter
- Add graphics, such as pie or bar charts, that are stored on the host system

Figure 1–3 shows a letter containing an overlay, page segment, graphics block, and text.

Figure 1–3. Sample letter layout elements



## Overlays

Overlays are resources you can temporarily store in printer memory. Overlays can consist of any combination of text data, image block data, graphics block data, or bar code data. When you define an overlay, it contains all printing instructions including its position on the page and the typestyle to use. It is independent of the logical page environment.

Letterheads and business forms are typical applications of overlays. You can merge variable data, such as the customer's name and address, with the overlay during printing and you can include other overlays and page segments within an overlay. You can nest overlays, which means you can include several levels of overlays within an overlay, depending on their size.

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## Page segments

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Page segments can consist of any combination of text data, image block data, graphics block data, or bar code data. Page segments are different from overlays in that you store them without printing instructions regarding the typestyle and page position.

Page segments are dependent on the page environment in that they merge with the logical page acquiring its characteristics. The typestyle for the page segment is the same one used when printing occurs. You can place page segments at any position on the page as long as all elements fall within the VPA.

- N **Note:** You cannot include other page segments or overlays within page segments.

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## Images and graphics

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You can send illustrations, such as charts, complex line drawings, and schematics to the printer as graphics, IM images, or IO images.

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### Images

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You create images by specifying individual points on the page. The points are called picture elements, or pels. Using an all-points-addressable system, each square inch on the page contains 300 by 300 points you can address. Because of the way they are created, each figure or image can require a large quantity of data.

IM images are based on Advanced Function Printing Data Stream (AFPDS) image cells. IM images are uncompressed raster data images, which are stored in your printer.

IO images are based on Image Object Content Architecture (IOCA). IO images are raster data images you can compress. Compressed images reduce the amount of data sent to the printer to create them and speed up transmission time. You can scale IO images to correct differences that may occur in the resolution of the scanner as compared to the printer.

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### Graphics

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You create vector graphics using individual lines, arcs, and markers to identify a specific location in a graphic. You can create complex graphics using a minimum of data because only the control information, such as the end points of a line, are sent to the printer.

## Bar codes

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A bar code is a set of patterns (bars and spaces) that represent alphabetic, numeric, and special characters. The bars and spaces are recognized by optical scanning devices. Many bar code types also include data you can read as well.

You can position bar codes on a logical page, page segment, or overlay. To ensure proper interpretation of the bar coded data, position the entire bar code in the printable area.

The supported bar code types are as follows:

- 3 of 9 code
- MSI
- UPC/CGPC Version A
- UP/CGPC Version E
- UPC Two-Character Supplemental
- UPC Five-Character Supplemental
- EAN-8
- EAN-13
- 2 of 5 Industrial
- 2 of 5 Matrix
- 2 of 5 Interleaved
- Codabar
- Code 128
- EAN Two-Digit Add-on
- EAN Five-Digit Add-on
- Postal Barcode (POSTNET)

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## Fonts

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A font is a set of characters in a specific typestyle and size. You can download fonts to your printer or use the fonts that are resident in printer storage.

**N    Note:** Xerox IPDS emulation does not support all fonts and code pages supported by the IBM systems. The typestyles in the supported fonts may have slight differences as compared to the IBM fonts.

The 4028 emulation provides 30 resident fonts and 53 resident code pages. The 3812/3816 emulation provides 37 fonts and 48 resident code pages. The Printer Configuration Report lists all resident fonts and code pages. Examples of the report are shown in the "Configuring IPDS" chapter.

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## Coordinate systems

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IPDS uses orthogonal coordinate systems to define any point on a page. The distances within these systems are measured in logical units (L-units) instead of physical picture elements. The coordinate systems are listed in this section. For greater detail, refer to the *IBM Intelligent Printer Data Stream Reference*, publication number S544-3417-04.

- Xm, Ym coordinate system—the physical page (medium) coordinate system.
- Xp, Yp coordinate system—the logical page presentation space coordinate system for both a page's logical page and an overlay's logical page.
- Inline, Baseline (I, B) coordinate system—describes the placement and orientation of text characters and data blocks on the logical page.
- Xg, Yg coordinate system—describes the placement of graphics data within the graphics presentation space.
- Xio, Yio coordinate system—describes the placement of IO image data within the IO image presentation space.
- Xbc, Ybc coordinate system—describes the placement of bar code data within the bar code presentation space.
- Xbl, Ybl coordinate system—describes the placement of IO image, graphics, and bar code presentation spaces within data blocks that are positioned on a logical page.

All coordinate systems can be used to locate any point in relation to the logical page and the medium space.



This chapter shows how to upgrade the interface card and set up the printer for IPDS.

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## Upgrading the interface card

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Follow these steps to upgrade the interface card prior to configuring your printer for IPDS:

1. Turn off the printer.
2. Install a Centronics cable from the parallel port of the PC to the mini-Centronics port on the interface card using the adaptor cable included in the option kit.
3. Power on the printer.
4. Perform one of the following steps:
  - If you are updating a printer in a coax environment, type the following and press Enter:

**COPY <floppy drive letter>:\*.XCX LPT1:/B**

- If you are updating a printer in a twinax environment, type the following and press Enter:

**COPY <floppy drive letter>:\*.XTX LPT1:/B**

When the file has completed copying to the printer, the LED on the interface board blinks for about 20 seconds.

5. Turn off the printer and turn it on again.

**Note:** Ignore any error sheets printed on the first power-on after loading new firmware. The system generates them when it recognizes new software.

## Setting up the printer for IPDS

This section contains the following procedures:

- Setting the printer emulation and address for IPDS processing only.
- Setting the printer for dual emulation and addresses in a twinax environment if you want to process both IPDS and SCS data streams on the same twinax printer.
- Copying the MakeITDS utility files to a directory on your computer.

- N **Note:** If you have installed the IPDS card in the coax environment, you can skip to the “Copying the MakeITDS utility files” section to install the MakeITDS files. Then continue with the “Configuring your printer” section if you need to change any settings in the configuration file.
- N **Note:** If you have installed the IPDS option on a 4219/MRP or a 4215/MRP, you must make sure the PCL Line Wrap option is turned off at the user interface. Refer to your printer’s operator guide for the procedure.

### Setting the printer emulation and address for IPDS processing in twinax only

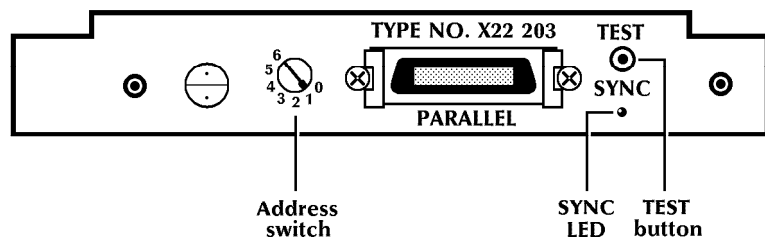
If you are working in a twinax environment, you can set the twinax interface to respond only as an IPDS printer. This procedure may have been completed by your service representative during the installation of the IPDS card. This section provides the steps if you need to complete the process.

- N **Note:** Perform the steps in this section if you want to set up your printer to process IPDS only.

On the twinax interface card, use the address switch and the TEST button to set the printer emulation and printer address.

Figure 2–1 shows the location of the address switch, SYNC LED, and TEST button on the twinax interface card.

Figure 2–1. Twinax interface card





## Setting the printer emulation

---

Follow these steps to set the printer emulation:

1. Turn off the printer.
- N **Note:** For console printers, turn off the printer using the rear power switch. Make sure the front main power switch is left on.
2. Remove back panel from the console printer.
3. Disconnect the twinax T-cable.
4. Set the address switch to 5 to identify IPDS as the emulation (see table 2-1).
5. Hold down the TEST button.
6. While holding the TEST button down, turn on the printer. The SYNC LED flashes twice.
7. Continue holding down the TEST button for an additional 10 seconds after the LED flashes the second time.
8. Release the TEST button.  
The printer outputs a start-up page and a page identifying the emulation settings. These settings remain during power-off.

The interface card reads the address switch and stores the corresponding printer emulation setting in permanent memory on the interface card. This setting remains in permanent memory until you change it.

- N **Note:** After you set the emulation, you must set the printer address or the interface card will not accept data from the twinax port.

## Setting the printer address

---

Follow these steps to set the printer address:

1. Turn off the printer.
2. Reconnect the twinax T-cable.
3. Set the address switch to the address you want to assign to the printer (1, 2, 3, and so on). You cannot use an address switch that is already assigned to another device.
4. Turn the printer on.

The printer outputs a start-up page and the Xerox Twinax Configuration Report listing the printer emulation and address settings.

## Setting the printer for dual emulation and addresses in a twinax environment

This procedure may have been completed by your service representative during the installation of the IPDS card. This section provides the steps if you need to complete the process.

If you are using IPDS in a twinax environment, you can set the twinax interface to respond as both an SCS printer (which must be the primary device) and an IPDS printer (as the secondary device).

After you set up the primary device as SCS, download a Function Selection via Line (FSL) command to identify the IPDS printer as the secondary device at a different address.

Refer to figure 2–1, which shows the location of the address switch, SYNC LED, and TEST button on the twinax interface card.

Table 2–1 lists each address switch and its corresponding printer emulation.

Table 2–1. Twinax printer emulations

Address	IBM printer emulation
0	3812/5219/3816 (nonIPDS)
1	5224
2	5225
3	5256
4	4234
5	IPDS (if the card is installed)
6	4245/6262

### Setting the printer emulation of the primary device

Follow these steps to set the printer emulation:

1. Turn off the printer.
2. Remove back panel from the console printer.
3. Disconnect the twinax T-cable.
4. Refer to table 2–1 to identify the address switch for the emulation of the SCS primary device (5224=1, 5225=2, and so on).
5. Set the address switch to the number from the table.
6. Hold down the TEST button.
7. While holding down the TEST button, turn on the printer. The SYNC LED flashes twice.

8. Continue holding down the TEST button for an additional 10 seconds after the LED flashes the second time.
9. Release the TEST button.

The printer outputs a start-up page and a page identifying the emulation settings. These settings remain during power-off.

The interface card reads the address switch and stores the corresponding printer emulation setting in permanent memory on the interface card. This setting remains in permanent memory until you change it.

- N **Note:** After you set the emulation, you must set the printer address or the interface card will not accept data from the twinax port.

---

### Setting the printer address for the primary device

---

Follow these steps to set the printer address:

1. Turn off the printer.
- N **Note:** For console printers, turn off the printer using the rear power switch. Make sure the front main power switch is left on.
2. Reconnect the twinax T-cable.
  3. Set the address switch to the address you want to assign to the printer (1, 2, 3, and so on). You cannot use an address switch that is already assigned to another device.
  4. Turn the printer on.

The printer outputs a start-up page and the Xerox Twinax Configuration Report listing the printer emulation and address settings.

---

### Identifying the IPDS printer as the secondary device

---

To specify a different address for the secondary IPDS device, download the following FSL command from your host computer:

**&&??@Y37, \*IPDS, <address number> @&&??[space]**

- N **Note:** Make sure you specify a different number from the one you set for the SCS emulation using the address switch. The address settings appear on the configuration report.

For more information about this FSL command, refer to your *Xerox MRP Family Twinax Command Reference*.

If you want to return to a single emulation, follow the steps for setting the printer emulation and address for the primary device in the two preceding sections.



This chapter shows how to use the MakeITDS utility to generate IPDS transparent data stream (ITDS) files and configure your printer to receive files created with Intelligent Printer Data Stream (IPDS) architecture.

The MakeITDS utility creates an Advanced Function Printing Data Stream (AFPDS) document containing configuration and resource information. This information is downloaded transparently to the printer as part of an IPDS data stream.

ITDS provides a mechanism for communicating actions and resident resources between a host and the Xerox MRP family of printers. You can download the generated AFPDS/ITDS output file to any Xerox MRP family IPDS printer using a personal computer (PC), an IBM AS/400 system, or an IBM host.

- N **Note:** You may not need to run the MakeITDS utility. The default settings provided accommodate the requirements of most working environments. The default emulation is set to IBM 4028.

---

## MakeITDS utility

---

The MakeITDS utility is supplied on a 3.5-inch disk for use on a personal computer running any version of DOS or OS/2. The disk contains the following files in a compressed format:

- Utility and program files
  - README.1ST—brief installation instructions and an overview of using the MakeITDS utility
  - MAKEITDS.EXE—MakeITDS utility to allow ITDS to create an AFPDS document containing ITDS commands
  - MAKEITDS.INI—initialization file, which is used by the MAKEITDS.EXE program
- Resource specification files
  - SETPRN.IRS—resource specification for a configuration
  - 028FNT20.B92—factory default font set you need to download to emulate an IBM 4028 IPDS printer
  - 812FNT20.B92—factory default font set you need to download to emulate an IBM 3812 or 3816 IPDS printer.
- ASCII configuration files for default emulation
  - SET4028.ITX—configuration file to emulate the IBM 4028
  - SET3816.ITX—configuration file to emulate the IBM 3816

- SET3812.ITX—configuration file to emulate the IBM 3812
- BINARY ITDS configuration files for default emulation
  - SET4028.IDA—configuration file to emulate the IBM 4028
  - SET3816.IDA—configuration file to emulate the IBM 3816
  - SET3812.IDA—configuration file to emulate the IBM 3812
- MAKEVB.EXE—IBM mainframe utility and sample JCL that allows you to upload the IPDS font set and configuration files from a PC to the host, and then send them from the host to the printer.

---

## Copying the MakeITDS utility files

---

### Prerequisites

Print and review the README.1ST file located on the MakeITDS utility disk. This file contains the latest information on the MakeITDS utility.

Follow these steps to install the MakeITDS utility:

1. From the DOS root directory, create a directory called MAKEITDS to contain the MakeITDS utility files by typing the following and pressing Enter:

**MD MAKEITDS**

2. Change to the MAKEITDS directory by typing the following and pressing Enter:

**CD MAKEITDS**

3. Insert the MakeITDS utility disk into the floppy disk drive.
4. From the MAKEITDS directory, type the following and press Enter:

**COPY <floppy drive letter>:\*.\***

You have copied the compressed program files to the MAKEITDS directory.

5. To expand the files, type the following and press Enter:

**ITDSINST**

You have installed the utility files in the MakeITDS directory. The files are listed in the “MakeITDS utility” section earlier in this chapter.

- Note:** The instructions for loading and using MAKEVB.EXE are described in the “Configuring IPDS from an IBM VM or MVS host computer” later in this chapter.

---

## Command parameters

---

You run the MakeITDS utility by executing the MAKEITDS command. The command has the following syntax:

**MAKEITDS [/P] /R infile [/O outfile] [/L logfile] [/H]**

Table 3–1 describes the parameters of the MAKEITDS command.

Table 3-1. MAKEITDS command parameter description

Parameter	Description
/P	Pause. Instructs the program to wait for operator intervention. The pause occurs after the conversion results display on the screen.
/R	Resource Specification File. The filename may include the drive, pathname, filename, and extension. The default drive and pathname is the current directory. The default extension is .IRS. This parameter indicates the translation is from ASCII to binary. It is used with the Xerox-provided .ITX files.
/O	Output Filename for the ASCII or binary output file. The filename may include the drive, pathname, filename, and extension. The default drive and pathname is the current directory. The default extension is .ITX for the ASCII output file and .IDA for the binary output file. If you do not specify /O, the input filename and default extension is used.
/L	Log Filename. The filename may include the drive, pathname, filename, and extension. The default drive and pathname is the current directory. The default extension is .LOG. If you do not specify this parameter, the input filename and the default extension is used.
/H	Help option. Displays brief program information about the command parameters.

## Configuring your printer

The IPDS interface card is preloaded with the 4028 default font set.

- Note:** Perform the steps in this section only if you are changing the default font set and emulation from 4028 to 3812/3816 or you need to change any settings in the configuration file.

Reconfiguring your IPDS emulation consists of the following steps, which you must perform in the order shown:

- Download the default font set
- Download the emulation file
- Modify, convert, and download the configuration file if necessary.



**CAUTION:** Before you begin these procedures, make sure your computer is connected to the parallel port on the coax or twinax interface card using the mini-Centronics adapter supplied with the printer. The PC Centronics parallel cable should be no longer than 10 feet/3 meters.

- Note:** Some older PCs do not recognize the parallel port when you turn the printer off and on. If this should occur during these procedures, disconnect and reconnect the parallel cable from the port.

### Downloading the default font set

---

Follow these steps to download the default font set to match the printer you want to emulate:

1. Turn the printer off and on again. Wait until all configuration sheets print and the user interface indicates the printer is idle before continuing.
2. Determine the font set you want to use:
  - The 028FNT20.B92 file consists of 30 resident fonts matching the 4028 emulation. This is the default font set.
  - The 812FNT20.B92 file consists of 37 resident fonts matching the 3812/3816 emulation.
3. Depending on the printer you are emulating, type one of the following (substituting the name of your printer port for LPT1) and press Enter:
  - **COPY 028FNT20.B92 LPT1: /B**
  - **COPY 812FNT20.B92 LPT1: /B**

The printer outputs the IPDS – ITDS LOG PRINTOUT. The first sheet of the log indicates the ITDS download is in progress. The second sheet indicates the number of resources received and defined, any resources that were deleted, and the number of errors or warnings that occurred during the download. The download process takes a few minutes.

4. Turn the printer off and on again before continuing.

### Downloading the emulation file

---

There are several predefined emulation files you can use. The SET3812.IDA, SET3816.IDA, and SET4028.IDA set the printer emulation to 3812, 3816, and 4028 respectively and provide the default configuration settings. To change the default settings, you can modify and convert a configuration file, such as SET4028.ITX.

Follow these steps to change the printer emulation:

1. Depending on the printer you are emulating, type one of the following (substituting the name of your printer port for LPT1) and press Enter:
  - **COPY SET3812.IDA LPT1: /B**
  - **COPY SET3816.IDA LPT1: /B**
  - **COPY SET4028.IDA LPT1: /B**

The printer outputs the IPDS – ITDS LOG PRINTOUT. The first sheet of the log indicates the ITDS download is in progress. The second sheet indicates the number of resources received and defined, any resources that were deleted, and the number of errors or warnings that occurred during the download.

2. Turn the printer off and on again for the configuration changes to take effect.



## Modifying the configuration file

---

The predefined emulation files contain the default configuration settings for each emulation. To change any of the settings, you need to modify and convert a configuration file. You can select any of the ASCII configuration files listed in the “MakeITDS utility” section earlier in this chapter.

Follow these steps to modify and convert a configuration file:

1. From the MAKEITDS directory, make a copy of one of the .ITX files:

### **COPY SET4028.ITX SETPRN.ITX**

Make sure you specify SETPRN.ITX as the name of the copied file.

2. Using a text editor, such as the MS-DOS Editor program, scroll through the configuration file.
3. Make sure the settings match the configuration of your printer. Refer to table 3-3, which describes the fields you can modify. Most of the defaults shown in the table reflect the settings in the Xerox-supplied .ITX files.
4. Save the file and exit the text editor program.
5. Type the following and press Enter:

### **MAKEITDS /R SETPRN**

Do not include the .ITX extension when typing the command.

The MakeITDS utility converts the SETPRN.ITX configuration file to a binary output file, called SETPRN.IDA, and a log file, called SETPRN.LOG.

You can send the files to the printer in the following ways:

- From the PC directly over the parallel port
- From the PC using PC Support
- From the PC and store them on the AS/400

## Sending the file from your PC via the parallel port

---

1. Turn the printer off and on again. Wait until all configuration sheets print and the user interface indicates the printer is idle before continuing.
2. Plug your parallel cable into the supplied adaptor cable and connect it to the IPDS card.
3. Type the following (substituting the name of your printer port for LPT1) and press Enter:

### **COPY SETPRN.IDA LPT1: /B**

The printer outputs the IPDS – ITDS LOG PRINTOUT. The first sheet of the log indicates the ITDS download is in progress. The second sheet indicates the number of resources received and defined, any resources that were deleted, and the number of errors or warnings that occurred during the download.

**N**

**Note:** Do not send another configuration file until the printer has output the second sheet and the printer is idle.

Sending a MakeITDS file while one is still being processed causes the download to fail. The printer will not respond to further downloads until you turn it off and on again.

4. Turn the printer off and on again for the configuration changes to take effect.

---

### Sending the file from the PC via PC Support

---

You can transfer the resource file from OS/2 or DOS to an IBM AS/400 system through shared folders.

- N **Note:** In the AS/400 environment, you must have AFP set to yes for the printer device description.

1. Turn the printer off and on again. Wait until all configuration sheets print and the user interface indicates the printer is idle before continuing.
2. Open the PC Support/400 main menu.
3. Select **Use Printers on host system**.
4. Select **Assign or change virtual printers**.
5. Using the Choose a Virtual Printer screen, specify the following information:
  - a. Select **PC printer** and enter the name of the required LPT port, for example, LPT1. The System name field is filled in automatically.
  - b. In the Printer device field, enter the name of the AS/400 printer.
  - c. In the Printer file library field, enter the appropriate library, which is specific to your system.
  - d. In the Printer file field, specify the printer file, which is specific to your system.
  - e. In the Printer data type field, select **5 AFPDS data**.
6. Exit to the main menu.
7. At the OS/2 or DOS command line, enter the pathname of the library containing the setup file.
8. Type the following (substituting the name of your printer port for LPT1) and press Enter to copy the setup file to the assigned LPT port:

**COPY /B SETPRN.IDA LPT1:**

- N **Note:** Once you configure the printer, whether you have AFP set to yes for the printer device description depends on the requirements of your other applications. Check with your AS/400 system administrator.

You must generate resource files each time you change the resource specifications, but you only need to upload the file to the host once. The next time you want to upload a SETPRN.IDA file to the host, just copy the file to the assigned LPT port.

### **Sending the file from the PC to store on the AS/400**

You can transfer the file from the PC to the AS/400 for storage. From the AS/400, they can be sent to the printer when needed.

- N **Note:** In the AS/400 environment, you must have AFP set to yes for the printer device description.

1. Create a physical file on the AS/400 using this AS/400 command:

**CRTPF FILE (*libraryname/filename*) RCDLEN(80)  
MAXMBRS(\*NOMAX) LVLCHK(\*NO)**

2. Copy the files from the PC to a shared folder on the AS/400 using this DOS command:

**COPY *filename.ext* I:*foldername***

The I: drive designation is a default drive assigned as a system drive by PC Support. You should use the drive letter assigned to the shared folder on your system.

3. Enter these commands to move the file from the shared folder to the physical file you created in step 1:

**CPYFRMPCD FROMFLR(*foldername*)  
TOFILE(*libraryname/filename*) FROMDOC(*filename.IDA*)  
TOMBR(*membername*) MBROPT(\*REPLACE)  
TRNTBL(\*NONE) TRNFMT(\*NOTEXT)**

4. Enter this command to move the file to the printer:

**PRTAFPDTA FILE(*libraryname/filename*)  
MBR(*membername*) DEV(*printername*)**

- N **Note:** Once you configure the printer, whether you have AFP set to yes for the printer device description depends on the requirements of your other applications. Check with your AS/400 system administrator.

### **Configuring IPDS from an IBM VM or MVS host computer**

You can download any configuration file or fontset file (such as an .IDA or .B92 file) from an IBM host computer to the printer, as long as your PC is configured to upload files to the host computer (such as IRMA, EXTRA, 3270 emulation). However, these files must be transferred to the host into a variable blocked machine (VBM) dataset and then reblocked using the MakeVB Utility. Since the file is an AFPDS file, it can be submitted as a job to PSF with the output being routed to your Xerox MRP family IPDS printer.

Follow these steps to load the MakeVB Utility:

1. From the DOS root directory, create a directory called MAKEVB to contain the MakeVB utility files you need to upload to the host by typing the following and pressing Enter:

**MD MAKEVB**

2. Change to the MAKEVB directory by typing the following and pressing Enter:

**CD MAKEVB**

3. Insert the MakeITDS utility disk into the floppy disk drive.
4. From the MakeVB directory, type the following and press Enter:

**COPY <floppy drive letter>:MAKEVB.EXE**

The system copies the compressed files to the MAKEVB directory.

5. To expand the files, type the following and press Enter:

**MAKEVB**

The following files are created in the MAKEVB directory (instructions as to the types of datasets these files need to be uploaded to are given in later steps):

- MAKEVB.TXT is the program object file that is executed on the IBM Host Computer.
  - LNKMBV.JCL is the linkage JCL for the MakeVB program.
  - MAKEVB.JCL is the sample execution JCL for MakeVB. This uses an IEBGENER. In the first job step, it transfers the target file to a temporary dataset, which permits the reuse of the same dataset for input and output.
6. Transfer MAKEVB.TXT to the host computer. This file must be transferred in BINARY format, with a fixed record length of 80 characters. Transfer it to an existing MVS (or VM) object library.
  7. Transfer LNKMBV.JCL and MAKEVB.JCL to the host. These files should be transferred in ASCII format. Transfer these files to any dataset where you would normally store JCL for a job that is commonly used.
  8. Create a load library and object library where MakeVB is linked and the object file is stored (refer to BS36919.XEROX.LOADLIB and BS36919.XEROX.OBJ in figure 3-1). These libraries should have PO Organization, FB blocking, logical record length (LRECL) of 80, and a block size of 3120.

Figure 3-1. **Sample LNKMBV JCL**

```
//BS36919L JOB (D478), 'LINKAGE2',CLASS=A,MSGCLASS=X,NOTIFY=BS36919
//*
//LKED EXEC PGM=IEWL,PARM='MAP,LIST,XREF',REGION=2048K
//SYSLIB DD DSN=SYS1.LINKLIB,DISP=SHR
//OBJLIB DD DSN=BS36919.XEROX.OBJ,DISP=SHR
//SYSUT1 DD SPACE=(1024,(120,120),,,ROUND),UNIT=VIO
//SYSPRINT DD SYSOUT=*
//SYSLMOD DD DISP=SHR,DSN=BS36919.XEROX.LOADLIB,
// VOL=SER=IRCU06,UNIT=DISK,SPACE=(CYL,(1,2,1)),
// DCB=(DSORG=PO,RECFM=U,LRECL=0,BLKSIZE=23200)
//SYSLIN DD *
INCLUDE OBJLIB(MAKEVB)
NAME MAKEVB(R)
/*
```

9. Modify the LNKMBV.JCL file. Insert your standard Job header and the relevant datasets you created in step 6. Refer to figure 3-1 for a listing of the supplied JCL.
10. Execute the LNKMBV.JCL. You only need to run LNKMBV one time to create the executable object file.
11. Create a variable blocked dataset into which your .IDA and .B92 files can be transferred. Be sure to set the record format to VBM (variable blocking with machine carriage control). The record length should be 255 with a block size of 25249.
12. Transfer your .IDA or .B92 file to the host using your PC. This file should be uploaded in binary format.
13. Modify the MAKEVB.JCL substituting your standard job header, the object library dataset you created in step 6 for the MakeVB Object file, the variable blocked datasets where your .IDA files are stored (BS36919.XEROX.ITDSFSL in figure 3-2), and the dataset you want to place the reblocked files.

These datasets must have a variable blocked record format (VBM) as described in step 11. The input and output datasets may be the same if the input member is initially copied to a temporary dataset. Refer to figure 3-3 for a listing of the supplied JCL.

Figure 3-2. **Sample MAKEVB JCL**

```
//BS36919L JOB (D478), 'MAKEVB',CLASS=A,MSGCLASS=X,NOTIFY=BS36919
/*
//DOIT   PROC
//S1     EXEC PGM=IEBGENER,REGION=2048K
/*
//SYSUT1 DD DSN=BS36919.XEROX.ITDSFSL(FONT812),DISP=SHR
//SYSUT2 DD DSN=BS36919.XEROX.ITDSFSL(FONT812),DISP=(NE,PASS),UNIT=VIO
//SYSIN  DD DUMMY
//SYSOUT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
/*
S2      EXEC PGM=MAKEVB,REGION=4096K
//STEPLIB DD DISP=SHR,DSN=BS36919.XEROX.LOADLIB
//SYSIN  DD DSN=BS36919.XEROX.ITDSFSL(FONT812),DISP=(OLD,DELETE)
//SYSOUT DD DISP=SHR,DSN=BS36919.XEROX.ITDSFSL(FONT812)
//SYSPRINT DD SYSOUT=*
//      PEND
/*
//BS36919 EXEC PROC=DOIT
/*
```

14. Execute the MakeVB against your .IDA or .B92 file.
15. Power the printer off and then on again. Wait until all configuration sheets have printed and the UI shows that the printer is idle.

16. Execute your IEBGENER program to send the job to your printer via PSF. Refer figure 3–3 for an example of the required JCL to print to your IPDS printer.

Figure 3–3.      **Sample FILE DOWNLOAD JCL**

```
//BS36919L JOB (D478), 'IPDS',MSGLEVEL=(1,1),CLASS=A,  
//      MSGCLASS=R,NOTIFY=BS36919  
//*  
/*JOBPARM LINECT=0,ROOM=3456  
//*  
/*      THE IPDS PRINTER IS MSGCLASS 'R' AND PRINTER 194  
//*  
//      EXEC PGM=IEBGENER  
//SYSPRINT DD SYSOUT=*  
//SYSIN   DD DUMMY  
//SYSUT2  DD SYSOUT=*,DEST=PRNTR194  
//*  
//SYSUT1  DD DSN=BS36919.XEROX.ITDSFLS(FONT812),DISP=SHR  
//*
```

17. Repeat steps 11 through 16 to send additional files as necessary.

N      **Note:** You only need to run MAKEVB one time on a file. Once MAKEVB is executed on a configuration or font file, it can stay in the dataset and be sent to the printer only when required.

## Resource specification files

MakeITDS uses resource specification files to define resources to the IPDS interface. SETPRN.IRS uses the configuration file (SETPRN.ITX) to define the resource.

The capabilities of resource specification files allow you to do the following:

- Provide configuration parameters
- Define, load, and delete resources, such as fonts, code pages, font substitution, and so on
- Print settings, store settings permanently, or restore factory defaults.

Figure 3–4 shows a sample resource specification file. This sample changes the IPDS settings according to the commands listed SETPRN.ITX, creates a substitution for FGID 27 (substituting FGID 19), saves the settings, and prints the new resource list. Table 3–2 provides a list of the available resource commands.

Figure 3–4. **Sample resource specification file**

```
CONFIGURATION_START
  FILE    SETPRN.ITX
END

DEFINE_SUBSTITUTION
  NAME      SUBST27
  FGID      27
  SUBST_FGID 19
  REPORT    YES
END

ACTION_START
  SAVE_SETTINGS
  PRINT_RESOURCE_LIST
END
```

Table 3-2. Resource commands

Resource specification field name	Description
DEFINE_CONFIGURATION	<p>Beginning of a configuration description resource.</p> <p>NAME The name of the configuration description file.</p> <p>END End of a configuration description resource.</p>
DEFINE_SUBSTITUTION	<p>Beginning of a font substitution resource description.</p> <p>NAME The name of the font substitution resource.</p> <p>FGID The FGID of the font for which you want to define a substitution. Valid range is 0-65534.</p> <p>WIDTH Defines the width of the FGID. The value is defined in 1440th of an inch whose valid range is 1-32766. The value should match a valid font width for the given FGID. You may omit this parameter if the FGID is less than 300. The font width is taken from the FGID.</p> <p>WEIGHT Optional parameter that defines the weight of the FGID. Valid range is as follows:</p> <p>NORMAL (1)</p> <p>BOLD (2)</p> <p>LIGHT (8)</p> <p>The weight of the FGID is used if not specified otherwise in this command. If a font substitution with a weight of BOLD is defined to use a weight of NORMAL or LIGHT, then algorithmic bolding is used, which may impact throughput.</p> <p>STYLE Optional parameter that defines the style of a font resource. The style information will be part of the resource identification, but has no other effect. Valid range is as follows:</p> <p>ROMAN (1)</p> <p>ITALIC (4)</p> <p>The style information of the FGID is used if this parameter is omitted.</p> <p>SUBST_FGID</p> <p>Defines the FGID of the font resource to use to replace the resource specified in the FGID parameter. Valid range is 0-65534.</p> <p>SUBST_WIDTH</p> <p>Defines the width of the substitution font. The value is defined in 1440th of an inch whose valid range is 1-32766. The value should match a valid font width for the given FGID. You may omit this parameter if the FGID is less than 300. The font width is taken from the FGID.</p> <p>REPORT Marks the substitution to be reported back to the system when the printer is queried. Valid settings are YES or NO.</p> <p>END End of the DEFINE_SUBSTITUTION resource.</p>



Table 3-2. Resource commands (continued)

Resource specification field name	Description
DEFINE_FONT	<p>Allows you to store an AFP font in the Printer's nonvolatile memory.</p> <p><b>NAME</b> The name of the font as you want it to appear on the IPDS Font Report.</p> <p><b>FILE</b> The name of the AFP font file to store at the printer. Include the pathname to the file, for example, C:\MAKEITDS MYAFPFNT.XRX.</p> <p><b>FGID</b> The FGID number the application uses to select the font.</p> <p><b>WIDTH</b> Defines the width of the font used to format text on a page. This value should be in 1440th of an inch resolution. For FGID values below 300, the width is determined from the font; you do not need to supply it.</p> <p><b>WEIGHT</b> Optional parameter that defines the weight of the FGID. Valid options are NORMAL, BOLD, or LIGHT.</p> <p><b>STYLE</b> Optional parameter that defines the style of a font resource. Valid options are ROMAN or ITALIC.</p> <p><b>CODEPAGE_GROUP</b> Optional parameter that indicates the codepage group with which the font resource is associated. Valid parameters are any codepage group described in table 4-5.</p> <p><b>END</b> End of the DEFINE_FONT resource.</p>
DEFINE_CODEPAGE	<p>Allows you to store a new code page in the printer's nonvolatile memory.</p> <p><b>NAME</b> The name of the code page as you want it to appear on the IPDS Codepage Report.</p> <p><b>FILE</b> The name of the codepage file to store at the printer. Include the pathname to the file, for example, C:\MAKEITDS MYCODPAG.XRX.</p> <p><b>CPGID</b> The codepage ID number that is being stored in the printer.</p> <p><b>CODEPAGE_GROUP</b> Optional parameter that indicates the codepage group. Refer to table 4-5 for more information.</p> <p><b>CODEPAGE_VERSION</b> Optional parameter that indicates the codepage version. Valid parameters are 0 or 1.</p> <p><b>END</b> End of the DEFINE_CODEPAGE resource.</p>
DELETE_FONT	<p>Allows you to delete a font that was stored in the printer's nonvolatile memory.</p> <p><b>FGID</b> The FGID number of the font to delete.</p> <p><b>WIDTH</b> Defines the width of the font to delete. This value should be in 1440th of an inch resolution and must match the width of the specified FGID. Optionally, you can use the asterisk (*) as a wildcard.</p> <p><b>END</b> End of the DELETE_FONT resource.</p>

Table 3-2. Resource commands (continued)

Resource specification field name	Description
DELETE_CODEPAGE	<p>Allows you to delete a codepage that was stored in the printer's nonvolatile memory.</p> <p>CPGID The ID number of the codepage to delete.</p> <p>CODEPAGE_VERSION The version of codepage to delete. This is an optional parameter. You can use the asterisk (*) as a wildcard to delete all versions of the codepage.</p> <p>END End of the DELETE_CODEPAGE resource.</p>
DELETE_SUBSTITUTION	<p>Allows you to delete a font's substitution resource.</p> <p>NAME The name of the font substitution resource to delete.</p> <p>WIDTH Defines the width of the font substitution to delete. This value should be in 1440th of an inch resolution and must match the width of the specified FGID. Optionally, you can use the asterisk (*) as a wildcard.</p> <p>END End of the DELETE_SUBSTITUTION resource.</p>
DEFINE_IPDS_SHARE	<p>Allows you to specify an ASCII string to be sent to the printer at the beginning of each IPDS job.</p> <p>STRING The string to be sent to the printer at the start of the job.</p> <p>END End of the DEFINE_IPDS_SHARE resource.</p>
ACTION_START	<p>Start of an Action resource command.</p> <p>RESTORE_FACTORY_SETTINGS Causes the IPDS Interface to restore the factory default settings as the current user settings.</p> <p>RESTORE_SETTINGS Restores the saved current settings as the user settings.</p> <p>SAVE_SETTINGS Stores the user settings as the current settings.</p> <p>PRINT_SETTINGS Prints the IPDS Settings Printout.</p> <p>PRINT_FONT_LIST Prints the IPDS Resident Font report.</p> <p>PRINT_CODEPAGE_LIST Prints the IPDS Resident Codepages report.</p> <p>PRINT_RESOURCE_LIST Prints the IPDS Resource List report.</p> <p>END End of the ACTION_START command.</p>

## Configuration settings

Configuration files (.ITX files) define the options that appear in the IPDS Setup section of the IPDS – Settings Printout (figure 3-8). An example of a configuration file (figure 3-5) is a copy of the SET4028.ITX file provided on the MakeITDS floppy disk. The Resource Specification (.IRS) file calls out the .ITX file to create a configuration (.IDA) file, which is downloaded to the printer.

Figure 3-5. **Sample configuration file**

```
;| Set the Emulation.

IBMEMULATION          IBM4028

;| Emulation and related parameters.

IMSMOOTHING           NO
DRSMOOTHINGLEVEL       10
RESOURCETIME          10

;| Margin and offset handling parameters.

MARGINSTOSYSTEM       NO
VPACHECK              VPAPHYSICAL
ADDMARGINS            NO
PRINTX                0
PRINTY                0

;| Font and codepage parameters.

DEFAULTFONTID         11
DEFAULTFONTWIDTH      144
DEFAULTCODEPAGEID     500
CODEPAGEVERSION       1

;| End of SET4028.ITX
```

Table 3–3 describes the IPDS settings you can modify with the configuration file. All other settings that appear on the IPDS Settings printout are set automatically by the printer. Refer to this table to modify the configuration file. The default settings shown in table 3–3 are used if you do not change them through the configuration file.

Table 3–3. IPDS settings

Settings Printout listing	Configuration file field name	Description
IBM Emulation	IBMEMULATION	Defines the type of IBM IPDS printer support. Do not use a space when specifying this parameter. IBM3812 IBM3816 IBM4028 Default: IBM4028
Default Codepage (CPGID)	DEFAULTCODEPAGEID	Defines the default code page global identifier (CPGID). Range: 1 through 65534 (decimal). All resident code pages are listed on the Printer Configuration Report. Default: 500 (International #5)
Codepage Version	CODEPAGEVERSION	Defines the code page to use when more than one is defined. Range: 0, 1 Default: 1
Default Font FGID	DEFAULTFONTID	Defines the resident default Font Global Identifier (FGID). If you select an FGID that does not support the default code page, the system lists the FGID on the IPDS SETTINGS PRINTOUT, but ignores it. Range: 1 through 65534 (decimal). All resident fonts are listed on the Printer Configuration Report. Default: 11 (Courier 10)
Default Font Width	DEFAULTFONTWIDTH	Defines the default font width. The value you specify is defined as 1/1440 of an inch; a value of 144 defines a 10–pitch font. The value must match a valid font width for the default font. Range: 1 through 32766 (decimal) Default: 144 (10 pitch)
Report Margins to System	MARGINSTOSYSTEM	Determines how the size of the unprintable area is reported to the host. YES = Reports the actual unprintable area of the printer you are using for the current paper size. NO = Reports the unprintable area of the emulated printer (IBM 4028, 3812, or 3816) for the current paper size. Default: NO

Table 3-3. IPDS settings (continued)

Settings Printout listing	Configuration file field name	Description
VPA Check	VPACHECK	<p>Indicates how the printer checks for picture elements (pels) that are outside of the defined valid printable area (VPA). Each setting defines a specific area or boundary the printer uses to check incoming data. If pels appear outside the defined area, the printer sends an error to the host.</p> <p>VPAMARGINS = Use margins for VPA check. The VPA equals the area where the IPDS logical page and the printable area of the selected paper size overlap. You cannot select this value if MARGINSTOSYSTEM is OFF.</p> <p>VPAPHYSICAL = Use entire page for VPA check. The VPA equals the area where the physical page and the IPDS logical page overlap. Data loss may occur in the unprintable area.</p> <p>VPALOGICAL = Use IPDS logical page for VPA check. The valid printable area is the area of the IPDS logical page. The printer returns an error if you try to print outside of the logical page. The printer does not return an error if you try to print within the logical page when the logical page extends beyond the printable area.</p> <p>NOVPA = No VPA check is performed.</p> <p>Default: VPAPHYSICAL</p>
IM Smoothing	IMSMOOTHING	<p>Indicates whether to use the IM smoothing function for the 3812/3816 emulations. This function makes fine adjustments to IM scaling in the range 240 to 300 pel.</p> <p>YES = Uses 240 to 300 pel scaling in 3812/3816 mode. This setting results in smoother lines, but the shading of images may appear dark.</p> <p>NO = Uses a simple scaling in the range 240 to 300 pel. This setting allows for a closer representation of shading characteristics, but slanted lines may appear jagged.</p> <p>Default: YES</p>
DR Smoothing level	DRSMOOTHINGLEVEL	<p>Defines the lower limit from which DR uses vector smoothing of scaled characters. The default level of 10 provides smoothing for characters with a scaling ratio of 1:1. If you specify 20, the system smooths characters that are scaled up two times or more.</p> <p>0 = Smoothing is always on. If you change the value to 0, characters appear bolder than the actual IBM fonts and the accurate positioning of scaled characters is guaranteed.</p> <p>1000 = Smoothing is always off.</p> <p>Default: 10 (scaling 1:1)</p>

Table 3–3. IPDS settings (continued)

Settings Printout listing	Configuration file field name	Description
Add margins	ADDMARGINS	Determines how the printer places data on the page. YES = Adds margins to the printable area. The printer starts positioning text from the inside edge of the left unprintable area and the bottom edge of the top unprintable area. NO = Does not add margins. The printer starts positioning text from the top left corner of the paper. If text or any object is placed within the nonprintable area, the data will be lost. Default: NO
Print offset (X)	PRINTX	Defines in pels the X–offset value, which shifts the starting point for printing in the X direction. You can use PRINTX with either setting of ADDMARGINS. It shifts the starting point for printing from the position determined by ADDMARGINS. Positive values move the starting point to the right; negative values move it to the left. Range: –999 to 999 pels Default: 0 pels
Print offset (Y)	PRINTY	Defines in pels the Y–offset value, which shifts the starting point for printing in the Y direction. You can use PRINTY with either setting of ADDMARGINS. It shifts the starting point for printing from the position determined by ADDMARGINS. Positive values move the starting point to the right; negative values move it to the left. Range: –999 to 999 pels Default: 0 pels
Resource Time Out	RESOURCETIME	Defines in seconds the timeout for downloading ASCII resources. Range: 0 indicates timeout not active 1 through 255 timeout active Default: 10

## Automatic configuration

Your IPDS printer will perform an automatic configuration to indicate the Printer Select and Printer Setup parameters of the printer. These parameters identify the model of the printer, how much memory is available on the controller for resources, and whether a stacker and duplex printing are available. In addition, the IPDS interface will recognize the number of trays that are present and the size of paper loaded in each tray. These parameters are listed on the IPDS – Settings Printout (figure 3–8).

The interface will assign a BIN ID to each paper tray. You may want to override the BIN IDs that the printer assigns. To do this, you must first disable the Autoconfiguration feature and then send a MakeITDS file to redefine the BIN ID for each paper tray. You also need to define the size of paper, its printable area, and the size of the logical page.

Refer to tables 5-1 through 5-4 in the “Accessing printer features from IPDS” chapter for a listing of the default BIN IDs that the printer assigns. The “Reconfiguring BIN IDs” appendix provides values for all supported paper sizes.

To disable the Autoconfiguration feature, send the following FSL to the printer:

**&&??@@Y119,0@**

If you send this from the mini-Centronics interface, you must precede it with the following FSL:

**&&??@@Y249,FOREST@**

**Note:** When you disable the Autoconfiguration feature, you must send a new MakeITDS file to reconfigure the IPDS interface each time you change the size of paper in a paper tray or change the BIN ID. Failure to correctly define the paper size will produce unpredictable results when auto configuration is disabled.

To override the Autoconfiguration data, you must add the following to your configuration specification (.itx) file:

TRAY—the beginning of a tray definition. Valid parameter is number from 1 to 5.

PRESENT—Indicates whether this tray is present. Valid parameters are YES or NO.

ID—Specifies the IPDS BIN ID in decimal. Valid values are 0 to 255.

PRINTER ID—Indicates the PCL paper tray command parameter used to select this paper tray. Printer IDs are unique. Refer to the *Xerox MRP Family PCL5 and PostScript Printer Language Reference* for the specific PCL commands required.

PAPERSIZE—Indicates the size of paper loaded in the paper tray. Valid parameters are LETTER, LEGAL, LEDGER, A3, A4, A5, B4, B5, EXECUTIVE, INVOICE, FOLIO, QUARTO, ENV\_MONARCH, ENV\_9, ENV\_COM\_10, ENV\_DL, ENV\_C5, and ENV\_B5. Paper size must be defined as described in the “Reconfiguring BIN IDs” appendix.

DUPLEX—Indicates whether duplex printing is available from this tray. Valid parameters are Yes or No.

ENDTRAY—Indicates the end of the paper tray definition.

---

## Printing the Printer Configuration Report

---

The first page of the configuration report prints each time you power on the printer. For the 4220/MRP and 4230/MRP, you can also print the report from the user interface (refer to the *Xerox MRP Family System Administrator Guide*).

For the 4219/MRP and the 4215/MRP, you can generate the report by printing the Other I/O log report (refer to the operator guide for your printer).

You can print the report on any of the Xerox IPDS printers by pressing the TEST button located on the coax or twinax interface card.

Figure 3–6 shows a sample of the first page of the report, which describes the functions and parameters of the coax interface.

Figure 3–6. **Xerox Coax Interface Configuration Report—Example**

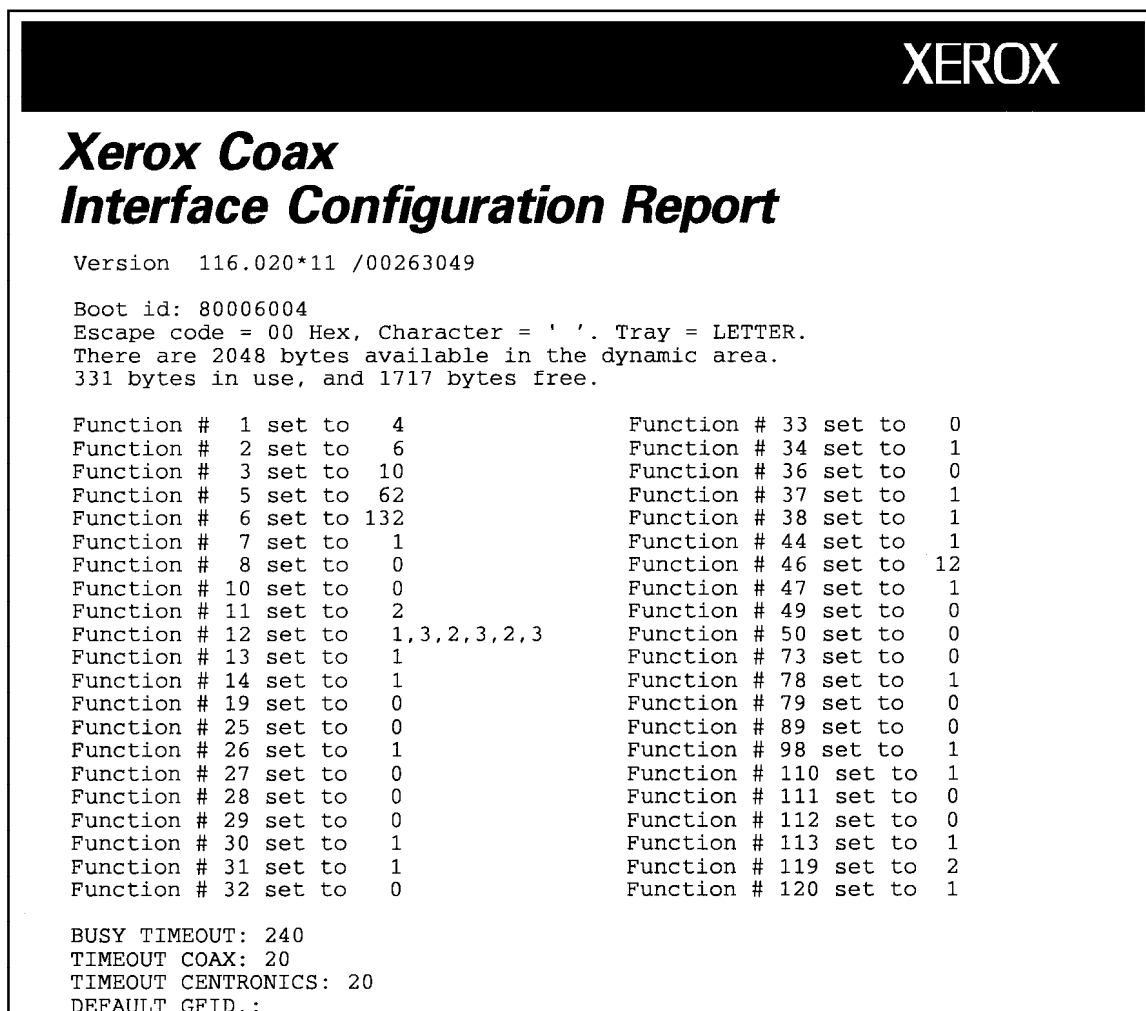
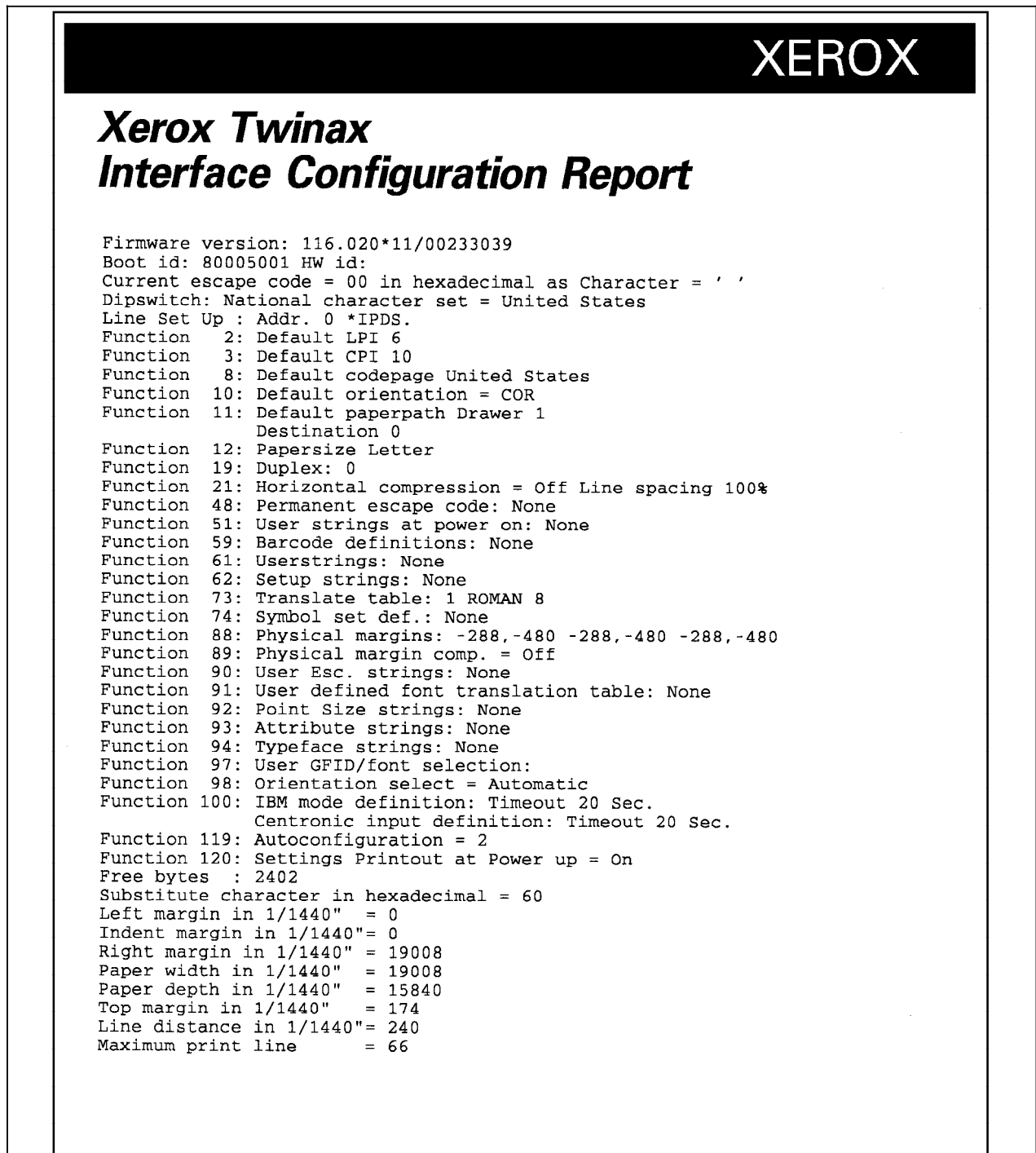




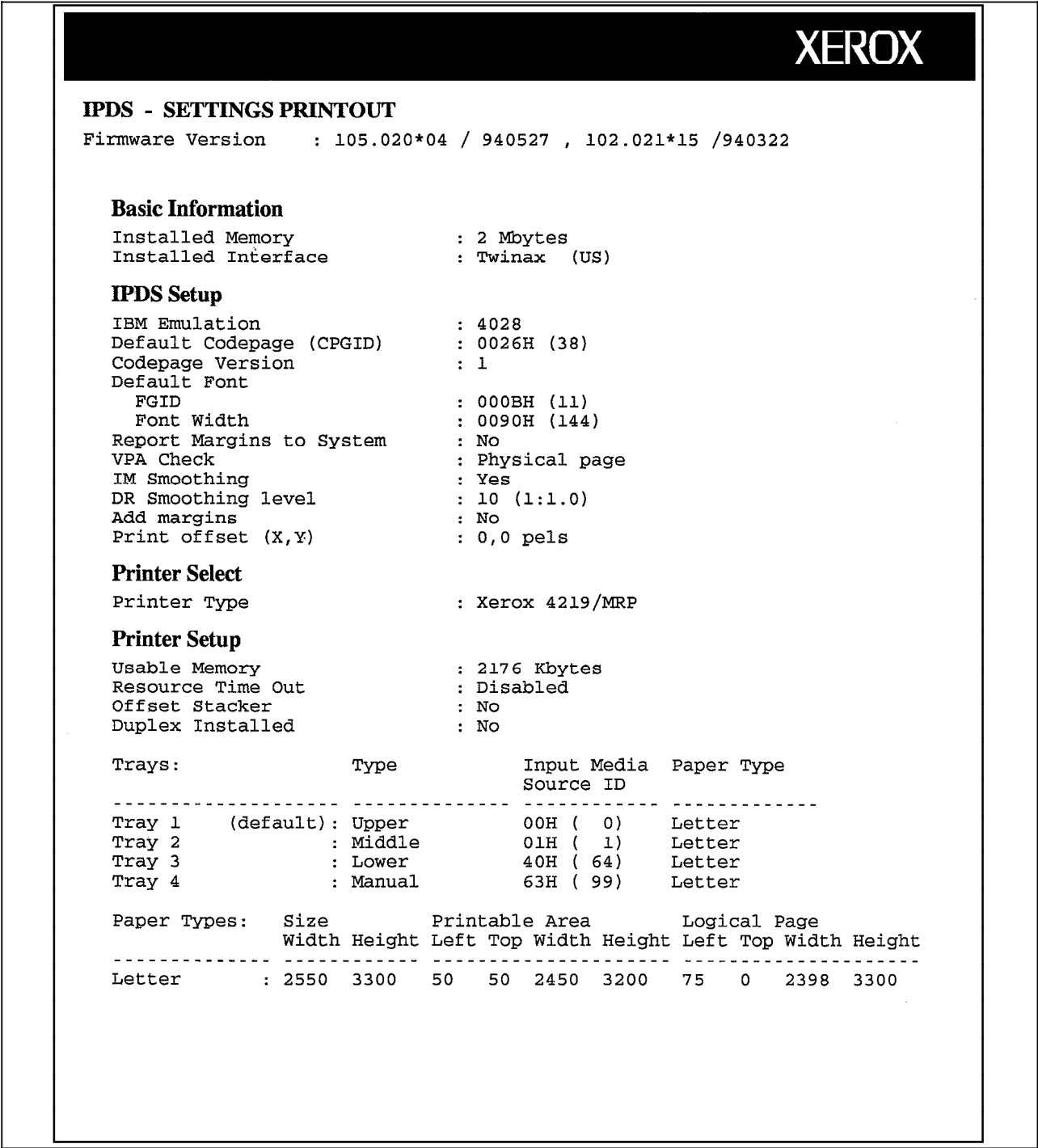
Figure 3-7 shows a sample of the first page of the report. This sample describes the functions and parameters of the twinax interface.

Figure 3-7. Xerox Twinax Interface Configuration Report—Example



The following example of the IPDS – Settings Printout describes the installed memory and interface, the defined settings for IPDS and the printer, and the type of printer in use.

Figure 3–8. IPDS – Settings Printout—Example



The following listings of IPDS Resident Fonts for the 4028 emulation lists the FGID, with attribute, name, and a print sample for all fonts resident on the printer.

Figure 3-9. IPDS Resident Fonts for the 4028 emulation—Example

XEROX					
IPDS - IPDS RESIDENT FONTS					
Firmware Version: 105.010*11 / 940318 , 102.021*15 /940322					
FGID hex (dec)	Width	Attribute	Name		Print Sample
0003 (3)	144	Normal	OCR B	10	ABCabc 123
000B (11)	144	Normal	Courier	10	ABCabc 123
000C (12)	144	Normal	Prestige Pica	10	ABCabc 123
0012 (18)	144	Italic	Courier italic	10	ABCabc 123
0013 (19)	144	Normal	OCR A	10	ABCabc 123
002E (46)	144	Bold	Courier bold	10	ABCabc 123
004C (76)	120	Normal	APL	12	ABCabc 123
0055 (85)	120	Normal	Courier	12	ABCabc 123
0056 (86)	120	Normal	Prestige Elite	12	ABCabc 123
005C (92)	120	Italic	Courier italic	12	ABCabc 123
006F (111)	120	Bold	Prestige Elite bold	12	ABCabc 123
0070 (112)	120	Italic	Prestige Elite italic	12	ABCabc 123
009F (159)	120	Bold	Boldface	PS	ABCabc 123
00A4 (164)	120	Normal	Prestige	PS	ABCabc 123
00DF (223)	96	Normal	Courier	15	ABCabc 123
00FE (254)	84	Normal	Courier	17.1	ABCabc 123
0119 (281)	72	Normal	Letter gothic	20	ABCabc 123
1637 (5687)	40	Normal	Times Roman	6	ABCabc 123
1637 (5687)	53	Normal	Times Roman	8	ABCabc 123
1637 (5687)	67	Normal	Times Roman	10	ABCabc 123
1637 (5687)	80	Normal	Times Roman	12	ABCabc 123
164B (5707)	67	Bold	Times Roman bold	10	ABCabc 123
164B (5707)	80	Bold	Times Roman bold	12	ABCabc 123
164B (5707)	93	Bold	Times Roman bold	14	ABCabc 123
164B (5707)	120	Bold	Times Roman bold	18	ABCabc 123
164B (5707)	160	Bold	Times Roman bold	24	ABCabc 123
16B7 (5815)	67	Italic	Times Roman italic	10	ABCabc 123
16B7 (5815)	80	Italic	Times Roman italic	12	ABCabc 123
16CB (5835)	67	Bold italic	Times Roman bold italic	10	ABCabc 123
16CB (5835)	80	Bold italic	Times Roman bold italic	12	ABCabc 123
30 Resident Fonts					

Figure 3–10 shows the IPDS Resident Codepages for the 4028 emulation, which lists all code pages resident on the printer.

Figure 3–10. IPDS Resident Codepages for the 4028 emulation—Example

XEROX

IPDS - IPDS RESIDENT CODEPAGES

Firmware Version: 105.010\*11 / 940318 , 102.021\*15 /940322

1

53 Resident Codepages

CPGID	Group Name
hex (dec)	
-----	
0025 (37)	A USA/Canada
0026 (38)	A US ASCII-L
0100 (256)	B International #1
0103 (259)	C Symbol Set 7
0104 (260)	A Canadian French
0111 (273)	A Germany/Austria
0112 (274)	A Belgium
0113 (275)	A Brazil
0114 (276)	A Canada (French)
0115 (277)	A Denmark/Norway
0116 (278)	A Finland/Sweden
0118 (280)	A Italy
0119 (281)	A Japan (English)
011A (282)	A Portugal
011B (283)	A Spanish
011C (284)	A Spain/Latin America
011D (285)	A United Kingdom
011E (286)	A Austria/Germany (alt)
011F (287)	A Denmark/Norway (alt)
0120 (288)	A Finland/Sweden (alt)
0121 (289)	B Spain (alt)
0122 (290)	J Japan - Katakana
0125 (293)	A APL
0129 (297)	A France
0136 (310)	D Graphic Escape APL/TN
0154 (340)	K OCR
0169 (361)	A International Typographic 500
016F (367)	A EBCDIC ASCII
017E (382)	A Austria Germany
017F (383)	A Belgium
0180 (384)	A Brazil
0181 (385)	A Canadian French
0182 (386)	A Denmark Norway
0183 (387)	A Finland Sweden
0184 (388)	A France Luxemburg
0185 (389)	A Italy
0186 (390)	A Japan - Latin
0187 (391)	A Portugal
0188 (392)	A Spain Phillipines
0189 (393)	A Spanish Speaking
018A (394)	A United Kingdom
018B (395)	A United States
01A4 (420)	I Arabic
01A8 (424)	H Hebrew
01B5 (437)	L PC
01F4 (500)	A International #5
033F (831)	A Portugal (Alternate)

Figure 3–10. IPDS Resident Codepages for the 4028 emulation—Example (continued)

XEROX

IPDS - IPDS RESIDENT CODEPAGES

Firmware Version: 105.010\*11 / 940318 , 102.021\*15 /940322

2

CPGID		Group Name	
hex	(dec)		
-----			
0366	(870)	A	Latin 2 Multilingual
0367	(871)	A	Iceland
037C	(892)	E	OCR A
037D	(893)	F	OCR B
03EA	(1002)	G	DCF REL 2 COMPATIBILITY
03EB	(1003)	A	U.S. Text Subset

The following example shows the IPDS Resource List Printout for the 4028 emulation listing the available storage devices and amount of available memory. The printout also lists the current resources, such as fonts, code pages, and the code page version number. The amount of memory each resource uses is displayed.

Figure 3–11. IPDS Resource List Printout for the 4028 emulation—Example

XEROX

IPDS - RESOURCE LIST PRINTOUT

Firmware Version: 105.010\*11 / 940318 , 102.021\*15 /940322

1

Storage Devices

Device	Size	Free
FLASH	524288	542
FLASH	524288	65618

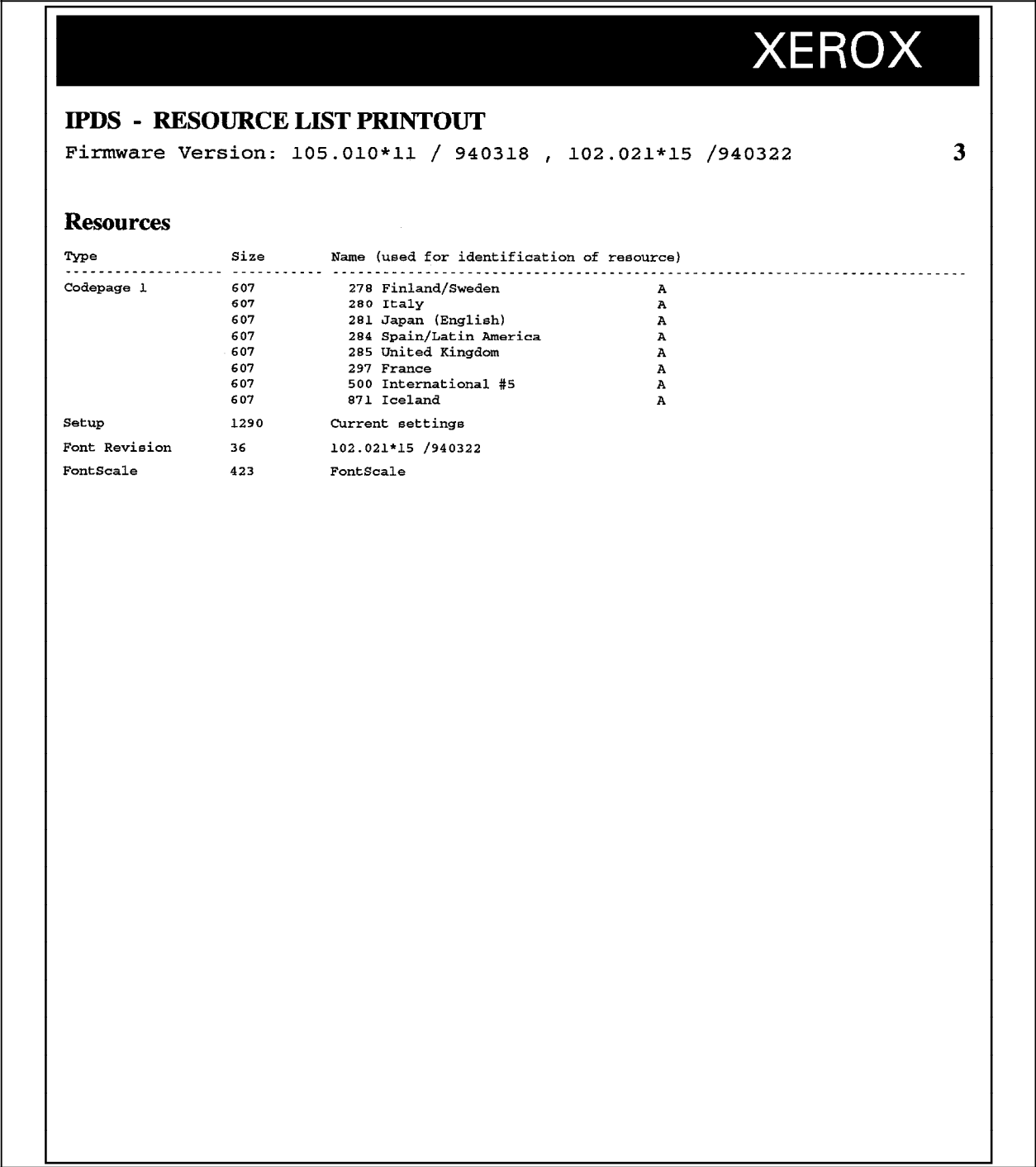
Resources

Type	Size	Name (used for identification of resource)
Font	35609	12 144 Prestige Pica 10 NORMAL A,B,C,G,L
	42294	18 144 Courier italic 10 ITALIC A,B,G,L
	8444	19 144 OCR A 10 NORMAL E,K
	37551	46 144 Courier bold 10 BOLD A,B,G,L
	16550	76 120 APL 12 NORMAL D
	32340	85 120 Courier 12 NORMAL A,B,C,G,L
	32380	86 120 Prestige Elite 12 NORMAL A,B,C,G,L
	35287	92 120 Courier italic 12 ITALIC A,B,G,L
	32432	111 120 Prestige Elite bold 12 BOLD A,B,G,L
	35064	112 120 Prestige Elite italic 12 ITALIC A,B,G,L
	38664	159 120 Boldface PS BOLD A,B,G,L
	36472	164 120 Prestige PS NORMAL A,B,G,L
	24691	223 96 Courier 15 NORMAL A,B,L
	20995	254 84 Courier 17.1 NORMAL A,B,L
	20668	281 72 Letter gothic 20 NORMAL A,B,L
	14639	5687 40 Times Roman 6 NORMAL A
	19519	5687 53 Times Roman 8 NORMAL A
	25765	5687 67 Times Roman 10 NORMAL A
	10107	3 144 OCR B 10 NORMAL F,K
	37562	11 144 Courier 10 NORMAL A,B,C,G,L
	32542	5687 80 Times Roman 12 NORMAL A
	27205	5707 67 Times Roman bold 10 BOLD A
	32891	5707 80 Times Roman bold 12 BOLD A
	39767	5707 93 Times Roman bold 14 BOLD A
	51949	5707 120 Times Roman bold 18 BOLD A
	66503	5707 160 Times Roman bold 24 BOLD A
	28075	5815 67 Times Roman italic 10 ITALIC A
	35516	5815 80 Times Roman italic 12 ITALIC A
	29543	5835 67 Times Roman bold italic 10 ITALIC BOLD A
	37170	5835 80 Times Roman bold italic 12 ITALIC BOLD A
Font Substitute	96	20 144 Pica 10 NORMAL 11 144
	96	30 144 Math Symbol 10 NORMAL 11 144
	96	41 144 Roman Text 10 NORMAL 12 144
	96	42 144 Serif Text 10 NORMAL 11 144
	96	43 144 Serif Text Italic 10 ITALIC 18 144
	96	70 120 Serif Text 12 NORMAL 85 120
	96	71 120 Serif Italic 12 ITALIC 92 120
	96	80 120 Math Symbol 12 NORMAL 86 120
	96	107 120 Elite 12 NORMAL 85 120
	96	176 120 Bold PS BOLD 159 120
	96	221 96 Prestige 15 NORMAL 223 96
	96	229 96 Serif 15 NORMAL 223 96
	96	256 84 Prestige 17.1 NORMAL 254 84
	96	751 54 Son. Serif 8 NORMAL 5687 53
	96	760 40 Times Roman 6 NORMAL 5687 40
	96	761 80 Times Roman Bold 12 BOLD 5707 80
	96	762 93 Times Roman Bold 14 BOLD 5707 93
	96	763 80 Times Roman Italic 12 ITALIC 5815 80
	96	764 67 Times Roman Bold Italic 10 ITALIC BOLD 5835 67
	96	765 80 Times Roman Bold Italic 12 ITALIC BOLD 5835 80
	96	1053 66 Sonoran Serif Bold 10 BOLD 5707 67
	96	1056 66 Sonoran Serif Italic 10 ITALIC 5815 67
	96	1351 78 Sonoran Serif 12 NORMAL 5687 80
	96	1653 108 Sonoran Serif Bold 16 BOLD 5707 93

Figure 3–11. IPDS Resource List Printout for the 4028 emulation—Example (continued)

XEROX							
IPDS - RESOURCE LIST PRINTOUT							
Firmware Version: 105.010*11 / 940318 , 102.021*15 /940322							2
Resources							
Type	Size	Name (used for identification of resource)					
Font Substitute	96	1803	120 Sonoran Serif Bold	18	BOLD	5707	120
	96	2103	162 Sonoran Serif Bold	24	BOLD	5707	160
	96	60	144 Prestige Pica bold (AB)	10	BOLD	12	144
	96	72	120 Serif bold (AB)	12	BOLD	85	120
	96	108	120 Courier bold (AB)	12	BOLD	85	120
	96	253	84 Courier bold (AB)	17.	BOLD	254	84
Codepage 0	607	37	USA/Canada	A			
	607	38	US ASCII-L	A			
	607	256	International #1	B			
	607	259	Symbol Set 7	C			
	607	260	Canadian French	A			
	607	273	Germany/Austria	A			
	607	274	Belgium	A			
	607	275	Brazil	A			
	607	276	Canada (French)	A			
	607	277	Denmark/Norway	A			
	607	278	Finland/Sweden	A			
	607	280	Italy	A			
	607	281	Japan (English)	A			
	607	282	Portugal	A			
	607	283	Spanish	A			
	607	284	Spain/Latin America	A			
	607	285	United Kingdom	A			
	607	286	Austria/Germany (alt)	A			
	607	287	Denmark/Norway (alt)	A			
	607	288	Finland/Sweden (alt)	A			
	607	289	Spain (alt)	B			
	607	290	Japan - Katakana	J			
	607	293	APL	A			
	607	297	France	A			
	607	310	Graphic Escape APL/TN	D			
	607	340	OCR	K			
	607	361	International Typographic 500	A			
	607	367	EBCDIC ASCII	A			
	607	382	Austria Germany	A			
	607	383	Belgium	A			
	607	384	Brazil	A			
	607	385	Canadian French	A			
	607	386	Denmark Norway	A			
	607	387	Finland Sweden	A			
	607	388	France Luxemburg	A			
	607	389	Italy	A			
	607	390	Japan - Latin	A			
	607	391	Portugal	A			
	607	392	Spain Phillipines	A			
	607	393	Spanish Speaking	A			
	607	394	United Kingdom	A			
	607	395	United States	A			
	607	420	Arabic	I			
	607	424	Hebrew	H			
	607	437	PC	L			
	607	500	International #5	A			
	607	831	Portugal (Alternate)	A			
	607	870	Latin 2 Multilingual	A			
	607	871	Iceland	A			
	607	892	OCR A	E			
	607	893	OCR B	F			
	607	1002	DCF REL 2 COMPATIBILITY	G			
	607	1003	U.S. Text Subset	A			
Codepage 1	607	37	USA/Canada	A			
	607	273	Germany/Austria	A			
	607	274	Belgium	A			
	607	277	Denmark/Norway	A			

Figure 3–11. IPDS Resource List Printout for the 4028 emulation—Example (continued)



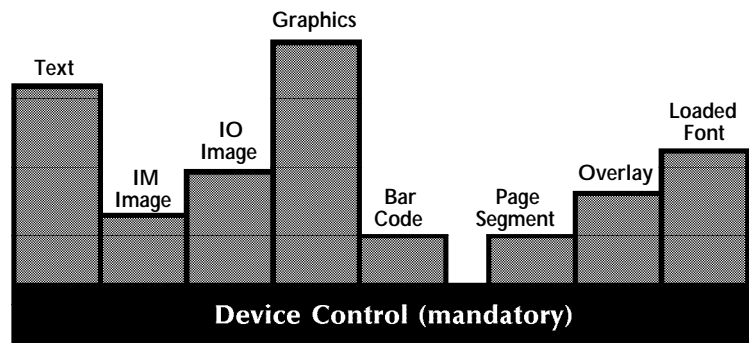


This chapter describes how the IBM Intelligent Printer Data Stream (IPDS) is supported on your Xerox MRP printer. The command sets include the following:

- Device Control
- Text
- IM Image
- IO Image
- Graphics
- Bar code
- Overlay
- Page Segment
- Load Font

The command sets, shown in Figure 4-1, are based on the IBM IPDS system architecture.

Figure 4-1. IPDS command sets



For more information on the IPDS command sets, refer to the *IBM Intelligent Printer Data Stream Reference*, publication number S544-3417-04.

## Device Control command set

The Device Control command set defines the logical page environment and communicates device controls. Table 4–1 shows how these commands are supported on your Xerox printer.

Table 4–1. **Device Control commands**

Hex value	Command	Comments
X'D62E'	Activate Resource (previously called Load Resource Equivalence)	X'01' and X'08' are supported for Resource Type (RT). X'03', X'04', and X'06' are supported for Resource ID Format (RIDF). X'0000' is supported for Font Inline Sequence (FIS). Resource class flags are not supported.
X'D6AF'	Begin Page	Supported.
X'D6CE'	Define User Area	Not supported.
X'D65D'	End	Supported.
X'D6BF'	End Page	Supported.
X'D69F'	Load Copy Control	255 copy groups are supported. The maximum number of overlays and suppression IDs (in combination) cannot exceed 126.
X'D63F'	Load Font Equivalence	X'01' through X'FF' are supported for Font Local ID (LID). X'000', X'2D00', X'5A00', and X'8700' are supported for downloaded fonts. Only '0000' is supported for resident fonts. Bits 5 and 6 are supported for flags.
X'D6CF'	Logical Page Descriptor (previously called Load Page Descriptor)	X'00' (ten inches) is supported for Unitbase. X'0001 through X7FFF' are supported for XUPUB and YUPUB. Ordered data flags are ignored. Bytes 24 through 42 (Initial Text Conditions) are supported.
X'D66D'	Logical Page Position (previously called Load Page Position)	Supported. The logical page position can be extended by changing the value of PRINTX, PRINTY, or ADDMARGINS in the configuration file.
X'D603'	No Operation	Supported.
X'D697'	Set Home State	Supported.
X'D6E4'	Sense Type and Model	This command instructs the printer to report information identifying its printer type and model and its capabilities in the form command set vectors. The command set vectors consist of general information about the command set followed by two-byte pairs identifying individual properties.  The coax printer model number is reported as IBM model X'02'. The twinax printer model number is reported as IBM model X'01'. If a printer supports duplex, the printer model number is reported as IBM model X'12'.

Table 4-1. Device Control commands (continued)

Hex value	Command	Comments
X'D6E4'	Sense Type and Model (continued)	<p>The two-byte pairs corresponding to a command are only sent back if the command is supported by the printer.</p> <p>The two-byte pairs identifying the printer's properties for the Device Control command set vector are as follows:</p> <ul style="list-style-type: none"> <li>X'002C' Length &lt;variable&gt;</li> <li>X'C4C3' Device Control Function Set</li> <li>X'FF10' Device Control/1 subset</li> <li>X'6001' Multiple Copies support</li> <li>X'702E' Load Resource Equivalence</li> <li>X'F001' End persistent NACK without leaving IPDS</li> <li>X'8008' Mark Form support</li> <li>X'800A' Alternate Offset Stacker</li> <li>X'80F2' Discard Buffered Data support</li> <li>X'80F4' Request Resource List support</li> <li>X'80F6' Exception Handling Control support</li> <li>X'9001' Print Buffered Data support</li> <li>X'9003' Specify Group Operation</li> <li>X'9005' Erase Residual Print Data support</li> <li>X'9007' Erase Residual Font Data support</li> <li>X'90F3' Obtain Printer Characteristics support</li> <li>X'90F5' Page Counters Control support</li> <li>X'9015' Select Input Media Source support</li> <li>X'9016' Set Media Origin</li> <li>X'9017' Set Media Size</li> <li>X'9004' Define Group boundary</li> <li>X'9013' Eject to Front Facing</li> </ul> <p>The two-byte pairs identifying the printer's properties for the Text command set vector are as follows:</p> <ul style="list-style-type: none"> <li>X'000A' Length &lt;variable&gt;</li> <li>X'D7E3' Text Function Set</li> <li>X'FF20' Text/2 subset</li> <li>X'1001' Unordered text support</li> <li>X'50FF' Eight text orientations supported</li> </ul> <p>The two-byte pairs identifying the printer's properties for the IM Image command set vector are as follows:</p> <ul style="list-style-type: none"> <li>X'000A' Length &lt;variable&gt;</li> <li>X'C9D4' IM Image Function Set</li> <li>X'FF10' Image/1 subset</li> <li>X'1001' Unordered image support</li> <li>X'A004' Four pattern rotations supported</li> </ul> <p>The two-byte pairs identifying the printer's properties for the Overlay command set vector are as follows:</p> <ul style="list-style-type: none"> <li>X'0008' Length &lt;variable&gt;</li> <li>X'D6D3' Overlay Function Set</li> <li>X'FF10' Overlay/1 subset</li> <li>X'15FF' Nested overlays more than 255 levels supported.</li> </ul> <p>The two-byte pairs identifying the printer's properties for the Page Segment command set vector are as follows:</p> <ul style="list-style-type: none"> <li>X'0006' Length &lt;variable&gt;</li> <li>X'D7E2' Page Segment Function Set</li> <li>X'FF10' Page Segment/1 subset</li> </ul>

Table 4-1. **Device Control commands** (continued)

Hex value	Command	Comments
X'D6E4'	Sense Type and Model (continued)	<p>the two-byte pairs identifying the printer's properties for the Load Font command set vector (4028 emulation) are as follows:</p> <ul style="list-style-type: none"> <li>X'000C' Length &lt;variable&gt;</li> <li>X'C3C6' Loaded Font Function Set (4028)</li> <li>X'FF10' Coded fonts only</li> <li>X'A004' Four pattern rotations supported</li> <li>X'C005' Bounded box pattern technology</li> <li>X'C101' Relative metrics</li> </ul> <p>The two-byte pairs identifying the printer's properties for the Load Font command set vector (3812/3816 emulation) are as follows:</p> <ul style="list-style-type: none"> <li>X'000A' Length &lt;variable&gt;</li> <li>X'C3C6' Loaded Font Function Set (3812/3816)</li> <li>X'FF10' Coded fonts only</li> <li>X'A004' Four pattern rotations supported</li> <li>X'C005' Bounded box pattern technology</li> </ul> <p>The two-byte pairs identifying the printer's properties for the IO Image command set vector are as follows:</p> <ul style="list-style-type: none"> <li>X'0014' Length &lt;variable&gt;</li> <li>X'C9D6' IO Image Function Set (optional vector)</li> <li>X'FF10' Image/1 subset</li> <li>X'1001' Unordered image support</li> <li>X'5001' MMR Compression algorithm supported</li> <li>X'5003' Uncompressed image support</li> <li>X'5081' G3 Facsimile Coding Scheme</li> <li>X'5082' G4 Facsimile Coding Scheme</li> <li>X'5101' Bit allocation algorithm</li> <li>X'A004' Four orthogonal image rotation support</li> </ul> <p>The two-byte pairs identifying the printer's properties for the Graphics command set vector are as follows:</p> <ul style="list-style-type: none"> <li>X'000A' Length &lt;variable&gt;</li> <li>X'E5C7' Graphics Function Set</li> <li>X'FF20' DR/2 level subset</li> <li>X'1001' Unordered graphics blocks support</li> <li>X'A004' Four orientations supported</li> </ul> <p>The two-byte pairs identifying the printer's properties for the Bar Code command set vector are as follows:</p> <ul style="list-style-type: none"> <li>X'000A' Length &lt;variable&gt;</li> <li>X'C2C3' Bar Code Function Set</li> <li>X'FF10' Bar Code Bar Code/1 level subset</li> <li>X'1001' Unordered bar code blocks support</li> <li>X'A004' Four orientations supported</li> </ul>

Table 4-1. Device Control commands (continued)

Hex value	Command	Comments
X'D633'	Execute Order Anystate	<p>X'0A00' (Alternate Offset Stacker) Supported.</p> <p>X'0C00' (Control Edge Marks) Not supported.</p> <p>X'F200' (Discard Buffered Data) Supported. This command returns the printer to the home state regardless of its current position. The IBM 3812/3816 printers flush the buffer (printing the information) before returning to the home state; the IBM 4028 does not. The Xerox IPDS emulation performs as the IBM 4028 does even if you are using the 3812/3816 emulation. When the system encounters the Discard Buffered Data command, the Mark Form is carried forward to the next page.</p> <p>X'F600' (Exception Handling Control) Bits 0, 1, and 6 are supported for offset location 2. Bit 6 only supports the value 0, which means exception highlighting is not supported. Bit 7 is supported for offset location 3. Bits 6 and 7 are supported for offset location 4.</p> <p>X'0800' (Mark Form) The printer marks the current or next sheet at the top and bottom margins with a 1/2-inch (approximate) form. The actual size depends on the current paper size. Even if you are using the 3812/3816 emulation, the mark is identical to the IBM 4028. Under some circumstances, IBM printers discard the Mark Form sequence when an exception occurs on the page. The Xerox IPDS printer will print it.</p> <p>X'F800' (Print Quality Control) Not supported.</p> <p>X'F400' (Request Resource List) Resource Types X'01', X'04' through X'08', and X'10' are supported.</p>
X'D68F'	Execute Order Home State	<p>X'0400' (Define Group Boundary). Group Level fields are not supported.</p> <p>X'F300' (Obtain Printer Characteristics) The following responses are sent from the printer to the host on receipt of the Obtain Printer Characteristics order:</p> <p>X'0001' (Printable Area self-defining field) Supported.</p> <p>If you set PAPERSIZE to any envelope in the configuration file, bit 5 is set.</p> <p>If the tray ID for the current tray is manual, bit 6 is set.</p> <p>X'0002' (Symbol Set) Not supported.</p> <p>X'0003' (Image/Coded Font Resolution) Offset locations 4 and 6 through 9 are supported.</p> <p>X'0004' (Storage Pools) Offset locations 2 through 6 are supported.</p> <p>X'0005' (Color Support) Offset locations 4 through n are reported if the printer supports color; otherwise, this field is not reported.</p> <p>X'0006' (Installed Features) Offset locations 4 through n are reported as defined in the configuration file for DUPLEX. If you specify YES for DUPLEX in the configuration file and duplex is available, the duplex bit 0 will be set to B'1' of the X'0001' field for at least one bin.</p>

Table 4-1. **Device Control commands** (continued)

Hex value	Command	Comments
X'D68F'	Execute Order Home State (continued)	<p>X'0007' (Available Features) Offset locations 4 through n are reported as defined in the configuration file for DUPLEX and OFFSETSTACKER. If you specify YES for DUPLEX in the configuration file and duplex is available, the duplex bit 0 will be set to B'1' in bytes 22, 23 of the X'0001' field response for at least one bin.</p> <p>X'0009' (Print Quality Support) Not supported.</p> <p>X'000A' (RT and RIDF Support) The printer responds with a nonzero Resource Type reply for query combinations with Host-Assigned Resource ID or IBM Global Resource ID.</p> <p>X'000B' (Remote Resource RT and RIDF Support) Supports the Resource Types (X'01' and X'08') and ID formats (X'03' and X'06') as described in the Activate Resource command.</p> <p>X'000E' (Bar Code Type) Supports the common bar code set plus the Codabar, Code 128, and POSTNET combinations.</p> <p>X'0012' (Specify Group Operation) Supported.</p> <p>X'F500' (Page Counters Control) The Received Page Counter, Committed Page Counter, and Committed Copy Counter are directly implemented. The other counters are simulated.</p> <p>X'0100' (Print Buffered Data) The End Page command always sends all data for that page to the printer and updates the Committed, Operator, Jam, and Stacked counters.</p> <p>X'1500' (Select Input Media Source) Bin selection is determined by the configuration file.</p> <p>X'1600' (Set Media Origin) Supported. The effective media origin is the selected corner of the physical paper.</p> <p>X'1700' (Set Media Size) This order specifies the size of the media. If the printer can determine the dimensions, it may ignore one or both of the physical dimensions specified in this order if a conflict is encountered. If both the SMS and the valid sensor and operator input exist, the printer determines the media size by using the smaller of the SMS and valid sensor or operator input in each dimension. An exception exists if you try to print outside of the valid printable area (VPA).</p> <p>X'0300' (Specify Group Operation) Treated as a No Operation (NOP) command.</p> <p>X'0D00' (Stack Received Pages) Not supported.</p>

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## Text command

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The Write Text command controls the presentation of text information on a page, page segment, or overlay. The command supports the PTOCA PT1 and PTOCA PT2 subsets of PTOCA data with the following restrictions or differences:

- Overstrike is done using the current font. The increment between two overstrike characters is accomplished by using the character increment and the intercharacter adjustment value of the currently selected font.
- The underscore position is always six dots below the baseline regardless of the font in use.
- IBM printers substitute a hyphen (-) if you try to print a character that is not defined in the current font. Xerox printers substitute a space.

The Load Equivalence command is not supported.

For more information, refer to the *IBM Data Stream and Object Architecture Presentation Text Object Content Architecture (PTOCA) Reference*, publication number SC31-6803-0.

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## IM Image command set

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The IM Image command set contains the following commands:

- Write Image Control (WIC)
- Write Image (WI)

The command set controls the presentation of image raster data on a page, page segment, or overlay. The Xerox IPDS emulation supports this command set as follows:

- 240 and 300 picture elements (pel) are supported. When the printer receives a 240-pel image, the image is scaled to 300 pel. This may result in slight differences in the shading characteristics.
- Changing IMSMOOTHING in the configuration file allows you to choose between a rough and a smoothing algorithm.
  - Setting IMSMOOTHING to YES in 3812 or 3816 emulation mode results in smoother lines, but the shading of images may appear dark.
  - Setting IMSMOOTHING to NO allows for closer shading characteristics, but some slanted lines may appear jagged.
- Optimized IM replication is supported using the PCL5 data stream. This replication uses HP-GL2 graphics to replicate an IMAGE block.

## IO Image command set

The IO Image command set contains the following commands:

- Write Image Control 2 (WIC2)
- Write Image 2 (WI2)

The command set controls the presentation of image data on a page, page segment, or overlay. Table 4–2 shows how these commands are supported on your Xerox printer.

Table 4–2. **IO Image commands**

Hex value	Command	Comments
X'D63E'	Write Image Control 2	Supported.
X'D65E'	Write Image 2	Support for X'95' (Image Encoding Parameter) is limited to X'01' (IBM Modified CCITT Modified Read algorithm), X'03' (no compression), X'81' (CCITT T.4 G3 facsimile two-dimensional coding scheme), and X'82' (CCITT T.6 G4 facsimile two-dimensional coding scheme). Support for X'96' (Image Data Element Size Parameter) is limited to 1 or 8 bits per image data point. Support for X'97' (Image Look-Up Table ID Parameter) is limited to the standard look-up table.

## Graphics command set

The Graphics command set contains the following commands:

- Write Graphics Control (WGC)
- Write Graphics (WG)

The command set controls the presentation of graphics on a page, page segment, or overlay. Color printing is simulated. The printer reports color as a capability and handles it by using shaded files.

The Write Graphics command carries GOCA level DR/2 graphics data to the printer. The Xerox IPDS emulation deviates from this architecture in the following ways:

- Validation of the valid printable area (VPA) is performed only on graphic blocks.
- Chaining graphic blocks is not supported.
- The scaling algorithm for DR characters differs depending on the scaling factor.
  - Character outline scaling algorithm (including smoothing) is used if the scaling factor in both the l and b direction is equal or greater than the value set for DRSMOOTHING.
  - Dot-to-dot scaling algorithm is used if the scaling factor is greater than the value set for DRSMOOTHING; this algorithm produces a lighter character.



- Only X'02' (overpaint) is supported for the Set Mix drawing order.
- Only X'05' (leavealone) is supported for the Set Background Mix drawing order.
- Only X'00' and X'FF' are supported for the Set Pattern Set drawing order.
- Only X'00'–X'10' and X'40' are supported for the Set Pattern Symbol drawing order.
- Layering of graphics objects is not supported. The objects will be opaque.

For complete information regarding GOCA level DR/2, refer to the *IBM Data Stream and Object Architecture Graphics Object Content Architecture (GOCA) Reference*, publication number SC31-6804-0.

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## Bar code command set

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The Bar code command set contains the following commands:

- Write Bar Code Control (WBCC)
- Write Bar Code (WBC)

The command set controls the presentation of bar code data on a page, page segment, or overlay. It supports the common bar code set plus the Codabar, Code 128, and POSTNET combinations as described in the "Device Control command set" section.

Bar and space widths are printed in multiples of one dot (dot width 1/300"). In some situations, the printer adds an extra dot to the narrow space to improve the readability of the bar code.

**N** **Note:** If you are emulating an IBM 3812 or 3816, the resources associated with the bar codes need to be converted to 300SPI to print on your Xerox 4220/MRP or 4230/MRP IPDS printer. This conversion may cause the length of the bar code to be 80% shorter than the length of the intended bar code.

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## Overlay command set

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The Overlay command set contains the following commands:

- Begin Overlay (BO)
- Deactivate Overlay (DO)
- Include Overlay (IO)

The command set allows you to store and name data on the printer for repeated use. An overlay is a resource object containing text, image, graphics, or bar code data. Because overlays define their own environment, they are typically used as forms. During printing, IPDS merges the overlay with the logical page.

## Page Segment command set

The Page Segment command set contains the following fully supported commands:

- Begin Page Segment (BPS)
- Deactivate Page Segment (DPS), previously called Delete Page Segment
- Include Page Segment (IPS)

The command set allows you to store and name data on the printer for repeated use. An page segment is a resource object containing text, image, graphics, or bar code data that is processed in the existing page environment. During printing, IPDS merges the page segment with the logical page.

## Load Font command set

The Load Font command set contains the following commands:

- Deactivate Font (DF), previously called Delete Font
- Load Font (LF)
- Load Font Control (LFC)
- Load Font Index (LFI)
- Load Symbol Set (LSS)

The command set controls how coded font resources are downloaded and managed at the printer. The 4028 algorithm is the supported font substitution algorithm.

Table 4–3 shows how these commands are supported on your Xerox printer.

Table 4–3.      **Load Font commands**

Hex value	Command	Comments
X'D64F'	Deactivate Font	Supported.
X'D62F'	Load Font	Supported.
X'D61F'	Load Font Control	Only single-byte coded fonts are supported for offset location 2. Only single-byte coded fonts are supported for bits 2–3 of offset location 5. Only 3000 units per unit base are supported for offset locations 12–13 and 14–15. Offset location 21 is not used. Only X'00' (ten inches) is supported for offset location 26. Only 3000 pel units per unit base are supported for offset locations 28–29 and 30–31.
X'D60F'	Load Font Index	Supported.
X'D61E'	Load Symbol Set	Not supported.

**Note:** Scaling fonts vertically or horizontally may produce characters with rough edges.

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## 5. Accessing printer features from IPDS

This chapter describes how to access the features of your Xerox printer in an IPDS environment. It contains the following sections:

- Tray mapping
- Checkpoint capability in the IBM host environment
- Port timeouts
- Content fidelity vs. absolute fidelity
- Nonprintable area considerations
- IPDS font and code page comparisons
- PSF font support
- Converting 240 spi fonts for use in the 4028 emulation

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### Tray mapping

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Tables 5–1 through 5–4 show the values you should use at your IBM host to access source paper trays on your Xerox printer. These values will appear on the IPDS Settings Printout for your Xerox printer.

The printer has predetermined defaults mapping the Input Media Source ID to the paper trays. The ID parameter of the tray information on the Settings Printout corresponds to the IPDS Input Media Source ID. The PRINTERID parameter defines the PCL5 tray command that is generated for the input media source. If an Input Media Source ID is received but not defined on the Settings Printout, it is ignored.

In the IBM mainframe environment, the Input Media Source ID is determined by the BIN number provided in the COPYGROUP, FORMDEF, and SUBGROUP commands in PPFA/370. The Input Media Source ID generated by PSF is the BIN number minus 1. For example, a BIN number of 100 generates an Input Media Source ID of 99. This always selects the manual tray on your printer.

In the IBM AS/400 environment, you can choose any of the following six input sources from Office Vision:

- Tray 1 selects Input Media Source ID 0
- Tray 2 selects Input Media Source ID 1
- Tray 3 selects Input Media Source ID 2
- Manual selects Input Media Source ID 99
- Envelope selects Input Media Source ID 64
- Continuous selects Input Media Source ID 2

When selecting the input source from the AS/400, you can select one of four source drawers:

- Drawer 1 selects Input Media Source ID 0
- Drawer 2 selects Input Media Source ID 1
- Drawer 3 selects Input Media Source ID 2
- \*E1 selects Input Media Source ID 64

Note that Input Media Source ID 64 is not defined on the 4215 and 4219 printers. If you want to pull from the manual feed tray by selecting \*E1 from the printer file, you must create an additional tray definition as described in the “Reconfiguring BIN IDs” appendix. This is done by creating a tray definition with an ID of 64 and a PRINTERID of 2. You must also define the size of paper to be fed from the manual feed tray as described in the appendix.

Tables 5–1 through 5–4 show the values you should use at your IBM host to access source paper trays on your Xerox MRP printer.

Table 5–1. **4220/MRP without the high-capacity feeder**

AFPDS Bin ID	Input Media Source ID	PCL tray command	4220/MRP tray
1	0	1 (Paper Tray)	Tray 1
2	1	3 (Manual–Envelope)	Tray 2
65	64	4 (Lower)	Tray 3
100	99	2 (Manual)	Tray 5

Table 5–2. **4220/MRP and 4230/MRP with the high-capacity feeder**

AFPDS Bin ID	Input Media Source ID	PCL tray command	4220/MRP tray 4230/MRP tray
2	1	1 (Paper Tray)	Tray 1
3	2	3 (Manual–Envelope)	Tray 2
65	64	4 (Lower)	Tray 3
1	0	5 (Paper Deck)	Tray 4
100	99	2 (Manual)	Tray 5

Table 5–3. **4219/MRP**

AFPDS Bin ID	Input Media Source ID	PCL tray command	4219/MRP tray
1	0	1 (Paper Tray)	Upper
2	1	7 (Undefined)	Middle
65	64	4 (Lower)	Lower
100	99	2 (Manual)	Manual

Table 5–4. 4215/MRP

AFPDS Bin ID	Input Media Source ID	PCL tray command	4215/MRP tray
1	0	1 (Paper Tray)	Upper
2	1	4 (Lower)	Lower
100	99	2 (Manual)	Manual

## Checkpoint capability in the IBM host environment

The IBM host environment has the capability of checkpointing the printer at certain page intervals. Checkpointing is turned on with a TSO command. If the printer is powered off or fails while a job is printing, the host resends pages from the last page acknowledged by the printer. Your Xerox IPDS printer acknowledges pages as they are received and formatted at the interface, not when they are actually printed.

If a power failure occurs, there may be pages in the controller that were not imaged. There may also be pages in the paper path being printed that were acknowledged to the host, but not actually printed. The number of pages depends on the complexity of the job, as well as the speed of the line sending the job. It is recommended that you run with page checkpointing turned off or set to a high number (such as 100). This causes the host to resend the whole job or a large number of pages, which should guarantee that no pages are lost.

## Binding the IBM host to the Xerox IPDS printer

For your IBM host to bind properly with your Xerox IPDS printer, use the logmode table shown in figure 5–1. The logmode table contains parameters used by the host to start the bind process. Supply this information to your system programmer to define the printer at the host. Although the table shown refers to the IBM 3812, you can use it for all three emulations.

Figure 5–1. Logmode table

```
IBM3812
LOGMODE=IBM3812,FMPROF=X'03',TSPROF=X'03',X00539838
PRIPROT=X'B1',SECPROT=X'B0',COMPROT=X'7080',X00539938
SSNDPAC=X'00',SRCVPAC=X'03',RUSIZES=X'8585',X00540038
PSNDPAC=X'03',PSERVIC=X'014000010000000001000000
```

## Defining the printer as a line printer and an IPDS printer

You can define the 42XX/MRP printer as a line printer and as an IPDS printer using the same LU. You cannot send data to both printers simultaneously; only one of the printers can be active.

Figure 5-2 provides an example of the Functional SubSystem (FSS) for emulating an IBM 4028. This information can be found under SYS1.JESPARMS.

Figure 5-2. **FSS for emulating an IBM 4028**

```
FSSDEF(FSS8) PROC=APSW428A /* FUNC. SubSys. 4028 emulation */
```

Figure 5-3 provides an example of the FSS for emulating an IBM 3812/3816.

Figure 5-3. **FSS for emulating an IBM 3812/3816**

```
FSSDEF(FSSE) PROC=APSW316B /* Func. SubSys. 3812/3816 emulation */
```

Figure 5-4 provides an example of a printer definition to JES defining the printer as a PSF printer. PRT 194 is emulating an IBM 4028 and PRT 220 is emulating an IBM 3812/16.

Figure 5-4. **Defining the printer as a PSF printer**

```
PRT(194) CLASS=R, /* IPDS printer simulates a */
MODE=FSS,FSS=FSS8, /* 4028 , A&E rm. 3456 */
ROUTECD=U194, /* Vtam LU:N15018LV */
PRMODE=(PAGE,LINE,SOSI1), /* Applid: PSFFSB5
UCS=0,SEP=YES,SEPDS=YES,MARK=YES,
FCB=STD1,START=NO,CKPTPAGE=100,FLASH=FL

PRT(220) CLASS=R, /* IPDS printer simulates a 3812/16 */
MODE=FSS,FSS=FSSE,
3812/3816, A&E rm. 3541 */
ROUTECD=U220, /* Vtam LU: N15018LO */
PRMODE=(PAGE,LINE,SOSI1),Applid: PSFFSB9 */
UCS=0,SEP=YES,SEPDS=YES,MARK=YES,
FCB=STD1,START=NO,CKPTPAGE=100,FLASH=FL
```

Figure 5–5 provides an example of a printer definition to JES defining the printer as a line printer or remote or channel-attached printer.

Figure 5–5. **Defining the printer as a PSF printer**

```
RMT(14) DEVVTYPE=LUTYPE1,BUFSIZE=256,NUMRDR=0,NUMPRT=1,NUMPUN=1,
COMPRESS=NO,COMPACT=NO,LINE=14
R(14).PR(1) CLASS=AJ,PRWIDTH=132,FCBLOAD=YES,START
R(14).PU(1)LASS=BK,START,CCTL=NO,CMPCT=NO,NOCOMP,SEP=NO,
LRECL=80,NOSUSPND,SELECT=BASIC
/* REMOTE 3770 DEFINITION FOR */
/* JES/328X PRINT FACILITY - */
```

## PSF font support

Your Xerox IPDS printer supports 30 resident fonts for the 4028 emulation and 37 resident fonts for the 3812/3816 emulation. In the IBM mainframe environment, you need to indicate to the Printer Services Facility (PSF) the specific fonts that are resident at the printer before you print in IPDS. If you do not do so, PSF downloads fonts that are already stored at the printer. This seriously impacts performance.

PSF provides a utility called APSRMARK. The utility marks the fonts on the host that are resident at the printer to prevent PSF from downloading them again. Although your Xerox printer includes many of the more popular IPDS fonts, it does not include them all. To correctly mark your fonts, use APSRMARK to generate a report showing the marked resources. The procedure to generate this report as well as to mark resident fonts is in the *IBM Print Services Facility/MVS 2.1.0 System Programmer Guide*, publication number S544–3672–00.

Once you generate the IBM report, refer to Appendix B of the IBM manual to determine the FGID associated with the font file in the report. PSF font files have names, such as COL00B0A, that must be looked up in the font table to determine the FGID. Next, obtain an IPDS Settings printout and match the FGIDs listed in the Resident Fonts section to the ones that match the fonts in the report generated by APSRMARK. This allows you to determine whether you have marked the correct fonts at the host. Fonts marked PUBLIC in the APSRMARK report have been marked properly as printer resident fonts.

If you are replacing an IBM 4028 or 3816 system, you may leave the fonts marked the same as they were for the IBM printers, assuming they were marked.

## Converting 240 spi fonts for use in the 4028 emulation

If you have replaced an IBM 3812 or 3816 printer or you need to switch to the 4028 emulation, you may want to convert the fonts on the host from 240 spi to 300 spi to match the resolution of the printer. PSF provides a utility that performs this function for you. It is called APSRCF30 and instructions on its use are located

in Appendix G of the *PSF/MVS 2.1.0 Systems Programmer Guide* from IBM.

If you do not convert these resources at the host to 300 spi fonts, they will have to be converted at the printer, which causes a performance degradation. Using this utility, you only need to convert the fonts on the host once. Without the utility, you need to convert them each time they are downloaded.

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## Port timeouts

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Due to the complexity of some IPDS documents, delays may occur at the host during the transmission of a job to the printer while the page is being processed at the host. This delay could cause a timeout at the printer, which causes differences in the output.

The default timeout on the coax and twinax ports is 20 seconds. If you notice differences in output, increase the timeout value until the problem no longer exists. The timeout value is increased by sending FSL 100 as described in the *Xerox MRP Family Twinax Command Reference* and the *Xerox MRP Family Coax Command Reference*.

Keep the following in mind when sending FSL commands:

- If you are working in the twinax environment and have configured the printer for IPDS processing only, FSL commands must be sent via the mini-Centronics port.
- If you have configured the printer for dual processing (SCS and IPDS), FSL commands may be sent to the SCS port or the mini-Centronics port.

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## Content fidelity vs. absolute fidelity

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When operating in the AS/400 environment, you can set up your IPDS printer for either content fidelity or absolute fidelity:

- Content fidelity indicates the host should allow the printer to print the job even if exceptions occur
- Absolute fidelity indicates a page should print only if the printer does not respond with any exceptions.

If the AS/400 is set up for absolute fidelity, blank pages may be produced when an exception has occurred. If blank pages are encountered, change the fidelity setting at the AS/400 from absolute fidelity to content fidelity.

Content fidelity enables the printer to print as much of the document as possible and to highlight the offending portions of the job by entering a description of the problem in the error log on the operator's screen at the AS/400. These exceptions are normally caused because the printer does not implement the IPDS ColorOfMedium commands, but the exceptions do not have any noticeable impact on your output.



## Nonprintable area considerations

Your Xerox IPDS printer has a 50-pixel nonprintable area surrounding the IPDS page. This requires that you consider the types of applications you are running on the printer and the valid printable area (VPA) of the page.

This section describes the configuration settings that relate to the printable area of the page. For more information about the configuration settings, refer to the “Configuring IPDS” chapter.

### MARGINSTOSYSTEM parameter

Use the MARGINSTOSYSTEM parameter to select the size of the nonprintable area that the printer reports to the host:

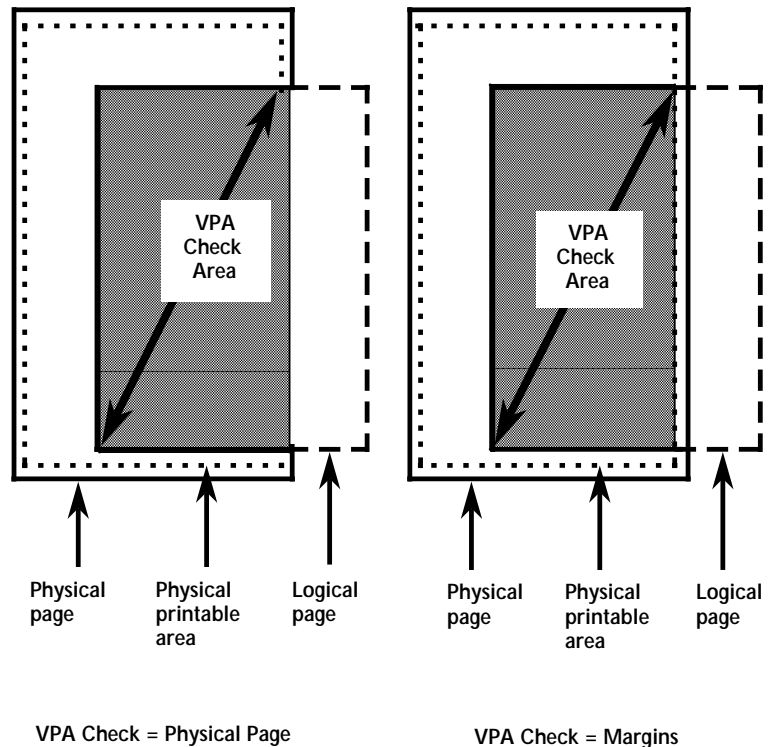
- YES reports the actual nonprintable area of the printer you are using for the current paper size.
- NO reports the nonprintable area of the emulated printer (IBM 4028, 3812, or 3816) for the current paper size.

### VPACHECK parameter

Use the VPACHECK parameter to define how the printer checks for picture elements (pels) that are not within the defined printable area.

Figure 5–6 shows the defined areas for the VPAMARGINS and VPAPHYSICAL settings you can select with the VPACHECK parameter.

Figure 5–6. **VPACHECK (VPAMARGINS and VPAPHYSICAL settings)**



The settings for the VPACHECK parameter are as follows:

- VPAMARGINS indicates you want to use the margins for VPA check. The VPA equals the area where the IPDS logical page and the printable area of the selected paper size overlap. You cannot select this value if MARGINSTOSYSTEM is OFF.
- VPAPHYSICAL indicates you want to use the entire page for VPA check. The VPA equals the area where the physical page and the IPDS logical page overlap. Data loss may occur in the unprintable area.
- VPALOGICAL indicates you want to use the IPDS logical page for VPA check. The valid printable area is the area of the IPDS logical page. The printer returns an error if you try to print outside of the logical page. The printer does not return an error if you try to print within the logical page when the logical page extends beyond the printable area.
- NOVPA indicates you do not want to use VPA check.

#### **ADDMARGINS parameter**

Use the ADDMARGINS parameter to indicate how you want the printer to place data on the page.

- YES adds margins to the printable area. The printer starts positioning text from the inside edge of the left unprintable area and the bottom edge of the top unprintable area.
- NO does not add margins. The printer starts positioning text from the top left corner of the paper.

If your applications print edge-to-edge on the IBM 3812 or 3816 printer, set the ADDMARGINS parameter to YES. This causes your Xerox printer to move the page origin into the printable area, however, data may be lost at the bottom and right side of the page.

#### **PRINTX and PRINTY parameters**

The PRINTX and PRINTY parameters define in pels the X- and Y-offset values, which shift the starting point for printing in the X and Y directions. You can use these parameters with either setting of ADDMARGINS. Each parameter shifts the starting point for printing from the position determined by ADDMARGINS. Positive values move the starting point to the right; negative values move it to the left.

## Default font and code page considerations

Your Xerox IPDS printer uses the FGID 11 font and code page 500 as default settings. You can change the default code page and font by using the following commands: DEFAULTCODEPAGEID, CODEPAGEVERSION, DEFAULTFONTID, and DEFAULTFONTWIDTH. Refer to the “Configuring IPDS” chapter for the process.

When defining a new default font, make sure all parameters are programmed with values that the selected FGID supports. If you select the wrong font width or code page, the selection is ignored. Only a resident font can be selected as the default font.

Table 5–5 shows the values to program for the 4028 emulation. In the 4028 emulation, some values for CODEPAGEID are not valid for all fonts. CODEPAGEIDs in 4028 emulation are divided into code page groups defined at the bottom of the table. Refer to the “Resident code pages” appendix for a description of the code points available for each code page.

Table 5–5. 4028 font and code page parameters

Typeface	Pitch	FGID	Font width	Code page groups	Font ID
OCR B	10	3	144	F, K	C0E0OCRB
Courier B	10	11	144	A, B, C, G, L	C0E0OCR10
Prestige Pica	10	12	144	A, B, C, G, L	C0E0OPR10
Courier Italic	10	18	144	A, B, G, L	C0E0OC110
OCR A	10	19	144	E, K	C0E0OCRA
Courier Bold	10	46	144	A, B, G, L	C0E0OCB10
APL	12	76	120	D	C0E0AP12
Courier	12	85	120	A, B, C, G, L	C0E0OCR12
Prestige Elite	12	86	120	A, B, C, G, L	C0E0OPR12
Courier Italic	12	92	120	A, B, G, L	C0E0OC112
Prestige Elite Bold	12	111	120	A, B, G, L	C0E0OPB12
Prestige Elite Italic	12	112	120	A, B, G, L	C0E0P112
Boldface	PS	159	120	A, B, G, L	C0E0OBTR
Prestige	PS	164	120	A, B, G, L	C0E0OPRTR
Courier	15	223	96	A, B, L	C0E0OCR15
Courier	17.1	254	84	A, B, L	C0E0OCR17
Letter Gothic	20	281	72	A, B, L	C0E0OLR20

Table 5-5. **4028 font and code page parameters**  
(continued)

Typeface	Pitch	FGID	Font width	Code page groups	Font ID
Times Roman	6*	5687	40	A	C0E20T60
Times Roman	8*	5687	53	A	C0E20T80
Times Roman	10*	5687	67	A	C0E20T00
Times Roman	12*	5687	80	A	C0E20TB0
Times Roman Bold	10*	5707	67	A	C0E40T00
Times Roman Bold	12*	5707	80	A	C0E40TB0
Times Roman Bold	14*	5707	93	A	C0E40TD0
Times Roman Bold	18*	5707	120	A	C0E40TH0
Times Roman Bold	24*	5707	160	A	C0E40TN0
Times Roman Italic	10*	5815	67	A	C0E30T00
Times Roman Italic	12*	5815	80	A	C0E30TB0
Times Roman Bold Italic	10*	5835	67	A	C0E50T00
Times Roman Bold Italic	12*	5835	80	A	C0E50TB0

\*Indicates proportional spaced font.

Code page Group A consists of Version 0 code page 37, 38, 260, 273, 274, 275, 276, 277, 278, 280, 281, 282, 284, 285, 286, 287, 288, 297, 361, 367, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 500, 831, 870, 871, 1003. Group A also contains Version 1 of code page 37, 273, 274, 277, 278, 280, 281, 284, 285, 297, 500, and 871.

Code page Group B consists of Version 0 code page 256 and 289.

Code page Group C consists of Version 0 code page 259.

Code page Group D consists of Version 0 code page 293 and 310.

Code page Group E consists of Version 0 code page 892.

Code page Group F consists of Version 0 code page 893.

Code page Group G consists of Version 0 code page 1002.

Code page Group H consists of Version 0 code page 424.

Code page Group I consists of Version 0 code page 420.

Code page Group J consists of Version 0 code page 290.

Code page Group K consists of Version 0 code page 340.

Code page Group L consists of Version 0 code page 437.

Table 5–6 shows the values for the 3816/3812 emulation. There are no restrictions regarding code page groups in the 3816/3812 emulation. Although all assignments are recognized, some assignments cause problems, such as assigning an OCR code page to an APL font. No error checking is done in 3816/3812 mode to prevent the user from making these assignments. Refer to the “Resident code pages” appendix for a description of the code points available for each code page.

Table 5–6. **3812/3816 font and code page parameters**

Typeface	Pitch	FGID	Font width	Font ID
OCR B	10	3	144	C0L00BOA
Orator	10	5	144	C0S0OR10
Courier	10	11	144	C0S0CR10
Prestige Pica	10	12	144	C0S0PR10
Courier Italic	10	18	144	C0S0C110
OCR A	10	19	144	C0L00AOA
Gothic Text	10	40	144	C0D0GT10
Serif Text Italic	10	43	144	C0D0S110
APL	10	45	144	C0S0AE10
Gothic Text	12	66	120	C0D0GT12
Gothic Text Italic	12	68	120	C0D0G112
Script	12	84	120	C0S0SR12
Courier	12	85	120	C0S0CR12
Prestige Elite	12	86	120	C0S0PR12
Letter Gothic	12	87	120	C0S0LT12
Prestige Elite Italic	12	112	120	C0S0P112
Boldface Italic	PS	155	120	C0S0BITR
Essay	PS	160	120	C0S0ESTR
Essay Italic	PS	162	120	C0S0EITR
Essay Light	PS	173	120	C0S0ELTR
Document	PS	175	120	C0S0DOTR

Table 5–6. **3812/3816 font and code page parameters**  
(continued)

Typeface	Pitch	FGID	Font width	Font ID
Gothic Text	13	204	108	C0D0D224
Serif Text	15	229	96	C0D0ST15
Gothic Text	15	230	96	C0D0GT15
Courier	5	244	288	C0E0CR15
Courier	17.1	252	84	C0S0CR17
Courier Sub/Sup	17.1	254	84	C0E0CR17
APL	20	280	72	C0S0AE20
Gothic Text	20	281	72	C0D0GT20
Gothic Text	26.7	290	54	C0D0GT24
Sonoran Serif	8*	4407	54	C0T05580
Sonoran Serif	10*	4407	66	C0T05500
Sonoran Serif	12*	4407	78	C0T055BO
Sonoran Serif Bold	10*	4427	66	C0T07500
Sonoran Serif Bold	16*	4427	108	C0T075FO
Sonoran Serif Bold	24*	4427	162	C0T075NO
Sonoran Serif Italic	10*	4535	66	C0T15500

## Font substitution

Your Xerox printer is configured to provide a predetermined set of font substitutions. You may change any of these substitutions or add to them by using the resource commands described in the “Configuring IPDS” chapter.

The following table describes the set of default font substitutions that are provided with the 4028 font set.

Table 5–7. 4028 emulation font substitutions

Typeface	Pitch	FGID	Font width	Substitution FGID	Substitution fontwidth
Pica	10	20	144	11	144
Math Symbol	10	30	144	11	144
Roman Text	10	41	144	12	144
Serif Text	10	42	144	11	144
Serif Text Italic	10	43	144	18	144
Prestige Pica Bold (AB)	10	60	144	12	144
Serif Text	12	70	120	85	120
Serif Italic	12	71	120	92	120
Serif Bold (AB)	12	72	120	85	120
Math Symbol	12	80	120	86	120
Elite	12	107	120	85	120
Courier Bold (AB)	12	108	120	85	120
Bold	PS	176	120	159	120
Prestige	15	221	96	223	96
Serif	15	229	96	223	96
Courier Bold (AB)	17.1	253	84	254	84
Prestige	17.1	256	84	254	84
Sonoran Serif	8*	751	54	5687	53
Times Roman	6*	760	40	5687	40
Times Roman Bold	12*	761	80	5707	80
Times Roman Bold	14*	762	93	5707	93
Times Roman Italic	12*	763	80	5815	80
Times Roman Bold Italic	10*	764	67	5835	67
Times Roman Bold Italic	12*	765	80	5835	80
Sonoran Serif	10*	1051	66	5687	67
Sonoran Serif Bold	10*	1053	66	5707	67
Sonoran Serif Italic	10*	1056	66	5815	67
Sonoran Serif	12*	1351	78	5687	80
Sonoran Serif Bold	16*	1653	108	5707	93
Sonoran Serif Bold	18*	1803	120	5707	120

\* Indicates proportional spaced font.

The following table lists the default font substitutions that are provided with the 3816/3812 font set.

Table 5–8. **3812/3816 emulation font substitutions**

Typeface	Pitch	FGID	Font width	Substitution FGID	Substitution fontwidth
Artesan	10	13	144	11	144
Pica	10	20	144	12	144
Matrix Gothic	10	26	144	40	144
Math Symbol	10	30	144	11	144
Orator Bold (AB)	10	38	144	5	144
Gothic Text Bold (AB)	10	39	144	40	144
Roman Text	10	41	144	40	144
Serif Text	10	42	144	40	144
Courier Bold (AB)	10	46	144	11	144
Shalom Bold (AB)	10	50	144	11	144
Prestige_Bold (AB)	10	60	144	12	144
Gothic Text Bold (AB)	12	69	144	66	120
Serif Text	12	70	120	66	120
Serif Text Italic	12	71	120	68	120
Serif Text Bold (AB)	12	72	120	66	120
Math Symbol	12	80	120	86	120
Light Italic	12	91	120	112	120
Shalom Bold (AB)	12	101	120	86	120
Courier	12	107	120	85	120
Courier Bold (AB)	12	108	120	85	120
Letter Gothic Bold (AB)	12	110	120	87	120
Prestige_Bold (AB)	12	111	120	86	120
Modern	PS	158	120	175	120
Boldface (AB)	PS	159	120	175	120
Essay Bold (AB)	PS	163	120	160	120
Barak Bold (AB)	PS	168	120	175	120
Boldface (AB)	PS	176	120	175	120
Bold Italic	PS	177	120	155	120
Math Symbol	12	193	120	86	120
Math Symbol	10	198	144	11	144

\* Indicates proportional spaced font.



Table 5–8. **3812/3816 emulation font substitutions**  
(continued)

Typeface	Pitch	FGID	Font width	Substitution FGID	Substitution fontwidth
Gothic Text Bold (AB)	15	212	96	230	96
Prestige	15	221	96	230	96
Letter Gothic	15	222	96	230	96
Courier	15	223	96	230	96
Math Symbols	15	225	96	86	120
Shalom Bold Condensed (AB)	15	234	96	230	96
Courier Bold (AB)	5	245	288	244	288
Courier Bold (AB)	17.1	253	84	252	84
Sonoran Serif	8*	751	54	4407	54
Sonoran Serif	10*	1051	66	4407	66
Sonoran Serif Bold	10*	1053	66	4427	66
Sonoran Serif Italic	10*	1056	66	4535	66
Sonoran Serif	12	1351	78	4407	78
Sonoran Bold	16*	1653	108	4427	108
Sonoran Bold	24*	2103	162	4427	162

\* Indicates proportional spaced font.

# IPDS font and code page comparisons

This section compares the Xerox font sets and code pages provided for your Xerox printer to those provided for the IBM 4028, IBM 3812, and 3816 printers.

## Font comparison

The Xerox MRP Family IPDS interface option uses two font sets to emulate the three IBM IPDS printers:

- The IBM 3812 and 3816 printers have identical font sets, which are emulated in the Xerox MRP Family 3812/16 font set.
- The IBM 4028 font set is emulated by the Xerox MRP Family 4028 font set.

The 3812/16 font set has 37 standard fonts. The following IBM fonts are not included:

- Roman Text 10 pitch (FGID 41)
- Serif Text 10 pitch (FGID 42)
- Katakana (FGID 44)
- Serif Text 12 pitch (FGID 70)
- Serif Text Italic 12 pitch (FGID 71)

There are a number of font substitutions available on the IBM printers that are not present in the 3812/16 font set. IBM has a number of alternative font sets available for the IBM 3812 and 3816 printers to meet special requirements.

The Xerox MRP Family 4028 font set has 30 standard fonts. The following IBM fonts are not included:

- Prestige 15 pitch (FGID 221)
- Prestige 17.1 pitch (FGID 256)

Table 5–9 provides a comparison of the IBM and Xerox fonts. In the table, the following notation is used:

- Y                      The font is supported as a standard font.
- —                     The font is not supported as a standard font or as a substitution font.
- Bold number        The font is a bold version of the FGID number.
- Sub number         The font is supported only as a substitution font. If the font is selected, FGID number is used in its place.

Table 5-9. IPDS font comparison

Font	IBM 3812/16	Xerox 3812/16 emulation	IBM 4028	Xerox 4028 emulation
3 — OCR B	Y	Y	Y	Y
5 — Orator 10	Y	Y	—	—
11 — Courier.10	Y	Y	Y	Y
12 — Prestige.10	Y	Y	Y	Y
13 — Artisan.10	Sub 11	Sub 11	—	—
18 — Courier Italic.10	Y	Y	Y	Y
19 — OCR A	Y	Y	Y	Y
20 — Pica.10	Sub 12	Sub 12	Sub 11	Sub 11
26 — Matrix Gothic.10	Sub 40	Sub 40	—	—
30 — Math Symbol.10	Sub 11	Sub 11	Sub 11	Sub 11
38 — Orator Bold.10	Bold 5	Bold 5	—	—
39 — Gothic Text Bold.10	Bold 40	Bold 40	—	—
40 — Gothic Text.10	Y	Y	—	—
41 — Roman Text.10	Y	Sub 40	Sub 12	Sub 12
42 — Serif Text.10	Y	Sub 40	Sub 11	Sub 11
43 — Serif Text Italic.10	Y	Y	Sub 18	Sub 18
44 — Katakana	Y	—	—	—
45 — APL.10	Y	Y	—	—
46 — Courier Bold.10	Bold 11	Bold 11	Y	Y
60 — Prestige Bold.10	Bold 12	Bold 12	—	Bold 12
66 — Gothic Text.12	Y	Y	—	—
68 — Gothic Text Italic.12	Y	Y	—	—
69 — Gothic Text Bold.12	Bold 66	Bold 66	—	—
70 — Serif Text.12	Y	Sub 66	Sub 85	Sub 85
71 — Serif Text Italic.12	Y	Sub 68	Sub 92	Sub 92
72 — Serif Text Bold.12	Bold 70	Bold 66	—	Bold 85
76 — APL.12	—	—	Y	Y
80 — Math Symbol.12	Sub 86	Sub 86	Sub 86	Sub 86
84 — Script	Y	Y	—	—
85 — Courier.12	Y	Y	Y	Y
86 — Prestige.12	Y	Y	Y	Y
87 — Letter Gothic.12	Y	Y	—	—
91 — Light Italic.12	Sub 112	Sub 112	—	—
92 — Courier Italic.12	—	—	Y	Y

Table 5-9. **IPDS font comparison** (continued)

Font	IBM 3812/16	Xerox 3812/16 emulation	IBM 4028	Xerox 4028 emulation
107 — 12 Pitch	Sub 85	—	Sub 85	Sub 85
108 — Courier Bold.12	Bold 85	Bold 85	—	Bold 85
110 — Letter Gothic Bold.12	Bold 87	Bold 87	—	—
111 — Prestige Bold.12	Bold 86	Bold 86	Y	Y
112 — Prestige Italic.12	Y	Y	Y	Y
155 — Boldface Italic	Y	Y	—	—
158 — Modern	Sub 175	Sub 175	—	—
159 — Boldface	Bold 175	Bold 175	Y	Y
160 — Essay	Y	Y	—	—
162 — Essay Italic	Y	Y	—	—
163 — Essay Bold	Bold 160	Bold 160	—	—
164 — Prestige.12	—	—	Y	Y
173 — Essay Light	Y	Y	—	—
175 — Document	Y	Y	—	—
176 — Bold	Sub 159	—	Sub 159	Sub 159
177 — Bold Italic	Sub 155	Sub 155	—	—
204 — Gothic Text.13	Y	Y	—	—
221 — Prestige.15	Sub 230	Sub 230	Y	Sub 223
222 — Gothic.15	Sub 230	Sub 230	—	—
223 — Courier.15	Sub 230	Sub 230	Y	Y
225 — Math Symbol.15	Sub 86	Sub 86	—	—
229 — Serif Text.15	Y	Y	Sub 223	Sub 223
230 — Gothic Text.15	Y	Y	—	—
244 — Courier.5	Y	Y	—	—
245 — Courier Bold.5	Bold 244	Bold 244	—	—
252 — Courier.17	Y	Y	—	—
253 — Courier Bold.17	Bold 252	Bold 252	—	Bold 254
254 — Courier.17ss	Y	Y	Y	Y
256 — Prestige.17.1	—	—	Y	Sub 254
280 — APL.20	Y	Y	—	—
281 — Gothic Text.20	Y	Y	Y	Y
290 — Gothic Text.27	Y	Y	—	—

Table 5–9. **IPDS font comparison** (continued)

Font	IBM 3812/16	Xerox 3812/16 emulation	IBM 4028	Xerox 4028 emulation
751 — Sonoran Serif 8pt	Y	Y	Sub 5687	Sub 5687
1051 — Sonoran Serif 10pt	Y	Y	Sub 5687	Sub 5687
1053 — Sonoran Serif Bold 10pt	Y	Y	Sub 5707	Sub 5707
1056 — Sonoran Serif Italic 10pt	Y	Y	Sub 5815	Sub 5815
1351 — Sonoran Serif 12pt	Y	Y	Sub 5687	Sub 5687
1653 — Sonoran Serif Bold 16pt	Y	Y	Sub 5707	Sub 5707
2103 — Sonoran Serif Bold 24pt	Y	Y	Sub 5707	Sub 5707
5687 — Times Roman 6pt	—	—	Y	Y
5687 — Times Roman 8pt	—	—	Y	Y
5687 — Times Roman 10pt	—	—	Y	Y
5687 — Times Roman 12pt	—	—	Y	Y
5707 — Times Roman Bold 10pt	—	—	Y	Y
5707 — Times Roman Bold 12pt	—	—	Y	Y
5707 — Times Roman Bold 14pt	—	—	Y	Y
5707 — Times Roman Bold 18pt	—	—	Y	Y
5707 — Times Roman Bold 24pt	—	—	Y	Y
5815 — Times Roman Italic 10pt	—	—	Y	Y
5815 — Times Roman Italic 12pt	—	—	Y	Y
5835 — Times Roman Bold Italic 10pt	—	—	Y	Y
5835 — Times Roman Bold Italic 12pt	—	—	Y	Y

## Code page comparison

The two font sets, 3812/16 and 4028, contain a number of code pages, matching those available in the standard IBM printers.

The 3812/16 font set contains 48 code pages, which is more than available on the IBM 3812 or 3816 printer. In addition, all code pages supported by the two IBM printers operating in a coax environment are present in the font set.

There are 53 code pages present in the 4028 font set, which is more than available on the IBM 4028 printer. The 53 code pages include those in the 3812/16 font set plus five additional pages.

Table 5–10 lists the code pages available for both emulations of the Xerox IPDS printer. The table uses the following notation:

- Y The code page is supported as a standard code page.
- — The code page is not supported.

Table 5–10. IPDS code page characteristics

Code page	IBM 3812/16	Xerox 3812/16 emulation	IBM 4028	Xerox 4028 emulation
37 — USA / Canada	Y	Y	Y	Y
38 — US ASCII	—	—	Y	Y
256 — International 1	Y	Y	Y	Y
259 — Symbol Set	Y	Y	Y	Y
260 — Canadian French	Y	Y	Y	Y
273 — Germany Austria	Y	Y	Y	Y
274 — Belgium	Y	Y	Y	Y
275 — Brazil	Y	Y	—	Y
276 — Canada (French)	—	—	Y	Y
277 — Denmark / Norway	Y	Y	Y	Y
278 — Finland Sweden	Y	Y	Y	Y
280 — Italy	Y	Y	Y	Y
281 — Japan (English)	Y	Y	Y	Y
282 — Portugal	Y	Y	—	Y
283 — Spanish	—	—	—	Y
284 — Spain / Latin America	Y	Y	Y	Y
285 — UK	Y	Y	Y	Y
286 — Austria / Germany (alt)	Y	Y	Y	Y
287 — Denmark / Norway (alt)	Y	Y	Y	Y
288 — Finland Sweden (alt)	Y	Y	Y	Y
289 — Spain (alt)	Y	Y	Y	Y
290 — Japan (Katakana)	Y	Y	— <sup>3</sup>	Y
293 — APL	Y <sup>1</sup>	Y	— <sup>3</sup>	Y
297 — France	Y	Y	Y	Y
310 — Graphic Escape APL	Y <sup>1</sup>	Y	Y	Y
340 — OCR	— <sup>2</sup>	Y	— <sup>2</sup>	Y
361 — International Typographic	Y	Y	—	Y
367 — EBCDIC ASCII	—	—	Y	Y
382 — Austria Germany	Y <sup>1</sup>	Y	—	Y
383 — Belgium	Y <sup>1</sup>	Y	—	Y
384 — Brazil	Y <sup>1</sup>	Y	—	Y
385 — Canadian French	Y <sup>1</sup>	Y	—	Y
386 — Denmark Norway	Y <sup>1</sup>	Y	—	Y
387 — Finland Sweden	Y <sup>1</sup>	Y	—	Y

Table 5-10. IPDS code page characteristics (continued)

Code page	IBM 3812/16	Xerox 3812/16 emulation	IBM 4028	Xerox 4028 emulation
388 — France Luxembourg	Y <sup>1</sup>	Y	—	Y
389 — Italy	Y <sup>1</sup>	Y	—	Y
390 — Japan Latin	Y <sup>1</sup>	Y	—	Y
391 — Portugal	Y <sup>1</sup>	Y	—	Y
392 — Spain Philippines	Y <sup>1</sup>	Y	—	Y
393 — Spanish Speaking	Y <sup>1</sup>	Y	—	Y
394 — UK	Y <sup>1</sup>	Y	—	Y
395 — US	Y <sup>1</sup>	Y	—	Y
420 — Arabic	—	Y	— <sup>3</sup>	Y
424 — Hebrew	—	Y	— <sup>3</sup>	Y
437 — PC	Y	Y	—	Y
500 — International 5	Y	Y	Y	Y
831 — Portugal (alt)	—	Y	Y	Y
870 — Latin 2 Multilingual	—	—	— <sup>3</sup>	Y
871 — Iceland	Y	Y	Y	Y
892 — OCR A	Y	Y	Y	Y
893 — OCR B	Y	Y	Y	Y
1002 — DCF Rel 2 Compatibility	Y <sup>1</sup>	Y	Y	Y
1003 — US Text Subset	Y <sup>1</sup>	Y	—	Y

<sup>1</sup> Only available with the COAX IBM 3812/16.

<sup>2</sup> Code page 340 is classified as obsolete on the IBM systems. Selecting the code page with OCR A or OCR B selects either Code page 892 or 893, respectively.

<sup>3</sup> Only available on a font card for the IBM 4028.





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## A.

## Exception codes

This appendix lists the supported exception IDs by exception class. The Xerox IPDS may not report the same exceptions in the same order or at the same time as the IBM printers it is emulating.

For detailed information about exception reporting, refer to the *IBM Intelligent Printer Data Stream Reference*, publication number S544-3417-04.

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### Command reject exceptions

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A command reject exception indicates the printer rejected an IPDS command without examining the data within the command. There are no alternate exception actions (AEAs) for command reject exceptions. Table A-1 lists the supported exceptions IDs for this exception class.

Table A-1.      **Equipment check with intervention required**

ID code	Description
0x800100	Invalid IPDS command code
0x800200	Invalid IPDS command sequence
0x800400	Data received after ARQ
0x80E000	Invalid IPDS command length

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### Intervention required exceptions

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An intervention required exception indicates the printer detected a condition requiring manual intervention at the printer. There are no AEAs for intervention required exceptions. Table A-2 lists the supported exceptions IDs for this exception class.

Table A-2.      **Intervention required exception IDs**

ID code	Description
0x400000	Printer not ready
0x400100	Printer out of paper (end of forms)

## Data check exceptions

A data check exception indicates the printer detected an undefined character or position check. Table A-3 lists the supported exceptions IDs for this exception class.

Table A-3. Data check exception IDs

ID code	Description
0x082100	Undefined character
0x08C100	Position check

## Specification check-IO image exceptions

A specification check-IO image exceptions indicated the printer received an IO image command containing an invalid data parameter or value. For more information, refer to the *IBM Data Stream and Object Architecture Image Object Content Architecture (IOCA) Reference*, publication number SC31-6805. Table A-4 lists the supported exceptions IDs for this exception class.

Table A-4. Specification check-IO image exception IDs

ID code	Description
0x050001	Invalid IO image self-defining field code
0x050003	Invalid IO image self-defining field length
0x050004	Invalid IO image self-defining field value
0x05700F	IO – Begin Segment out of sequence
0x05910F	IO – Begin Image Content out of sequence
0x05920F	Image Data self-defining field out of sequence
0x05930F	End Image Content out of sequence
0x05940F	Image Size Parameter missing
0x059410	Image Size Parameter value unsupported
0x059411	Image Size cannot be determined
0x05950F	Image Encoding Parameter out of sequence
0x059510	Image Encoding Parameter value unsupported
0x059511	IO image decompression error
0x05960F	Image Data Element Size Parameter out of sequence
0x059610	Image Data Element Size Parameter value unsupported
0x05970F	Image Look Up Table ID out of sequence
0x059710	Image Look Up Table ID parameter unsupported
0x05A902	IO data outside the Image Presentation Space

## Specification check-bar code exceptions

A specification check-bar code exception indicates the printer received a bar code command with an invalid data parameter or value. For more information, refer to the *IBM Data Stream and Object Architecture Bar Code Object Content Architecture (BCOCA) Reference*, publication number S544–3766. Table A–5 lists the supported exceptions IDs for this exception class.

Table A–5.      **Specification check-bar code exception IDs**

ID code	Description
0x040300	Invalid bar code type
0x040600	Invalid module width
0x040700	Invalid element height
0x040800	Invalid height multiplier
0x040900	Invalid wide-to-narrow ratio
0x040A00	Invalid symbol reference point
0x040B00	Invalid bar code modifier
0x040C00	Invalid bar code data length
0x040E00	Check digit calculation exception
0x041000	Invalid HRI location
0x041100	Attempt to print outside block

## Specification check-graphics data exceptions

A specification check–graphics data exception indicates the printer received a graphics command with an invalid data parameter or value. For more information, refer to the *IBM Data Stream and Object Architecture Graphics Object Content Architecture (GOCA) Reference*, publication number SC31–6804. Table A–6 lists the supported exceptions IDs for this exception class.

Table A–6. **Specification check–graphics data exception IDs**

ID code	Description
0x030001	Unsupported graphics command code
0x030002	Reserved byte or invalid attribute set
0x030003	Incorrect drawing order length
0x03000C	Segment prolog exception
0x03000E	Unsupported attribute value
0x030021	Invalid or unsupported default
0x033400	Character angle value not supported
0x033E00	Invalid End Prolog
0x036000	Area bracket exception
0x036800	Begin Area received incorrectly
0x036801	Area truncated exception
0x036802	Supported order invalid in area
0x037001	Unsupported Begin Segment Introducer (BSI) segment flag
0x037082	Invalid BSI segment flag
0x0370C1	Invalid BSI length
0x0370C5	Insufficient segment data
0x039200	Graphics image order sequence error
0x039300	Graphics image bracket exception
0x039301	Incorrect number of Image Data orders
0x03C300	Font not available
0x03C301	Undefined graphics character code
0x03D100	Truncated graphics image exception
0x03D101	Invalid order in graphics image
0x03D102	Graphics image format not supported
0x03D103	Image width greater than maximum supported
0x3E100	Relative line outside coordinate space

## Specification check-general exceptions

A specification check-general exception indicates the printer received a command with an invalid parameter or value. Table A-7 lists the supported exceptions IDs for this exception class.

Table A-7. Specification check-general exception IDs

ID code	Description
0x020001	Embedded control sequence code exception
0x020201	End Suppression control sequence exception
0x020202	Invalid IPDS command length
0x020205	Invalid data self-defining field length
0x020302	IPDS command header length too small
0x020305	Invalid or unsupported block orientation
0x020401	End Page encountered during suppression
0x020402	Invalid use of ARQ Continuation Bit
0x020405	Area position reference system not supported
0x020501	Invalid spanning sequence
0x020505	Invalid self-defining field unit base
0x020601	Invalid Begin Suppress (BSU)
0x020605	Invalid self-defining field L-units
0x020705	Invalid self-defining field extents
0x020805	Invalid or unsupported mapping option
0x020A05	Data in a block might be outside the valid printable area (VPA)
0x020B05	Invalid self-defining field identifier
0x020C01	Invalid or unsupported font local ID
0x020F01	Invalid Set Text Orientation (STO)
0x021001	Invalid Set Inline Margin (SIM)
0x021101	Invalid Set Baseline Increment (SBI)
0x021201	Invalid intercharacter adjustment
0x021202	Font storage is full
0x021301	Invalid Absolute Move Baseline (AMB)
0x021401	Invalid Absolute Move Inline (AMI)
0x021501	Invalid Relative Move Inline (RMI)
0x021502	Invalid DF command font or font ID
0x021601	Invalid Relative Move Baseline (RMB)
0x021701	Invalid Set Variable Space Increment (SVI)
0x021702	Invalid deletion type in DF command
0x021802	Invalid font ID
0x021901	Invalid repeat length for RPS

Table A-7. **Specification check-general exception IDs**  
(continued)

ID code	Description
0x021902	Multiple occurrences of the same LFE
0x021B02	Invalid Load Font Control unit base
0x021C01	Invalid escape sequence
0x021E01	Invalid WT control sequence length
0x021F01	Repeat String (RPS) length exception
0x022002	Invalid Load Font Control (LFC) font stageability byte
0x022202	Invalid LFC data pattern format
0x022302	Invalid value for LFC font type bits
0x022602	Invalid Load Symbol Set (LSS) or LFC X-box size
0x022702	Invalid LSS or LFC Y-box size
0x022A02	Invalid value for LFC X-density
0x022B02	Invalid value for LFC Y-density
0x022E02	Insufficient font data received
0x023001	Insufficient storage for Load Copy Control (LCC) record
0x023101	Invalid LCC number of copies
0x023201	Invalid LCC keyword in copy group entry
0x023202	Excess font data received
0x023401	Invalid LCC entry type count
0x023601	Invalid LCC simplex/duplex parameter
0x023902	LCC font for Host-Assigned ID (HAID) already assigned
0x023C02	Invalid value within a Load Font Index (LFI) command
0x023E02	Invalid LFC character pattern address
0x023F02	STO-SCFL-LFE mismatch
0x024002	Invalid value for font inline sequence
0x024201	WIC (Write Image Control) pel count is less than minimum required
0x024301	WIC pel count is greater than maximum supported
0x024401	WIC scan count is less than minimum required
0x024501	WIC scan count is greater than maximum supported
0x024601	Invalid WIC source image format
0x024602	Invalid parameter in an LFI command
0x024701	Invalid WIC magnification factor
0x024702	Invalid Load Font Equivalence (LFE) font inline sequence
0x024801	Invalid WIC scan line direction

Table A-7. **Specification check-general exception IDs**  
(continued)

ID code	Description
0x024A01	Invalid WIC image block location
0x024D02	Insufficient storage for LFC and LFI
0x025803	Invalid or unsupported value for Text Color
0x026002	Invalid Logical Page Descriptor (LPD) L-units per unit base ( $X_p + I$ )
0x026102	Invalid LPD L-units per unit base ( $Y_p + B$ )
0x026202	Invalid LPD $X_p$ -extent
0x026301	Insufficient pattern storage
0x026302	Invalid LPD $Y_p$ -extent
0x026402	Invalid LPD unit base
0x026802	Invalid LPD inline sequence direction
0x026902	Invalid LPD baseline sequence direction
0x026A01	Insufficient source image data
0x026A02	Invalid LPD initial I print coordinate
0x026B01	Excess source image data received
0x026B02	Invalid LPD initial B print coordinate
0x026F02	Invalid Media Origin parameter in XOH-SMO
0x027202	Invalid XOH-SMS $X_m$ Extent
0x027302	Invalid XOH-SMS $Y_m$ Extent
0x027701	Group termination exception
0x027801	Invalid order type
0x028501	Invalid Deactivate Overlay (DO) command overlay ID
0x028702	Invalid LFC (Load Font Control) unit base for pel units
0x028802	Invalid LFC X pel units per unit base
0x028902	Invalid LFC Y pel units per unit base
0x028A02	Invalid LFC Relative Metric Multiplying Factor (RMMF) value
0x029001	Invalid or unsupported overlay ID
0x029101	Begin Overlay (BO) overlay ID already loaded
0x029102	Invalid XOA Request Resource List (RRL) entry
0x029201	Overlay ID not loaded
0x029301	Recursive overlay invocation
0x029401	Invalid page segment Host-Assigned ID (HAID)

Table A-7. **Specification check-general exception IDs**  
(continued)

ID code	Description
0x029501	Page segment HAID already loaded
0x029502	Invalid XOH Page Counters Control (PCC) command page counter update
0x029601	Page segment HAID not loaded
0x029801	Invalid or unsupported suppression number
0x029803	Invalid Temporary Baseline Move (TBM) control sequence
0x02A401	Page boundary in X direction cannot be represented
0x02A501	Page boundary in Y direction cannot be represented
0x02AD01	Invalid Logical Page Position (LPP) command
0x02AE01	Invalid IO command parameter
0x02AF01	Insufficient storage to print the sheet
0x02C001	Mixture of Xm-axis and Ym-axis duplex copy groups
0x02C101	Maximum simplex/duplex keywords in LCC
0x02C201	Odd number of duplex copy groups in LCC
0x02C301	Mixture of simplex/duplex parameters in LCC
0x02C401	Unusual copy counts in LCC
0x02FF02	Exceptions detected but not queued

## Conditions requiring host notification

A condition requiring host notification indicates the printer detected a condition that should be reported to the host. There are no AEAs for conditions requiring host notification. Table A-8 lists the supported exceptions IDs for this exception class.

Table A-8. **Conditions requiring host notification exception IDs**

ID code	Description
0x010100	Physical Media Size or Input Media Source ID changed
0x01E400	Cancel key pressed



## B.

## Resident code pages

This appendix provides examples of the resident code pages. Within each illustration, the top row indicates the high nibble of the code to be looked up and the vertical column on the left indicates the low nibble of the code to be looked up.

Figure B-1. USA/Canada resident code page 37

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	^	{	}	\	0
-1		é	/	É	a	j	~	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	ç	!	!	:	«	ª	i	[	-	1	2	3
-B	.	\$	,	#	»	º	¿	]	ô	û	ô	û
-C	<	*	%	@	ð	æ	Ð	—	ö	ü	ö	ü
-D	(	)	_	'	ý	,	Ý	“	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	Þ	’	ó	ú	ó	ú
-F		-	?	"	±	¤	®	×	õ	ÿ	õ	

Figure B-2. US ASCII-L resident code page 38  
(4028 emulation only)

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-						{	}	\	0
-1			/		a	j	~		A	J		1
-2					b	k	s		B	K	S	2
-3					c	l	t		C	L	T	3
-4					d	m	u		D	M	U	4
-5					e	n	v		E	N	V	5
-6					f	o	w		F	O	W	6
-7					g	p	x		G	P	X	7
-8					h	q	y		H	Q	Y	8
-9				`	i	r	z		I	R	Z	9
-A	[	]		:								
-B	.	\$	,	#								
-C	<	*	%	@								
-D	(	)	_	'								
-E	+	;	>	=								
-F	!	^	?	"								

Figure B-3. International #1 resident code page 256

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	{	}	\	0
-1		é	/	Ê	à	j	~	£	À	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	ℳ	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	[	]		:	«	»	¡	¬	-	¹	²	³
-B	.	\$	,	#	»	º	¿		ô	û	ô	û
-C	<	*	%	@	ö	æ	Ð	-	ö	ü	Ö	Ü
-D	(	)	_	'	ý	,	Ý	¨	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	!	^	?	"	±	¤	®	=	õ	ÿ	Õ	

Figure B-4. Symbol Set 7 resident code page 259

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		≤	-	∩	=	‰	≡	0	{	}	\	°
-1		~	≥	∪	α	9	~	1	∇	=		1
-2	=	<	√	⊂	β	κ	σ	2	∞	§	Σ	2
-3	-	>	∧	⊃	ψ	ω	τ	3	Ψ	Ω	→	3
-4	+	ℝ		⊕	φ	μ	ξ	4	Φ	ð	Σ	4
-5	~	ē	∠	⊥	ε	ν	×	5	←	~	κ	5
-6	π	∴	<		π	o	δ	6	Π	↓	Δ	6
-7	Δ	↗	>	⊗	λ	ρ	χ	7	Λ	/	≡	7
-8	~	↘	≠	~	η	γ	υ	8	¶	Γ	Υ	8
-9	/	‡	□	`	ι	θ	ζ	9	↑	Θ	≈	9
-A	[	]	'	÷	Γ	Τ	γ	⊥	-	□	~	0
-B	†	•	♀	±	‡	†	‡	◊	◆	■	↵	¼
-C	<	≠	♂	°	⊥	⊥	⊥	•	~	◻	►	¾
-D	(	)	_	'		™	-	£	♣	-	▲	¾
-E	⊗	..	>	"	(	)	∫	¤		∇	∫	¾
-F	√	^	f	⊗	l	j	l	¥	♠	∠	j	

Figure B-5. Canadian French resident code page 260

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-						é	è	,	0
-1			/	É	a	j	''		A	J		1
-2	â	ê	Â	Ê	b	k	s		B	K	S	2
-3		ë		Ë	c	l	t		C	L	T	3
-4			À	È	d	m	u		D	M	U	4
-5					e	n	v		E	N	V	5
-6		î		Î	f	o	w		F	O	W	6
-7		ï		Ï	g	p	x		G	P	X	7
-8	ç		Ç		h	q	y		H	Q	Y	8
-9				`	i	r	z		I	R	Z	9
-A	à	´	ù	:								
-B	.	\$	,	#					ô	û	ô	û
-C	<	*	%	@						ü		Û
-D	(	)	_	'								Ü
-E	+	;	>	=								
-F	!	^	?	"								

Figure B-6. Germany/Austria resident code page 273

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	¢	ä	ü	ö	0
-1		é	/	É	a	j	ß	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	{	ë	[	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	@	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	â	ï	Ä	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	˜	Ñ	`	i	r	z	¾	I	R	Z	9
-A	Ä	Ü	Ö	:	«	»	ı	ı	-	ı	ı	ı
-B	.	\$	,	#	»	º	¿		ô	û	ô	û
-C	<	*	%	§	ð	æ	Ð	—	ı	}	\	]
-D	(	)	_	'	ý	,	Ý	¨	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	ó	ú
-F	!	^	?	"	±	¤	©	×	õ	ÿ	õ	

Figure B-7. Belgium resident code page 274

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	ç	é	è	ç	0
-1		{	/	Ê	a	j	¨	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
-4	@	}	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	\	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	[	]	ù	:	«	»	¡	¬	-	1	2	3
-B	.	\$	,	#	»	º	¿		ô	û	ô	û
-C	<	*	%	à	ö	æ	Ð	—	ö	ü	Ö	Ü
-D	(	)	_	'	ý	,	Ý	~	ò	í	Ò	Û
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	Ó	Ú
-F	!	^	?	"	±	¤	®	×	õ	ÿ	Õ	

Figure B-8. Brazil resident code page 275

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	ç	õ	é	\	0
-1		}	/	[	a	j	~	£	À	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	`	î	@	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ı	ì	İ	Î	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	ã	i	r	z	¾	I	R	Z	9
-A	É	Ş	Ç	:	«	ª	ı	¬	-	ı	2	3
-B	.	Ç	,	Õ	»	º	¿		ô	û	ô	û
-C	<	*	%	Ã	ð	æ	Ð	—	ö	ü	ö	ü
-D	(	)	_	'	ý	,	Ý	“	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	Þ	’	ó	ú	ó	ú
-F	!	^	?	"	±	¤	©	×	{	ÿ	#	



Figure B-9. Canada (French) resident code page 276  
(4028 emulation only)

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-						é	è	,	0
-1			/		a	j	''		A	J		1
-2					b	k	s		B	K	S	2
-3					c	l	t		C	L	T	3
-4					d	m	u		D	M	U	4
-5					e	n	v		E	N	V	5
-6					f	o	w		F	O	W	6
-7					g	p	x		G	P	X	7
-8					h	q	y		H	Q	Y	8
-9				`	i	r	z		I	R	Z	9
-A	à	´	ù	:								
-B	.	\$	,	#								
-C	<	*	%	@								
-D	(	)	_	'								
-E	+	;	>	=								
-F	!	^	?	"								

Figure B-10. Denmark/Norway resident code page 277

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-		@	°	μ	¢	æ	å	\	0
-1		é	/	É	a	j	ü	£	À	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	}	ï	§	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	#	⌘	ø	:	«	≡	ı	-	-	ı	²	³
-B	.	Å	,	Æ	»	≡	ı		ô	û	ô	û
-C	<	*	%	ø	ö	{	Ð	—	ö	~	ö	ü
-D	(	)	_	'	ý	,	Ý	¨	ò	ù	ò	ù
-E	+	;	>	=	þ	[	Þ	´	ó	ú	ó	ú
-F	!	^	?	"	±	]	®	×	ö	ÿ	ö	

Figure B-11. Finland/Sweden resident code page 278

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	ä	å	É	0
-1		`	/	\	a	j	ü	£	À	Å	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	{	ë	#	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	[	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	}	ï	\$	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	é	i	r	z	¾	I	R	Z	9
-A	§	¤	ö	:	«	ª	ı	-	-	ı	²	³
-B	.	Ä	,	Ä	»	º	¿		ô	û	ô	û
-C	<	*	%	Ö	ö	æ	Ð	—	ı	~	@	Ü
-D	(	)	_	'	Ý	,	Ý	”	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	þ	´	ó	ú	ó	ú
-F	!	^	?	"	±	]	®	×	õ	ÿ	õ	

Figure B-12. Italy resident code page 280

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	l	μ	ç	à	è	ç	0
-1		]	/	É	a	j	ì	#	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	{	}	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	@	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	\	~	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	Ù	i	r	z	¾	I	R	Z	9
-A	°	é	ò	:	«	»	ì	¬	-	1	2	3
-B	.	\$	,	£	»	»	¿		ô	û	ô	û
-C	<	*	%	§	ð	æ	Ð	—	ö	ü	ö	ü
-D	(	)	_	'	ý	.	Ý	..	¡	`	ò	ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	ó	ú
-F	!	^	?	"	±	¤	©	×	õ	ÿ	õ	

Figure B-13. Japan (English) resident code page 281

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	{	}	\$	0
-1		é	/	É	a	j	—	[	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	\	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	£	!	¡	:	«	ª	ı	^	-	ı	²	³
-B	.	¥	,	#	»	º	¿	]	ô	û	ô	û
-C	<	*	%	@	ð	æ	Ð	~	ö	ü	ö	ü
-D	(	)	_	'	ý	,	Ý	¨	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	ó	ú
-F		~	?	"	±	×	®	×	ø	ÿ	õ	

Figure B-14. Portugal resident code page 282

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	ç	ã	´	Ç	0
-1		é	/	Ê	a	j	ç	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	{	î	#	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	˘	ì	\	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	[	]	õ	:	«	ª	ı	¬	-	ı	²	³
-B	.	\$	,	Ã	»	º	¿		ô	û	ô	û
-C	<	*	%	Õ	Ö	æ	Ð	—	ö	ü	Ö	Ü
-D	(	)	_	'	Ý	,	Ý	¨	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	}	ó	ú	Ó	Ú
-F	!	^	?	"	±	¤	®	×	¡	ÿ	@	

Figure B-15. Spanish resident code page 283  
(4028 emulation only)

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	¢	{	}	\	0
-1		é	/	É	a	j	¨	£	À	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	\$	C	L	T	3
-4	à	è	À	È	d	m	u	f	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	¡	ß	#	`	i	r	z	¾	I	R	Z	9
-A	[	]	ñ	:	«	»	¡	^	-	1	2	3
-B	.	ß	,	Ñ	»	º	¿	!	ô	û	ô	û
-C	<	*	%	@	ð	æ	Ð	-	ö	ü	ö	ü
-D	(	)	_	'	ý	,	Ý	~	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	ó	ú
-F		~	?	"	±	¤	®	_	õ	ÿ	õ	

Figure B-16. Spain/Latin America resident code page 284

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°	μ	¢	{	}	\	0
-1		é	/	É	a	j	¨	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9		ß	#	`	i	r	z	¾	I	R	Z	9
-A	[	]	ñ	:	«	»	¡	^	-	1	2	3
-B	.	\$	,	Ñ	»	º	¿	!	ô	û	ô	û
-C	<	*	%	@	ð	æ	Ð	—	ö	ü	ö	ü
-D	(	)	_	'	ý	,	Ý	~	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	ó	ú
-F		~	?	"	±	¤	©	×	õ	ÿ	õ	



Figure B-17. United Kingdom resident code page 285

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	¢	{	}	\	0
-1		é	/	É	a	j	—	[	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	\$	!		:	«	»	i	^	-	1	2	3
-B	.	£	,	#	»	°	¿	]	ô	û	ô	û
-C	<	*	%	@	ö	æ	Ð	~	ö	ü	ö	ü
-D	(	)	_	'	ý	,	Ý	¨	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	Þ	'	ó	ú	ó	ú
-F		~	?	"	±	¤	©	×	ö	ÿ	ö	

Figure B-18. Austria/Germany (alt) resident code page 286

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	ç	ä	ü	ö	o
-1		é	/	É	a	j	ß	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	{	ë	[	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	@	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	â	ï	Ä	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	~	Ñ	`	i	r	z	¾	I	R	Z	9
-A	ö	ü	ß	:	«	»	ı	ı	-	ı	ı	ı
-B	.	Û	,	Ä	»	º	¿		ô	û	ô	û
-C	<	*	%	Ö	ö	æ	Ð	—		}	\	
-D	(	)	_	'	ý	,	Ÿ	“	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	Þ	’	ó	ú	ó	ú
-F		ı	?	ä	±	¤	©	×	ö	ÿ	ö	

The following code points are not supported in the 4028 font set:

42 – 49  
 51 – 59  
 62 – 69  
 70 – 79  
 80, 8A – 8F  
 90, 9A – 9F  
 A0, A1, AA – AF  
 B0 – BF  
 C0, CA – CF  
 D0, DA – DF  
 E0, E1, EA – EF  
 FA – FE

Figure B-19. Denmark/Norway resident code page 287

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	!	@	°	μ	¢	æ	å	\	0
-1		é	/	É	a	j	ü	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	}	ï	\$	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	ø	å	!	:	«	ª	ı	¬	-	ı	²	³
-B	.	Å	,	Æ	»	º	¿		ô	û	ô	û
-C	<	*	%	Ø	Ǿ	{	Ð	—	ö	~	ö	ü
-D	(	)	_	'	Ý	,	Ý	¨	ò	ù	ò	ù
-E	+	;	>	=	þ	[	þ	´	ó	ú	ó	ú
-F		~	?	æ	±	]	©	×	õ	ÿ	õ	

The following code points are not supported in the 4028 font set:

42 – 49  
 51 – 59  
 62 – 69  
 70 – 79  
 80, 8A – 8F  
 90, 9A – 9F  
 A0, A1, AA – AF  
 B0 – BF  
 C0, CA – CF  
 D0, DA – DF  
 E0, E1, EA – EF  
 FA – FE

Figure B-20. Finland/Sweden resident code page 288

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	¢	ä	å	é	0
-1		`	/	\	a	j	ü	£	À	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	{	ë	#	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	[	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	}	ï	§	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	É	i	r	z	¾	I	R	Z	9
-A	ö	å		:	«	»	i	¬	-	ı	²	³
-B	.	Ä	,	Ä	»	º	¿		ô	û	ô	û
-C	<	*	%	Ö	ö	æ	Ð	—		~	@	Ü
-D	(	)	_	'	ý	.	Ý	¨	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	ó	ú
-F		¬	?	ä	±	]	®	×	õ	ÿ	õ	

The following code points are not supported in the 4028 font set:

42 – 49  
 51 – 59  
 62 – 69  
 70 – 79  
 80, 8A – 8F  
 90, 9A – 9F  
 A0, A1, AA – AF  
 B0 – BF  
 C0, CA – CF  
 D0, DA – DF  
 E0, E1, EA – EF  
 FA – FE

Figure B-21. Spain (alt) resident code page 289

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	¢	{	}	\	0
-1		é	/	É	a	j	¨	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ı	ß	#	`	i	r	z	¾	I	R	Z	9
-A	ç	!	ı	:	«	»	ı	^	-	ı	2	3
-B	.	‰	,	Ñ	»	»	¿	!	ô	û	ô	û
-C	<	*	%	@	ö	æ	Ð	—	ö	ü	ö	ü
-D	(	)	_	'	ý	.	Ý	~	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	þ	´	ó	ú	ó	ú
-F		~	?	ñ	±	¤	©	×	õ	ÿ	õ	

The following code points are not supported in the 4028 font set:

42 – 49  
 51 – 59  
 62 – 69  
 70 – 79  
 80, 8A – 8F  
 90, 9A – 9F  
 A0, A1, AA – AF  
 B0 – BF  
 C0, CA – CF  
 D0, DA – DF  
 E0, E1, EA – EF  
 FA – FE

Figure B-22. Japan – Katakana resident code page 290

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	[	]		~	^	{	}	\$	0
-1			/	i			-	ç	A	J		1
-2			a	j				\	B	K	S	2
-3			b	k				t	C	L	T	3
-4			c	l				u	D	M	U	4
-5			d	m				v	E	N	V	5
-6			e	n				w	F	O	W	6
-7			f	o				x	G	P	X	7
-8			g	p				y	H	Q	Y	8
-9			h	`				z	I	R	Z	9
-A	£	!		:								
-B	.	¥	,	#	q	r	s					
-C	<	*	%	@								
-D	(	)	_	'								
-E	+	;	>	=								
-F		~	?	"								

Figure B-23. APL resident code page 293

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		ε	-	◇	~	□	-	α	{	}	\	0
-1	<u>A</u>	<u>J</u>	/	^	a	j	~	ε	A	J	≡	1
-2	<u>B</u>	<u>K</u>	<u>S</u>	..	b	k	s	ι	B	K	S	2
-3	<u>C</u>	<u>L</u>	<u>T</u>	⊞	c	l	t	ρ	C	L	T	3
-4	<u>D</u>	<u>M</u>	<u>U</u>	⊥	d	m	u	ω	D	M	U	4
-5	<u>E</u>	<u>N</u>	<u>V</u>	€	e	n	v		E	N	V	5
-6	<u>F</u>	<u>O</u>	<u>W</u>	†	f	o	w	x	F	O	W	6
-7	<u>G</u>	<u>P</u>	<u>X</u>	‡	g	p	x	\	G	P	X	7
-8	<u>H</u>	<u>Q</u>	<u>Y</u>	∇	h	q	y	÷	H	Q	Y	8
-9	<u>I</u>	<u>R</u>	<u>Z</u>	˘	i	r	z		I	R	Z	9
-A	¢	!	!	:	↑	⊃	n	∇	★	I	f	
-B	.	\$	,	#	↓	⊂	u	Δ	✱	!	˘	∇
-C	<	*	%	@	≤		⊥	τ	⊥	ψ	∴	Δ
-D	(	)	_	'	┐	o	[	]	φ	Δ	⊖	⊗
-E	+	;	>	=	└		≥	≠	⊞	⊞	⊞	⊞
-F		¬	?	"	→	←	•		⊞	⊞	⊞	

Figure B-24. France resident code page 297

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	[	`	ç	é	è	ç	0
-1		{	/	É	a	j	¨	#	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	@	}	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	]	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	\	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	μ	i	r	z	¾	I	R	Z	9
-A	°	§	ù	:	«	ª	ı	¬	-	ı	²	³
-B	.	\$	,	£	»	º	¿		ô	û	ô	û
-C	<	*	%	à	ð	æ	Ð	—	ö	ü	ö	ü
-D	(	)	_	'	ý	,	Ý	˘	ò	ı	Ò	Û
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	!	^	?	"	±	×	®	×	õ	ÿ	Õ	



Figure B-25. Graphic Escape APL/TN resident code page 310

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0				◇	~	□	-	α	{	}	≡	°
-1	<u>A</u>	<u>J</u>		^		█	°	€	(	)	₁	₁
-2	<u>B</u>	<u>K</u>	<u>S</u>	..	—	█	—	ı	+	-	₂	₂
-3	<u>C</u>	<u>L</u>	<u>T</u>	⊠		■	•	ρ	■	+	₃	₃
-4	<u>D</u>	<u>M</u>	<u>U</u>	⊥		■	n	ω	L	J		₄
-5	<u>E</u>	<u>N</u>	<u>V</u>	⊥		█			┌	┐		₅
-6	<u>F</u>	<u>O</u>	<u>W</u>	┌				x	┌	┐		₆
-7	<u>G</u>	<u>P</u>	<u>X</u>	┐				\	┐	└		₇
-8	<u>H</u>	<u>Q</u>	<u>Y</u>	v				÷	§	¶		₈
-9	<u>I</u>	<u>R</u>	<u>Z</u>									₉
-A					↑	↵	n	▽	★	I	≠	
-B					↓	↵	u	Δ	✱	!	↖	↗
-C					≤	≠	⊥	τ	∏	▽	∴	△
-D					┌	○	[	]	Φ	Δ	Θ	⊗
-E					L	±	≥	≠	∇	∇	⊠	⊗
-F					→	←	•		⊗	n	⊗	

Figure B-26. OCR resident code page 340

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø				{	}	\	0
-1			/		a	j	~	£	A	J		1
-2					b	k	s	¥	B	K	S	2
-3	ä		Å		c	l	t		C	L	T	3
-4					d	m	u		D	M	U	4
-5					e	n	v	§	E	N	V	5
-6				_	f	o	w		F	O	W	6
-7	a		Ä	-	g	p	x		G	P	X	7
-8					h	q	y		H	Q	Y	8
-9		ß	Ñ	`	i	r	z		I	R	Z	9
-A	[	]		:								
-B	.	\$	,	#								
-C	<	*	%	@		æ			ö	ü	ö	ü
-D	(	)	_	'		,		"				
-E	+	;	>	=	ij	Æ		'				
-F	!	^	?	"	IJ	¤		■		^		

Figure B-27. International Typographic 500 resident code page 361

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
<b>-0</b>		&	-	ø	Ø	°	ff	ç	{	}	\	0
<b>-1</b>		é	/	É	à	j		£	A	J		1
<b>-2</b>	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
<b>-3</b>	ã	ë	Ã	Ë	c	l	t	fi	C	L	T	3
<b>-4</b>	à	è	À	È	d	m	u	fl	D	M	U	4
<b>-5</b>	á	í	Á	Í	e	n	v	§	E	N	V	5
<b>-6</b>	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
<b>-7</b>	â	ï	À	Ï	g	p	x	¼	G	P	X	7
<b>-8</b>	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
<b>-9</b>	ñ	ß	Ñ		i	r	z	¾	I	R	Z	9
<b>-A</b>	[	]		:	«	—	ı	⅙		⅔	⅜	⅞
<b>-B</b>	.	\$	,	#	»	Œ	ı	‘	ô	û	Ô	Û
<b>-C</b>	<	*	%	@	‰	æ	œ	’	õ	ü	Ö	Ü
<b>-D</b>	(	)	_	'	—	Ÿ	ffl	“	ò	ù	Ò	Ù
<b>-E</b>	+	;	>	=	ij	Æ	‡	”	ó	ú	Ó	Ú
<b>-F</b>	!	¬	?	"	ffi	•	„	†	ō	ÿ	Õ	

Figure B-28. EBCDIC ASCII resident code page 367  
(4028 emulation only)

	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0				0	@	P	`	p								
-1			!	1	A	Q	a	q								
-2			"	2	B	R	b	r								
-3			#	3	C	S	c	s								
-4			\$	4	D	T	d	t								
-5			%	5	E	U	e	u								
-6			&	6	F	V	f	v								
-7			'	7	G	W	g	w								
-8			(	8	H	X	h	x								
-9			)	9	I	Y	i	y								
-A			*	:	J	Z	j	z								
-B			+	;	K	[	k	{								
-C			,	<	L	\	l									
-D			-	=	M	]	m	}								
-E			.	>	N	^	n	~								
-F			/	?	O	_	o									

Figure B-29. Austria Germany resident code page 382

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°		ç	ä	ü	ö	0
-1		é	/	É	a	j	ß	£	À	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	{	ë	[	Ë	c	l	t		C	L	T	3
-4	à	è	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	@	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ		Ñ		i	r	z	¾	I	R	Z	9
-A	Ä	Ü	Ö	:	«		i	⅓		⅔	⅔	⅔
-B	.	\$	,	#	»		¿		ô	û	ô	û
-C	<	*	%	§	‰	æ				}	\	]
-D	(	)	_	'					ò	ù	ò	ù
-E	+	;	>	=	¡	£	‡		ó	ú	ó	ú
-F	!	~	?	"		•		†	õ	ÿ	õ	

Figure B-30. Belgium resident code page 383

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°		ç	é	è	ç	0
-1		{	/	É	a	j		£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	@	}	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	\	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ		i	r	z	¾	I	R	Z	9
-A	[	]	ù	:	«		i	⅜		⅝	⅞	⅞
-B	.	\$	,	#	»		¿		ô	û	ô	û
-C	<	*	%	à	%	æ			ö	ü	ö	ü
-D	(	)	_	'					ò		ò	û
-E	+	;	>	=	ij	Æ	‡		ó	ú	ó	ú
-F	!	~	?	"		•		†	õ	ÿ	õ	

Figure B-31. Brazil resident code page 384

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°		ç	õ	é	\	0
-1		}	/	[	a	j		£	À	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	à	è	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6		î	@	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8		ì	]	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	ã	i	r	z	¾	I	R	Z	9
-A	Ê	\$	Ç	:	«		i	⅓		⅔	⅔	⅔
-B	.	Ç	,	Õ	»		¿		ô	û	ô	û
-C	<	*	%	Ã	‰	æ			ö	ü	ö	ü
-D	(	)	_	'					ò	ù	ò	ù
-E	+	;	>	=	ij	Æ	‡		ó	ú	ó	ú
-F	!	~	?	"		•		†	{	ÿ	#	

Figure B-32. Canadian French resident code page 385

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°		ç	é	è		0
-1		{	/	Ê	a	j		£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	í	í	í	í	í	í	í	í	í	í	í	í
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	]	i	r	z	¾	I	R	Z	9
-A	à	\	ù	:	«		i	⅓		⅔	⅔	⅔
-B	.	\$	,	#	»		¿		ô	û	ô	û
-C	<	*	%	@	‰	æ			ö	ü	ö	ü
-D	(	)	_	'					ò		ò	ù
-E	+	;	>	=	ij	Æ	‡		ó	ú	ó	ú
-F	!	~	?	"		•		†	õ	ÿ	õ	



Figure B-33. Denmark Norway resident code page 386

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-		@	°		ç	æ	å	\	0
-1		é	/	É	a	j	ü	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	à	è	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	}	ï	§	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ		i	r	z	¾	I	R	Z	9
-A	#	]	ø	:	«		i	⅓		¾	⅔	⅘
-B	.	Å	,	Æ	»		¿		ô	û	ô	û
-C	<	*	%	Ø	‰	{			ö		Ö	Ü
-D	(	)	_	'					ò	ù	Ò	Ù
-E	+	;	>	=	ij	[	‡		ó	ú	Ó	Ú
-F	!	¬	?	"		•		†	õ	ÿ	Õ	

Figure B-34. Finland Sweden resident code page 387

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°		ç	ä	å	É	0
-1			/	\	a	j	ü	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	{	ë	#	Ë	c	l	t		C	L	T	3
-4	à	è	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	[	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	}	ï	\$	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	é	i	r	z	¾	I	R	Z	9
-A	§	l	ö	:	«		i	⅜		¾	¾	¾
-B	.	Å	,	Ä	»		¿		ô	û	ô	û
-C	<	*	%	Ö	‰	æ					@	Ù
-D	(	)	_	'					ò	ù	ò	ù
-E	+	;	>	=	ij	Æ	‡		ó	ú	ó	ú
-F	!	¬	?	"		•		†	õ	ÿ	Õ	

Figure B-35. France Luxembourg resident code page 388

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	[		ç	é	è	ç	0
-1		{	/	É	a	j		#	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	@	}	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	]	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	\	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ		i	r	z	¾	I	R	Z	9
-A	°	§	ù	:	«		i	⅓		¾	⅔	⅔
-B	.	\$	,	£	»		¿		ô	û	ô	û
-C	<	*	%	à	‰	æ			ö	ü	ö	ü
-D	(	)	_	'					ò		ò	ù
-E	+	;	>	=	ij	Æ	‡		ó	ú	ó	ú
-F	!	~	?	"		•		†	õ	ÿ	õ	

Figure B-36. Italy resident code page 389

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	[		ç	à	è	ç	0
-1		]	/	É	a	j	ì	#	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	{	}	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	@	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç		Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	Ù	i	r	z	¾	I	R	Z	9
-A	°	é	ò	:	«		i	⅓		⅔	⅔	⅔
-B	.	\$	,	£	»		¿		ô	û	ô	û
-C	<	*	%	§	‰	æ			ö	ü	ö	ü
-D	(	)	—	'							ò	û
-E	+	;	>	=	ij	Æ	‡		ó	ú	ó	ú
-F	!	¬	?	"		•		†	õ	ÿ	õ	

Figure B-37. Japan – Latin resident code page 390

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°		ç	{	}	\$	0
-1		é	/	É	a	j		[	A	J		1
-2	â	ê	Â	Ê	b	k	s	\	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	à	è	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ		i	r	z	¾	I	R	Z	9
-A	£	!	]	:	«		i	⅓		⅔	⅔	⅔
-B	.	¥	,	#	»		¿		ô	û	Ô	Û
-C	<	*	%	@	%	æ			ö	ü	Ö	Ü
-D	(	)	_	'					ò	ù	Ò	Ù
-E	+	;	>	=	ij	Æ	‡		ó	ú	Ó	Ú
-F		¬	?	"		•		†	õ	ÿ	Õ	

Figure B-38. Portugal resident code page 391

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°		ç	ã	}	Ç	0
-1		é	/	Ê	a	j	ç	£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	à	è	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	\$	E	N	V	5
-6	{	î	#	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8		ì	\	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ		i	r	z	¾	I	R	Z	9
-A	[	]	õ	:	«		i	⅓		⅔	⅔	⅔
-B	.	\$	,	Ã	»		¿		ô	û	Ô	Û
-C	<	*	%	Õ	‰	æ			ö	ü	Ö	Ü
-D	(	)	_	'					ò	ù	Ò	Ù
-E	+	;	>	=	ij	Æ	‡		ó	ú	Ó	Ú
-F	!	~	?	"		•		†		ÿ	@	

Figure B-39. Spain Phillipines resident code page 392

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°		ç	{	}	\	0
-1		é	/	É	a	j		£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	à	è	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	!	ß	#		i	r	z	¾	I	R	Z	9
-A	[	]	ñ	:	«		i	⅓		⅔	⅔	⅔
-B	.	\$	,	Ñ	»		¿		ô	û	ô	û
-C	<	*	%	@	%	æ			ö	ü	ö	ü
-D	(	)	_	'					ò	ù	ò	ù
-E	+	;	>	=	ij	Æ	‡		ó	ú	ó	ú
-F		~	?	"		•		†	õ	ÿ	õ	

Figure B-40. Spanish Speaking resident code page 393

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	Ø	°		ç	{	}	\	0
-1		é	/	Ê	a	j		£	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	à	è	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	!	B	#		i	r	z	¾	I	R	Z	9
-A	[	]	ñ	:	«		i	⅓		⅔	⅔	⅔
-B	.	\$	,	Ñ	»		¿		ô	û	ô	û
-C	<	*	%	@	‰	æ			ö	ü	ö	ü
-D	(	)	_	'					ò	ù	ò	ù
-E	+	;	>	=	¡	Æ	‡		ó	ú	ó	ú
-F		ˆ	?	"		•		†	õ	ÿ	õ	



Figure B-41. United Kingdom resident code page 394

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°		ç	{	}	\	0
-1		é	/	É	a	j		[	A	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	à	è	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ		i	r	z	¾	I	R	Z	9
-A	\$	!	]	:	«		i	⅓		⅔	⅕	⅙
-B	.	£	,	#	»		¿		ô	û	ô	û
-C	<	*	%	@	‰	æ			ö	ü	Ö	Ü
-D	(	)	_	'					ò	ù	Ò	Ù
-E	+	;	>	=	ij	Æ	‡		ó	ú	Ó	Ú
-F		~	?	"		•		†	õ	ÿ	Õ	

Figure B-42. United States resident code page 395

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°		[	{	}	\	0
-1		é	/	É	a	j		£	À	J		1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4	à	è	À	È	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ		i	r	z	¾	I	R	Z	9
-A	ç	!	]	:	«		i	¼		¾	¾	¾
-B	.	\$	,	#	»		¿		ô	û	ô	û
-C	<	*	%	@	%	æ			ö	ü	ö	ü
-D	(	)	_	'					ò	ù	ò	ù
-E	+	;	>	=	ij	Æ	‡		ó	ú	ó	ú
-F		~	?	"		•		†	õ	ÿ	õ	

Figure B-43. Arabic resident code page 420

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-								×	0
-1			/		a	j	÷		A	J		1
-2					b	k	s		B	K	S	2
-3					c	l	t		C	L	T	3
-4					d	m	u		D	M	U	4
-5					e	n	v		E	N	V	5
-6					f	o	w		F	O	W	6
-7					g	p	x		G	P	X	7
-8					h	q	y		H	Q	Y	8
-9					i	r	z		I	R	Z	9
-A	ç	!		:					-			
-B		^		„								
-C	<			@								
-D	(	)	_	'								
-E	+	;	>	=								
-F		~	?	"								

Figure B-44. Hebrew resident code page 424

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-			°	μ	^	{	}	\	0
-1			/		a	j	~	£	A	J	÷	1
-2					b	k	s	¥	B	K	S	2
-3					c	l	t	•	C	L	T	3
-4					d	m	u	©	D	M	U	4
-5					e	n	v	§	E	N	V	5
-6					f	o	w	¶	F	O	W	6
-7					g	p	x	¼	G	P	X	7
-8				=	h	q	y	½	H	Q	Y	8
-9				`	i	r	z	¾	I	R	Z	9
-A	¢	!		:	«			[	-	1	2	3
-B	.	\$	,	#	»			]				
-C	<	*	%	@				—				
-D	(	)	_	'		.		..				
-E	+	;	>	=				'				
-F		~	?	"	±	×	⊗	×				

Figure B-45. PC resident code page 437

	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		►		0	@	P	`	p	Ç	É	á	⋮	Ł	⋈	α	≡
-1	☺	◄	!	1	A	Q	a	q	ü	æ	í	⋮	⊥	⌒	β	±
-2	☼	↕	"	2	B	R	b	r	é	Æ	ó	⋮	⌒	π	Γ	≥
-3	♥	!!	#	3	C	S	c	s	â	ô	ú		⌒	⋈	π	≤
-4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ	⌒	—	⌒	Σ	∫
-5	♣	§	%	5	E	U	e	u	à	ò	Ñ	⌒	⌒	⌒	σ	∫
-6	♠	=	&	6	F	V	f	v	å	û	ª	⌒	⌒	⌒	μ	÷
-7	●	↕	'	7	G	W	g	w	ç	ù	º	⌒	⌒	⌒	τ	≈
-8	◼	↑	(	8	H	X	h	x	ê	ÿ	¿	⌒	⌒	⌒	Φ	°
-9	○	↓	)	9	I	Y	i	y	ë	Ö	¬	⌒	⌒	⌒	Θ	•
-A	◼	→	*	:	J	Z	j	z	è	Ü	¬	⌒	⌒	⌒	Ω	•
-B	♂	←	+	;	K	[	k	{	ï	¢	½	⌒	⌒	⌒	δ	√
-C	♀	⌒	,	<	L	\	l		î	£	¼	⌒	⌒	⌒	∞	π
-D	♪	↔	-	=	M	]	m	}	ì	¥	ì	⌒	=	⌒	∅	²
-E	♫	▲	.	>	N	^	n	~	Ä	℥	«	⌒	⌒	⌒	ε	▪
-F	⚙	▼	/	?	O	_	o	△	Å	f	»	⌒	⌒	⌒	∩	

Figure B-46. International #5 resident code page 500

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	ç	{	}	\	0
-1		é	/	Ê	a	j	~	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	[	]		:	«	»	i	¬	-	1	2	3
-B	.	\$	,	#	»	º	¿		ô	û	ô	û
-C	<	*	%	@	ð	æ	Ð	—	ö	ü	Ö	Ü
-D	(	)	_	'	ý	.	Ý	¨	ò	ù	Ò	Ù
-E	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
-F	!	^	?	"	±	¤	©	×	õ	ÿ	Õ	

Figure B-47. Portugal (Alternate) resident code page 831

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	^	{	}	\	0
-1		é	/	É	a	j	~	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	`	i	r	z	¾	I	R	Z	9
-A	ç	!	!	:	«	»	i	[	-	1	2	3
-B	.	\$	,	#	»	º	¿	]	ô	û	ô	û
-C	<	*	%	@	ð	æ	Ð	—	ö	ü	ö	ü
-D	(	)	_	'	ý	,	Ý	“	ò	ù	ò	ù
-E	+	;	>	=	þ	Æ	Þ	’	ó	ú	ó	ú
-F		~	?	"	±	¤	©	×	õ	ÿ	õ	

Figure B-48. Latin 2 Multilingual resident code page 870  
(4028 emulation only)

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	˘	˘				{	}	\	0
-1		é	/	É	a	j	˜		A	J	÷	1
-2	â		Â		b	k	s		B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t		C	L	T	3
-4		û		Û	d	m	u		D	M	U	4
-5	á	í	Á	Í	e	n	v	š	E	N	V	5
-6		î		Î	f	o	w	ž	F	O	W	6
-7	č				g	p	x		G	P	X	7
-8	ç		Ç		h	q	y		H	Q	Y	8
-9		ß		`	i	r	z		I	R	Z	9
-A	[	]		:					-			
-B	.	\$	,	#	ň				ô		ô	
-C	<	*	%	@		š	Đ		ö	ü	Ö	Ü
-D	(	)	_	'	ý	,	Ý	”				
-E	+	;	>	=	ř			‘	ó	ú	Ó	Ú
-F	!	^	?	"		▣		x		ě		



Figure B-49. Iceland resident code page 871

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø	°	μ	ç	þ	æ	´	0
-1		é	/	É	a	j	ö	£	A	J	÷	1
-2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
-3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
-4	à	è	À	È	d	m	u	©	D	M	U	4
-5	á	í	Á	Í	e	n	v	§	E	N	V	5
-6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
-7	å	ï	Å	Ï	g	p	x	¼	G	P	X	7
-8	ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
-9	ñ	ß	Ñ	Ö	i	r	z	¾	I	R	Z	9
-A	Ð	Æ	ı	:	«	ª	ı	¬	-	ı	2	3
-B	.	\$	,	#	»	º	¿		ô	û	ô	û
-C	<	*	%	Ð	`	}	@	—	~	ü	ˆ	Û
-D	(	)	_	'	ý	.	ÿ	“	ò	ù	ò	ù
-E	+	;	>	=	{	]	[	\	ó	ú	ó	ú
-F	!	Ö	?	"	±	¤	©	×	ö	ÿ	ö	

Figure B-50. OCR A resident code page 892

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-		ø				{	}	\	0
-1			/		a	j		£	A	J		1
-2					b	k	s	¥	B	K	S	2
-3			Ä		c	l	t		C	L	T	3
-4					d	m	u		D	M	U	4
-5					e	n	v		E	N	V	5
-6					f	o	w		F	O	W	6
-7			Å	-	g	p	x		G	P	X	7
-8					h	q	y		H	Q	Y	8
-9			Ñ		i	r	z		I	R	Z	9
-A	[	]		:								
-B	.	¢	ı	#					ı	ſ	ı	
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-D	(	)		'								
-E	+	;	>	=		£						
-F	!		?	"				■		^		

Figure B-51. OCR B resident code page 893

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-	ø	ø				{	}	\	0
-1			/		a	j	~	£	A	J		1
-2					b	k	s	¥	B	K	S	2
-3	ä		Ä		c	l	t		C	L	T	3
-4					d	m	u		D	M	U	4
-5					e	n	v	§	E	N	V	5
-6				_	f	o	w		F	O	W	6
-7	ä		Ä	-	g	p	x		G	P	X	7
-8					h	q	y		H	Q	Y	8
-9		ß	Ñ	·	i	r	z		I	R	Z	9
-A	[	]		:								
-B	-	\$	,	#								
-C	<	*	%	@		æ			ö	ü	ö	ü
-D	(	)	_	'		,		"				
-E	+	;	>	=	ij	Æ		·				
-F	!	^	?	"	IJ	¤		■		^		

Figure B-52. DCF REL 2 COMPATIBILITY  
resident code page 1002

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-					°			\	0
-1			/		a	j		¹	A	J		1
-2					b	k	s	²	B	K	S	2
-3					c	l	t	³	C	L	T	3
-4					d	m	u	⁴	D	M	U	4
-5					e	n	v	⁵	E	N	V	5
-6					f	o	w	⁶	F	O	W	6
-7					g	p	x	⁷	G	P	X	7
-8					h	q	y	⁸	H	Q	Y	8
-9					i	r	z	⁹	I	R	Z	9
-A	¢	!		:								
-B	.	\$	,	#	{	}	L	J	⊥		†	
-C	<	*	%	@	≤		┌	┐	└	§	‡	
-D	(	)	—	'			[	]				
-E	+	;	>	=		±	≥	≠				
-F		~	?	"	+	▪	•	—				

Figure B-53. U. S. TEXT SUBSET resident code page 1003

	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0		&	-				-	°			\	0
-1			/		a	j	°	1	A	J		1
-2					b	k	s	2	B	K	S	2
-3					c	l	t	3	C	L	T	3
-4					d	m	u	4	D	M	U	4
-5					e	n	v	5	E	N	V	5
-6					f	o	w	6	F	O	W	6
-7					g	p	x	7	G	P	X	7
-8					h	q	y	8	H	Q	Y	8
-9					i	r	z	9	I	R	Z	9
-A	¢	!		:								
-B	.	\$	,	#	{	}						
-C	<	*	%	@	≤	≡				§		
-D	(	)	_	'	(	)	[	]				
-E	+	;	>	=	+	±	≥	≠				
-F		~	?	"		■	•					



## C. Reconfiguring BIN IDs

This appendix describes reconfiguring the BIN IDs.

To change the BIN ID for the IPDS interface you must specify the following information:

- BIN ID
- PCL tray selection
- Paper size.

The example in figure C-1 shows specifying BIN ID 0 to select the PCL tray selection command 1. It also defines legal paper size and duplex printing.

Figure C-1. **Changing the BIN ID**

```
TRAY 1      Upper tray
PRESENT YES
ID 0
PRINTERID 1
PAPERSIZE LEGAL
DUPLEX YES
ENDTRAY
```

After specifying the BIN and paper size with the TRAY and ENDTRAY MakeITDS commands, the paper sizes must also be defined if they differ from the sizes shown in the following figures. Since the IPDS interface will convert the datastream to PCL5, you must define the PCL papersize for each of the different paper sizes you intend to use.

Figure C-2 provides the specifications in points for lettersize paper.

Figure C-2. **Letter paper**

```
PAPER LETTER
PRINTAREAX 50
PRINTAREAY 50
PRINTAREAWIDTH 2450
PRINTAREAHEIGHT 3200
LOGICALPAGEX 75
LOGICALPAGEY 0
LOGICALPAGEWIDTH 2400
LOGICALPAGEHEIGHT 3300
ENDPAPER
```

Figure C-3 provides the specifications in points for legal paper.

Figure C-3. **Legal paper**

PAPER	LEGAL	
	PRINTAREAX	50
	PRINTAREAY	50
	PRINTAREAWIDTH	2450
	PRINTAREAHEIGHT	4100
	LOGICALPAGEX	75
	LOGICALPAGEY	0
	LOGICALPAGEWIDTH	2400
	LOGICALPAGEHEIGHT	4200
ENDPAPER		

Figure C-4 provides the specifications in points for A3 paper.

Figure C-4. **A3 paper**

PAPER	A3	
	PRINTAREAX	50
	PRINTAREAY	50
	PRINTAREAWIDTH	3408
	PRINTAREAHEIGHT	4861
	LOGICALPAGEX	71
	LOGICALPAGEY	0
	LOGICALPAGEWIDTH	3366
	LOGICALPAGEHEIGHT	4961
ENDPAPER		

Figure C-5 provides the specifications in points for A4 paper.

Figure C-5. **A4 paper**

PAPER	A4	
	PRINTAREAX	50
	PRINTAREAY	50
	PRINTAREAWIDTH	2380
	PRINTAREAHEIGHT	3407
	LOGICALPAGEX	71
	LOGICALPAGEY	0
	LOGICALPAGEWIDTH	2338
	LOGICALPAGEHEIGHT	3507
ENDPAPER		



Figure C-6 provides the specifications in points for A5 paper.

Figure C-6. **A5 paper**

PAPER	A5	
PRINTAREAX		50
PRINTAREAY		50
PRINTAREAWIDTH		1654
PRINTAREAHEIGHT		2380
LOGICALPAGEX		71
LOGICALPAGEY		0
LOGICALPAGEWIDTH		1612
LOGICALPAGEHEIGHT		2480
ENDPAPER		

Figure C-7 provides the specifications in points for B4 paper.

Figure C-7. **B4 paper**

PAPER	B4	
PRINTAREAX		50
PRINTAREAY		50
PRINTAREAWIDTH		2935
PRINTAREAHEIGHT		4199
LOGICALPAGEX		71
LOGICALPAGEY		0
LOGICALPAGEWIDTH		2893
LOGICALPAGEHEIGHT		4299
ENDPAPER		

Figure C-8 provides the specifications in points for B5 paper.

Figure C-8. **B5 paper**

PAPER	B5	
PRINTAREAX		50
PRINTAREAY		50
PRINTAREAWIDTH		2060
PRINTAREAHEIGHT		2930
LOGICALPAGEX		71
LOGICALPAGEY		0
LOGICALPAGEWIDTH		2018
LOGICALPAGEHEIGHT		3030
ENDPAPER		

Figure C-9 provides the specifications in points for executive paper.

Figure C-9. **Executive paper**

PAPER	EXECUTIVE	
	PRINTAREAX	50
	PRINTAREAY	50
	PRINTAREAWIDTH	2075
	PRINTAREAHEIGHT	3050
	LOGICALPAGEX	75
	LOGICALPAGEY	0
	LOGICALPAGEWIDTH	2025
	LOGICALPAGEHEIGHT	3150
ENDPAPER		

Figure C-10 provides the specifications in points for ledger paper.

Figure C-10. **Ledger paper**

PAPER	LEDGER	
	PRINTAREAX	50
	PRINTAREAY	50
	PRINTAREAWIDTH	3200
	PRINTAREAHEIGHT	5000
	LOGICALPAGEX	75
	LOGICALPAGEY	0
	LOGICALPAGEWIDTH	3150
	LOGICALPAGEHEIGHT	5100
ENDPAPER		

Figure C-11 provides the specifications in points for invoice paper.

Figure C-11. **Invoice paper**

PAPER	INVOICE	
	PRINTAREAX	50
	PRINTAREAY	50
	PRINTAREAWIDTH	1550
	PRINTAREAHEIGHT	2450
	LOGICALPAGEX	75
	LOGICALPAGEY	0
	LOGICALPAGEWIDTH	1500
	LOGICALPAGEHEIGHT	2550
ENDPAPER		

Figure C–12 provides the specifications in points for folio paper.

Figure C–12. **Folio paper**

PAPER	FOLIO	
	PRINTAREAX	50
	PRINTAREAY	50
	PRINTAREAWIDTH	2450
	PRINTAREAHEIGHT	3800
	LOGICALPAGEX	75
	LOGICALPAGEY	0
	LOGICALPAGEWIDTH	2400
	LOGICALPAGEHEIGHT	3900
ENDPAPER		

Figure C–13 provides the specifications in points for quarto paper.

Figure C–13. **Quarto paper**

PAPER	QUARTO	
	PRINTAREAX	50
	PRINTAREAY	50
	PRINTAREAWIDTH	2450
	PRINTAREAHEIGHT	3148
	LOGICALPAGEX	75
	LOGICALPAGEY	0
	LOGICALPAGEWIDTH	2400
	LOGICALPAGEHEIGHT	3248
ENDPAPER		

Figure C–14 provides the specifications in points for monarch envelopes.

Figure C–14. **Monarch envelope**

PAPER	ENV_MONARCH	
	PRINTAREAX	50
	PRINTAREAY	50
	PRINTAREAWIDTH	1062
	PRINTAREAHEIGHT	2150
	LOGICALPAGEX	75
	LOGICALPAGEY	0
	LOGICALPAGEWIDTH	1012
	LOGICALPAGEHEIGHT	2250
ENDPAPER		

Figure C–15 provides the specifications in points for number 9 envelopes.

Figure C–15. **Number 9 envelope**

PAPER	ENV_9	
PRINTAREAX		50
PRINTAREAY		50
PRINTAREAWIDTH		1062
PRINTAREAHEIGHT		2562
LOGICALPAGEX		75
LOGICALPAGEY		0
LOGICALPAGEWIDTH		1012
LOGICALPAGEHEIGHT		2662
ENDPAPER		

Figure C–16 provides the specifications in points for commercial number 10 envelopes.

Figure C–16. **Commercial number 10 envelope**

PAPER	ENV_COM_10	
PRINTAREAX		50
PRINTAREAY		50
PRINTAREAWIDTH		1137
PRINTAREAHEIGHT		2750
LOGICALPAGEX		75
LOGICALPAGEY		0
LOGICALPAGEWIDTH		1087
LOGICALPAGEHEIGHT		2850
ENDPAPER		

Figure C–17 provides the specifications in points for DL envelopes.

Figure C–17. **DL envelope**

PAPER	ENV_DL	
PRINTAREAX		50
PRINTAREAY		50
PRINTAREAWIDTH		1199
PRINTAREAHEIGHT		2498
LOGICALPAGEX		71
LOGICALPAGEY		0
LOGICALPAGEWIDTH		1157
LOGICALPAGEHEIGHT		2598
ENDPAPER		

Figure C–18 provides the specifications in points for C5 envelopes.

Figure C–18. **C5 envelope**

PAPER	ENV_C5	
PRINTAREAX		50
PRINTAREAY		50
PRINTAREAWIDTH		1813
PRINTAREAHEIGHT		2604
LOGICALPAGEX		71
LOGICALPAGEY		0
LOGICALPAGEWIDTH		1771
LOGICALPAGEHEIGHT		2704
ENDPAPER		

Figure C–19 provides the specifications in points for B5 envelopes.

Figure C–19. **B5 envelope**

PAPER	ENV_B5	
PRINTAREAX		50
PRINTAREAY		50
PRINTAREAWIDTH		1979
PRINTAREAHEIGHT		2852
LOGICALPAGEX		71
LOGICALPAGEY		0
LOGICALPAGEWIDTH		1937
LOGICALPAGEHEIGHT		2952
ENDPAPER		



## D.

## Related publications

### Related publications

This section lists various publications that are helpful when using your printer or learning more about the IBM IPDS architecture. The following Xerox publications, as well as this manual, are available through the Xerox Documentation and Software Services (XDSS) (U.S. only).

**Note:** Xerox Canada, Ltd. and Rank Xerox Ltd. publications are available through your local sales representative or analyst.

### Xerox MRP Family publications

The Xerox 4230/MRP and 4220/MRP library sets includes the following manuals.

Publication	U.S. Number	International	
		Language	Number
4220/MRP, 4230/MRP Operator Guide	720P13940	French Spanish German Italian	
4220/MRP, 4230/MRP System Administrator Guide	720P13950	French	
4215/MRP, 4219/MRP, 4220/MRP, 4230/MRP Twinax Command Reference*	720P12751		
4215/MRP, 4219/MRP, 4220/MRP, 4230/MRP Coax Command Reference*	720P12761		
4215/MRP, 4219/MRP, 4220/MRP, 4230/MRP Intelligent Printer Data Stream (IPDS) Configuration and Reference Guide*	720P12771		
4215/MRP, 4219/MRP, 4220/MRP, 4230/MRP PCL 5 and PostScript Printer Language Reference**	721P81071		

\* Manuals are shipped with the options.

\*\* In the U.S., the Printer Language Reference for PCL 5 and PostScript is not shipped with the printer. To order this document, fill out and mail the Printer Language Reference Order Card found at the back of the *System Administrator Guide*. The manual is shipped at no charge to you.

In RX, this manual is shipped with the printer.

Publication	U.S. Number	International	
		Language	Number
4220/MRP, 4230/MRP Network Interface for Novell Operator Guide*	720P12302		
4215/MRP, 4219/MRP, 4220/MRP, 4230/MRP Fax Modem for Macintosh Operator Guide*	720P12321		
4215/MRP, 4219/MRP, 4220/MRP, 4230/MRP Fax Modem for MS-DOS Operator Guide*	720P12331		
4220/MRP, 4230/MRP AppleTalk Interface Operator Guide*	720P12312		
4220/MRP, 4230/MRP TCP/IP Operator Guide*	720P13721		
4220/MRP, 4230/MRP EtherTalk Operator Guide*	720P13731		
4220/MRP, 4230/MRP LAN Manager/LAN Server Operator Guide*	720P13701		
4220/MRP, 4230/MRP Windows NT Operator Guide*	720P13711		

\* Manuals are shipped with the options.

For information about current Xerox training classes and workshops, refer to the *Xerox Customer Education: Printing Systems Catalog*, 610P30238 (U.S. only). In other locations, see your local representative for details.



## Other publications

This section lists the IBM publications that provide greater detail about the IPDS system architecture and related architectures.

<b>Publication</b>	<b>Number</b>
<i>IBM Advanced Function Printing Data Stream Reference</i>	S544-3202-2
<i>IBM Data Stream and Object Architectures IBM Intelligent Printer Data Stream Reference</i>	S544-3417-3
<i>IBM Data Stream and Object Architectures Font Object Content Architecture (FOCA) Reference</i>	S544-3285-1
<i>IBM Data Stream and Object Architectures Bar Code Object Architecture (BCOA) Reference</i>	S544-3766-0
<i>IBM Data Stream and Object Architectures Presentation Text Object Content Architecture (PTOCA) Reference</i>	SC31-6803-0
<i>IBM Data Stream and Object Architectures Graphics Object Content Architecture (GOCA) Reference</i>	SC31-6804-0
<i>IBM Data Stream and Object Architectures Image Object Content Architecture (IOCA) Reference</i>	SC31-6805-1
<i>IBM Print Services Facility/MVS System Programming Guide (version 2.1.0)</i>	S544-3672-00
<i>IBM Page Printer Formatting Aid/370 Users Guide and Reference</i>	S544-3700-02



<b>AFP</b>	Advanced Function Presentation. An IBM architecture that uses the all-points-addressable concept to print text and images on a printer.
<b>algorithm</b>	A prescribed set of well-defined, unambiguous rules or processes for the solution of a problem in a finite number of steps.
<b>alphanumeric</b>	Set of characters including the letters A through Z, numerals 0 through 9, and all printable special symbols.
<b>ASCII</b>	American Standard Code for Information Interchange. It is a 7-bit (or 8-bit) coding scheme used for the computer representation of letters, numbers, punctuation marks, and other symbols commonly found on a standard typewriter. It also represents special unprintable characters used by computer devices, that is, carriage return, line feed, form feed, escape, and so forth.
<b>bar code</b>	Symbol and data that can be scanned by an optical scanning device. The symbol is a series of parallel bars and spaces as defined by various standards organizations.
<b>Bar code command set</b>	Group of IPDS commands used to place bar coded information on a page, within a page sement, or within an overlay.
<b>byte</b>	Group of eight bits. A kilobyte is equal to 1,024 bytes; a megabyte is equal to 1,024 kilobytes or 1,048,576 (1024 x 1024) bytes.
<b>Codabar</b>	Standardized bar code symbology. This is a self-checking numeric code represented by four bars and three spaces.
<b>Code 128</b>	Standardized bar code symbology. This is a variable length, alphanumeric code with 128 characters.
<b>data block</b>	Rectangular area on the logical page or overlay, which can contain a data object. Data objects include graphics, images, and bar codes.
<b>data stream</b>	A continuous stream of data with a defined format.

<b>Device Control command set</b>	Group of IPDS commands used to define the page environment and communicate device controls.
<b>dot</b>	Smallest printable unit. See also <i>picture element</i> .
<b>duplex</b>	Printer capability to print data on both sides of a page.
<b>emulation</b>	Emulation is when one device is set up to behave like a different device.
<b>exception</b>	Invalid or unsupported data stream requiring notification to the host or requiring the host to resend data.
<b>factory default</b>	Settings that are programmed into the printer before it is shipped. These settings are in use unless you override them using either the printer control panel or by sending printer commands.
<b>graphics block</b>	Object containing graphics data.
<b>Graphics command set</b>	Group of IPDS commands used to control the presentation of graphics on a page, page segment, or overlay.
<b>graphics data</b>	Picture created by use of lines, arcs, and markers.
<b>hexadecimal</b>	Numbering system requiring sixteen number symbols (0 through 9 and A through F) used to represent data.
<b>host computer</b>	Computer transmitting data to a printer or other peripheral device. Also called a host for short.
<b>HP–GL/2</b>	Hewlett–Packard Graphics Language Level 2. Industry standard language for pen plotters that is integrated into the PCL 5 printer language. Allows drawing of vector (line) drawings, such as circles and rectangles.
<b>HP PCL</b>	Hewlett–Packard Printer Control Language.
<b>image block</b>	Object containing image data.
<b>image data</b>	Picture created by rectangular arrays of raster information.
<b>IM Image command set</b>	Group of IPDS commands used to control the presentation of image raster data on a page, page segment, or overlay.
<b>Intelligent Printer Data Stream</b>	IPDS. Host–to–printer data stream containing data and controls to manage the presentation of data.

<b>interface</b>	Connection between two devices. Interfaces are meant to carry electronic impulses from one place to another. Hardware interfaces, for instance, link a host computer to a printer. Often refers to an electronic device that enables one kind of equipment to communicate with or control another.
<b>IO Image command set</b>	Group of IPDS commands used to control the presentation of image data on a page, page segment or overlay.
<b>IPDS</b>	Intelligent Printer Data Stream. IBM's Systems Application Architecture host-to-printer data stream for advanced function printing subsystems. It provides an interface to all-points addressable (APA) printers that make possible the presentation of pages containing an architecturally unlimited mixture of different data types: high-quality text, raster image, vector graphics, and bar code.
<b>JCL</b>	Job control language. High-level language used with the MVS or DOS operating systems to identify job requirements, such as user name, program name, CPU processing time, input/output devices, and files needed for batch processing.
<b>KB</b>	Kilobyte. Unit of 1,024 bytes.
<b>landscape</b>	Page orientation in which output is printed parallel to the longer edge of the page. See also <i>portrait</i> .
<b>Load Font command set</b>	Group of IPDS commands used to control how coded font resources are downloaded and managed at the printer.
<b>logical page</b>	Rectangular area on the physical page. The logical page is defined by its size, shape, orientation, and offset on the physical page.
<b>marker</b>	Symbol in graphics data that identifies a specific location.
<b>MB</b>	Megabyte. Unit of 1,048,576 bytes.
<b>memory</b>	Part of a computer system that stores data, either temporarily or permanently.
<b>MRP</b>	Mid Range Printer. Identifies a group of Xerox printers including the 4215/MRP, 4219/MRP, and 4220/MRP.
<b>object</b>	Group of structured fields that can contain one or more other structured fields. Examples include text, font, graphics, and image objects.
<b>Overlay command set</b>	Group of IPDS commands used to store and name data on the printer for repeated use.

<b>overlay</b>	Resource object containing text, images, graphics, or bar code data. Overlays defined their own environment.
<b>Page Segment command set</b>	Group of IPDS commands used to store and name data on the printer for repeated use.
<b>page segment</b>	Resource object containing text, images, graphics, or bar code data processed in the existing page environment.
<b>PCL</b>	Hewlett-Packard Printer Control Language.
<b>physical page</b>	Paper on which you print information.
<b>picture element</b>	pel. The smallest printable unit that can be printed. Also called pixel or dot.
<b>port</b>	Communications connection from a computer to the printer, suitable for attaching a single line.
<b>portrait</b>	Page orientation in which the output is printed parallel to the shorter edge of the page. See also <i>landscape</i> .
<b>POSTNET</b>	Standardized bar code symbology.
<b>print objects</b>	Text, images, graphics, and bar codes.
<b>print resources</b>	Downloaded fonts, overlays, and page segments.
<b>printer commands</b>	Instructions sent to the printer through application software programs, which change printing variables, such as page orientation, margins, and fonts.
<b>PSF</b>	Print Services Facility. PSF is the print driver that converts Systems Application Architecture (SAA) source applications data to IPDS (Intelligent Printer Data Stream). PSF also converts Advanced Function Presentation Data Stream (AFPDS) to IPDS.
<b>SCS</b>	SNA Character String. One logical record that is physically sent to the printer in several parts, each of which is exactly 256 bytes long with the exception of the last part. The SCS data stream consists of a 1-byte printer control code followed by the data to be printed.
<b>SNA</b>	Systems Network Architecture. Defines message formats and protocols for IBM network communications.
<b>simplex</b>	Printer capability to print data on one side of the page.
<b>SNA Distribution Services</b>	IBM architecture that defines a set of rules to receive, route, and send electronic mail in a network of systems.

<b>valid printable area</b>	VPA. Intersection of the current logical page with the printable area of the physical page.
<b>vector graphics</b>	Lines or curves drawn point-to-point by the printer.
<b>Write Text command</b>	IPDS command used to control the presentation of text information on a page, page segment, or overlay.





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