IBM

IBM Network Printers

Twinax/Coax Configuration Guide

> **Note!**
>
> Before using this information and the product it supports, be sure to read the general information in Appendix H, "Notices" on page 167.

Fourth Edition (September 1997)

This edition applies to the *IBM Network Printers: Twinax/Coax Configuration Guide* and to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters.

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Contents

Book at a Glance

Terminology

In this book, the "IBM Coax SCS/DSC/DSE Interface" and the "IBM Twinax SCS Interface" are referred to as NICs. A NIC is a **N**etwork **I**nterface **C**ard. By **network**, we mean any sort of wiring connection between a printer and a host.

By **network printer**, we mean:

- IBM Network Printer 12 (4312)

- IBM Network Printer 17 (4317)

- IBM Network Printer 24 (4324)

Note that some of the forms of attachment described in this book apply to **some**, but not all, the IBM network printers.

This book is written for **end users**, SE's, systems programmers, and others involved in installing and configuring IBM network printers that ship with an IBM Coax SCS/DSC/DSE Interface or IBM Twinax SCS Interface.

We provide you with the step-by-step procedures to configure your printers for various datastreams (IPDS, SCS, etc.), in various environments (VM, VSE, MVS, AS/400) using coaxial or twinaxial attachments. For each step in a procedure, we (generally) provide you with an example and point you to a source of additional information.

Note: Given the wide variety of host configurations, the attachment procedure that you need to use may not be provided here. However, you should be able to adapt a provided procedure to you specific needs.

Attachment Configurations Described Here

Table 1. Attachment Types

Operating Environment	Protocol	Attached to	Datastream
PSF/MVS/CICS	Coax	3174	• IPDS • SCS/DSE
PSF/VM	SNA	3174	• IPDS • SCS/DSE
PSF/VSE/CICS	SNA	3174	• IPDS • SCS/DSE
AS/400	SNA	• Workstation Controller • 5394/5494	• IPDS • SCS • ASCII
AIX/MVS/AS400	TCP/IP	7913	IPDS
System/36			IPDS

Note: You can print IPDS only if the printer's IPDS option is installed.

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How to use the book

Begin by using the instructions in 1.0, "Introduction" on page 3, which describes the principal configuration tasks.

Once you have determined how you want to configure the printer, you can take the two principal steps involved:

- The **user** can configure the **printer** by using the operator panels

- **Host** personnel can configure the host for the selected environment(s)

Our Use of Typefaces

Bold	Bold is used for keywords, defined terms, and for emphasis.
Italic	Identifies command variables and names of publications.
<u>underlining</u>	Underlining is used occasionally to indicate alternatives or for emphasis.
`Examples`	Monospaced text is used for command syntax and examples.
CAPITALS	Used for all parameter (for example, LOCADDR), component (for example, JES or VTAM), and command names (for example, CRTDEVPRT).

Product Support

The IBM Support Center maintains current information about the IBM products described here, including updates and fixes to accompanying software.

IBM Support operates a 7x24 (seven days a week, 24 hours a day) support service in the United States and Canada. The phone number for the IBM Support Center is 1-800-358-6661. For international support, contact your local Call Center.

Please have the following information available when you call the IBM Support Center:

- A **printer** configuration page, see page 3.2, "The Printer Configuration Page" on page 16

- A **NIC** configuration page, see page 3.3, "The NIC Configuration Page" on page 18

- A description of the problem

- Error messages and error logs, if appropriate

- A description of the type of hardware involved

- Software levels in use at your site

- A description of the attachment type and components

AS/400 Support Needs

Please refer to 19.2, "Support Needs for AS/400 Problems" on page 102 for additional AS/400 support requirements and suggestions.

Setting up and Preparing to Configure the Printer

1

1.0 Introduction

This introduction, and all the chapters in "Setting up and Preparing to Configure the Printer" on page 1, is intended for the use of the **end user** of the printer.

1.1 Overview

The following diagram summarizes the environments in which you can configure IBM network printers (right side of the diagram). The diagram also shows you (on the left side) the major activities involved in configuring a printer in these different environments:

Configuration		PRT		
PRT Menus				
NIC Menus	Coax	Coax/Twinax	Twinax	NIC
Address/Port	3174	7913	VVC/5394/5494	Control Unit
Address/Buffer	SNA	TCP/IP	SNA	Communications
IPDS SCS DSC DSE PCL PS	MVS VM	AIX AS/400	AS/400	Hosts
PSF CICS VPA JES328X	VSE	MVS	System/36	

dk0010
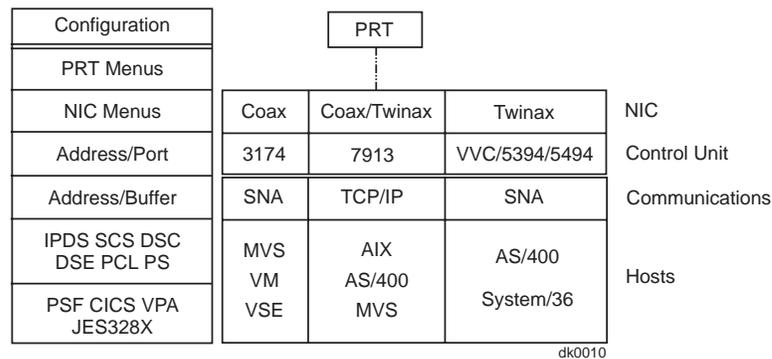
As you can see from the diagram, regardless of the environment involved, you must perform certain configuration activities. These activities are:

- You have to use the printer operator panel to configure the **printer** for each environment. The menus you have to access and configure include the datastream menus (IPDS, SCS, DSC/DSE).

- You also have to use the operator panels to configure the **NICs** for the attachment type involved (Twinax or Coax menus).

- Each environment also comes with a specific type of control unit or interface (3174, 5394/5494, and so on) that must be configured (in most cases with an address) on the **host** side.

- Each environment also involves a specific communications mode (SNA or non-SNA) that also must be configured on the **host**, **NIC**, and **printer** sides.

- Each environment also involves a major activity of configuring the **host** and the printing application (for example, PSF or CICS) for the printer.

This book provides you with **checklists** and **examples** for each of the activities required for each of the environments described here. The configuration chapters provide you with checklists and examples for a specific datastream (IPDS or SCS) in a specific host environment.

1.2 Planning your Configuration

There are six major tasks you need to accomplish to configure your printer:

1. Plan your tasks (done by the user).

2. Install the NIC in the printer (done by the user).

3. Understand your printer and how to configure it (done by the user).

4. Complete the configuration worksheet for each printer (done by the user).

5. Configure the host attachment (done by the host personnel).

6. Verify the configuration (done by the user and host personnel).

The following sections describe these tasks in more detail.

1.2.1 Planning

As you see from the above list of major tasks, some tasks are done by the user, while the host attachment is done by host support personnel such as systems programmers.

When planning a printer configuration, you need to complete the configuration worksheet (described in 5.0, "Configuration Worksheet" on page 33), make at least two copies of the completed worksheet, one for the user to use to configure the printer, and one to hand to host support personnel who will do the host attachment.

Since it may take a while for the host attachment personnel to schedule and perform the host attachment configuration, you should turn the worksheet over to host personnel as soon as possible, perform the printer configuration tasks, then be prepared to test the configuration when both of you are ready.

1.2.2 Installing the NIC in the Printer

The first task you need to do is set up the printer and install the NIC in it using the procedure in 2.0, "Installing the Coax/Twinax NIC" on page 7.

1.2.3 Understanding and Configuring your Printer

Once the printer has been set up and a NIC installed in it, your next task is to understand the printer and configure it for the tasks for which you want to use it. 4.0, "Learning about your Printer" on page 21 provides you with this information.

1.2.4 Configuration Worksheet

The configuration worksheet describes the information you need to collect.

The **user's** tasks here are to:

- Determine the type of attachment (twinaxial or coaxial) for the printer

- Determine the data stream(s) to be supported by the printer

- Configure the printer using the printer operator panel

- Collect the data host personnel will need for the host attachment

1.2.5 Configuring the Host Attachment

Once the configuration worksheet is completed, turn over a copy to your host attachment personnel. Please note that there is no standard situation in a host environment. A large shop may have several different people who need to be involved in the host configuration. For example, in a VM, VSE, or MVS host environment, you may have to arrange the configuration with several different personnel types, such as:

- A systems programmer
- An NCP administrator
- A VTAM programmer
- A PSF administrator
- A Controller (3174) administrator

In other shops, one person may be responsible for all of these different tasks.

> **OS Types**
>
> The MVS, VM, and VSE hosts in the configuration chapters are for an S/390 OS. The procedures should be adapted for S/360 and S/370 OS's.

You can select the appropriate chapter from among the following items and give it to your host personnel, along with the worksheet, as a checklist of what they need to do:

MVS

- 7.0, "MVS IPDS via Coax" on page 41
- 8.0, "MVS SCS/DSE/DSC via Coax" on page 49

VM

- 9.0, "VM IPDS via Coax" on page 55
- 10.0, "VM SCS/DSE/DSC via Coax" on page 63

VSE

- 11.0, "VSE IPDS via Coax" on page 69
- 12.0, "VSE SCS/DSE via Coax" on page 75

AS/400

- 14.0, "AS/400 for IPDS via Twinax" on page 83
- 15.0, "AS/400 for SCS via Twinax" on page 89
- 16.0, "AS/400 Advanced 36 via Twinax" on page 93
- 17.0, "AS/400 for SCS on ASCII Printers via Twinax" on page 95

7913

- 20.0, "AIX IPDS TCP/IP to a 7913 to a Coax or Twinax Printer" on page 111
- 21.0, "AS/400 IPDS TCP/IP to a 7913 to a Coax or Twinax Printer" on page 115

- 22.0, "MVS IPDS via TCP/IP to a 7913 to a Coax or Twinax Printer" on page 121

System/36

- 18.0, "System/36 for IPDS via Twinax" on page 97

1.2.6 Verifying the Configuration

When the host attachment personnel have completed their tasks, and you have completed your printer configuration tasks, the final task is to verify the configuration by sending appropriate print jobs to the printer.

2.0 Installing the Coax/Twinax NIC

This chapter tells you:

- What cabling options you have

- How to install an IBM Coax or Twinax NIC in an IBM network printer

> **NIC Microcode Update**
>
> For related information, refer to Appendix E, "Updating Coax/Twinax NIC Microcode" on page 161.

2.1 Installing the NIC in the Printer

The following steps guide you through the process of setting up your printer, installing the NIC in it, and verifying the **physical** connection of the printer to the cable.

1. Unpack the printer and set it up. Refer to the printer's *Quick Setup* and *User's Guide*. **Do not power on the printer.**

2. Install any options you have for the printer, such as extra memory. If you will be using your printer for IPDS printing, install the optional IPDS SIMM for the printer.

3. Make sure that you have the correct host cable. Refer to 2.2, "Obtaining your Coaxial/Twinaxial Cable" on page 10 for more information on cables.

4. Verify the kind of NIC you have by checking the faceplate. Also familiarize yourself with the NIC's features.

    The Twinax NIC looks like this:
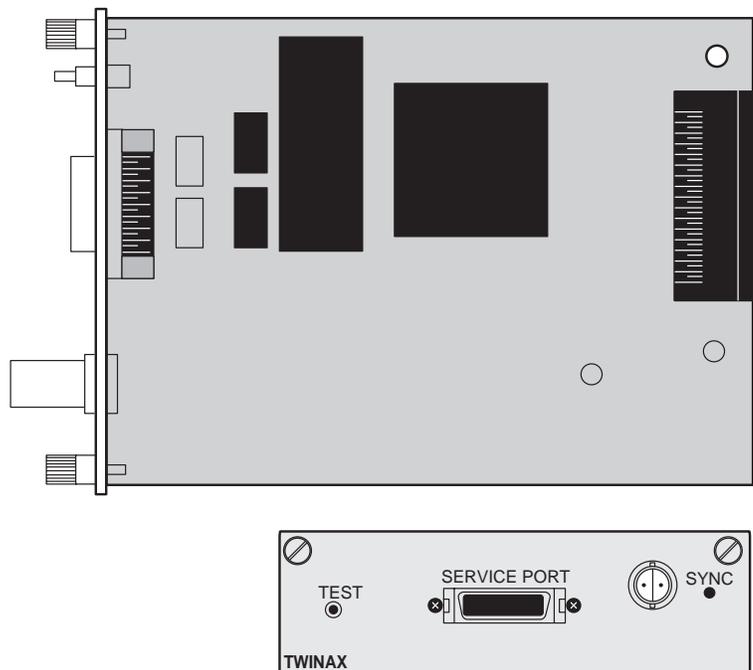
Table 2. Twinax NIC Faceplate	
Feature	**Function**
TEST	TEST is a push button. When the printer is powered on, press this button to produce a NIC configuration page. Refer to 3.3, "The NIC Configuration Page" on page 18 for step-by-step instructions.
SERVICE PORT	The Service Port is used by IBM SE's to update the NIC microcode. Refer to Appendix E, "Updating Coax/Twinax NIC Microcode" on page 161 for details.
SYNC	When appropriately installed in the printer and attached to the host, the SYNC light will remain lit. If the light **blinks**, there is an problem with the printer. If the light is **off**, when the printer is on, there is a problem either with the printer or the attachment.

The Coax NIC looks like this:
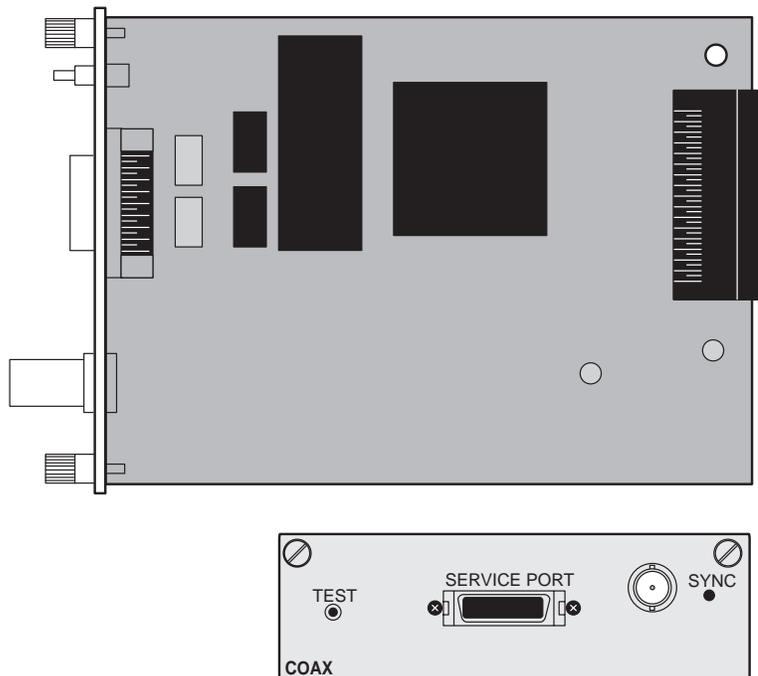
Table 3. Coax NIC Faceplate	
Feature	**Function**
TEST	TEST is a push button. When the printer is powered on, press this button to produce a NIC configuration page. Refer to 3.3, "The NIC Configuration Page" on page 18 for step-by-step instructions.
SERVICE PORT	The Service Port is used by IBM SE's to update the NIC microcode. Refer to Appendix E, "Updating Coax/Twinax NIC Microcode" on page 161 for details.
SYNC	When appropriately installed in the printer and attached to the host, the SYNC light will remain lit. If the light **blinks**, there is a problem with the printer. If the light is **off**, when the printer is on, there is a problem either with the printer or the attachment.

5. Carefully open the anti-static bag in which the NIC is packaged and take the card out of it.

> **Beware of Static Electricity**
>
> Because static electricity can damage the NIC, care should be exercised when handling one.

6. Install the coax or twinax NIC in the printer using the procedure in 2.3, "Physically Installing a NIC in the Printer" on page 13. **Do not attach the NIC cable to the network at this point.**

7. Power on the printer.

8. Verify the physical installation of the card in the printer by doing the procedure in 3.2.1, "Printing a Printer Configuration Page" on page 16. If the "Installed Options" section does not show Twinax or Coax, repeat step 6.

9. Connect the NIC to the appropriate cable:

   - For Twinax, attach the provided T-cable to the system twinax cable. Then attach the other end of the T-cable to the connector on the NIC.
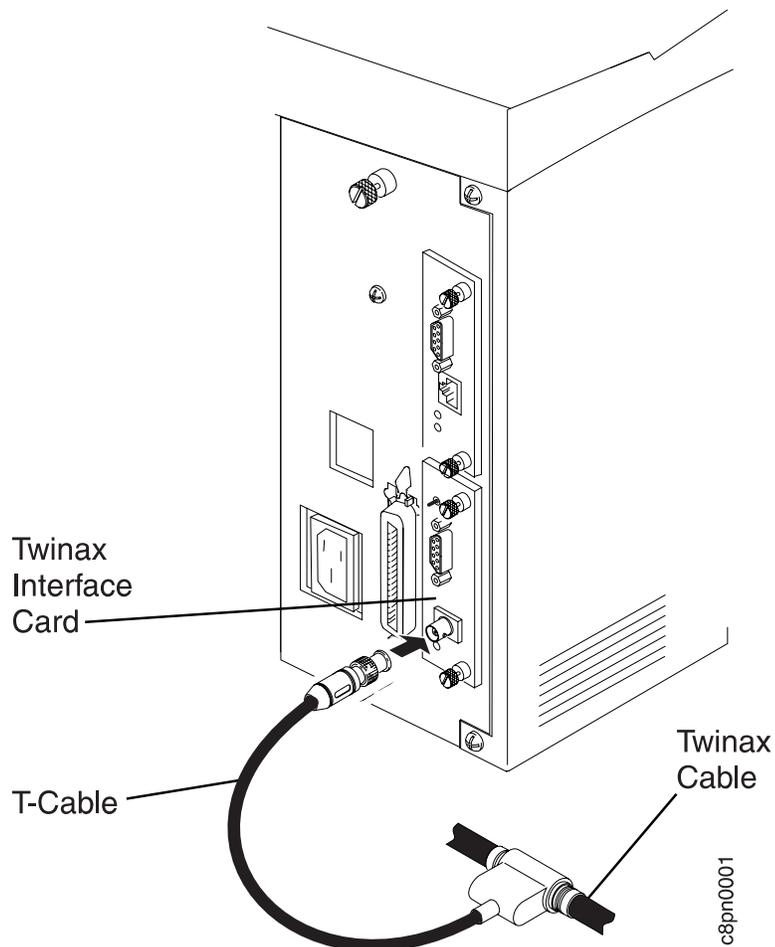
> **Note:** Once you have attached the cable to the twinax line, do not disconnect it. You might disable other devices on the line.

   - For Coax, connect your system cable to the connector on the NIC.

Twinax
Connector

or

Coax
Connector

c8pn0002
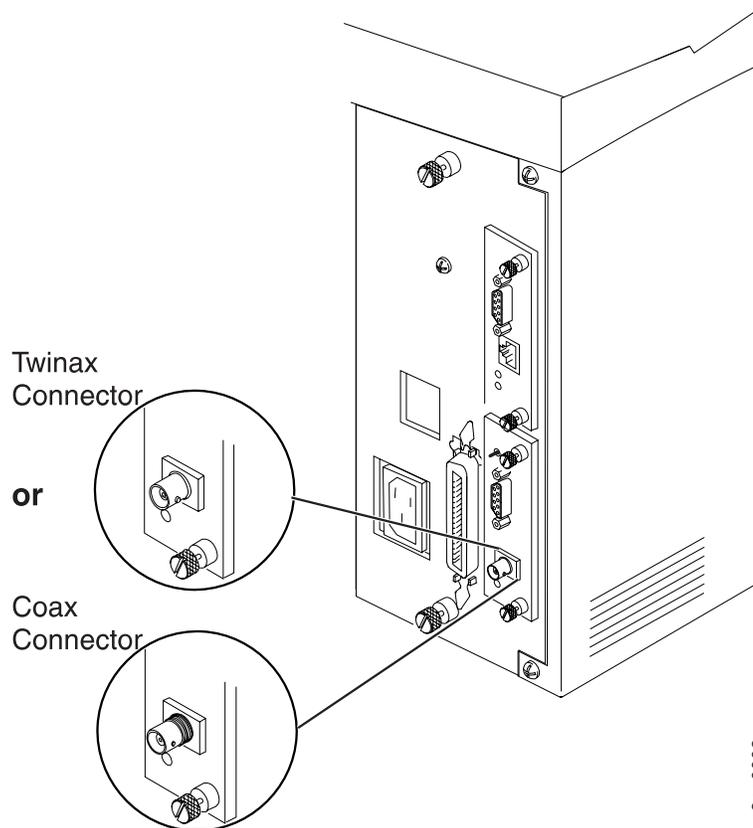
10. Learn how to obtain printer and NIC configuration pages by doing the procedures in step 7 on page 9.

11. Understand the printer functions as they affect configuration tasks as described in 4.0, "Learning about your Printer" on page 21.

12. Fill out your configuration worksheets with the data you will need (see 5.0, "Configuration Worksheet" on page 33.

13. Continue the configuration process by selecting the appropriate configuration chapter(s) from:

   - "Configuring Coaxially Attached Hosts" on page 37

   - "Configuring Twinaxially Attached Hosts" on page 79

   - "Configuring Hosts Attached to the I-data 7913" on page 109

Note: If you will be configuring AS/400 or System/36 on a twinaxial attachment, you will need a station address for the printer. In the configuration procedures for these environments, we tell you when and how to set the station address.

2.2 Obtaining your Coaxial/Twinaxial Cable

This section describes how to accomplish step 3 on page 7. When you have completed this step, go on to step 4 on page 7.

2.2.1 Using Coaxial Cable

You have the following options:

- Obtain a Coaxial cable from IBM or other vendor

- Use the IBM Cabling system, which is designed to handle twinaxial, coaxial, Token Ring, and other communications methods.

2.2.1.1 Ordering Coax Cable from IBM

To attach to a 3270 Family Controller/Adapter, you need a coaxial cable. You can order this cable preassembled in any length. Specify the length when you order the cable.

The following table lists the coaxial cables and accessories available from IBM.

Table 4. Coaxial Cables available from IBM	
IBM Part Number	**Description**
323921[1]	Bulk cable (for indoor use). Specify the length when you order.
5252750[1]	Bulk cable (for outdoor use). Specify the length when you order.
4885584[2]	Bulk cable (Teflon covered). Specify the length when you order.
2577672[1]	Preassembled cable (for indoor use). Specify the length when you order.
1833108[1]	Preassembled cable (for outdoor use). Specify the length when you order.
4154741[2]	Preassembled cable (Teflon covered). Specify the length when you order.
1836418	Connector kit (indoor). This includes two cable connectors.
1836419	Connector kit (outdoor). This includes two cable connectors.
1743508	Connector kit (Teflon). This includes two cable connectors.
1836444	Cable connector (indoor). For individual cable ends.
1836447	Cable connector (outdoor). For individual cable ends.
4449035	Cable connector (Teflon). For individual cable ends.
5252643	Cable-to-cable adapter for connecting two cables.
1830818	Station protector kit for outdoor cable installation. This includes two station protectors.
1833106	Station protector attachment kit.
5252899	Replacement station protector element.

Notes:

1. Type CL2 cable for general use.

2. Type CL2P cable for use in ducts and plenums.

Note: All signal cables must be rated as fire resistant or be in a conduit per National Electric Code, Article 725. Consult local building codes for the requirements in your locality.

2.2.1.2 Using the IBM Cabling System

You also may wish to use the IBM Cabling System for 3270 Family Controller/Adapter attachments. Read the *IBM Cabling System — Planning and Installation Guide*, GA27-3361, and *Using the IBM Cabling System with Communications Products*, GA27-3620, for more information about the IBM Cabling System.

Note: The coax connector is an IBM dual purpose connector that allows the network printer to attach to the IBM Cabling System without the use of a balun (an impedence matching device) provided that the mating connector also supports the dual purpose connector. (This mating connector should have an extra white insulator between the center conductor and the outside ring.)

2.2.2 Using Twinaxial Cable

You have several options, among them:

- Using a twinaxial cable
- Using the IBM cabling system
- Using telephone twisted-pair

2.2.2.1 Obtaining a Twinaxial Cable

The twinaxial cable has male connectors on both ends. You can order this cable preassembled in any length up to 1525 meters (5000 feet). Specify the length when you order the cable.

The following table lists the twinaxial cables and accessories available from IBM.

IBM Part Number	Description
7362211[1]	Bulk cable (vinyl — for indoor/outdoor use). Specify the length when you order.
7362061[2]	Bulk cable (Teflon covered). Specify the length when you order.
7362267[1]	Preassembled cable (vinyl — for indoor/outdoor use) with connectors. Specify the length when you order.
7362062[2]	Preassembled cable (Teflon covered) with connectors. Specify the length when you order.
7362268	Connector kit for vinyl-covered cables. This includes two connectors.
7362063	Connector kit for Teflon-covered cables. This includes two connectors.
7362229	Cable connector for individual cable ends.
7362230	Cable-to-cable adapter for connecting two cables together.
7361807	Station protector kit for outdoor cable installation. This includes two station protectors.
7362426	Replacement station protector element.
483619	Shrink tubing (for covering cable-to-cable adapter).
94X3677	Protective sleeve (to cover metallic connectors).

Notes:

1. Type CL2 cable for general use.

2. Type CL2P cable for use in ducts and plenums.

Note: All system cables must be rated as fire resistant or be in a conduit per National Electric Code, Article 725. Consult local building codes for the requirements in your locality.

2.2.2.2 Choosing the IBM Cabling System

Consider using the IBM Cabling System for the twinaxial Controller attachment. This cabling system allows the connection of virtually any compatible system. Refer to *IBM Cabling System—Planning and Installation Guide*, GA27-3361, and *Using the IBM Cabling System with Communication Products*, GA27-3620, for more information about the IBM Cabling System.

2.2.2.3 Choosing Telephone Twisted-Pair Cabling and a 5299

Type 3 telephone twisted-pair cabling for the twinaxial controller attachment is another option for customers in the U.S.A. and Canada. The 5299 Model 3 Terminal Multiconnector with twinaxial-to-twisted-pair adapters allows the attachment to be made over the same telephone wiring cable that typically is already installed for the voice (telephone) network. For more information, refer to *IBM 5299 Terminal Multiconnector Model 3 Planning, Installation, and Problem Analysis Guide*, GA27-3749.

2.3 Physically Installing a NIC in the Printer

This procedure describes how to perform step 6 on page 9.

An IBM NIC is inserted in one of the available slots in the back of an IBM Network Printer:

- You can install two NICs in a Network Printer 17, 20, 24 or Network Printer 30.

  Note: If two cards are installed, they cannot be of the same type.

- You can install one NIC of any type in Network Printer 12.

To install the NIC:

1. Turn the printer's power off.

2. Remove the power cord and any cables attached to the printer.

3. Remove the temporary cover on the slot on the rear of the printer. If two slots are available, IBM recommends using the **top** slot first.

4. Insert the card into the slot by gently pressing the board into position.

5. Tighten the thumb screws on the NIC to secure it in place.

6. Reattach the power cord.

7. Print a printer configuration page (refer to 3.2.1, "Printing a Printer Configuration Page" on page 16) to verify that you see either "COAX" or "TWINAX" under the Installed Options section of the page.

For a detailed description of this procedure, refer to the printer's *User's Guide*.

3.0 Obtaining Configuration Data from the Printer

This chapter describes:

- How to use the printer operator panel
- How to obtain a **printer** configuration page
- How to obtain a **NIC** configuration page
- Using the printer's TEST MENU

You will need to know how to use the printer operator panel, and how to obtain a **printer** and a **NIC** configuration page at various points in the life cycle of your NIC, such as:

- When you change printer configuration settings
- When you update printer or NIC microcode
- When you have to contact IBM Support

3.1 Printer Operator Panel Actions

Following is a description of the various actions you can perform when using the IBM network printer operator panel. Refer to the User's Guide for your printer for a complete description of how to use your operator panel keys.

ONLINE	Use the ONLINE key to take the printer offline or to put it online (if it is offline). **Before you can navigate the menus, the printer must be offline.**
MENU	Use the MENU key to scroll the list of items for the menu listed in the message display area. Note that you must take the printer **offline** before you can use the MENU key.
VALUE	Use the VALUE key to scroll the list of available values for a menu item. See ENTER key.
ENTER	Use the ENTER key to change a menu item to a new value when the value is displayed in the message display area. (A value is active if an asterisk (*) appears next to the value.)
Cancel	Press the MENU or ITEM key to cancel any change or entry before it takes effect. The change has taken effect if an asterisk (*) is displayed to the right of the changed value.
Increment	Press the VALUE key. The value increments by one each time you press the key.
Fast Increment	Press and hold the VALUE key. The value increments by ten at a time while you hold the key.
Decrement	Press the SHIFT and then VALUE keys.
Fast Decrement	Press and hold the SHIFT and then VALUE keys.

Note: See the *User's Guide* for your printer for additional details about the operator panel.

3.2 The Printer Configuration Page

PRINTER Configuration Page

The following procedure is used to obtain a **printer** configuration page. If you want to print the related **NIC** configuration page, refer to page 3.3, "The NIC Configuration Page" on page 18.

Each of the IBM network printers produces a "Configuration Page" for the printer that shows information like:

- Test Menu options, such as printing the configuration page

- Settings for the various menus and options, such as:

  - All printer menu items and current settings

  - Installed options

  - Printer details such as page count and code levels installed in the printer

  - Printer details (such as code levels)

3.2.1 Printing a Printer Configuration Page

Note: The printer configuration page is accessible only when the printer is not in "bind" with a PSF host.

1. Before printing a configuration page, make sure all print jobs are finished. If you need to immediately print a configuration page, then cancel the job that is currently printing.

2. Make sure the printer is offline. If the printer is online, press the **Online** key to take it offline.

3. Press the **Menu** key once. TEST MENU appears in the message display area.

4. Press the **Item** key once. CONFIG PAGE appears in the message display area. Note that the menu name appears on the top line and the action item appears on the second line.

5. Press the **Enter** key to print the configuration page. (If you do not have letter or A4 paper loaded, the message Load Letter may be displayed; press the **Continue** key to print the configuration page.) Printing the configuration page takes a moment or two.

6. To restore the printer to READY status, press the **Online** button.

Network Administrator Tip

The configuration page lists all menus and menu items in the same order as displayed on the printer operator panel. You can use the configuration page as a map for the menus. You may want to display a configuration page near the printer to assist users in selecting menus and menu items.

3.2.2 Reading the Printer Configuration Page

**IBM Network Printer 24
Configuration Page**

TEST MENU ①
CONFIG PAGE
PRINT PS FONTS
PRINT PCL FONTS
PRINT PS DEMO
CONTINUOUS TEST
RESET PRINTER
FACTORY DEFAULT
FORMAT DISK
ONLINE HEX PRT

PAPER MENU
SOURCE = TRAY 2
OUTPUT = MAIN
TRAY SWITCH = OFF
MANUAL = OFF
AUXSIZE = LETTER
ENVSIZE = COM10
DUPLEX = ON
BINDING = LONG
TRAY RENUM = OFF

CONFIG MENU
JAMRECOVERY = OFF
AUTOCONTINU = ON
DENSITY = 15
PWRSAV=30 MIN
QUALITY = REFINE

MEMCONFIG MENU
PCL SAVE = OFF
PS2 SAVE = OFF

PARALLEL MENU
PERSONALTY = AUTO
BI-DI = ON
PORT TIMEOUT = 15

PCL MENU
PAGEPROT = AUTO
COPIES = 1
PAGESIZE = LETTER
ORIENTAION = P
FORM = 60 LINES
FNTSCR = INTERNAL
FONTNUM = 0
PT.SIZE = 12.00
PITCH = 10.00
SYMSET = ROMAN-8

PS MENU
PAGEPROT = AUTO
COPIES = 1
PRINT ERRS = OFF

ETHERNET MENU
PERSONALTY = AUTO
PORT TMEOUT = 15

MACHINE INFO
PAGE COUNT
ERROR LOG
TONER CTR
FUSER CTR

LANGUAGE MENU
LANG = ENGLISH

INSTALLED OPTIONS ②
DUPLEX
ENVELOPE FEEDER
PS
ETHERNET
DISK
32 MB Extra Memory

TOTAL MEMORY = 36 MB

AUTOSENSED PAPER ③
TRAY 1= LETTER
TRAY 2 = 11 X 17

PRINTER DETAILS ④
PAGE COUNT = 3330
TONER CTR = 1741
FUSER CTR =1741
CODE LEVELS
CTL 1.04
PCL 1.3.1
PS 1.06
EN 5.16

PRINTER DETAILS
PAGE COUNT = 3330 — Ⓐ
TONER CTR = 1741 — Ⓑ
Ⓔ — FUSER CTR =1741 — Ⓒ
CODE LEVELS
Ⓕ — CTL 1.04 — Ⓓ
PCL 1.3.1
Ⓖ — PS 1.06
EN 5.16
Ⓗ

c9pu241

The printer configuration page, as shown in the illustration, lists the following information:

1. **Menus**—All of the menu settings currently active for your printer. Note that the list of menus you see is determined by the options you have installed; for example, you see the Coax (or Twinax) Menu only when you have the Coax (or Twinax) NIC installed.

2. **Installed Options**—The options and memory you have installed. In this example, optional Envelope Feeder and Duplex unit are installed.

   Important: IBM recommends printing the Printer Configuration Page whenever you install a new option. Review Installed Options to make sure the printer recognizes the option you installed. If the option is not listed, reinstall the option.

3. **Autosensed Paper**—The paper loaded in various trays. In this example, letter size paper is loaded in Tray 1 and 11 by 17 inch paper is loaded in Tray 2.

4. **Printer Details**—Page counts for the printer, the toner cartridge, the fuser, and printer program code levels.

a. **Page Count**—The number of pages printed on the printer.

b. **Toner CTR**—The number of pages printed with the toner cartridge. (You should reset the toner count whenever you replace the toner cartridge.)

c. **Fuser CTR**—The number of pages printed with the fuser. (You should reset the fuser counter whenever you replace the fuser.)

d. **Code Levels**—The printer program code version levels installed on the printer for the printer controller, data stream languages, and option code. If you need to update the printer's "operating system," also called controller code, or add an option, you may need to update the following software with different versions:

e. **CTL**—The printer controller program code version. (If you need to update the printer's "operating system," also called controller code, you will need this number.)

Note: If you have other options or NICs installed, the list of code levels will be different from those shown in the example.

3.3 The NIC Configuration Page

┌─ **NIC Configuration Page** ──────────────────────────────────┐

The following procedure is used to obtain a **NIC** configuration page. If you want the related **printer** configuration page, refer to page 3.2, "The Printer Configuration Page" on page 16.

└──┘

3.3.1 Obtaining a NIC Configuration Page

The following procedure obtains a NIC configuration page from the printer.

1. Press the TEST button on the NIC faceplate.

3.3.2 What a NIC Configuration Page Is

Successful printing of the NIC configuration page verifies most functions on the NIC as well as the print capability of the printer.

The NIC configuration page also provides information that can be used by IBM support personnel to diagnose and resolve problems with a NIC. For this reason, we provide you with no explanation of what is shown on the NIC configuration pages beyond showing you what they look like so you can supply one, on demand, to IBM support.

Note that the Twinax and Coax **NIC** configuration pages differ in content.

- 3.3.3, "Coax NIC Configuration Page" on page 19 shows a partial list of the contents of the Coax NIC configuration page

- 3.3.4, "Twinax NIC Configuration Page" on page 19 shows a partial list of the contents of a Twinax NIC configuration page.

3.3.3 Coax NIC Configuration Page

A Coax NIC configuration page looks like this:

```
IBM Network Printer 17 - Version 149.015*0736107

BOOT id: 80034003
Escape code = 00 Hex, Character= ' '. Tray = LETTER.
There are 2048 bytes available in the dynamic area.
351 bytes in use, and 1697 free.

Function #  1 is set to 2
   ⋮
Function #120 is set to 0

TIMEOUT BUSY,HOLD: 240,120
TIMEOUT COAX: 90
DEFAULT GFID.:          MARGIN COMP.:
   ⋮
BARCODES: 39,3,2;29,3,2;28,3,2...
```

3.3.4 Twinax NIC Configuration Page

A Twinax configuration page looks like this:

```
IBM Network Printer 17, Firmware version: 149.015*0736107

Boot id: 80034003
Current escape code = 00 in hexadecimal as character = ' '
Line Set Up: Addr. 0 *IPDS 1K
Function  2: Default LPI 6
Function  3: Default CPI 10
   ⋮
Function 120: Settings Printout at Power Up: = Off
Free bytes  : 1857
   ⋮
```

3.4 Using the Printer's TEST Menu

You can use the network printer's TEST Menu to display basic information about your printer and to perform simple troubleshooting tasks. The following table describes <u>some</u> of the functions, relevant to this book, that are provided on the TEST Menu for all IBM network printers.

TEST Menu Item	Description
CONFIG PAGE	Prints the Printer Configuration Page. Refer to 3.2, "The Printer Configuration Page" on page 16.
PRINT PCL FONTS	Prints a list of the PCL5e fonts installed on the printer.
PRINT SCS CHARACTERS	Prints the SCS code page (character set).

4.0 Learning about your Printer

<u>PLEASE READ THROUGH THIS MATERIAL FOR THE FIRST PRINTER YOU INSTALL AND CONFIGURE.</u>

The intent of this chapter is to describe some of the features of the IBM network printers so that when you are want to configure the printer (using the printer operator panel) in such and such a way, you will understand how to achieve your aim.

The following topics are described here:

- How a printer page is defined

- Determining page orientation

- Determining how to specify what input tray or output bin PSF (PSF/400, PSF/MVS, PSF/VM, or PSF/VSE) is to use for printing tasks for IPDS print files

- Fine-tuning printer performance

- Answers to frequently asked questions

4.1 How a Printer Page is Defined

This section describes the way the printable area on a page is set up for the IBM network printers.

The standard printable area is less than the whole page since there is a small boundary around the page that is referred to as the "unprintable area." This area differs from printer to printer. The following diagrams illustrate how the IBM network printers define the printable area for various datastreams.

4.1.1 Network Printers 12 and 17

These printers define the printable/unprintable area differently for IPDS and non-IPDS datastreams.

4.1.1.1 IPDS
Following are the dimensions for Network Printers 12 and 17. The dimensions shown are valid for all paper types.


```
4 mm
(0.157 in)

Letter

IPDS (Tx or Cx)
Letter-size
Portrait


4 mm
(0.157 in)

Letter

IPDS (Tx or Cx)
Letter-size
Landscape

c8pn0003
```

21
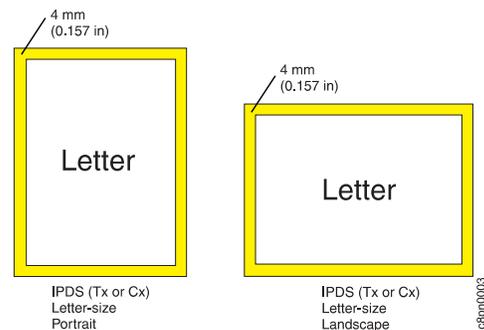
4.1.1.2 Non-IPDS

Following is a diagram showing the printable/unprintable area for Network Printers 12 and 17. The areas vary by paper type.

100 Pels
4.24 mm
(0.167 in)

150 Pels
6.34 mm
(0.25 in)

Letter

Non-IPDS (Tx or Cx)
Letter-size
Portrait

100 Pels
4.24 mm
(0.167 in)

120 Pels
5.06 mm
(0.20 in)

Letter

Non-IPDS (Tx or Cx)
Letter-size
Landscape

c8pn0004

100 Pels
4.24 mm
(0.167 in)

142 Pels
6.02 mm
(0.237 in)

A4

Non-IPDS (Tx or Cx)
A4-size
Portrait

80 Pels
3.38 mm
(0.133 in)

118 Pels
5.00 mm
(0.197 in)

A4

Non-IPDS (Tx or Cx)
A4-size
Landscape

c8pn0005
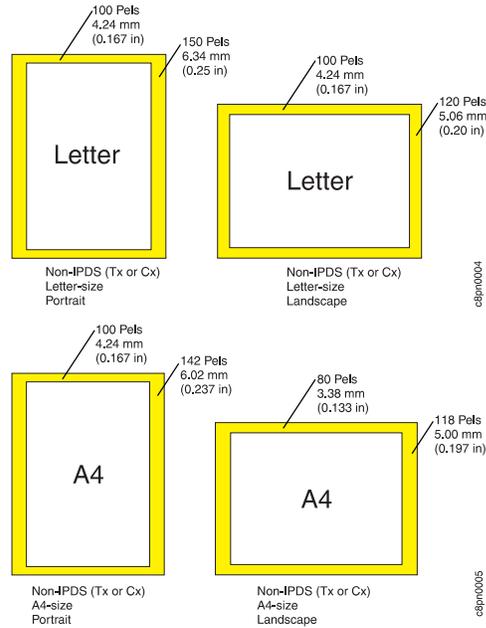
4.1.2 Network Printer 24

For Network Printer 24, the printable/unprintable area is the same for any datastream and all paper types.

6.0 mm
(0.236 in)

4.5 mm
(0.177 in)

6.0 mm
(0.236 in)

4.5 mm
(0.177 in)

Short-edge Feed

Long-edge Feed

c8pn0006
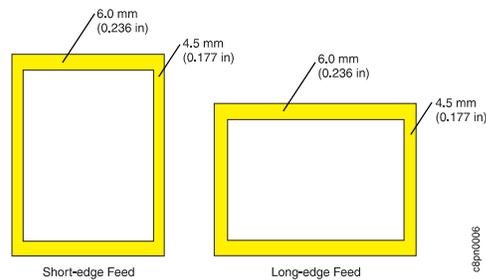
4.2 How the Printable Area is Defined

The printable area is defined differently for the different data streams.

4.2.1 The IPDS Printable Area

PSF obtains printer characteristics, including page setup, by using the "Obtain Printer Characteristics (OPC)" command. The only adjustment you can make is to change the default characters per inch (CPI) on the IPDS MENU.

4.2.2 The SCS Printable Area

For the SCS datastream, you can either use the default values or change the following parameters to adjust your printable area. The Coax and Twinax NICs have different settings.

4.2.2.1 Setting the Coax SCS Page

To set the values for SCS on a coax NIC, access the COAX SCS menu and set the following parameters:

Parameter	Description	Default
LPI	Lines per inch	6
CPI	Characters per inch	10
MPL	Maximum page length	66
MPP	Maximum print position (page width)	132

4.2.2.2 Setting the Twinax SCS Page

For a Twinax NIC, you can set only the two values for LPI and CPI on the TWINAX SCS menu.

4.2.3 Printing to the Edge of the Page

This section describes what to do if you want to ignore the unprintable area and force the printer to print to the edge of the page.

4.2.3.1 For IPDS

For IPDS, you can set the EDGE/EDGE parameter to enabled on the IPDS MENU.

You should also turn VPA **off** for IPDS. If you do not, you will get messages about printing outside the valid printable area (08c1 flags).

Note: NP 24 does not enable EDGE/EDGE printing.

4.2.3.2 For SCS and other Datastreams

You can enable (or disable) EDGE/EDGE for SCS and other datastreams from the COAX or TWINAX SETUP menus.

Note: NP 24 does not enable EDGE/EDGE printing.

4.2.4 Putting Fonts on the Printed Page

The IBM network printers are 600 pel printers. To print effectively to these printers, you need the IBM 300 pel fonts for IPDS printing. **240 pel fonts will be rejected by the printers.**

IPDS fonts can be downloaded to the printer. Non-IPDS fonts, on the other hand, are resident on the printer and cannot be downloaded to the printer.

If one of your existing documents uses a non-IPDS font that is not resident on the printer, you can **substitute** the font for one that is on the printer. Use the TEST MENU on any of the printers to get a copy of the different fonts (IPDS, PS, PCL) and the SCS character set. Refer to *IBM Network Printers: IPDS and SCS Technical Reference*, S544-5312.

4.3 How to Specify Page Orientation

This section describes how page orientation is determined.

For IPDS documents, the page orientation is determined by PSF or the application.

Both the Coax SCS Menu and the Twinax SCS Menu allow you to set the orientation of the printed page under the Trays item.

The Tray settings may, however, be overridden by whether or not the Automatic Print Orientation (APO) item is enabled or disabled. In addition, page orientation can be controlled at the datastream level.

4.3.1 How Printing Orientation is Determined in Coax/Twinax IPDS

Three items determine the orientation of data on a printed page. These items are listed below in their order of precedence:

1. Orientation controls **embedded** in the datastream. These controls take precedence over any other setting.

2. The **APO** setting on the Coax or Twinax SCS menus. The APO setting, if enabled, takes precedence over the TRAY and AUX settings, but is overridden by embedded datastream controls.

3. The **TRAY** and **AUX** settings on the Coax or Twinax SCS menus. These settings take precedence only if there are no datastream controls and APO is disabled.

Table 5. Page Orientation Precedence		
Precedence	**Item**	**Description**
1	Datastream controls	Embedded datastream controls take precedence over other settings.
2	APO on Coax or Twinax SCS Menu	If enabled, APO: • Is overridden by datastream controls • Overrides TRAY and AUX settings
3	TRAY and AUX	These settings take precedence if APO is disabled and there are no datastream controls.

Note: Refer to *IBM Network Printers: IPDS and SCS Technical Reference*, S544-5312, for information on the IPDS and non-IPDS controls you can embed in the datastream.

4.3.1.1 Embedding Orientation Controls

To determine how to imbed orientation controls in the SCS and other non-ipds datastreams, please refer to *IBM Network Printers: IPDS and SCS Technical Reference*, S544-5312.

4.3.1.2 Enabling or Disabling APO

APO may be enabled or disabled on the Twinax or Coax SCS menu.

```
┌─ Page Dimensions ─────────────────────────────────────────────────┐
│                                                                    │
│  The dimensions of a page are determined by the formula: MPL/LPI X MPP/CPI. │
│                                                                    │
└────────────────────────────────────────────────────────────────────┘
```

If APO is **enabled** (factory default), the page orientation is determined as follows:

- If the data can fit on a valid page size (that is, a page whose dimensions are equal to or less than the size of the media in the source tray), then the page is printed in either landscape or portrait orientation, as fits the specified dimensions:

    - If the width is greater than the height, the page is printed in landscape mode.

    - If the height is greater than the width, the page is printed in portrait mode.

- If the data does **not** fit the requested dimensions, then the printer uses the orientation setting on the Tray item.

If APO is **disabled**, then the printer uses the Tray item settings to determine orientation (same as when APO is enabled, but the data doesn't fit).

4.3.1.3 Tray Item Settings

Tray item orientation settings are used whenever APO is disabled or enabled but unable to fit the requested data on a page.

Following are the possible orientations when APO is disabled or APO is enabled and the data cannot fit:

LAND   Prints along the long side of the page.

PORT   Prints along the short side of the page.

C-PORT   Compressed portrait. Prints in portrait with characters reduced in size.

COR   Computer output reduction. Prints in landscape using a font that is 70% the size of the specified font. Ignores the LBM and TBM values.

4.3.2 IBM Recommendations

For IBM Network Printers 12, 17, and 24, a valid page size is measured **not** from the edge of the paper, but from the edge along the internal border (allowing for a specified margin).

The above statement is true except under one condition: If the Edge-Edge parameter is set to ON (in either the Twinax or Coax Setup menus), then:

- Network Printer 12 and 17 calculates a valid page size from the edge of the paper.

- Network Printer 24, which does **not** allow edge-to-edge printing, will always calculate a valid page size based on an internal border of:

    - 6mm on leading and following edges

– 4.5mm on side edges

IBM recommends that you enable APO (the factory default) **and** also specify COR on the TRAY item for the widest range of acceptable print orientations.

If you also set Edge-Edge to ON, then:

- For NP24, there is no change
- For NP12 and NP17, the valid paper size expands from the internal border to the edge of the paper.

Note: Because toner may "bleed" over the edges of the paper when Edge-Edge is ON, IBM recommends that you do **not** use Edge-Edge ON except when necessary.

4.4 Understanding PSF Input Trays and Output Bins

```
┌─ Terminology ──────────────────────────────────────────────────────┐
│                                                                     │
│ A variety of terms are used to refer to the containers from which   │
│ printable media are pulled (for example, envelope and paper trays)  │
│ and into which printed media are placed (for example, trays, bins). │
│ In this section, we use the word "tray" generically to mean any     │
│ source of printable material, and "bin" to mean any destination of  │
│ printed media.                                                      │
└─────────────────────────────────────────────────────────────────────┘
```

The intent of this section is to describe how PSF determines the identity of the input trays and output bins for each of the IBM network printers.

4.4.1 NP 12

The NP 12 can have up to 4 input trays and 2 output bins.

4.4.1.1 NP 12 Source Trays
This section describes how source or input trays are used and identified by PSF for IBM Network Printer 12.

4.4.1.1.1 NP 12 Default: From PSF, if no input bin is specified or PSF asks for the default bin, input will come from the bin identified in the 4312 under Paper Menu, Source.

4.4.1.1.2 NP 12 If Tray Renumbering is Off: If PSF requests an input bin, AND Paper Menu, Tray Renum = OFF, mapping is as follows:

Requested Bin	Paper Pulled From
PSF Bin 1	Top paper tray (Tray 1)
PSF Bin 2	Bottom tray (Tray 2)
Note:	
Tray 2 does not exist if the envelope tray is installed.	
PSF Bin 100	*Auxiliary paper tray (AUXTRAY)
PSF Bin 65	Envelope Feeder

Requested Bin	Paper Pulled From
Note: * Paper Menu, Auxsize must be set to the appropriate letter or envelop size. When Tray Renum = OFF, the printer numbers the trays from top to bottom as: • Top tray is 1 • Bottom is 2	

4.4.1.1.3 NP 12 If Tray Renumbering is On: If PSF requests an input bin, AND Paper Menu, Tray Renum = 1 < > 2, mapping is as follows:

Req Input Bin	Paper Pulled From
PSF Bin 1	Bottom paper tray (Tray 1)
PSF Bin 2	Top paper tray (Tray 2)
PSF Bin 100	Auxiliary paper tray (AUXTRAY)
PSF Bin 65	Envelope Feeder
Note: Paper Menu, Auxsize must be set to the appropriate letter or envelope size. When Tray Renum = 1<>2, the printer numbers the trays from top to bottom as: • Top tray is 2 • Bottom tray is 1	

4.4.1.2 NP 12 Output Bins

This section describes how output bins are used and identified by PSF for IBM Network Printer 12.

From PSF, if no output bin is specified, or PSF asks for the default bin, output will come from the bin identified in the 4312 under Paper Menu, Output.

If PSF requests an output bin, mapping is as follows:

PSF Output Bin	Output Tray
1	Main output tray
2	Face-up output bin

4.4.2 NP 17

The NP 17 printer can have up to five input trays and 12 output bins.

4.4.2.1 NP 17 Source Trays

This section describes how source or input trays are used and identified by PSF for IBM Network Printer 17.

4.4.2.1.1 NP 17 Default: From PSF, if no input bin is specified or PSF asks for the default bin, input will come from the bin identified in the 4317 under Paper Menu, Source.

4.4.2.1.2 NP 17 If Tray Renumbering is Off: If PSF requests an input bin, AND Paper Menu, Tray Renum = OFF, mapping is as follows:

Requested Bin	Paper Pulled From
PSF Bin 1	Top paper tray (Tray 1)
PSF Bin 2	Middle paper tray (Tray 2)

Requested Bin	Paper Pulled From
PSF Bin 3	Bottom paper tray (Tray 3)
PSF Bin 100	Auxiliary paper tray (AUXTRAY)
PSF Bin 65	Envelope Feeder
Note: Paper Menu, Auxsize must be set to the appropriate letter or envelope size. When Tray Renum = OFF, the printer numbers the trays from top to bottom as: • Top tray is 1 • Middle is 2 • Bottom is 3	

4.4.2.1.3 NP 17 If Tray Renumbering is On: If PSF requests an input bin, AND Paper Menu, Tray Renum = 1 < > 2, mapping is as follows:

Requested Bin	Paper Pulled From
PSF Bin 1	Middle paper tray (Tray 1)
PSF Bin 2	Top paper tray (Tray 2)
PSF Bin 3	Bottom paper tray (Tray 3)
PSF Bin 100	Auxiliary paper tray (AUXTRAY)
PSF Bin 65	Envelope Feeder
Note: Paper Menu, Auxsize must be set to the appropriate letter or envelope size. When Tray Renum = 1<>2, the printer numbers the trays from top to bottom as: • Top tray is 2, Middle tray is 1 • Bottom tray is 3	

4.4.2.2 NP 17 Output Bins

This section describes how output bins are used and identified by PSF for IBM Network Printer 17.

From PSF, if no output bin is specified, or PSF asks for the default bin, output will come from the bin identified in the 4317 under Paper Menu, Output.

If PSF requests an output bin, mapping is as follows:

PSF Output Bin	Output Tray
1	Main output tray
2	Offset stacker, invalid bin if mailbox installed
3	Mailbox bin 1
4	Mailbox bin 2
5	Mailbox bin 3
6	Mailbox bin 4
7	Mailbox bin 5
8	Mailbox bin 6
9	Mailbox bin 7
10	Mailbox bin 8
11	Mailbox bin 9
12	Mailbox bin 10

4.4.3 NP 24

The NP 24 printer can have up to three bins.

4.4.3.1 NP 24 Source Trays

This section describes how source or input trays are used and identified by PSF for IBM Network Printer 24.

4.4.3.1.1 NP 24 Default: From PSF, if no input bin is specified or PSF asks for the default bin, input will come from the bin identified in the 4324 under Paper Menu, Source.

4.4.3.1.2 NP 24 If Tray Renumbering is Off: If PSF requests an input bin, AND Paper Menu, Tray Renum = OFF, mapping is as follows:

Requested Bin	Paper Pulled From
PSF Bin 1	Top paper tray (Tray 1)
PSF Bin 2	Middle paper tray (Tray 2)
PSF Bin 3	Bottom paper tray (Tray 3)
PSF Bin 100	Auxiliary paper tray (AUXTRAY)
PSF Bin 65	Envelope Feeder

> **Note:** Paper Menu, Auxsize must be set to the appropriate letter or envelope size. When Tray Renum = OFF, the printer numbers the trays from top to bottom as:
> - Top tray is 1
> - Middle is 2
> - Bottom is 3

4.4.3.1.3 NP 24 If Tray Renumbering is On: If PSF requests an input bin, AND Paper Menu, Tray Renum = 1 < > 3, mapping is as follows:

Requested Bin	Paper Pulled From
PSF Bin 1	Bottom paper tray (Tray 1)
PSF Bin 2	Middle paper tray (Tray 2)
PSF Bin 3	Top paper tray (Tray 3)
PSF Bin 100	Auxiliary paper tray (AUXTRAY)
PSF Bin 65	Envelope Feeder

> **Note:** Paper Menu, Auxsize must be set to the appropriate letter or envelope size.
>
> When Tray Renum = 1<>3, the printer numbers the trays from top to bottom as:
> - Top tray is 3
> - Middle tray is 2
> - Bottom tray is 1

4.4.3.2 NP 24 Output Trays

This section describes how output bins are used and identified by PSF for IBM Network Printer 24.

From PSF, if no output bin is specified, or PSF asks for the default bin, output will come from the bin identified in the 4324 under Paper Menu, Output.

If PSF requests an output bin, mapping is as follows:

PSF Output Bin	Output Tray
1	Main output tray
2	Offset stacker, invalid bin if stacker installed
3	Top output tray (face down; can staple)
4	Middle output tray (face down; can staple)
5	Bottom output tray (face down; can staple)
6	Top output tray (face up)
7	Middle output tray (face up)
8	Bottom output tray (face up)
9	*Continuous output (face down)
Note: Continuous output is placed first in tray 3. When tray 3 becomes full, output is placed in tray 4, and finally in tray 5.	

4.4.4 Understanding Printer Performance

The IBM network printers operate at their rated speed only under certain conditions. If you experience performance that is less than expected, you may want to try to determine why the printer is working slowly and try to resolve the problem before determining that the printer is too slow for your uses.

In what follows, we list and describe some of the conditions that may cause performance degradation and how to resolve them.

4.4.4.1 Network Throughput

To print as quickly as possible, printers have to receive the data in a timely and well-packaged manner. If you are sending data over a WAN with one or more routers or sending the data over telephone lines for great distances, the printer may not be able to work at rated performance.

4.4.4.2 Image Performance

If you find that a document with images seems to slow the printer down, you may want to go to the application that created the image and determine how the source image was created.

If your source image was created in landscape and you are trying to print it in portrait orientation or vice versa, the printer will slow down.

To speed things up, you could try rotating the source image 90 degrees (from landscape to portrait, for example).

4.4.4.3 Overlays

Since the IBM network printers do not cache rasterized versions of overlay resources, these printers will slow down if more than one overlay is used more than just occasionally.

4.4.4.4 Setting Buffer Size on Twinax and Coax for IPDS

Both Twinax and Coax NICs have buffer sizes that can be set for IPDS. Set the Twinax buffer size in the TWINAX SETUP menu; set the same for Coax in the COAX SETUP menu.

4.4.4.4.1 Twinax Buffer Size: For a Twinax NIC, the default buffer size is 1024 bytes. While the buffer can be set at a lower value (256), IBM recommends that you keep it at 1024.

However, if you are using a 5394 or 5494 for a remote attachment for AS/400 on a twinaxial attachment, set the buffer size to 256.

4.4.4.4.2 Coax Buffer Size: For a Coax NIC, there are several buffer size values that can be set. However, some of those values should not be used.

Printer performance is improved when the buffer size on the printer matches the RU sizes for LU-1 used by VTAM. Your best appraoch is to determine the VTAM RU size used on LU-1 and then set the buffer size on the printer to the value closest to the RU size.

You can also improve performance by increasing the amount of internal storage (RAM) on your printer. If there is insufficient RAM, your data sets may not process as fast as expected or may not process at all.

4.4.4.5 Handling Print Quality Problems

Please refer to the following sections of the printer-specific user guide for your printer:

- Appendix D in the user's guide for Network Printer 12.

- Appendix D in the user's guide for Network Printer 17.

- Appendix C in the user's guide for Network Printer 24.

4.4.5 Answers to some Frequently Asked Questions

Will IPDS jobs with page segments and overlays print the same on 43xx as on a 3116? Yes, provided that you have set the FONTSUB to ON in the IPDS Menu.

Why does a 43xx print a blank page after printing a PCL job? The print application is generating a form feed after printing.

Will a 300 pel document going to a 4028 print just as readily on a 600 pel 43xx printer? Yes.

How do you change the default output font? For IPDS, change the default FGID in the IPDS menu. For SCS, you can do one of two things:

1. If you are printing from a host and using JES, you can have an FSL created that changes the font for all print jobs.

2. If you are printing PCL, change the FONTNUM parameter on the PCL menu. For further information, refer to *PCL5e and PostScript Technical Reference Guide*.

How do you use an offset stacker job function in an MVS environment?

- If you are printing **IPDS**, go into PPFA and select PAG DEF, then set JOG=YES. You may also set the offset command in a FORMDEF using the JOG command.

- If you are printing **SCS**, use the DDO command in PPM. If you are using this function from AS/400, give the NIC an SCS address in the TWINAX setup menu, then on the PAPER menu set OUTPUT=OFFSET.

Note: Offset stacker can be set as a printer default.

5.0 Configuration Worksheet

Use this worksheet as a way of documenting your configuration for each printer.

5.1 Printer Type, Attachment, and Datastream

Type	• 12 • 17 • 24	You may want to use the printer type in host setup names.
Attachment	• Coax • Twinax	• See "Configuring Coaxially Attached Hosts" on page 37 • See "Configuring Twinaxially Attached Hosts" on page 79
Datastream	• IPDS • SCS • DSC-DSE	There is one chapter for IPDS for each host type (MVS, VM, VSE) and an associated SCS/DSC/DSE chapter.

5.2 Host Configurations

5.2.1 AS/400

Parameter	Example	Your Value
Station address	(0-6)	
AFP	YES/NO	
CRTDEVPRT	Automatic/Manual	
Manual Configuration for IPDS (refer to 14.6, "Configuring AS/400 for IPDS Manually" on page 86	• DEVD • DEVCLS • DEVTYPE • AFP • PORT • SWTSET • LOCADR • CTL	

5.2.2 MVS

Parameter	Your Value
LOCADDR	
DLOGMOD	
LUNAME	
APPLID	
LOGMODE	

5.2.3 System/36

Parameter	Value
Port address	X

5.2.4 VM

Parameter	Value
TASKPRTID	
APPLID	
CONVERT	
DEST	
LUNAME	
MGMTMODE	
SHARE	
DISCINTV	

5.2.5 VSE

Parameter	Value
LUNAME	
APPLID	
RUSIZES	
MGMTMODE	
DISCINTV	
TIMEOUT	
LUNAME	

5.3 Printer Tray Setup

NP 12

- Standard:
  - 250 input
  - 80 Aux
  - 250 output
- Optional:
  - 500 input
  - Duplex
  - Envelope tray

NP 17

- Standard:
  - 250 input
  - 100 Aux
  - 250 output

- Optional:
  - 1 or 2 500 input
  - 500 Output
  - Duplex
  - Envelope feeder
  - Mailbox

NP 24

- Standard:
  - 2x500 page input
  - 100 Aux
  - 500 face-down
  - 100 face-up
- Optional:
  - Duplex
  - Upper 500 (Tray 1)
  - Lower 500 (Tray 2)
  - Envelope feeder
  - 2000 input
  - 2000 finisher

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6.0 Introduction to the IBM Coax NIC

The chapters in "Configuring Coaxially Attached Hosts" on page 37 describe how to configure MVS, VM, or VSE **hosts** for IPDS or non-IPDS (SCS, DSC, DSE) printing.

6.1 Datastreams Supported

The IBM Coax NIC supports the following data streams:

- IPDS
- SCS
- DSC
- DSE

The IPDS datastream is passed to the printer in structured fields. Non-IPDS datastreams (DSE/DSC/SCS) are converted to PCL 5 before being passed to the printer. Additional details are mentioned where they apply.

6.2 Hardware Attachments for Coax

The IBM network printers with coax features can be attached to a host through any of the following. Note, however, that the focus of the procedures is on the 3174 attachment. You must adapt the 3174 instructions to the actual attachment that you use.

- 3174 subsystem control unit
- 9221 ES/9000 processor workstation subsystem controller
- 9370 information system workstation subsystem controller
- 9371 (Micro Channel 370) using 3270 adapter, 9371 feature # 6120
- PS/2 with Micro Channel PSA card (RPQ# SO2137)

6.3 Communications Methods

Communication	LU	Datastream
SNA	LU-1	IPDS or SCS
SNA	LU-3	DSE (3270) or IPDS
Non-SNA	LU-0	DSC (3270) or IPDS

7.0 MVS IPDS via Coax

Use this chapter to configure an IBM network printer connected with a coaxial cable to an MVS system for IPDS printing. For details not provided in this chapter, refer to *IBM Network Printers: IPDS and SCS Technical Reference*.

Note: If you want to configure the printer for non-IPDS, refer to 8.0, "MVS SCS/DSE/DSC via Coax" on page 49.

7.1 Components

This chapter describes the procedure for configuring an IBM network printer and an MVS host to print IPDS files. The following table describes the operating environments described here.

	MVS/PSF IPDS	**Non-PSF IPDS**
Local Attachment	LU1 • VTAM • JES • PSF/MVS	LU1 • VTAM • JES • CICS, etc.
Remote Attachment	LU1 • NCP • VTAM • JES • PSF/MVS	LU1 • NCP • VTAM • JES • CICS, etc.

7.2 Requirements

An MVS system that includes NCP (for remote attachments), VTAM, PSF, JES, and a 3174 (or similar) controller, including the LU1 attachment.

PSF/MVS, Version 2.1.0, 2.1.1, or 2.2.0 or higher, for PSF-driven IPDS printing on IBM Network Printers 12, 17, and 24.

IBM network printers are 600-pel devices that are treated by MVS as 300-pel devices. If you will be using the fonts resident on the printer, you simply need to be aware of this fact. If you want to use downloaded fonts, however, you must download only 300-pel fonts, since 240-pel fonts cannot be downloaded to an IBM network printer. For more information, refer to 4.2.4, "Putting Fonts on the Printed Page" on page 23.

7.3 Attachment/Configuration Procedure

User Tasks

1. If you have not yet done so, set up the printer and install the NIC as described in 2.0, "Installing the Coax/Twinax NIC" on page 7.

2. Access the COAX SETUP MENU on the printer and set the following parameters:

Table 6. COAX SETUP MENU	
Parameter	**Setting**
PORT TMEOUT	If you are sharing the printer with other hosts or on a network, set this value. Refer to Appendix A, "Port Switching Printer Sharing" on page 141.
EDGE-EDGE	Set this value when necessary
BUFFERSIZE	Set to the size of the RU size in VTAM.
Note: For LU-1, valid VTAM RU sizes are 960, 1920 (default), and 2560, but 3440 and 3564 are not valid RU sizes.	

3. Access the IPDS MENU on the printer Operator Panel and set the following parameters:

Table 7. MVS IPDS MENU Setup	
Parameter	**Setting**
Emulation	4028 or 43xx
Note: Use 43xx provided that you have the correct level and service of PSF, otherwise use 4028 emulation.	
Code Page	
Note: If you do not use the default code page (037) for the US and Canada, enter a default code page value. Refer to the IPDS MENU descriptions in the User's Guide for the printer.	
Fontsub	ON

4. Recycle power on printer to make the changes take effect. **Do not connect the printer to the MVS host at this time**.

Host System Programmer/Administrator Tasks

5. Define your control unit to MVS. Refer to 7.4, "Defining the Control Unit to MVS" on page 43 for assistance.

6. If you are using a **remote** SNA attachment to the 3174 control unit, you will need to set up an NCP definition. Refer to 7.5, "Creating an NCP Definition for the Printer" on page 43. If you are configuring a **local** attached printer, go on to step 7.

7. Set up VTAM parameters as described in 7.6, "Configuring VTAM for MVS IPDS Over Coax" on page 44.

8. If you are printing IPDS through PSF/MVS, set up PSF/MVS writer proc as described in 7.8, "Define the Printer" on page 46. If you are printing IPDS through some application other than PSF/MVS, set up your printing application (such as CICS or JES328X Print Facility).

9. Define the printer to JES, as described in 7.7, "Define the Printer to JES" on page 45.

User Tasks

10. Connect the printer's coaxial cable to the MVS host control unit.

11. Verify that you have configured the printer correctly by sending a print job to the printer. Use the procedure in 7.9, "Test your Attachment/Configuration" on page 47.

7.4 Defining the Control Unit to MVS

THIS SECTION DESCRIBES STEP 5 ON PAGE 42.

If you have not already done so, define the communications control unit for the MVS host, such as the 3174 control unit, to MVS. Use either an MVS configuration program (MVSCP) or a hardware configuration definition (HCD), depending on the version of your MVS system:

- When using a version earlier than MVS 4.1.0, use an MVSCP.

- When using a version of MVS 4.1.0 or later, use an HCD or an MVSCP.

For more information about using these methods, refer to:

- *Input/Output Configuration Program (IOCP) User's GuideDialog* for your processor (see G.7, "General Publications" on page 165 for the order numbers by processor)

- *MVS/ESA Migration Planning: Dynamic I/O Configuration*

- *MVS/ESA Hardware Configuration: Using the Dialog*

7.5 Creating an NCP Definition for the Printer

THIS SECTION DESCRIBES STEP 6 ON PAGE 42.

You need to create an NCP definition for the printer only if you are setting up a printer on LU-1 (SNA) remotely connected to a 3174 (or similar) control unit.

Create an NCP definition for the printer that points to the LU-1 default logmodes entry defined in 7.6, "Configuring VTAM for MVS IPDS Over Coax" on page 44.

Whether you are using PSF/MVS or a non-PSF application to submit your IPDS print jobs, your entry should look something like the following example:

```
XYZ       GROUP   TYPE=NCP,...
          LINK    ADRESS=(032)
REMPU74   PU      ADDR=C1,...
REM4312   LU      LOCADDR=number
                  DLOGMOD=name
                  MODETAB=mytable
```

4312   The ID of the printer.

LOCADDR   The number of the port on the 3174 to which you will be attaching the printer. This number must be the same number/ID as that you will define to VTAM in 7.6, "Configuring VTAM for MVS IPDS Over Coax" on page 44. In general, this value equals the port number of the printer plus 2 (refer to Appendix B, "3174 Port and VTAM Numbering" on page 143).

DLOGMOD   The default logmode entry name.

MODETAB   The MODEENT table entry name.

Contact your NCP support personnel to have an NCP definition created.

7.6 Configuring VTAM for MVS IPDS Over Coax

Attention: The MODEENT entries illustrated below are **examples only**. A VTAM systems programmer is required to develop entries that provide functionality beyond the elementary level.

Define the assigned Logical Unit (LU) printer port to VTAM. This task has two steps.

Step 1 - Local Major Node VTAM Definition:

The first step is required only for **local** attachments. To define the printer to the local Major Node VTAM definition, make an entry like this:

```
LOC4312 VBUILD TYPE=LOCAL
LOCPU74 PU      CUADDR=nn,MAXBFRU=2
LOC4312           LOCADDR=nn,MODETAB=mytable,DLOGMODE=4312PSFL,ISTATUS=ACTIVE
```

Specify three parameters:

LUNAME   Specifies the SNA logical unit with which PSF is to initiate a session. This value must be the same as the LU statement name in the VTAM major node.

APPLID   Specifies an application program that is the SNA logical unit (LU) provided by VTAM and used by PSF. This value must be the same value as the APPL statement name in a VTAM application major node.

LOGMODE   Specifies the VTAM logon mode table entry that defines characteristics of the session between the logical units identified by the APPLID and LUNAME parameters. This name must match the name on the corresponding entry in the LOGMODE table and the value on the LOGMODE parameter in the MODEENT statement in the LOGMODE table. The name must also match the DLOGMOD parameter in VTAM.

Step 2 - LOGMODE Table Entry:

In the VTAM MODE table, you should make an entry for the printer specifying the LOGMODE with the MODEENT statement to define the attachment protocol. Following is an example:

```
PSFL4312 MODEENT LOGMODE=4312PSFL
              FMPROF=X'03',TSPROF=X'03',PRIPROT=X'B1'
              SECPROT=X'90',COMPROT=X'7080',RUSIZES=X'87C6',
              PSERVIC=X'01000000E100000000000000'
              PSNDPAC=X'01',SRCVPAC=X'01'
```

The RUSIZES statement specifies the maximum request unit (RU) size. This value should also be entered for the BUFFERSIZE in the COAX SETUP menu (we'll tell you when to do this).

Refer to the *PSF/MVS Systems Programming Guide* section on configuring SNA for Group 4 printers.

For detailed information about VTAM applications, please consult *VTAM Programming Guide* and *VTAM Resource Definitions.*

7.7 Define the Printer to JES

THIS SECTION DESCRIBES HOW TO PERFORM STEP 9 ON PAGE 42.

JES2 and JES3 do not natively support coaxially-attached printers. Therefore, another application program must be used to print data residing on the JES spool. For a coaxially-attached printer, one example of this capability is PSF/MVS (for IPDS files) or the IBM JES328X Print Facility, Version 3 (for non-IPDS files).

In JES, you'll need to specify an FSS (Functional Subsystem) and a Functional Subsystem Application (FSA) for each printer. (You must define at least one FSA per printer.) You will need a new FSA, but you may choose to use an existing FSS.

7.7.1 JES2 Printer Definitions

The following shows the JES2 printer definition initialization member, located in the system PARMLIB. The first line shows the FSS; the remaining lines show the FSA.

Note: In JES2 the FSA takes the form "PRTxxx."

```
FSS(FSS1),PROC=PSFPROC,HASPFSSM=HASPFSSM
PRT1     FSS=FSS1,MODE=FSS,PRMODE=(LINE,PAGE,SOSI1),
         CLASS=C,UCS=0,SEP,NOSEPDS,CKPTPAGE=100,
         DRAIN,MARK,TRKCELL=YES
```

Notes:

1. The above example is correct for JES2 3.11 and above. For earlier versions of JES2, the statement is named FSSDEF and would be stated as FSSDEF FSSNAME=FSS1.

2. The value you specify for the PROC parameter must match the name on the PSF/MVS Startup procedure.

7.7.2 JES3 Printer Definitions

The following shows an example of a JES3 printer definition. This example is not executable, but it is intended to help the JES3 systems programmer define the printer to the MVS host. The first line shows the FSS; the remaining lines show you the FSA for JES3.

Note: In JES3, the FSA takes the form of "DEVIO."

```
FSSDEF,TYPE=WTR,FSSNAME=FSS1,APPLID=PSFPROC,SYSTEM=SYS1,TERM=NO
DEVICE,LUNAME=PRT4312,JUNIT=(,SYS1,,OFF),FSSNAME=FSS1,
        MODE=FSS,PM=(LINE,PAGE,SOSI1),CHARS=(YES,GT12),
```

Notes:

1. The value you specify for the LUNAME parameter must match the name of the printer on the PSF/MVS Startup procedure.

2. The value you specify for the APPLID parameter must match the name on the PSF/MVS Startup procedure.

Note: Reference the PSF/MVS Systems Programming Guide for more information.

7.8 Define the Printer

THIS SECTION DESCRIBES HOW TO DO STEP 8 ON PAGE 42.

If you are going to use PSF/MVS, do the procedure in 7.8.1, "Define the Printer to PSF/MVS." If you are going to use some application other than PSF/MVS to submit your IPDS print jobs, refer to 7.8.2, "Define the Printer to CICS/JES328X" on page 47.

7.8.1 Define the Printer to PSF/MVS

Determine if you will be using a new or an existing PRINTDEV (startup proc). The PRINTDEV specifies printer-initialization parameters.

PSF/MVS supplies sample printdevs. Refer to the APSWPROB example in SYS1.PROCLIB.

Specify the following parameters in the printdev:

APPLID   Required for SNA-attached printers. The APPLID must match the LU name and the APPLID in the VTAM application.

LUNAME   The name of the logical unit. The LUNAME must match the LUNAME in the PSF startup procedure and in the VTAM definition.

You also need to specify the fonts to be used by the network printers (using the FONTDD statement).[1]

Following is a portion of a printdev.

Note: In the following example, the required parameters are bolded, as are the parameters you need to verify for successful printing.

```
//PSFPROC PROC
//*************** IBM NETWORK PRINTERS WRITER PROCEDURE ***************
//*
//*01* MODULE-NAME = PSFPROC
//*
    ⋮
//FONT300  DD   DSN=SYS1.FONT300,   /* SYSTEM FONTS - 300 PEL        */
//         DISP=SHR
//* *********************************************************    */
//*              PRINTDEV                                        */
//* *********************************************************    */
//PRT1     CNTL
//PRT1      PRINTDEV FONTDD=*.FONT300,/* 300 PEL FONT LIBRARY DD     */
  ⋮
//          APPLID=PSFAPP1            /* VTAM APPLID OF PSF          */
//          LUNAME=NP4312             /* VTAM Printer LOG UNIT NAME  */
//                                    /*   SECONDS                   */
//PRT1     ENDCNTL
```

---

[1] IBM network printers are 600-pel devices that appear to PSF/MVS as 300-pel devices.

7.8.2 Define the Printer to CICS/JES328X

If you are not using PSF/MVS, define the printer to the print application you will be using. You may use CICS, JES328X, or some other application. For an example of a CICS definition, refer to Appendix C, "Defining a Network Printer to CICS" on page 145. For a description of a JES328X definition, refer to Appendix D, "Using JES328X as Printer Controller" on page 159.

7.9 Test your Attachment/Configuration

The normal flow of a print job through the MVS printing process is:

1. Submit a job from some application.

2. The print job goes into a spool file depending on its class.

3. The job is interpreted by JES, which then sends it on to PSF (or some other application, like CICS), which sends it to the printer.

If a job does not print at all, retrace the configuration steps to make sure each step was done correctly.

8.0 MVS SCS/DSE/DSC via Coax

This chapter describes the procedure for configuring an IBM network printer and an MVS host to print SCS, DSE, or DSC files. For details not provided in this chapter, refer to *IBM Network Printers: IPDS and SCS Technical Reference*.

Sending ASCII Data and PCL Commands to Printers

For those customers who would like to adapt their non-IPDS printing to use PCL resources instead of the standard SCS or DES/DSC resources, refer to *Sending ASCII Data and PCL Commands to IBM Network Printers over Coax and Twinax*, which is available only on the Web.

Note: To configure a network printer and an MVS host to print IPDS data, refer to 7.0, "MVS IPDS via Coax" on page 41.

8.1 Components

The following table describes the operating environments described here.

	SCS	DSE	DSC
Local Attachment	LU1 • VTAM • JES • CICS, etc.	LU1 • VTAM • JES • CICS, etc.	LU1 • VTAM • JES • CICS, etc.
Remote Attachment	LU1 • NCP • VTAM • JES • CICS, etc.	LU1 • NCP • VTAM • JES • CICS, etc.	

8.2 Requirements

An MVS system that includes NCP (for remote attachments), VTAM, JES, and a 3174 (or similar) controller, including:

- LU1 for SCS
- LU3 for DSE
- LU0 for DSC

8.3 Attachment/Configuration Procedure

User Tasks

1. If you have not yet done so, set up the printer and install the NIC as described in 2.0, "Installing the Coax/Twinax NIC" on page 7.

2. Access the COAX SETUP MENU on the printer and set the following parameters for SCS:

Table 8. COAX SETUP MENU for SCS	
Parameter	**Setting**
PORT TMEOUT	If you are sharing the printer with other hosts or on a network, set this value. Refer to Appendix A, "Port Switching Printer Sharing" on page 141.
BUFFERSIZE	Set to the size of the RU size in VTAM
Note: For LU-1, valid VTAM RU sizes are 960, 1920 (default), and 2560, but 3440 and 3564 and not valid RU sizes.	
EDGE-EDGE	Set this to ON for SCS data only, if you want. Note that this option is not available on the IBM Network Printer 4324.

3. If you are configuring for **SCS**, access the COAX SCS MENU and set the following parameters:

Table 9. COAX SCS MENU	
Parameter	**Setting**
COR	Set the printing orientation for the different trays. COR is recommended.
APO	Leave APO in its default enabled state.
LPI	Leave the LPI setting at 6, or change it if you wish.
CPI	Leave the CPI at its default setting (10), or change it if you wish.
MPL	Leave the MPL at its default setting of 66, or change it if you wish.
MPP	Leave the MPP at its default setting of 132, or change it if you wish.

4. If you are configuring for **DSE/DSC**, access the COAX DSC/DSE MENU and set the parameters you want. Note that when you configure an LU3 or LU0, the printer settings alone control the printed output. You must, therefore, set the printer to match the output you expect.

Host System Programmer/Administrator Tasks

5. Define your control unit to MVS using the procedure in 8.4, "Defining your Control Unit" on page 51.

6. If you are using a **remote** SNA attachment to the 3174 control unit, you will need to set up an NCP definition. Refer to 8.5, "Setting up NCP" on page 51. If you are configuring a **local** attached printer, go on to step 7.

7. Set up VTAM parameters as described in 8.6, "Setting up VTAM" on page 52.

8. Optionally, define the printer to JES using the examples provided in 8.7, "Define the Printer to JES" on page 53.

9. Define the printer to CICS, GDDM, VPS, or other application program using the information in 8.8, "Setting up CICS or other Printing Capability" on page 54.

User Task

10. Verify that you have configured the printer correctly by sending a print job to the printer. Refer to 8.9, "Test your Attachment/Configuration" on page 54.

8.4 Defining your Control Unit

THIS SECTION DESCRIBES STEP 5 ON PAGE 50.

If you have not already done so, define the communications control unit for the MVS host, such as the 3174 control unit. Use either an MVS configuration program (MVSCP) or a hardware configuration definition (HCD), depending on the version of your MVS system:

- When using a version earlier than MVS 4.1.0, use an MVSCP.

- When using a version of MVS 4.1.0 or later, use an HCD or an MVSCP.

For more information about using these methods, refer to:

- *Input/Output Configuration Program (IOCP) User's GuideDialog* for your processor (see G.7, "General Publications" on page 165 for the order numbers by processor)

- *MVS/ESA Migration Planning: Dynamic I/O Configuration*

- *MVS/ESA Hardware Configuration: Using the Dialog*

8.5 Setting up NCP

THIS SECTION DESCRIBES STEP 6 ON PAGE 50.

You need to create an NCP definition for the printer only if you are setting up a printer on LU-1 (SNA) remotely connected to a 3174 (or similar) control unit.

Your entry should look something like the following example:

```
XYZ       GROUP    TYPE=NCP,...
          LINK     ADRESS=(032)
REMPU74   PU       ADDR=C1,...
REM4312   LU       LOCADDR=number
                   DLOGMOD=name
                   MODETAB=mytable
```

4312   The ID of the printer.

LOCADDR   The number of the port on the 3174 to which you will be attaching the printer. This number must be the same number/ID as that you will define to VTAM in 8.6, "Setting up VTAM" on page 52. In general, this value equals the port number of the printer plus 2 (refer to Appendix B, "3174 Port and VTAM Numbering" on page 143).

DLOGMOD   The default logmode entry name.

MODETAB   The MODEENT table entry name.

Contact your NCP support personnel to have an NCP definition created.

Refer to *NCP SSP Generation and Loading Guide*, SC32-6221 for help on setting up NCP.

8.6 Setting up VTAM

THIS SECTION DESCRIBES STEP 7 ON PAGE 50.

Attention: The MODEENT entries illustrated below are **examples only**. A VTAM systems programmer is required to develop entries that provide functionality beyond the elementary.

Define the assigned Logical Unit (LU) printer port to VTAM. This task has two steps.

Step 1 - Local Major Node VTAM Definition:

The first step is required only for **local** attachments. To define the printer to the local Major Node VTAM definition, make an entry like this:

```
LOC4312 VBUILD TYPE=LOCAL
LOCPU74 PU       CUADDR=nn,MAXBFRU=2
LOC4312          LOCADDR=nn,MODETAB=mytable,DLOGMODE=4312PSFL,ISTATUS=ACTIVE
```

Specify three parameters:

LUNAME   The name of the logical unit. The LUNAME must match the LUNAME in the PSF startup procedure and in the VTAM definition.

APPLID   The name of the application (PSF) that will be using the printer. The APPLID must match the LU name and the APPLID in the VTAM application.

LOGMODE   This name must match the name on the corresponding entry in the LOGMODE table and the value on the LOGMODE parameter in the MODEENT statement in the LOGMODE table. The name must also match the DLOGMOD parameter in VTAM.

Step 2 - Set up LOGMODE Table

In the VTAM MODE table, you should make an entry for the printer specifying the LOGMODE. Following is an example:

```
PSFL4312 MODEENT LOGMODE=4312PSFL
                 FMPROF=X'03',TSPROF=X'03',PRIPROT=X'B1'
                 SECPROT=X'90',COMPROT=X'7080',RUSIZES=X'87C6',
                 PSERVIC=X'01000000E100000000000000'
                 PSNDPAC=X'01',SRCVPAC=X'01'
```

The RUSIZES statement is important. This value should also be entered for the BUFFERSIZE in the COAX SETUP menu (we'll tell you when to do this).

Refer to the *PSF/MVS Systems Programming Guide* section on configuring SNA for Group 4 printers.

For detailed information about VTAM applications, please consult *VTAM Programming Guide* and *VTAM Resource Definitions.*

8.7 Define the Printer to JES

THIS SECTION DESCRIBES HOW TO PERFORM STEP 8 ON PAGE 50.

JES2 and JES3 do not natively support coaxially-attached printers. Therefore, another application program must be used to print data residing on the JES spool. For a coaxially-attached printer, one example of this capability is the IBM JES328X Print Facility, Version 3 (for non-IPDS files).

In JES, you'll need to specify an FSS (Functional Subsystem) and a Functional Subsystem Application (FSA) for each printer. (You must define at least one FSA per printer.) You will need a new FSA, but you may choose to use an existing FSS.

8.7.1 JES2 Printer Definitions

The following shows the JES2 printer definition initialization member, located in the system PARMLIB. The first line shows the FSS; the remaining lines show the FSA.

Note: In JES2 the FSA takes the form "PRTxxx."

```
FSS(FSS1),PROC=JES328XPROC,HASPFSSM=HASPFSSM
PRT1    FSS=FSS1,MODE=FSS,PRMODE=(LINE,PAGE,SOSI1),
        CLASS=C,UCS=0,SEP,NOSEPDS,CKPTPAGE=100,
        DRAIN,MARK,TRKCELL=YES
```

Notes:

1. The above example is correct for JES2 3.11 and above. For earlier versions of JES2, the statement is named FSSDEF and would be stated as FSSDEF FSSNAME=FSS1.

2. The value you specify for the PROC parameter must match the name on the Startup procedure.

8.7.2 JES3 Printer Definitions

The following shows an example of a JES3 printer definition. This example is not executable, but it is intended to help the JES3 systems programmer define the printer to the MVS host. The first line shows the FSS; the remaining lines show you the FSA for JES3.

Note: In JES3, the FSA takes the form of "DEVIO."

```
FSSDEF,TYPE=WTR,FSSNAME=FSS1,APPLID=JES328XPROC,SYSTEM=SYS1,TERM=NO
DEVICE,LUNAME=PRT4312,JUNIT=(,SYS1,,OFF),FSSNAME=FSS1,
       MODE=FSS,PM=(LINE,PAGE,SOSI1),CHARS=(YES,GT12),
```

Notes:

1. The value you specify for the LUNAME parameter must match the name of the printer on the MVS Startup procedure.

2. The value you specify for the APPLID parameter must match the name on the MVS Startup procedure.

8.8 Setting up CICS or other Printing Capability

THIS SECTION DESCRIBES STEP 9 ON PAGE 50.

Refer to Appendix C, "Defining a Network Printer to CICS" on page 145 for an example of how to set up CICS. For a description of a JES328X definition, refer to Appendix D, "Using JES328X as Printer Controller" on page 159.

8.9 Test your Attachment/Configuration

The normal flow of a print job through the MVS printing process is:

1. Submit a job from some application.

2. The print job goes into a spool file depending on its class.

3. The job is interpreted by JES, which then sends it on to some application, like CICS, which sends it to the printer.

If a job does not print at all, retrace the configuration steps to make sure each step was done correctly.

9.0 VM IPDS via Coax

This chapter describes the procedure for configuring an IBM network printer and a VM host to print IPDS files. For details not provided in this chapter, refer to *IBM Network Printers: IPDS and SCS Technical Reference*.

Note: To configure a network printer and a VM host to print SCS, DSE, or DSC data, refer to 10.0, "VM SCS/DSE/DSC via Coax" on page 63.

9.1 Components

The following table describes the operating environments described here.

	VM/PSF IPDS	Non-PSF IPDS
Local Attachment	LU1 • VTAM • SFCM • PDM	LU1 • VTAM • SFCM • PDM • Other?
Remote Attachment	LU1 • NCP • VTAM • SFCM • PDM	LU1 • NCP • VTAM • SFCM • PDM • Other?

Note: In the following sections, the IBM network printers are sometimes referred to as **Group 4** printers.

Group 4 printers can be attached in three basic ways:

- Non-SNA local attachment requiring PDM, but not VTAM
- SNA local-attachment (prt-->cu-->vtam-->pdm)
- SNA remote-attachment (prt-->cu-->adapter-->vtam-->pdm)

In this document, the emphasis is on SNA local and remote attachments. Adapt these instructions when configuring SNA remote attachments.

9.2 Requirements

A VM system that includes NCP (for remote attachments), VTAM, PSF, and a 3174 (or similar) controller, including the LU1 attachment.

PSF/VM 2.1.1 or higher (or 2.1.0 including maintenance). You will need APAR PN89456 and prerequisites for PSF/VM for all printers, including the D/T 4312, 4317, and 4324 network printers, that accept XOH DGB (Define Group Boundary) commands.

IBM network printers are 600-pel devices that are treated by VM as 300-pel devices. If you will be using the fonts resident on the printer, you simply need to be

aware of this fact. If you want to use downloaded fonts, however, you must download only 300-pel fonts, since 240-pel fonts cannot be downloaded to an IBM network printer. For more information, refer to 4.2.4, "Putting Fonts on the Printed Page" on page 23.

9.3 Attachment/Configuration Procedure

User Tasks

1. If you have not yet done so, set up the printer and install the NIC as described in 2.0, "Installing the Coax/Twinax NIC" on page 7.

2. Access the COAX SETUP MENU on the printer and set the following parameters:

Table 10. COAX SETUP MENU	
Parameter	**Setting**
PORT TMEOUT	If you are sharing the printer with other hosts or on a network, set this value. Refer to Appendix A, "Port Switching Printer Sharing" on page 141.
EDGE-EDGE	Set this value when necessary
BUFFERSIZE	Set to the size of the RU size in VTAM.
Note: For LU-1, valid VTAM RU sizes are 960, 1920 (default), and 2560, but 3440 and 3564 are not valid RU sizes.	

3. Access the IPDS MENU on the printer Operator Panel and set the following parameters:

Table 11. VM IPDS MENU Setup	
Parameter	**Setting**
Emulation	4028 or 43xx
Note: Use 43xx provided that you have the correct level and service of PSF, otherwise use 4028 emulation.	
Code Page	
Note: If you do not use the default code page (037) for the US and Canada, enter a default code page value. Refer to the IPDS MENU descriptions in the User's Guide for the printer.	
Fontsub	ON

Host System Programmer/Administrator Tasks

4. If you are using SNA, find a free port on the 3174 control unit. You will need an LUNAME for the port. Refer to 9.5, "Defining the Control Unit" on page 57.

5. If you are using a **remote** SNA attachment to the 3174 control unit, you will need to set up an NCP definition. Refer to 9.4, "Creating an NCP Definition for the Printer" on page 57. If you are configuring a **local** attached printer, go on to step 6.

6. Set up VTAM parameters as described in 9.6, "Setting up VTAM" on page 58.

7. Set up your PSF/VM. Refer to 9.7, "Setting up PSF/VM and PDM" on page 58 for examples.

User Tasks

8. Verify that you have configured the printer correctly by sending a print job to the printer. Use the procedure in 9.8, "Test your Attachment/Configuration" on page 61.

9. If you have problems, refer to 9.9, "Troubleshooting" on page 61.

9.4 Creating an NCP Definition for the Printer

THIS SECTION DESCRIBES STEP 5 ON PAGE 56.

You need to create an NCP definition for the printer only if you are setting up a printer on LU-1 (SNA) remotely connected to a 3174 (or similar) control unit.

Create an NCP definition for the printer that points to the LU-1 default logmodes entry defined in 9.6, "Setting up VTAM" on page 58.

Whether you are using PSF/VM or a non-PSF application to submit your IPDS print jobs, your entry should look something like the following example:

```
XYZ       GROUP   TYPE=NCP,...
          LINK    ADRESS=(032)
REMPU74   PU      ADDR=C1,...
REM4312   LU      LOCADDR=number
                  DLOGMOD=name
                  MODETAB=mytable
```

4312   The ID of the printer.

LOCADDR   The number of the port on the 3174 to which you will be attaching the printer. This number must be the same number/ID as that you will define to VTAM in 9.6, "Setting up VTAM" on page 58.

DLOGMOD   The default logmode entry name.

MODETAB   The MODEENT table entry name.

Contact your NCP support personnel to have an NCP definition created.

9.5 Defining the Control Unit

THIS SECTION DESCRIBES STEP 4 ON PAGE 56.

If you have not already done so, define the communications control unit for the VM host, such as the 3174 control unit.

For information about defining your control unit to VM, refer to:

- *Input/Output Configuration Program (IOCP) User's Guide* for your processor (see G.7, "General Publications" on page 165 for the order numbers by processor)

- *VM/ESA Migration Planning: Dynamic I/O Configuration*

- *VM/ESA VM/ESA Planning and Administration Guide*

9.6 Setting up VTAM

To set up VTAM for VM, you need to do two things:

- Set up a PSF APPL VTAMLST file
- Set up a VTAMLST Printer Definition

Following is an example of each of these files.

9.6.1 An Example of the PSF APPL VTAMLST File

```
*
*PSF APPL
*
PSFAPPL1 APPL AUTH=ACQ,EAS=1,SONSCIP=YES,AUTHEXIT=YES
PSFAPPL2 APPL AUTH=ACQ,EAS=1,SONSCIP=YES,AUTHEXIT=YES
PSFWRT1  APPL AUTH=ACQ,EAS=1,SONSCIP=YES,AUTHEXIT=YES
BLDD60   APPL AUTH=ACQ,EAS=1,SONSCIP=YES,AUTHEXIT=YES
```

9.6.2 An Example of the Printer Definition VTAMLST File

```
*
*CHANNEL DEFINITION THAT GOES INTO VTAM VTAMLST
*
         VBUILD TYPE=LOCAL
PSFVMPU  PU    CUADDR=4D0,MAXBFRU=15,PUTYPE=2 ,SSCPFM=USSCS,VPACING=1
PORT06A  LU    LOCADDR=8,DLOGMOD=IBM3812C,                              X
                MODETAB=MODEIBM,VPACING=1
```

9.7 Setting up PSF/VM and PDM

To set up PSF/VM, you need to set up three items:

- SFCM
- OPTIONS PDM file
- OPTIONS taskprtid file

9.7.1 Setting up SFCM

Set up the SFCM (spool file conversion machine), which references the PDM files (not the printer). Following is an example of the entries in the OPTIONS SFCM file.

```
PDM SPDML3   193
*PDM SPDML31  222
SFCMDISK 191
SYSDIAG DUMPDEV *
PRTID SFCML3S
* ALLQUERY YES
DISKFULL 99
```

9.7.2 The OPTIONS PDM File

Group 4 PDM processes files for Group4 (network) printers. A Group4 PDM consists of a PDM program and one printer task program for each Group4 (network) printer. The Group4 task program drives a network printer either through an SNA control unit using VTAM or through a non-SNA control unit using the DSC protocol.

To set up PSF/VM, you need to identify the printer in the PDM options files.

The OPTIONS PDM file contains the names of each printer. The network printer name should be entered here. Following is an example:

```
* Group4 OPTIONS PDM File
*
* PDM A-disk
PDMDISK 191
* Printer IDs and atttachments of Group4 printers
 TASKPRTID PRT546 NOSNA
 TASKPRTID PRT21  SNA
*Printer ID for Task Manager
PRTID TML3
* SFCM identifier and disk address
 SFCM SSFCML3  193
* Userid and nodeid of system diagnostician
SYSDIAG SDUMPL3 *
```

9.7.3 The OPTIONS taskprtid File

An OPTIONS taskprtid file must exist for each printer named in the OPTIONS PDM file. The OPTIONS taskprtid file has one set of parameters for SNA and another for non-SNA connections.

9.7.3.1 Non-SNA OPTIONS taskprtid

If using non-SNA, you need to define the following parameters in the OPTIONS taskprtid file:

ADDR   Virtual address of the printer (on the cu).

CONVERT   Number of files that can be converted for the printer at one time.

DEST   Destination ID for the printer.

HEADFDEF   FORMDEF of the header page.

HEADPDEF   PAGEDEF of the header page.

TAILFDEF   FORMDEF of the trailer page.

TAILPDEF   PAGEDEF of the trailer page.

An example of a non-SNA options file is:

```
CLASS  Z
 HEADFDEF F1SGRP4  FDEF38PP
*HEADFDEF F1010110 FDEF38PP
*HEADFDEF F1SLLA FDEF38PP
HEADPDEF P1S3812  PDEF38PP
 HEADPDEF P1SGRP4  PDEF38PP
*HEADPDEF P1SLCR12  PDEF38PP
*HEADPDEF P1SLGT12  PDEF38PP
 TAILFDEF F1SGRP4  FDEF38PP
*TAILFDEF F1010110 FDEF38PP
*TAILFDEF F1SLLA FDEF38PP
TAILPDEF P1S3812  PDEF38PP
 TAILPDEF P1SGRP4  PDEF38PP
*TAILPDEF P1SLCR12  PDEF38PP
*TAILPDEF P1SLGT12  PDEF38PP
CONVERT 50
ADDR 546
MITIME 250
```

Note: The required parameters are in **bold**.

9.7.3.2 SNA OPTIONS taskprtid

If configuring for SNA, you need to specify the following parameters:

APPLID   Name by which the PSF application is known to VTAM. The APPLID must match the LU name and the APPLID in the VTAM application.

CONVERT   The number of files that can be converted for this printer at a time.

DEST   Destination ID for the printer.

LUNAME   Specifies the logical unit name of the printer. The name must match the LUNAME in VTAM.

MGMTMODE   Specify OUTAVAIL.

SHARE   YES.

DISCINTV   Seconds of idle time before PSF disconnects from the printer when there is no print job.

An example of an SNA options file follows:

```
*ALLQUERY YES
*APPLID must match the APPLID specified earlier
 APPLID PSFFSA1
 CLASS  Z
 COMPMSG YES
 CONVERT 10
 DEST  TASK021
 FAILURE  WCONNECT
 FORM STANDARD
 FORMCNTL YES
*LOGMODE  IBM4312C
*LUNAME must match earlier specification
LUNAME  PORT06A
 MGMTMODE  OUTAVAIL
 SHARE YES
 TIMEOUT  REDRIVE
 HEADFDEF F1SGRP4  FDEF43PP
```

```
HEADPDEF P1SGRP4   PDEF43PP
TAILFDEF F1SGRP4   FDEF43PP
TAILPDEF P1SGRP4   PDEF43PP
```

Note: Required parameters are in **bold**.

9.8 Test your Attachment/Configuration

Test your configuration by sending a print job to the printer. Use PSF or whatever application you prefer.

9.9 Troubleshooting

9.9.1 Querying PSF/VM

If you send a job to the printer you've just configured but nothing prints (after a suitable interval), you could use several Query SFCM commands to try to determine what is going on.

1. First, query all printers with the command:

```
cp smsg ssfcml3 q sys
( SPDML3 @ BLDSTG ); T=0.01/0.01 13:00:28
  FROM SFCML3S: APRQSY339I PRT21    3130 PRINTING      QSIZE 000000
  FROM SFCML3S: APRQSY339I CLASS Z    FORM STANDARD DEST TASK021
```

2. Second, specifically query the network printer with the command:

```
send sfcml3s q sys prt21
( SPDML3 @ BLDSTG ); T=0.01/0.01 13:01:42
  FROM SFCML3S: APRQSY339I PRT21    3130 PRINTING      QSIZE 000000
  FROM SFCML3S: APRQSY339I CLASS Z    FORM STANDARD DEST TASK021
```

   Note: For steps 1 and 2, the CLASS, FORM, and DEST parameter values must match your virtual printer (Q 00E).

3. Third, enter the audit command:

```
send sfcml3s au on
( SPDML3 @ BLDSTG ); T=0.01/0.01 13:02:56
  FROM SFCML3S: APROPR702I AUDIT COMMAND QUEUED
FROM SFCML3S: APRCOM327I AUDIT STARTED
FROM SFCML3S: APRDAS362I THE SFCM 191 DISK IS 14 PERCENT FULL
FROM SFCML3S: APRSCL363I SFCM BEGAN PROCESSING FOR PRINTER PRT21,
CONVERT = 000 OF 10
```

   Note: For this step, make sure that the SFCM disk is not full and that the converted value does not equal or exceed the maximum (CONVERT=010 of 10).

9.9.2 Other Hints

Query the printer with the commands:

```
SMSG pdmid Q prtid
SMSG pdmid Q prtid ACTive
```

10.0 VM SCS/DSE/DSC via Coax

This chapter describes the procedure for configuring an IBM network printer and a VM host to print SCS, DSE, or DSC files. For details not provided in this chapter, refer to *IBM Network Printers: IPDS and SCS Technical Reference*.

Sending ASCII Data and PCL Commands to Printers

For those customers who would like to adapt their non-IPDS printing to use PCL resources instead of the standard SCS or DES/DSC resources, refer to *Sending ASCII Data and PCL Commands to IBM Network Printers over Coax and Twinax*, which is available only on the Web.

Note: To configure a network printer and a VM host to print IPDS data, refer to 9.0, "VM IPDS via Coax" on page 55.

10.1 Components

The following table describes the operating environments described here.

	SCS	DSE	DSC
Local Attachment	LU1 • VTAM • RSCS • JES328X, etc.	LU1 • VTAM • RSCS • JES328X, etc.	LU1 • VTAM • RSCS • JES328X, etc.
Remote Attachment	LU1 • NCP • VTAM • RSCS • JES328X	LU1 • NCP • VTAM • RSCS • JES328X	

10.2 Requirements

A VM system that includes NCP (for remote attachments), VTAM, RSCS, and a 3174 (or similar) controller, including:

- LU1 for SCS
- LU3 for DSE
- LU0 for DSC

10.3 Attachment/Configuration Procedure

User Tasks

1. If you have not yet done so, set up the printer and install the NIC as described in 2.0, "Installing the Coax/Twinax NIC" on page 7.

2. Access the COAX SETUP MENU on the printer and set the following parameters for SCS:

Table 12. COAX SETUP MENU for SCS	
Parameter	**Setting**
EDGE-EDGE	Set this to ON for SCS data only, if you want. Note that this option is not available on the IBM Network Printer 4324.

3. If you are configuring for **SCS**, access the COAX SCS MENU and set the following parameters:

Table 13. COAX SCS MENU	
Parameter	**Setting**
COR	Set the printing orientation for the different trays. COR is recommended.
APO	Leave APO in its default enabled state.
LPI	Leave the LPI setting at 6, or change it if you wish.
CPI	Leave the CPI at its default setting (10), or change it if you wish.
MPL	Leave the MPL at its default setting of 66, or change it if you wish.
MPP	Leave the MPP at its default setting of 132, or change it if you wish.

4. If you are configuring for **DSE/DSC**, access the COAX DSC/DSE MENU and set the parameters you want. Note that when you configure an LU3 or LU0, the printer settings alone control the printed output. You must, therefore, set the printer to match the output you expect.

Host System Programmer/Administrator Tasks

5. Define your control unit to VM using the procedure in 10.4, "Setting up the Control Unit" on page 65.

6. If you are using a **remote** SNA attachment to the 3174 control unit, you will need to set up an NCP definition. Refer to 10.5, "Setting up NCP for VM" on page 65. If you are configuring a **local** attached printer, go on to step 7.

7. Set up VTAM parameters as described in 10.6, "Setting up VTAM for VM SCS/DSE" on page 66.

8. Define the printer to RSCS and create a PROFILE GCS file using the instructions in 10.7, "Creating an RSCS Configuration File and PROFILE GCS" on page 67 or define the printer to GDDM, JES328X, or other application program.

User Task

9. Verify that you have configured the printer correctly by sending a print job to the printer. Refer to 10.8, "Using the Printer" on page 68

10.4 Setting up the Control Unit

THIS SECTION DESCRIBES STEP 5 ON PAGE 64.

Following is a sample VTAM definition for a 3174:

```
LS001     VBUILD TYPE=LOCAL
PULS001 PU    CUADDR=001,ISTATUS=ACTIVE,MODETAB=MODE4245,           X
               USSTAB=USSTAB1
* MUX 1    HARDWARE GROUP 26
* TUBES
LS00102   LU     LOCADDR=02,DLOGMOD=D4A32XX3,                        X
               LOGAPPL=VM
LS00103   LU     LOCADDR=03,DLOGMOD=D4A32XX3,                        X
               LOGAPPL=VM
* PRINTER   LU_1 ATTACHED
LS00104   LU     LOCADDR=04,MODETAB=MODE4245,DLOGMOD=LU1PRT
* PRINTER   LU_3 ATTACHED
LS00105   LU     LOCADDR=05,MODETAB=MODE4245,DLOGMOD=LU3PRT
* PRINTER   LU_1 ATTACHED FOR PSF
LS00106   LU     LOCADDR=06,MODETAB=MODE4245,DLOGMOD=PRT4324
LS00107   LU     LOCADDR=07,DLOGMOD=D4A32XX3,
               LOGAPPL=VM
LS00108   LU     LOCADDR=08,DLOGMOD=D4A32XX3,
               LOGAPPL=VM
LS00109   LU     LOCADDR=09,DLOGMOD=D4A32XX3,
               LOGAPPL=VM

*************************************************
* MUX 2    HARDWARE GROUP 26
* DISPLAY
LS00110   LU     LOCADDR=10,DLOGMOD=D4A32XX3,                        X
               LOGAPPL=VM
* PRINTER   LU_1 ATTACHED
LS00111   LU     LOCADDR=11,MODETAB=MODE4245,DLOGMOD=LU1PRT
* PRINTER   LU_3 ATTACHED
LS00112   LU     LOCADDR=12,MODETAB=MODE4245,DLOGMOD=LU3PRT
* PRINTER   LU_1 ATTACHED FOR PSF
LS00113   LU     LOCADDR=13,MODETAB=MODE4245,DLOGMOD=PRT4324
* PRINTER   LU_1 ATTACHED
LS00114   LU     LOCADDR=14,MODETAB=MODE4245,DLOGMOD=LU1PRT
* PRINTER   LU_3 ATTACHED
LS00115   LU     LOCADDR=15,MODETAB=MODE4245,DLOGMOD=LU3PRT
* PRINTER   LU_1 ATTACHED FOR PSF
LS00116   LU     LOCADDR=16,MODETAB=MODE4245,DLOGMOD=PRT4324
LS00117   LU     LOCADDR=17,DLOGMOD=D4A32XX3,                        X
               LOGAPPL=VM
```

10.5 Setting up NCP for VM

THIS SECTION DESCRIBES STEP 6 ON PAGE 64.

You need to create an NCP definition for the printer only if you are setting up a printer on LU-1 (SNA) remotely connected to a 3174 (or similar) control unit.

Your entry should look something like the following example:

```
XYZ      GROUP   TYPE=NCP,...
         LINK    ADRESS=(032)
REMPU74  PU      ADDR=C1,...
REM4324  LU      LOCADDR=number
                 DLOGMOD=name
                 MODETAB=mytable
```

4324   The ID of the printer.

LOCADDR   The number of the port on the 3174 to which you will be attaching the printer. This number must be the same number/ID as that you will define to VTAM in 10.6, "Setting up VTAM for VM SCS/DSE."

DLOGMOD   The default logmode entry name.

MODETAB   The MODEENT table entry name.

Contact your NCP support personnel to have an NCP definition created.

Refer to *NCP SSP Generation and Loading Guide*, SC32-6221 for help on setting up NCP.

10.6 Setting up VTAM for VM SCS/DSE

THIS SECTION DESCRIBES STEP 7 ON PAGE 64.

Following is a sample MODETAB table showing the entries for a coax-attached printer:

```
MODE4245 MODETAB                                                      MOD00010
******************************************************                MOD00020
** SAMPLE MODE TAB ENTRIES FOR COAX ATTACHED PRINTERS.                MOD00030
** THESE ENTRIES ARE EXAMPLES AND MAY NOT YEALD THE BEST              MOD00040
** THROUGHPUT FOR YOURE ENVIRONMENT.                                  MOD00040
******************************************************                MOD00050
LU1PRT   MODEENT  LOGMODE=LU1PRT,FMPROF=X'03',TSPROF=X'03',           XMOD11420
                  PRIPROT=X'B1',SECPROT=X'30',COMPROT=X'3080',        XMOD11430
                  SSNDPAC=X'00',SRCVPAC=X'00',RUSIZES=X'8585',        XMOD11440
                  PSNDPAC=X'80',PSERVIC=X'01000000E100000000000000'    MOD11450
LU1PRT1  MODEENT  LOGMODE=LU1PRT1,FMPROF=X'03',TSPROF=X'03',          XMOD11460
                  PRIPROT=X'B1',SECPROT=X'90',COMPROT=X'3080',        XMOD11470
                  SSNDPAC=X'00',SRCVPAC=X'00',RUSIZES=X'8787',        XMOD11480
                  PSNDPAC=X'80',PSERVIC=X'01000000E100000000000000'    MOD11490
LU1PRT9  MODEENT  LOGMODE=LU1PRT9,FMPROF=X'03',TSPROF=X'03',          XMOD11780
                  PRIPROT=X'B1',SECPROT=X'90',COMPROT=X'3080',        XMOD11790
                  SSNDPAC=X'00',SRCVPAC=X'00',RUSIZES=X'F6F6',        XMOD11800
                  PSNDPAC=X'80',PSERVIC=X'01000000E100000000000000'    MOD11810
LU3PRT   MODEENT  LOGMODE=LU3PRT,FMPROF=X'03',TSPROF=X'03',           XMOD11940
                  PRIPROT=X'B1',SECPROT=X'20',COMPROT=X'3080',        XMOD11950
                  SSNDPAC=X'00',SRCVPAC=X'00',RUSIZES=X'C7C7',        XMOD11960
                  PSNDPAC=X'80',PSERVIC=X'03800000000018502B507F00'    MOD11970
PRT4324  MODEENT LOGMODE=PRT4324,FMPROF=X'03',TSPROF=X'03',           XMOD43860
                  PRIPROT=X'B1',SECPROT=X'B0',COMPROT=X'7080',        XMOD43870
                  RUSIZES=X'8585',PSNDPAC=X'03',SRCVPAC=X'03',        XMOD43880
                  SSNDPAC=X'00',                                      XMOD43890
                  PSERVIC=X'01400001000000000001000000'               MOD43900
         MODEEND                                                       MOD43910
         END                                                          MOD43920
```

10.7 Creating an RSCS Configuration File and PROFILE GCS

THIS SECTION DESCRIBES STEP 8 ON PAGE 64.

Following are examples of an RSCS Configuration file and a PROFILE GCS file.

10.7.1 RSCS Configuration File

```
          RSCS CONFIG

     LOCAL  VMSYS
     LANGUAGE * *
     OPFORM  STANDARD
     CHANNELS F E
     LINKDEFINE *LIST    TYPE LISTPROC CL * Q SIZE DP 7
     LINKDEFINE *NOTHERE TYPE NOTIFY
     LINKDEFINE PRT0102 TYPE 3270P    LINE 0102 QUEUE FIFO RETRY
     LINKDEFINE PRT0103 TYPE 3270P    LINE 0103 QUEUE FIFO RETRY
        PARM PRT0102 SEP=NO VFC=NO EPC=YES
        PARM PRT0103 SEP=NO VFC=NO EPC=NO
        PARM *NOTHERE MSGFILE=NOTHERE PURGE=3 CLASS=N
     AUTH *        OPERATOR VMSYS
     ROUTE   *USER*  TO *NOTHERE
     DUMP VM OPERATOR
     MSGNOH
     OPTION     ENQ=NO  SEN=NO  FIN=YES  LOOP=HOPS LIST=YES SECORGID=YES
     SAFCLASS U
     RECOVERY MSG OPERATOR RSCS ABENDED#IPL GCS
```

10.7.2 PROFILE GCS File

```
     PROFILE GCS
     /******************************************************************/
     /*  PROFILE GCS FOR RSCS MACHINE                          */
     /******************************************************************/
     TRACE 'O'
     'SPOOL CONS START TO CONFILE'
     /*--------------------------------------------------------------*/
     /* Disable any NON_SNA Ports we wish to define as a printer.    */
     /*--------------------------------------------------------------*/
     'DISABLE 0102'
     'DISABLE 0103'
     'DISABLE 0111'
     'DISABLE 0112'
     'DISABLE 0113'
     'DISABLE 0114'
     'DISABLE 0115'
     'DISABLE 0116'
     /*--------------------------------------------------------------*/
     /* Attach these ports to RSCS.                                  */
     /*--------------------------------------------------------------*/
     'CP ATTACH 0102 to rscs as 0102'
     'CP ATTACH 0103 to rscs as 0103'
     'CP ATTACH 0111 to rscs as 0111'
     'CP ATTACH 0112 to rscs as 0112'
     'CP ATTACH 0114 to rscs as 0114'
     'CP ATTACH 0115 to rscs as 0115'
     'GLOBAL LOADLIB RSCS'
```

```
'FILDEF CONFIG disk RSCS CONFIG *'
'LOADCMD RSCS DMTMAN'
'RSCS INIT'
ADDRESS RSCS
'START *LIST'
'START *NOTHERE'
'NETWORK START APPLID RSCS    RETRY 10'
'START PRT0102 CLASS * FORM *'
'START PRT0103 CLASS * FORM *'
'START PRT0111 CLASS * FORM *'
'START PRT0112 CLASS * FORM *'
'START PRT0114 CLASS * FORM *'
'START PRT0115 CLASS * FORM *'
'START SNA0104 CLASS * FORM *'
'START SNA0105 CLASS * FORM *'
'START SNA0119 CLASS * FORM *'
'START SNA0120 CLASS * FORM *'
'START SNA0122 CLASS * FORM *'
'START SNA0123 CLASS * FORM *'
SAY 'RSCS STARTUP COMPLETE'
```

Note: An alternative way of attaching printers is to use the CP DEDICATE statements in the CP Directory.

10.8 Using the Printer

THIS SECTION DESCRIBES STEP 9 ON PAGE 64.

When the configuring steps have been done, the next step is to tell VM that you wish to use the newly-configured printer.

1. Start the printer with the command:

   ```
   SMSG RSCS START PRT1601 CLASS * QUEUE FIFO FORM *
   ```

2. Tell VM that you wish to use the printer:

   ```
   CP SPOOL PRINT TO RSCS
   CP TAG DEV PRT TO PRT0101 SYSTEM 1
   ```

3. Send a print job to the printer.

11.0 VSE IPDS via Coax

This chapter describes the procedure for configuring an IBM network printer and a VSE host to print IPDS files. For details not provided in this chapter, refer to *IBM Network Printers: IPDS and SCS Technical Reference*.

Note: To configure a network printer and a VSE host to print SCS, DSE, or DSC data, refer to 12.0, "VSE SCS/DSE via Coax" on page 75.

11.1 Components

The following table describes the operating environments described here.

	VSE/PSF IPDS	Non-PSF IPDS
Local Attachment	LU1 • VTAM • AFP$LST • PSF/VSE	LU1 • VTAM • AFP$LST • CICS, etc.
Remote Attachment	LU1 • NCP • VTAM • AFP$LST • PSF/VSE	LU1 • NCP • VTAM • AFP$LST • CICS, etc.

11.2 Requirements

A VSE system that includes NCP (for remote attachments), VTAM, PSF/VSE, and a 3174 (or similar) controller, including the LU1 attachment.

PSF/VSE 2.2.1 or higher, and APAR DY44349 and prerequisites for PSF/VSE for all printers, including the D/T 4312, 4317, and 4324 network printers, that accept XOH DGB (Define Group Boundary) commands.

IBM network printers are 600-pel devices that are treated by VSE as 300-pel devices. If you will be using the fonts resident on the printer, you simply need to be aware of this fact. If you want to use downloaded fonts, however, you must download only 300-pel fonts, since 240-pel fonts cannot be downloaded to an IBM network printer. For more information, refer to 4.2.4, "Putting Fonts on the Printed Page" on page 23.

11.3 Attachment/Configuration Procedure

User Tasks

1. If you have not yet done so, set up the printer and install the NIC as described in 2.0, "Installing the Coax/Twinax NIC" on page 7.

2. Access the COAX SETUP MENU on the printer and set the following parameters:

Table 14. COAX SETUP MENU	
Parameter	**Setting**
PORT TMEOUT	If you are sharing the printer with other hosts or on a network, set this value. Refer to Appendix A, "Port Switching Printer Sharing" on page 141.
EDGE-EDGE	Set this value when necessary
BUFFERSIZE	Set to the size of the RU size in VTAM.
Note: For LU-1, valid VTAM RU sizes are 960, 1920 (default), and 2560, 3440 and 3564 are valid RU sizes.	

3. Access the IPDS MENU on the printer Operator Panel and set the following parameters:

Table 15. VSE IPDS MENU Setup	
Parameter	**Setting**
Emulation	4028 or 43xx
Note: Use 43nn provided that you have the correct level and service of PSF, otherwise use 4028 emulation.	
Code Page	
Note: If you do not use the default code page (037) for the US and Canada, enter a default code page value. Refer to the IPDS MENU descriptions in the User's Guide for the printer.	
Fontsub	ON

4. Recycle power on printer to make the changes take effect. **Do not connect the printer to the VSE host at this time**.

Host System Programmer/Administrator Tasks

5. Make sure there is a free port on your 3174 control unit. Obtain the LUNAME for the port from your systems programmer. Refer to 11.4, "Setting up the Control Unit."

6. Set up VTAM parameters as described in 11.5, "Setting up VTAM" on page 71.

7. Define AFP $$LST statements to POWER. Refer to 11.6, "Setting up the AFP POWER LST Statement" on page 71.

8. Set up the PSF/VSE writer proc (PRINTDEV) as described in 11.7, "Setting up the VSE Writer Proc" on page 72.

User Task

9. Verify that you have configured the printer correctly by sending a print job to the printer.

11.4 Setting up the Control Unit

THIS SECTION DESCRIBES STEP 5.

Attach the printer to the port specified in the VTAM Major Node definition in 11.5.3, "Creating a Major Node Printer Definition" on page 71.

11.5 Setting up VTAM

To define PSF and PSF SNA printers to VTAM, you need to take three steps:

1. Add a logmode entry for your printer to the LOGMODE table.

2. Create an APPLID for the printer and add it to the VTAM APPL statement. Note that this APPLID must be the same as the APPLID specified in the startup proc for PSF.

3. Create an SNA major node printer definition.

Instructions for performing these tasks can be found in *PSF/VSE Program Directory* (G544-3805) and in *PSF/VSE System Programming Guide*.

11.5.1 The LOGMODE Entry

Here is an example:

```
SP4312C  MODEENT LOGMODE=SP4312C,FMPROF=X'03',TSPROF=X'03',             X
                 PRIPROT=X'B1',SECPROT=X'B0',COMPROT=X'7080',           X
                 RUSIZES=X'85C7',PSERVIC=X'014000010000000001000000',   X
                 PSNDPAC=X'02',SRCVPAC=X'02',SSNDPAC=X'00'
```

11.5.2 Putting APPLID in VTAM APPL Statement

Here is an example:

```
VTAMAPPL  VBUILD TYPE=APPL
PSFAPPL   APPL AUTH=...
```

11.5.3 Creating a Major Node Printer Definition

```
VTMSNA    VBUILD TYPE=LOCAL
**********************************************************************
*
*             3174-1L LOCAL CONTROL UNIT -- ADDRESS 30A
*
*                 NP43xx DEFINITIONS
*
**********************************************************************
PU30A     PU    CUADDR=30A,MAXBFRU=13
LU30AP6   LU    LOCADDR=8,MODETAB=IESINCLM,DLOGMOD=SP4312C
LU30AP7   LU    LOCADDR=9,MODETAB=IESINCLM,DLOGMOD=SP4317C
LU30AP14  LU    LOCADDR=16,MODETAB=IESINCLM,DLOGMOD=SP4324C
LU30AP15  LU    LOCADDR=17,MODETAB=IESINCLM,DLOGMOD=SP4324C
**********************************************************************
```

11.6 Setting up the AFP POWER LST Statement

Note: VSE/POWER does not provide support for coaxially-attached printers. An additional application program or support is required, such as the report controller feature of CICS (Refer to Appendix C, "Defining a Network Printer to CICS" on page 145). There are several non-IBM products that can supply similar functionality for the VSE/POWER environment.

If you want to use the AFP keyword parameters, you must update the VSE/POWER autostart procedure. Refer to *PSF/VSE Program Directory*, or the *PSF/VSE System Programming Guide* for details.

An example of a VSE/POWER Define statement for $$LST AFP keywords is:

```
*************************************************************************
*    VSE/POWER DEFINE STATEMENTS FOR THE AFP KEYWORD PARAMETERS         *
*    SUPPORTED BY PRINT SERVICES FACILITY (PSF) VIA THE * $$ LST        *
*    JCL STATEMENT.                                                     *
*                                                                       *
*    INCORPORATE THE FOLLOWING VSE/POWER 'DEFINE' STATEMENTS INTO       *
*    YOUR VSE/POWER AUTOSTART PROCEDURE IF YOUR INSTALLATION WANTS       *
*    TO UTILIZE THE AFP KEYWORD PARAMETERS VIA THE * $$ LST JECL        *
*    STATEMENT. THESE STATMENTS MAY ALREADY EXIST IN THE SKELETON        *
*    VSE/POWER AUTOSTART PROCEDURE, SKPWSTRT, IN ICCF LIBRARY 59         *
*    DEPENDING ON THE VERSION OF VSE YOU ARE RUNNING.                    *
*                                                                       *
*    REFER TO THE "VSE/POWER INSTALLATIONS AND OPERATIONS GUIDE" FOR     *
*    ADDITIONAL INFORMATION ON VSE/POWER AUTOSTART.                      *
*************************************************************************
DEFINE L,CKPTPAGE,4,1,2,B,1,32767
DEFINE L,FORMDEF,1D,1,6,C
DEFINE L,PAGEDEF,1F,1,6,C
DEFINE L,PIMSG,21,2,3,C
DEFINE L,DATACK,2022,1,8,C
DEFINE L,FORMS,10,1,4,C
DEFINE L,PRMODE,18,1,8,C
DEFINE L,TRC,1A,1,3,C
DEFINE L,OUTBIN,2023,1,4,B,1,65535
```

Note: You may not want to use all of these defines. Select those you want.

11.7 Setting up the VSE Writer Proc

THIS SECTION DESCRIBES STEP 8 ON PAGE 70.

You need to either create a new writer proc for the printer or modify an existing proc. Following is an example:

```
// JOB PR4312                    DATE 02/27/97,CLOCK 08/06/13
*
// LIBDEF *,SEARCH=(PRD2SHR.CONFIG,PRD2SHR.PROD,PRD2SHR.DBASE,PRD2SHR.COMM,
PRD2SHR.COMM2,PRD1.BASE),PERM
// LIBDEF *,SEARCH=(FONT300.AFP,FONT300.CONVERT,AFPCRSC.REL22,
PSF220.AFP,TEST.FONT,TEST.FORMDEF,
TEST.OVERLAY,TEST.PSF20,TEST.PAGEDEF,TEST.PAGESEG,TEST.PARAMDS)
*
//      EXEC     APTBMIEP,SIZE=APTBMIEP                                  00001500

PR4317   PRINTDEV APPLID=PSFAPPL
                  CHARS=GT12,
                  CKPTPAGE=10000,
                  DATACK=BLOCK,
                  MGMTMODE=OUTAVAIL,
                  DISCINTV=0,
                  TIMEOUT=REDRIVE
                  FORMDEF=A10110,
```

```
                        PAGEDEF=A06462,
                        LUNAME=LU30AP6,
                        MESSAGE=(A06462,A10110),
                        PIMSG=(YES,0),
                        NOTIFY=YES,
                        RESOURCE=KEEP,
                        RESCBUFS=1,
                        SETUP=FORMS,
                        SEPPAGE=(SEP,SEP),
                        SPBUFFER=8
```

Required Parameters

APPLID   The APPLID must match the LU name and the APPLID in the
               VTAM application.

LUNAME   The name of the logical unit. The LUNAME must match the
               LUNAME in the PSF startup procedure and in the VTAM definition.

Printer Control Parameters

DISCINTV   Specifies the interval (in seconds) after which PSF ends a session
               with the printer if there is no data in the spooler. IBM recommends
               a value of 15 seconds for multiple shared printers.

MGMTMODE   Specifies the writer process to drive the printer. IBM recommends
               OUTAVAIL.

TIMEOUT   Specifies the action PSF is to take if a timeout occurs because
               there is no data to be printed. IBM recommends REDRIVE.

Note: For details, consult the *PSF/VSE System Programming Guide*, S544-3665

12.0 VSE SCS/DSE via Coax

This chapter describes the procedure for configuring an IBM network printer and a VSE host to print SCS, DSE, or DSC files. For details not provided in this chapter, refer to *IBM Network Printers: IPDS and SCS Technical Reference*.

Sending ASCII Data and PCL Commands to Printers

For those customers who would like to adapt their non-IPDS printing to use PCL resources instead of the standard SCS or DES/DSC resources, refer to *Sending ASCII Data and PCL Commands to IBM Network Printers over Coax and Twinax*, which is available only on the Web.

Note: To configure a network printer and a VSE host to print IPDS data, refer to 11.0, "VSE IPDS via Coax" on page 69.

12.1 Components

The following table describes the operating environments described here.

	SCS	DSE	DSC
Local Attachment	LU1 • VTAM • JES • CICS, etc.	LU1 • VTAM • JES • CICS, etc.	LU1 • VTAM • JES • CICS, etc.
Remote Attachment	LU1 • NCP • VTAM • JES • CICS, etc.	LU1 • NCP • VTAM • JES • CICS, etc.	

12.2 Requirements

- LU1 for SCS
- LU3 for DSE
- LU0 for DSC

12.3 Attachment/Configuration Procedure

User Tasks

1. If you have not yet done so, set up the printer and install the NIC as described in 2.0, "Installing the Coax/Twinax NIC" on page 7.

2. Access the COAX SETUP MENU on the printer and set the following parameters for SCS:

Table 16. COAX SETUP MENU for SCS	
Parameter	**Setting**
EDGE-EDGE	Set this to ON for SCS data only, if you want. Note that this option is not available on the IBM Network Printer 4324.

3. If you are configuring for **SCS**, access the COAX SCS MENU and set the following parameters:

Table 17. COAX SCS MENU	
Parameter	**Setting**
COR	Set the printing orientation for the different trays. COR is recommended.
APO	Leave APO in its default enabled state.
LPI	Leave the LPI setting at 6, or change it if you wish.
CPI	Leave the CPI at its default setting (10), or change it if you wish.
MPL	Leave the MPL at its default setting of 66, or change it if you wish.
MPP	Leave the MPP at its default setting of 132, or change it if you wish.

4. If you are configuring for **DSE/DSC**, access the COAX DSC/DSE MENU and set the parameters you want. Refer to the printer's User Guide for information on the COAX DSC/DSE menu. Note that when you configure an LU3 or LU0, the printer settings alone control the printed output. You must, therefore, set the printer to match the output you expect.

Host System Programmer/Administrator Tasks

5. Define your control unit to VSE using the procedure in 12.4, "Setting up the 3174 Control Unit on VSE for Coax" on page 77.

6. If you are using a **remote** SNA attachment to the 3174 control unit, you will need to set up an NCP definition. Refer to 12.5, "Setting up NCP for VSE" on page 77. If you are configuring a **local** attached printer, go on to step 7.

7. Set up VTAM parameters as described in 12.6, "Setting up VTAM for VSE" on page 77.

8. Optionally, define the printer to JES.

9. Define the printer to CICS, GDDM, or other application program. Refer to Appendix C, "Defining a Network Printer to CICS" on page 145 for the procedure for defining the printer to CICS.

User Task

10. Verify that you have configured the printer correctly by sending a print job to the printer.

12.4 Setting up the 3174 Control Unit on VSE for Coax

THIS SECTION DESCRIBES STEP 5 ON PAGE 76.

Refer to 11.4, "Setting up the Control Unit" on page 70.

12.5 Setting up NCP for VSE

THIS SECTION DESCRIBES STEP 6 ON PAGE 76.

Refer to *NCP SSP Generation and Loading Guide*, SC32-6221 for help on setting up NCP.

12.6 Setting up VTAM for VSE

THIS SECTION DESCRIBES STEP 7 ON PAGE 76.

Refer to the procedure in 11.5, "Setting up VTAM" on page 71.

12.7 Print Jobs to Test your Attachment/Configuration

THIS SECTION DESCRIBES STEP 10 ON PAGE 76.

If you have configured the printer to print using CICS, refer to Appendix C, "Defining a Network Printer to CICS" on page 145, or use whatever application system you configured to test the configuration.

Configuring Twinaxially Attached Hosts

13.0 Introduction to the IBM Twinax NIC

13.1 Datastreams Supported

The IBM Twinax NIC supports two data streams, IPDS and non-IPDS.

The IPDS datastream is passed to the printer in structured fields. The non-IPDS datastream is converted to PCL before being passed to the printer. Additional details are mentioned where they apply.

13.2 Hardware Supported

The IBM network printers with twinax features can be attached to an AS/400 through any of the following. Note, however, that the focus of the procedures is on the Workstation Controller for local attachments. You must adapt these instructions to remote attachment situations.

- Workstation Controller
- 5394/5494

14.0 AS/400 for IPDS via Twinax

Use this chapter to configure AS/400 for IPDS data to a Twinax printer. For details not provided in this chapter, refer to *IBM Network Printers: IPDS and SCS Technical Reference*.

14.1 Components

The procedure provided in this chapter describes how to configure an IBM network printer directly attached to AS/400 through a Twinaxial Workstation Controller. If you want to attach the printer remotely, through a 5394 or 5494 Remote Control Unit, you will need to adapt the provided procedures to your needs. We do provide you will hints on how to configure for the 5394 or 5494 throughout the text.

Note: For additional assistance in configuring the network printers, refer to *AS/400 Local Device Configuration Guide*, SC41-3121.

14.2 Requirements

There are three classes of requirements, one for the AS/400, one for fonts, and one for the tools you can use to change printer device descriptions.

IBM network printers can print IPDS with the following releases of AS/400:

- V2R2
- V2R3
- V3R1
- V3R2
- V3R6

Note: While the IBM network printers can work on these releases of AS/400, IBM supports them only on V3R1, V3R2, V3R6, and V3R7 or later releases.

IBM network printers are 600-pel devices that are treated by AS/400 as 300-pel devices. If you will be using the fonts resident on the printer, you simply need to be aware of this fact. If you want to use downloaded fonts, however, you must download only 300-pel fonts, since 240-pel fonts cannot be downloaded to an IBM network printer. For more information, refer to 4.2.4, "Putting Fonts on the Printed Page" on page 23.

If you have V3R1 or V3R6, you **may** need to obtain the WRKAFP2 command to use to modify the printer device description. If you do, you should obtain PTF SF31461, extract the Cover Letter, and install the command **before** doing any of the steps in 14.3, "Attachment/Configuration Procedure" on page 84.

14.3 Attachment/Configuration Procedure

User Tasks

1. Install the Twinax NIC in printer as described in 2.0, "Installing the Coax/Twinax NIC" on page 7, but **do not attach the cable to the AS/400 at this time**.

2. Either request a unique (unused) device address from your local AS/400 administrator, or use the information in 14.4, "Setting the Station Address for the Printer" on page 85 to determine an address for the printer. You will need the device address to configure the Twinax Setup Menu.

3. Access the TWINAX SETUP MENU (first, you may want to familiarize yourself with the information in 3.1, "Printer Operator Panel Actions" on page 15) and set the following parameters:

Table 18. AS/400 TWINAX SETUP MENU Setup

Parameter	Setting
IPDS ADDR	*device address* obtained from step 2. Note that if you will be using the printer for SCS printing from AS/400 (whose setup is described in 15.0, "AS/400 for SCS via Twinax" on page 89, you cannot use the same device address for both.
Buffersize	1024
Note: The 1024 byte buffer size is available on the AS/400 Twinax Workstation Controller, Version 2.2 or higher of the 5394 Remote Control Unit, or the 5494 Remote Control Unit.	
PORT TMEOUT	If you are using the printer to print different datastreams (IPDS/SCS) or from different ports (Twinax/LAN), then set the value of PORT TMEOUT to an appropriate value. The default is 90 seconds. The value tells the printer to wait that many seconds to see if there are any more jobs to print on a port, then switch to a different port. Refer to Appendix A, "Port Switching Printer Sharing" on page 141 for the details.

4. Access the IPDS MENU on the printer Operator Panel and set the following parameters:

Table 19. AS/400 IPDS MENU Setup

Parameter	Setting
Emulation	4028 or 43xx
Note: Use 4312, 4317, 4324 provided that you have the correct level and service of PSF, otherwise use 4028 emulation.	
Code Page	
Note: If you do not use the default code page (037) for the US and Canada, enter a default code page value. Refer to the IPDS MENU descriptions in the User's Guide for the printer.	
Fontsub	ON

5. Recycle power on printer to make the changes take effect. **Do not connect the printer to the AS/400**.

AS/400 Steps

6. There are two paths you can take to configure AS/400 for the printer, one automatic and one manual, that are based on how the system value for QAUTOCFG is set:

- If the AS/400 system value QAUTOCFG is set to ON (=1), then CRTDEVPRT will be done automatically by AS/400.

- If QAUTOCFG is set to OFF(=0), then CRTDEVPRT must be done manually.

To determine the setting for QAUTOCFG, type:

`DSPSYSVAL QAUTOCFG`

To reset the QAUTOCFG value, use CHGSYSVAL.

7. If QAUTOCFG is set to ON (=1), you can do the procedure in 14.5, "Letting AS/400 Configure the Printer Automatically" on page 86 to configure the printer automatically; otherwise, go to step 8.

8. If QAUTOCFG is set to OFF (=0), do the procedure in 14.6, "Configuring AS/400 for IPDS Manually" on page 86 to configure the printer manually.

   Note: If you are attaching to a remote 5394 or 5494, then CRTDEVPRT **must** be done manually.

9. Start the Writer and verify that you have configured the printer correctly by sending a print job to the printer.

10. If you have problems, refer to 14.8, "Troubleshooting" on page 88 for AS/400-specific problems.

14.4 Setting the Station Address for the Printer

THIS SECTION DESCRIBES STEP 2 ON PAGE 84.

On the AS/400, the Twinax address of the printer is called the Switch Setting. You can use the device address map on AS/400 to determine the addresses that are available for use by entering the WRKCTLD *ALL command. When prompted for the local Twinax controller, enter "12."

Notes:

1. Each device is connected to a port on a specific controller. (There may be more than one controller, each with its own set of ports, which are numbered zero through 6 (that is, there are seven ports).

2. Devices may be connected to the ports in different ways:

- Through a T-connector on a twinax bus

- Using twisted-pair on a single-line multiplexer

- Using IBM cabling

14.5 Letting AS/400 Configure the Printer Automatically

THIS SECTION DESCRIBES STEP 7 ON PAGE 85.

For 5394 or 5494 Remote

If you are attaching to a remote 5394 or 5494, you must use manual configuration. Go to 14.6, "Configuring AS/400 for IPDS Manually."

Note: You can autoconfigure the printer with the Twinax SCS or the Twinax IPDS feature. This section describes the procedure for configuring the printer automatically for IPDS. Refer to 15.0, "AS/400 for SCS via Twinax" on page 89 for how to configure the printer automatically for SCS.

To have the printer configured automatically by AS/400, do the following procedure:

1. Turn the printer OFF (if it is ON) and connect the Twinaxial cable to the AS/400.

2. Turn the printer ON. At this point, AS/400 will perform the automatic configuration process by querying the printer about its characteristics. This process will take several minutes. When the process is completed, AS/400 will vary the printer on automatically.

3. When the automatic configuration step is completed, you may do this **optional** step. If you wish to use PSF/400 **and** you want to use 4028 emulation, then:

    a. Vary the printer off.

    b. Change the device description to set AFP=YES

    c. Vary the printer back on

    Notes:

    a. To specify AFP=NO or AFP=YES, use the WRKAFP2 command for V3R1 or V3R6.

    b. For other releases, use CRTDEVPRT.

4. Return to the checklist and do step 9 on page 85.

If the IPDS feature was installed and set on the printer, AS/400 will autoconfigure the printer with the following parameters:

DEVTYPE   *IPDS

MODEL   0

AFP   *NO

PRTERRMSG *INQ

14.6 Configuring AS/400 for IPDS Manually

THIS SECTION DESCRIBES STEP 8 ON PAGE 85.

You can manually configure AS/400 to use the printer as a local or remote IPDS printer. The main differences between a local and a remote attachment are that:

- For a LOCAL attachment:

- DEVCLS is set to *LCL.

- PORT must be specified.

- SWTSET must be specified.

- For a REMOTE attachment:

- DEVCLS must be set to *RMT.

- Set LOCADR (instead of PRT and SWTSET).

To configure the printer manually, perform these steps:

1. Assuming you have configured the printer Operator Panel, disconnect the cable from the AS/400 (if you had attached it) and power on the printer.

2. Use either the WRKAFP2 command (for V3R1 or V3R6) or the CRTDEVPRT command (for other AS/400 releases) to specify the following parameters:

   DEVD Workstation printer name

   DEVCLS

   - Set to *LCL for a local attachment.

   - Set to *RMT for a remote attachment (through a 5394 or 5494).

   DEVTYPE *IPDS

   MODEL 0

   AFP *YES or *NO. Refer to 14.7, "AFP - Yes or No?" on page 88.

   PORT System port number. This parameter is set only for local IPDS printing.

   SWTSET Printer station address. This parameter is set only for local IPDS printing.

   LOCADR Printer local address. Refer to the Remote Control Unit documentation. This parameter is set only for a remote IPDS attachment.

   CTL Twinaxial workstation controller name.

   FONT Default font identifier.

   FORMFEED *AUTOCUT.

   BUFFERSIZE Set to the default 1024 for local attachments. Set to 256 for remote, 5394 or 5494, attachments.

   PRTERRMSG Set to *INQ.

3. Attach the printer cable to the AS/400.

4. Vary the printer OFF, then ON

5. Return to step 9 on page 85

14.7 AFP - Yes or No?

If you specify **AFP=YES**:

- All AS/400 AFP capabilities can be used. Functions such as electronic forms (overlays), downloaded fonts, bar codes, graphics, and images are supported.

- For AS/400 V3R1 or earlier, AFP is optional. For AS/400 V3R1 or later, AFP is called PSF/400.

- You may specify emulations of 4028 or 43*xx*.

If you specify **AFP=NO**:

- Fewer AS/400 AFP capabilities can be used. You can use bar codes, graphics and images. You cannot use electronic forms (overlays) or downloaded fonts.

- The only available emulation is 4028.

To change the setting for AFP (from AFP=NO to AFP=YES or the opposite), use the CHGDEVPRT command on the AS/400 **after** the automatic configuration process is completed. **We will tell you when to do this.**

14.8 Troubleshooting

If you are attaching remotely through a 5394 or 5494, the Twinax buffer size needs to be set to 256 bytes on the printer.

Notes:

1. If you are unable to resolve your problem, you may need to contact IBM Support. Before you do, please review 19.2, "Support Needs for AS/400 Problems" on page 102.

2. You may also want to review 19.1, "Limitations on AS/400" on page 101.

15.0 AS/400 for SCS via Twinax

Use this chapter to configure an IBM network printer to print SCS data on a twinaxially attached printer. For details not provided in this chapter, refer to *IBM Network Printers: IPDS and SCS Technical Reference*.

Sending ASCII Data and PCL Commands to Printers

For those customers who would like to adapt their non-IPDS printing to use PCL resources instead of the standard SCS resources, refer to *Sending ASCII Data and PCL Commands to IBM Network Printers over Coax and Twinax*, which is available only on the Web.

Note: For additional assistance in configuring the network printers, refer to *AS/400 Local Device Configuration Guide*, SC41-3121.

15.1 Components

The procedure provided in this chapter describes how to configure an IBM network printer directly attached to AS/400 through a Twinaxial Workstation Controller. If you want to attach the printer remotely, through a 5394 or 5494 Remote Control Unit, you will need to adapt the provided procedures to your needs. We do provide you will hints on how to configure for the 5394 or 5494 throughout the text.

15.2 Requirements

The 5219 emulation mode (SCS) for SCS printing is possible under the following AS/400 releases:

- V2R2
- V2R3
- V3R05
- V3R1
- V3R2

Note: While the IBM network printers can work on these releases of AS/400, IBM supports them only on V3R1, V3R2, V3R6, and V3R7 or later releases.

15.3 Attachment/Configuration Procedure

User Tasks

1. Install the Twinax NIC in the printer as described in 2.0, "Installing the Coax/Twinax NIC" on page 7, but **do not attach the cable to the AS/400 at this time**.

2. Either request a unique (unused) device address from your local AS/400 administrator, or use the information in 15.4, "Setting the Station Address on the Printer" on page 91 to determine an address for the printer.

3. Access the TWINAX SETUP MENU (first, you may want to familiarize yourself with the information in 3.1, "Printer Operator Panel Actions" on page 15) and set the following parameters:

Table 20. AS/400 TWINAX SETUP MENU Setup	
Parameter	**Setting**
SCS ADDR	*device address* of the SCS port obtained from step 2 on page 89. Note that if you will be using the printer for IPDS printing from AS/400 (whose setup is described in 14.0, "AS/400 for IPDS via Twinax" on page 83, you cannot use the same device address for both.
Buffersize	256
Note: For SCS or when connecting the printer remotely through a 5394 or 5494, the buffer size must be 256.	
PORT TMEOUT	If you are using the printer to print different datastreams (IPDS/SCS) or from different ports (Twinax/LAN), then set the value of PORT TMEOUT to an appropriate value. The default is 90 seconds. The value tells the printer to wait that many seconds to see if there are any more jobs to print on a port, then switch to a different port. Refer to Appendix A, "Port Switching Printer Sharing" on page 141 for the details.

4. Access the TWINAX SCS MENU on the printer Operator Panel and set the following parameters:

Table 21. TWINAX SCS MENU Setup	
Parameter	**Setting**
input tray	For each input tray, you can specify the default orientation for each print job using that tray. COR is the printer default for SCS printing. By specifying COR (computer output reduction), you are telling the printer to print in landscape and to reduce the size of the logical page so that more data can fit on the physical page. This is the recommended specification.
APO	ENABLE. The page orientation (portrait or lanscape) is selected automatically by a "best fit" procedure. If no best fit can be determined, the printer uses the orientation specified for the input tray (see previous parameter above).
Note:	
Refer to 4.3, "How to Specify Page Orientation" on page 24 for an explanation.	
CPI	Specify 5, 10, 12, 15, 17.1, 20, or 27 for the default characters per inch. The factory default is 10.
LPI	Specify 0, 3, 4, 6, or 8 for the lines per inch default. Zero specifies either the value specified for the job or the PCL default value for the printer.

Note: For DSE/DSC printing, note that the printer settings control output, since host controls are not supported.

5. Recycle power on printer to make the changes take effect. **Do not connect the printer to the AS/400**.

AS/400 Steps

6. For SCS data, you must configure the printer on AS/400 manually. Refer to 15.5, "Setting up SCS Manually."

7. Start the Writer and verify that you have configured the printer correctly by sending a print job to the printer.

8. If you have problems, refer to 14.8, "Troubleshooting" on page 88 for AS/400-specific problems.

15.4 Setting the Station Address on the Printer

THIS SECTION DESCRIBES STEP 2 ON PAGE 89.

On the AS/400, the Twinax address of the printer is called the Switch Setting. You can use the device address map on AS/400 to determine the addresses that are available for use by entering the WRKCTLD *ALL command. When prompted for the local Twinax controller, enter "12."

Notes:

1. Each device is connected to a port on a specific controller. (There may be more than one controller, each with its own set of ports, which are numbered zero through 6 (that is, there are seven ports).

2. Devices may be connected to the ports in different ways:

   - Through a T-connector on a twinax bus
   - Using twisted-pair on a single-line multiplexer
   - Using IBM cabling

15.5 Setting up SCS Manually

THIS SECTION DESCRIBES STEP 6.

This section describes the parameters you need to set when you do a manual configuration for SCS.

1. Enter the CRTDEVPRT command.

2. Set the following parameters:

   DEVTYPE   3812 or 5219.

   MODEL   1 for 3812; D1 for 5219.

   PRTERRMSG   *INFO.

Note: The DEVTYPE selected determines the printer functions that are available to the printing applications.

16.0 AS/400 Advanced 36 via Twinax

Use this chapter to configure an AS/400 Advanced 36 system to print IPDS or SCS data to a twinaxially connected IBM network printer. For details not provided in this chapter, refer to *IBM Network Printers: IPDS and SCS Technical Reference*.

16.1 Requirements

- AS/400 Advanced 36.

16.2 Attachment/Configuration Procedure

To configure AS/400 Advanced 36 systems to print **IPDS**, use the procedures in 14.0, "AS/400 for IPDS via Twinax" on page 83.

To configure AS/400 Advanced 36 systems to print **SCS**, use the procedures in 15.0, "AS/400 for SCS via Twinax" on page 89.

17.0 AS/400 for SCS on ASCII Printers via Twinax

This chapter describes how to configure AS/400 to print on ASCII printers.

Sending ASCII Data and PCL Commands to Printers

For those customers who would like to adapt their non-IPDS printing to use PCL resources instead of the standard SCS resources, refer to *Sending ASCII Data and PCL Commands to IBM Network Printers over Coax and Twinax*, which is available only on the Web.

17.1 Requirements

- AS/400 Release V3R2 or higher

IBM network printers are supported as a Workstation Customization Object (WCO) under the Host Print Transform (HPT) facility of AS/400, V3R2.

HPT transforms the AFPDS or SCS datastream to ASCII for printing on an ASCII printer attached to the AS/400 ASCII emulator products, including an AS/400 ASCII Workstation Controller.

17.2 Attachment/Configuration Procedure

The configuration procedure is identical to that described in 15.0, "AS/400 for SCS via Twinax" on page 89—**except that** you must specify different parameters when you use CRTDEVPRT to do the device description on AS/400, as follows:

DEVTYPE   Specify this as "3812."

MODEL   1

HPT   *YES

MFRTYPMDL

- If you have AS/400 V3R2 and above or V3R7 and above, specify *43*xx*.

- If you have any other AS/400 system, you may specify *HP4 or a Workstation Customization Object.

18.0 System/36 for IPDS via Twinax

Use this chapter to configure System/36 for IPDS printing. The IBM series of network printers (43xx) do not support System/36 for PPDS or SCS printing. For details not provided in this chapter, refer to *IBM Network Printers: IPDS and SCS Technical Reference*.

18.1 Requirements

The IBM network printers should work on any System/36. However, the printers have been tested only on Advanced System/36, Models 236 and 436.

18.2 Attachment/Configuration Procedure

User Tasks

1. Install the Twinax NIC in printer as described in 2.0, "Installing the Coax/Twinax NIC" on page 7, but **do not attach the cable to the AS/400 at this time**.

2. Either request a unique (unused) device address from your local System/36 administrator, or use the information in 18.3, "Finding a Free Address" on page 98 to determine an address for the printer.

3. Access the TWINAX SETUP MENU (first, you may want to familiarize yourself with the information in 3.1, "Printer Operator Panel Actions" on page 15) and set the following parameters:

Table 22. System 36 TWINAX SETUP MENU Setup

Parameter	Setting
IPDS Address	*device address* obtained from step 2.
Buffersize	1024

4. Access the IPDS MENU on the printer Operator Panel and set the following parameters:

Table 23. System/36 IPDS MENU Setup

Parameter	Setting
Emulation	4028 or 43xx
Note: Use 4312, 4317, 4324 provided that you have the correct level and service of PSF, otherwise use 4028 emulation.	
Code Page	
Note: If you do not use the default code page (037) for the US and Canada, enter a default code page value. Refer to the IPDS MENU descriptions in the User's Guide for the printer.	
Fontsub	ON
IPDS PORT	TWINAX

5. Recycle power on printer to make the changes take effect. **Do not connect the printer to the System/36**.

System/36 Steps

6. Use the CNFIGSSP command to add the printer to the selected port and address. Refer to 18.4, "Using CNFIGSSP for Port Address Entry" on page 98 for assistance. Keep a record of the port and address. **Do not apply the change at this time.**

   Note: For more information on using CNFIGSSP refer to *Changing your System Configuration*, SC21-8291-01.

7. Power off and unplug the printer.

8. Attach the twinax cable.

9. Apply the changed S/36 member. The apply process may take 30 seconds to 15 minutes. The apply has been made when the terminal returns to user control.

10. When step 9 is complete, plug the printer back in.

11. Start the Writer and verify that you have configured the printer correctly by using the procedure in 18.5, "Test the Configuration with a Print Job."

12. If you have problems, refer to 18.6, "Troubleshooting" on page 99 for AS/400p-specific problems.

18.3 Finding a Free Address

THIS SECTION DESCRIBES STEP 2 ON PAGE 97.

System/36 supports several Twinax ports. Each port supports seven addresses (0 to 6). The port to which you attach the Twinax cable does not have to be free, but one of its addresses has to be free.

If you do not know which addresses are free on a port, review the master configuration file to see the list of addresses associated with each port.

18.4 Using CNFIGSSP for Port Address Entry

THIS SECTION DESCRIBES STEP 6.

The port address entry function in CNFIGSSP is straightforward:

1. When you enter the CNFIGSSP command, you are shown a table with port numbers along the right side, and the associated addresses on the top.

2. To find the addresses associated with a port, either:

   • Cross check from address to port

   • Enter the device code

   Note: Use a device code of "PH."

18.5 Test the Configuration with a Print Job

THIS SECTION DESCRIBES STEP 11.

Use this section to test your configuration.

18.5.1 Print a Screen

1. Enter a command like:

   PRINT *px*

   where *px* is the printer ID recorded in step 6 on page 98.

2. Now press the **Print Screen** key and the printer should print the screen.

3. If you have problems performing this step, refer to the procedure in 18.6, "Troubleshooting."

18.5.2 Printing CATALOG

Enter CATALOG on the System/36 and several pages listing all files, folders, and libraries on the system will be printed.

18.6 Troubleshooting

1. If after following the above steps the error SYS-6300 is generated, verify that the twinax cable is securely connected.

2. If it is, browse the master configuration and make sure that the address used matches what was set in the twinax menu for the IPDS.[2]

3. If the above steps result in the error SYS-6330 ECQ-1D02 on the system and no output is obtained, go to the IPDS menu on the printer itself and set FONT SUB to ON.

4. If absolutely no errors are generated on the printer or on the system, stop and restart the printer from the System/36:

   STOP P,*px*
   START P,*px*

   where *px* is the printer ID recorded in step 6 on page 98.

5. If you are still unable to get any errors or output, verify that the output is not being printed on another printer. Verify that the printer ID used in the START and STOP commands and the PRINT command are the same and that they match what is displayed in the configuration master on the S/36 for the port and address to which the printer is physically attached.

6. If these steps do not resolve the problem you are seeing, or you have an error other than what is listed here, call 1-800-274-0015 for System/36 support or 1-800-358-6661 for IBM network printer 43xx support.

---

[2] You browse the master configuration by selecting the appropriate option of CNFIGSSP.

19.0 AS/400 Functions, Limitations and Support Requirements

19.1 Limitations on AS/400

For a description of general network printer capabilities, refer to 4.0, "Learning about your Printer" on page 21.

19.1.1 Printing Border

Various techniques exist to compensate for this border, including:

- Resetting the IPDS Menu items X-OFFSET, Y-OFFSET, and PAGE.

- Resetting the orientation for each tray listed on the Twinax SCS Menu.

- Setting EDGE-EDGE to ON on the IPDS Menu and the Twinax Setup Menu. Note, however, that setting EDGE-EDGE on is recommended only when necessary because of possible printer toner contamination.

19.1.2 Envelope Size Specification

See the *User's Guide* for your printer for detailed information about allowable envelope sizes and weights.

19.1.3 Error Recovery

For SCS, the IBM network printers manage the recovery of print data after intervention-required errors, such as paper jams and end of forms. (This requires JAMRECOVERY in the Configuration Menu set to ON.) They also provide early print complete indications to the host to improve print performance. These factors render host error recovery options other than Ignore (**I**) both unnecessary and potentially misleading when using SCS or when using IPDS with early print complete on. For this reason, if you use SCS or you use IPDS with early print complete set to on (EARLY COMPL = ON on the IPDS Menu), IBM recommends that the "Printer Error Messages" (PRTERRMSG) parameter of the device description be set to ***INFO** (instead of the ***INQ** value that is set in auto configuration).

19.1.4 Font Cards

You cannot use fonts on font cards, cartridges, optional flash SIMMs, or the hard drive for IPDS from the twinaxial interface. The IBM network printers do not support font cards or cartridges.

19.1.5 Bar code sizes

Identical bar code commands sent to different IPDS printers may exhibit slight variations in the size of the bar code produced.

19.2 Support Needs for AS/400 Problems

This section describes the information that IBM Support needs to help you resolve problems with AS/400 applications. The information may also be of help for System 36 and other environments.

19.2.1 General Information Needs

When you contact IBM Support Center for help, the following general information will facilitate the process:

Information Needed	Your Value
AS/400 version and release	
AS/400 PTF level last installed	
PSF/400	
CTL	
IPDS	
Twinax	
Twinax wiring type	• True • Telephone TP • IBM
Systems	
Attachments	
Is remote control unit used and microcode level of unit?	

19.2.2 Information Needed if Nothing Prints

If nothing prints, obtain the following information before you call IBM Support, or be prepared to obtain this information:

- Printer configuration page

- AS/400 Device description

- If used, a printout of WRKAFP2 data area (V3R1 or V3R6), or a printout of PSFCFG object (V3R2 or V3R7).

- The AS/400 message queue

- Copy of the Writer's Job Log

- Print the screen of the WRKRPYLE table.

- If the problem is related to a specific spool file, capture the job on tape with the QSPGETF program, including all AFP resources used.

19.2.3 Information Needed If You are Getting Incorrect Output

If your printer is printing, but you are getting incorrect output, you should provide IBM with all of the previous information as well as a printout of the problem output.

19.3 AS/400 Print Functions for the IBM network printers

19.3.1 AS/400 Print Functions

Table 24 (Page 1 of 4). AS/400 Print Functions			
Function	**IPDS**	**SCS**	**HPT**
Bold	Yes	Yes	Yes
Change font (type style)	Yes	Yes	Yes
Color	No	No	No
Double-byte character set (DBCS) data	No	No	No
Double-sided printing	Yes[1]	Yes[1]	Yes[1]
Double-sided tumble printing	Yes[1]	Yes[1]	Yes[1]
Graphics	Yes	No	No
Image	Yes	No	Yes[15]
Justification - Half (50%)	Yes	Yes	Yes
Justification - Right (100%)	Yes	Yes	Yes
Overstrike	Yes	Yes	Yes
Lines per inch (any value from 1.00-1440.00)	Yes	No	No
Lines per inch (2.54)	Yes	No	No
Lines per inch (4.0)	Yes	Yes	Yes
Lines per inch (5.33)	Yes	No	No
Lines per inch (6.0)	Yes	Yes	Yes
Lines per inch (8.0)	Yes	Yes	Yes
Lines per inch (9.0)	Yes	Yes	No
Lines per inch (9.6)	Yes	Yes	Yes
Lines per inch (12.0)	Yes	Yes	Yes
Lines per inch (24.0)	Yes	Yes	Yes
Lines per inch (48.0)	Yes	Yes	Yes
Line spacing (0.5)	Yes	Yes	Yes
Line spacing (1.0)	Yes	Yes	Yes
Line spacing (1.5)	Yes	Yes	Yes
Line spacing (2.0)	Yes	Yes	Yes
Line spacing (2.5)	Yes	Yes	Yes
Line spacing (3.0)	Yes	Yes	Yes
Labels - Continuous Form	No	No	No
Labels - Sheet Feed	Yes	Yes	Yes
Paper Length in Inches (Max for letter) for Network Printers 12 and 17.	10.685	10.685	10.685

Function	IPDS	SCS	HPT
Table 24 (Page 2 of 4). AS/400 Print Functions			
Paper Length in Inches (Max for letter) for Network Printer 24. [2] [3]	10.527	10.527	10.527
Print Line in Inches (max) for Network Printers 12 and 17. [23]	8.185	8.0	8.0
Print Line in Inches (max) for Network Printer 24. [23]	8.145	8.145[16]	8.0[16]
Paper source - continuous feed	No	No	No
Paper source - envelope feed[5] The automatic envelope feed support (drawer) is an optional feature.	Yes	Yes	Yes
Paper source - manual sheet/envelope feed	Yes[17]	Yes	Yes
Paper source - paper drawer (maximum not including envelope feeder) There are up to two optional 500-sheet input trays.	4 (4324) 4 (4317) 3 (4312)	4 (4324) 4 (4317) 3 (4312)	3 (4324) 3 (4317) 3 (4312)
Print quality - Draft	No	No	No
Print quality - Letter	Yes	Yes	Yes
Print quality - Text	No	No	No
Required Backspace	Yes	Yes	Yes
Rotation - automatic	Yes	Yes	Yes
Rotation - 90 degrees	Yes	Yes	Yes
Rotation - 180 degrees	Yes	Yes	Yes
Rotation - 270 degrees	Yes	Yes	Yes
Special characters (such as: cent, one half, and section symbol)	Yes[7]	Yes[7]	Yes[7]
Subscript/superscript	Yes	Yes	Yes
Symbols (code page 259)	Yes	Yes[8]	Yes[8]
Tabs	Yes	Yes	Yes
Underline	Yes	Yes[10]	Yes
Zero index carrier return (ZICR)	Yes	Yes	System Print (Printer File) Functions
Double-sided printing	Yes[1]	Yes[1]	Yes[1]

Table 24 (Page 3 of 4). AS/400 Print Functions			
Function	**IPDS**	**SCS**	**HPT**
Double-sided tumble printing	Yes[1]	Yes[1]	Yes[1]
Font (*CPI) CPI (5.0)	No	Yes	Yes
Font (*CPI) CPI (10.0)	Yes	Yes	Yes
Font (*CPI) CPI (12.0)	Yes	Yes	Yes
Font (*CPI) CPI (15.0)	Yes	Yes	Yes
FORMFEED(*CONT)	No	No	No
FORMFEED(*CUT)[5]	Yes	No	Yes
FORMFEED(AUTOCUT) DRAWER(*n) There are up to two optional 500-sheet trays	3 (4324)[19] 3 (4317)[19] 2 (4312)	4 (4324)[18] 4 (4317)[18] 3 (4312)[20]	3 (4324) 3 (4317) 3 (4312)
FORMFEED(AUTOCUT) DRAWER(*E1)[5]	Yes	Yes	Yes
Hardware Justification 50	No	Yes	Yes
Hardware Justification 100	No	Yes	Yes
DBCS/IGC data	No	No	No
LPP (11 in. at 6 LPI)	64 66 w/ EDGE-EDGE = ON	64 66 w/ EDGE-EDGE = ON	64
LPP (11 in. at 8 LPI)	85 88 w/ EDGE-EDGE = ON	85 88 w/ EDGE-EDGE = ON	85
LPI (4)	Yes	Yes	Yes
LPI (6)	Yes	Yes	Yes
LPI (8)	Yes	Yes	Yes
LPI (9)	Yes	Yes	No
PAGRTT(*AUTO)	Yes	Yes	Yes
PAGRTT(*COR)	Yes	Yes	20 cpi
PAGRTT(0)	Yes	Yes	Yes
PAGRTT(90)	Yes	Yes	Yes
PAGRTT(180)	Yes	Yes	Yes
PAGRTT(270)	Yes	Yes	Yes
PRTQLTY(*NLQ)	Yes	Yes	Yes
PRTQLTY(*STD)	No	No	No
PRTQLTY(*DRAFT)	No	No	No
RPLUNPRT	Yes	Yes	Yes
Bar code	Yes	No	Yes[15]
Chrid	Yes	No	No
Chrsiz	Yes	No	No[16]
Highlight	Yes[13]	Yes	Yes

Table 24 (Page 4 of 4). AS/400 Print Functions			
Function	**IPDS**	**SCS**	**HPT**
Skipa/skipb	Yes	Yes	Yes
Spacea/Spaceb	Yes	Yes	Yes
Underline	Yes	Yes	Yes
Color	No	No	No
Overlays/Page Segs	Yes	No	Yes[15]
Font Download	Yes	No	No[16]
Graphics	Yes	No	No
Multi-up (0 Rot)	Yes[14]	No	No[16]
Multi-up (90 Rot)	Yes[14]	No	No[16]

Reference Notes

1   Duplex support requires the correct level of OS/400 software. See 19.3.2, "AS/400 Duplex Summary" on page 107.

2   The paper size dimensions are the actual printable area dimensions, with EDGE-EDGE = OFF.

3   Results are based on letter-size paper.

5   The envelope or paper size must be set within the Paper Menu.

6   On the Network Printers 12 and 17, the optional envelope feeder can replace the optional 500-sheet tray.

7   The following special characters differ in SCS mode:

- code point B4--function symbol versus copyright symbol;
- code point BF--double underscore versus multiply symbol;
- code point DA--one(1) on baseline versus superscript one(1);
- code point E1--space versus division symbol;

8   Only box-draw characters are supported.

9   Character widths for proportionally spaced fonts are approximate; thus, justification, overstrike, underline, and tabs may not appear as desired.

10   Underscore will remain subscripted after subscripting ended when using word underscore.

13   The device type (DEVTYPE) parameter of the printer file must be set to *IPDS or *AFPDS.

14   Multi-up function will reduce using the 27-pitch font, but the AS/400 requires a PTF (SF16523 for V2R2, SF17070 for V2R3, SF17073 and SF17075 for V3R0.5).

15   Supported with AFP to PCL conversion by HPT. Refer to *PCL5e and PostScript Technical Reference*.

16   Function or result not tested.

17   OS/400 requests for manual paper will feed paper and envelopes from the auxiliary tray, but will not generate a manual feed message on the operator panel.

18	Drawer 4 accesses the auxiliary tray.
19	Drawer 4 does not access the auxiliary tray.
20	Drawer 3 accesses the auxiliary tray.

19.3.2 AS/400 Duplex Summary

Table 25. AS/400 Duplex Summary

DEVTYPE (CRTDEVPRT)	AFP (CRTDEVPRT)	Capability	Version
3812 (or 5219)	N/A	Simplex	V2.2
*IPDS	*NO	Simplex	V2.1
*IPDS	*NO	Simplex/Duplex	V2R3 - for duplex you need PTF SF15122 (or PTF SF15163 with PC Support/400) and its prerequisite and corequisite PTFs. V3R0.5 - for duplex you need PTF SF16902 (or PTF SF16805 with PC Support/400) and its prerequisite and corequisite PTFs. V3R1 and later
*IPDS	*YES	Simplex/Duplex	2.2

Note: The optional Duplex Unit must be installed on the printer to enable duplex printing. See the *User's Guide* for your printer for more information on allowable paper sizes and weights.

Configuring Hosts Attached to the I-data 7913

20.0 AIX IPDS TCP/IP to a 7913 to a Coax or Twinax Printer

> **Support for 7913**
>
> 7913 forms of attachment are supported for 4312, 4317, and 4324 network printers.

Use this chapter to configure an IBM network printer, where the host connects to an I-data 7913 LAN attachment using TCP/IP and the printer is attached to the 7913 through a coaxial or twinaxial cable.

20.1 Components

A diagram of this attachment type is:

PSF for AIX-->(TCP/IP)-->7913-->(Twinax or Coax)-->Printer

Note: For detailed instructions on the following process, refer to the I-data 7913 installation documentation included with each I-data 7913. You should also refer to the section on installing the I-data 7913 in the *PSF for AIX: Print Administration* manual.

20.2 Requirements

We assume that you have the following items:

- IBM AIX 3.2.5 or higher

- PSF for AIX 2.1 or higher and related APARs

- The TCP/IP option of AIX

- One I-data 7913-03 or 7913-04 LAN attachment for each printer you plan to install

- A RISC System/6000 or other workstation that runs TCP/IP that can be used **either** as a permanent BOOTP server **or** as a temporary way to set the IP address of the 7913 (depending on which of the two ways of setting the IP address on the 7913 you select)

20.3 Attachment/Configuration Procedure

1. If you have not yet done so, set up the printer and install the NIC as described in 2.0, "Installing the Coax/Twinax NIC" on page 7.

Host System Programmer/Administrator Tasks

2. Obtain an IP address (and, if necessary, a subnet mask and gateway address) from the LAN administrator for each 7913 you will be installing.

3. Assign an IP (and subnet mask and gateway) address to the 7913 using one of the procedures in 23.0, "Two Ways to set the IP Address on the 7913" on page 129.

4. For twinaxial printers, set the station address to zero (0). Refer to 20.4, "Setting the Station Address for Twinaxial NICs" on page 112.

5. Configure the 7913 for Ethernet or Token Ring. Refer to 20.5, "Configuring the 7913 for the LAN" on page 112.

User Tasks

6. Attach the coax or twinax cable to the 7913 port.

7. Configure the printer for IPDS by doing the procedure in 20.6, "Configuring your Printer for IPDS" on page 113.

8. Verify that you have configured the printer correctly by sending a print job to the printer using the procedure in 20.7, "Verifying the Configuration" on page 113.

9. If you want to understand how printer sharing is done, refer to Appendix A, "Port Switching Printer Sharing" on page 141.

20.4 Setting the Station Address for Twinaxial NICs

Use the following procedure to set the station address on twinaxial NICs:

1. Press the ONLINE key to take the printer offline.

2. Access the Twinax Setup Menu.

3. Select the IPDS ADDR item.

4. Set the IPDS address.

5. If you will be using the printer for SCS, also set the SCS address.

   Note: The IPDS and SCS addresses cannot both be the same.

6. While you're at it, set the IPDS BUFFERSIZE to 1024 for IPDS and 256 for SCS.

7. Turn the printer off, count to ten, then turn the printer back on to make the changes take effect.

20.5 Configuring the 7913 for the LAN

┌─ **Only if you have a LAN** ──

Do the following procedure only if you have an Ethernet or Token Ring LAN. IF you have a standalone 7913, **do not** do the following procedure.

└──

The 7913 needs to be configured correctly for the type of LAN to which it will be attached. Do the configuration for the type of LAN you have:

- 20.5.1, "Configuring the 7913 for Ethernet"

- 20.5.2, "Configuring the 7913 for Token Ring" on page 113

20.5.1 Configuring the 7913 for Ethernet

1. Disconnect the 7913 from the electrical power source.

2. Set the TWINAX/COAX rotary switch to one of the following positions:

   - Coax 2 for 10base2 to coax

   - Coax 5 for 10base5 to coax

- Coax T for 10baseT to coax

- Twinax 2 for 10base2 to twinax

- Twinax 5 for 10base5 to twinax

- Twinax T for 10 baseT to twinax

20.5.2 Configuring the 7913 for Token Ring

1. Disconnect the 7913 from the electrical outlet.

2. Set the RINGSPEED on the 7913 to the correct LAN speed (4 mbps or 16 mbps):

    - Set to 4 for 4 mbps LANs

    - Set to 16 for 16 mbps LANs

3. Set the PRINTERTYPE switch to one of the following:

    - Coax

    - Twinax

20.6 Configuring your Printer for IPDS

Using the printer operator panel, set up the printer for IPDS by setting the following parameters and values:

Menu	Item	Setting
IPDS	EMULATION	native
Note: Use 4312, 4317, or 4324 provided that you have the correct level and service of PSF; otherwise, use 4028 emulation.		
IPDS	FONTSUB	ON
IPDS	IPDS PORT	COAX or TWINAX

20.7 Verifying the Configuration

To send a print job to the printer from PSF for AIX, use one of the following commands:

```
qprt -P queuename file

lp   -d queuename file

lpr  -P queuename file

enq  -P queuename file
```

21.0 AS/400 IPDS TCP/IP to a 7913 to a Coax or Twinax Printer

┌─ **Support for 7913** ──────────────────────────────────────┐
│   │
│ 7913 forms of attachment are supported for 4312, 4317, and 4324 network │
│ printers.   │
│   │
└──┘

Use this chapter to configure AS/400 and PSF/400, which are attached to an I-data 7913 LAN Attachment through TCP/IP, to print IPDS files on your IBM network printer, which is twinaxially or coaxially attached to an I-data 7913.

21.1 Components

A diagram of this form of attachment is:

PSF/400-->(TCP/IP)-->7913-->(Twinax or Coax)-->Printer

The following form of attachment, though supported, is not described here:

PSF/400-->(SNA)-->PSF/2 Direct-->(TCP/IP)-->7913-->(Coax or Twinax)-->PRT

Note: You need the IPDS option for the printer to print IPDS through PSF/400.

21.2 Requirements

The procedure described in this chapter assumes that you already have:

- TCP/IP for PSF/400

- Network printer supporting software for PSF/400

- An I-data 7913-03 or 7913-04 LAN attachment for each printer you plan to install

- A RISC System/6000 or OS/2 workstation that runs TCP/IP that can be used **either** as a permanent BOOTP server **or** as a temporary way to set the IP address of the 7913 (depending on which of the two ways of setting the IP address on the 7913 you select)

21.3 Attachment/Configuration Procedure

1. If you have not already done so, set up the printer and install the NIC as described in 2.0, "Installing the Coax/Twinax NIC" on page 7.

Host Administrator Tasks

2. Set up line descriptions for AS/400 as described in 21.4, "Developing Line Descriptions with CRTLINETH or CRTLINTRN" on page 116.

3. Configure the AS/400 TCP/IP interface as described in 21.5, "Configuring an AS/400 TCP/IP Interface" on page 117.

4. Configure AS/400 for IPDS as described in 21.6, "Configuring PSF/400 for IPDS" on page 117.

5. Obtain an IP address for the 7913 from the network administrator.

6. Assign the IP address to the 7913 using one of the procedures in 23.0, "Two Ways to set the IP Address on the 7913" on page 129.

7. For twinaxial printers, set the station address to zero (0). Refer to 21.7, "Setting the Station Address for Twinaxial 7913s" on page 118.

8. Configure the 7913 for Ethernet or Token Ring. Refer to 21.8, "Configuring the 7913 for the LAN" on page 118.

User Steps

9. Attach the printer's coaxial or twinaxial cable to the 7913 port.

10. Using the printer operator panel, set up the printer for IPDS by setting the following parameters and values:

Menu	Item	Setting
ETHERNET or TOKEN RING	PERSONALTY	• AUTO, if you want to use the printer for other than IPDS printing • IPDS, for IPDS only
IPDS	EMULATION	4028
IPDS	FONTSUB	ON
Note: FONTSUB must be set to ON, else you may receive an error message when printing IPDS.		
IPDS	IPDS PORT	TRING, ETHER

11. Verify the configuration by doing the procedure in 21.9, "Verifying the 7913 Configuration on AS/400" on page 119.

21.4 Developing Line Descriptions with CRTLINETH or CRTLINTRN

For each 7913 LAN adapter on the AS/400, you need to create a line description for Token Ring or Ethernet for Release V3R1, V3R2, V3R6, and V3R7.

If a line description has already been created, make sure that the SSAP list includes options "AA" and "12" (these are default values) and that you know the LAN speed of your AS/400 LAN adapter.

Note: To change a line description, you need to vary the line off before making changes. After making the changes, you need to vary the line back on.

21.4.1 Creating an Ethernet Line Description

To change an existing line description, use the CHGLINETH command. To create a line description, use CRTLINETH.

Note: SSAP's of "AA" and "12" are automatically set as default values in the line description when you use "*CALC" when creating new line descriptions. You do not need to set these values unless they have been changed.

To create a line description, enter a command in the form:

```
CRTLINETH LIND(TRETH) RSRCNAME(LIN041)
```

21.4.2 Creating a Token Ring Line Description

To change an existing line description, use CHGLINTRN for a Token Ring. To create a line description, use CRTLINTRN.

Note: SSAP's of "AA" and "12" are set as default values in the line description.

To create a line description, enter a command in the form:

```
CRTLINTRN LIND(TRLAN) RSRCNAME(LIN031)
```

21.5 Configuring an AS/400 TCP/IP Interface

The next step in configuring AS/400 for the IBM network printers is to configure the interface on the AS/400 for TCP/IP.

Note: Do not enter the IP address of the 7913. Do **not** set the AS/400 interface address to the same address as the 7913 IP address. Also, do **not** add the 7913 to the AS/400 TCP/IP interface list.

21.5.1 Configuring an Interface for Ethernet

ADDTCPIFC is used to add a TCP/IP interface to AS/400. This step configures the AS/400 for attachment to a TCP/IP network.

21.5.2 Configuring an Interface for Token Ring

ADDTCPIFC is used to add a TCP/IP interface to AS/400.

21.6 Configuring PSF/400 for IPDS

21.6.1 Configuring PSF/400 for IPDS on V3R1

To configure IPDS printing on AS/400 V3R1, you must use two commands:

- CRTDEVPRT to create a printer device description
- WRKAFP2 configure the 7913's TCP/IP information

WRKAFP2

WRKAFP2 is a tool whose source code is in the cover letter for PTF 29961.

21.6.2 Configuring PSF/400 for IPDS on V3R2

To configure IPDS on AS/400 V3R2, you use the following commands:

- CRTDEVPRT to create a device description
- CRTPSFCFG to create a PSF configuration object

21.6.3 Configuring PSF/400 for IPDS on V3R6

To configure IPDS printing on AS/400 V3R6, you must use two commands:

- CRTDEVPRT to create a device description
- WRKAFP2 to configure the 7913's TCP/IP information

```
┌─ WRKAFP2 ──────────────────────────────────────────────────────────┐
│                                                                      │
│  WRKAFP2 is a tool whose source code is in the cover letter for PTF SF31461. │
│                                                                      │
└──────────────────────────────────────────────────────────────────────┘
```

21.6.4 Configuring PSF/400 for IPDS on V3R7

To configure IPDS on AS/400 V3R7, you use the following commands:

- CRTDEVPRT to create a device description
- CRTPSFCFG to configure the 7913's TCP/IP information(Optional)

21.7 Setting the Station Address for Twinaxial 7913s

Use the following procedure to set the station address on twinaxial 7913s:

1. Press the ONLINE key to take the printer offline.
2. Access the Twinax Setup Menu.
3. Select the IPDS ADDR item.
4. Set the IPDS address.
5. If you will be using the printer for SCS, also set the SCS address.

   Note: The IPDS and SCS addresses cannot both be the same.

6. While you're at it, set the IPDS BUFFERSIZE to 1024 for IPDS and 256 for SCS.
7. Turn the printer off, count to ten, then turn the printer back on to make the changes take effect.

21.8 Configuring the 7913 for the LAN

If you have a LAN, the 7913 needs to be configured correctly for the type of LAN to which it will be attached. Do the configuration for the type of LAN you have:

- 21.8.1, "Configuring the 7913 for Ethernet"
- 21.8.2, "Configuring the 7913 for Token Ring" on page 119

21.8.1 Configuring the 7913 for Ethernet

1. Disconnect the 7913 from the electrical power source.
2. Set the TWINAX/COAX rotary switch to one of the following positions:

   - Coax 2 for 10base2 to coax
   - Coax 5 for 10base5 to coax
   - Coax T for 10baseT to coax
   - Twinax 2 for 10base2 to twinax
   - Twinax 5 for 10base5 to twinax
   - Twinax T for 10 baseT to twinax

21.8.2 Configuring the 7913 for Token Ring

1. Disconnect the 7913 from the electrical outlet.

2. Set the RINGSPEED on the 7913 to the correct LAN speed (4 mbps or 16 mbps):

   - Set to 4 for 4 Mbps LANs

   - Set to 16 for 16 Mbps LANs

3. Set the PRINTERTYPE switch to one of the following:

   - Coax

   - Twinax

21.9 Verifying the 7913 Configuration on AS/400

To test IPDS printing, do the following:

1. Vary on the line description—VRYCFG CFGTYPE(*LIN)— if it is not already on.

2. Start TCP/IP by entering the command:

   STRTCP

3. Verify that the AS/400 TCP/IP interface is active.

4. Turn the printer on and wait until the printer operator panel displays READY.

5. Ping the 7913 from an AS/400 workstation with the command:

   PING RMTSYS ('*ip_address*')

   where *ip_address* is the Internet address of the 7913.

6. If the pings are not successful, refer to 21.10.1, "Printer Cannot be PINGed" on page 120.

7. If pings are successful, vary on the printer device description with the command:

   VRYCFG (*printer-device*) CFGTYPE(*DEV) STATUS(*ON)

8. Use PSF/400 to send an IPDS file to the printer by entering the following command on the AS/400 command line:

   STRPRTWTR DEV (*printer device*)

   where *printer device* is the IP address of the 7913.

If you have problems printing, do the following:

- Print a NIC configuration page. Refer to 3.3, "The NIC Configuration Page" on page 18.

- Verify that the IPDS service is enabled.

- Verify the service name.

- Verify that port number 5001 is being used.

If you are still unable to print IPDS files, contact IBM Support.

21.10 Resolving AS/400 Problems

Use this section to resolve problems configuring AS/400 on TCP/IP networks.

21.10.1 Printer Cannot be PINGed

If you have problems pinging the printer:

- Verify the configuration of AS/400, including the printer and any intervening devices such as routers and bridges.

- Verify that the AS/400 line description is varied on and the printer is turned on and displays a status of READY.

- Verify that the AS/400 TCP/IP interface is active.

21.10.2 If PSF/400 Terminates When Initialized

If PSF/400 terminates when you initialize it for IPDS printing and issues message PQT3603, check the error codes for the following possible problems:

- 10 means an incorrect RMTSYS (V3R1 or V3R6) or RMTLOCNAME (V3R2 or V3R7) has been specified for the 7913.

- 15 means that PSF/400 timed out waiting for the printer's response. You should check the value you entered for Activation Timer when using WRKAFP2 (V3R1 or V3R6), CRTPSFCFG (V3R2), or CRTDEVPRT (V3R7).

- 20-39 indicate general communications failure.

- 40-59 indicate a logic error between PSF and the printer control unit (7913). Contact IBM support.

21.10.3 Spooled Print File Remains in PND Status

Check the output queue with the command:

```
WRKOUTQ OUTQ (queuename)
```

This typically indicates that PSF/400 is waiting for a response from the printer. This can be verified by displaying the QSPL subsystem, WRKACTJOB SBS(QSPL). If the status of the PDJ job for the printer is SELW, then PSF/400 is waiting for a response from the printer.

21.10.4 Data is Being Clipped

To resolve this problem, you may want to set the PSC (Page Size Control) parameter in WRKAFP2 (V3R1 and V3R6) or CRTPSFCFG (V3R2 or V3R7) to be set to *YES and the IPDSPASTHR parameter to be set to *YES.

22.0 MVS IPDS via TCP/IP to a 7913 to a Coax or Twinax Printer

---

Support for 7913

7913 forms of attachment are supported for 4312, 4317, and 4324 network printers.

Use this chapter to configure an IBM network printer, where the host connects to an I-data 7913 LAN Attachment using TCP/IP and the printer is attached to the 7913 through a coaxial or twinaxial cable.

22.1 Components

A diagram of this form of attachment is:

PSF/MVS-->(TCP/IP)-->7913-->(Twinax or Coax)-->Printer

A related form of attachment, which is not described here, is:

PSF/MVS-->(SNA)-->PSF/2 Direct-->(TCP/IP)-->7913-->(Coax/Twinax)-->PRT

22.2 Requirements

We assume that you have the following items:

- One I-data 7913-03 or 7913-04 LAN attachmentfor each printer you will install

- A RISC System/6000 or OS/2 workstation that runs TCP/IP that can be used **either** as a permanent BOOTP server **or** as a temporary way to set the IP address of the 7913 (depending on which of the two ways of setting the IP address on the 7913 you select)

- MVS:

  - PSF/MVS Version 2.2.0 with APAR OW15599 (for TCP/IP support)

  - MVS TCP/IP 3.1 and associated APARs

22.3 Attachment/Configuration Procedure

1. If you have not yet done so, set up the printer and install the NIC as described in 2.0, "Installing the Coax/Twinax NIC" on page 7.

Host System Programmer/Administrator Tasks

2. Obtain a unique IP address from the network administrator for each 7913 you will be configuring.

3. Assign an IP address to the 7913 using one of the procedures in 23.0, "Two Ways to set the IP Address on the 7913" on page 129.

4. Define the TCP/IP profile. Refer to 22.4, "Setting up the TCP/IP Profile" on page 122.

5. Define the MVS communications control unit to MVS using the procedure in 22.6, "Defining the Control Unit" on page 124.

6. Define the printer to JES using the procedure in 22.7, "Defining the Printer to JES" on page 124.

7. Using PSF/MVS, set up a writer procedure for the printer using the instructions in 22.8, "Setting up a Writer Proc" on page 125.

8. Configure the 7913 for Ethernet or Token Ring. Refer to 22.9, "Configuring the 7913 for the LAN" on page 127.

User Tasks

9. Attach the coax or twinax cable to the 7913 port.

10. Configure the printer for IPDS by doing the procedure in 22.10, "Configuring your Printer for IPDS" on page 128.

11. Verify that you have configured the printer correctly by sending a print job to the printer.

22.4 Setting up the TCP/IP Profile

The TCP/IP profile contains system configuration statements used to initialize the TCP/IP address space. Of those statements, the following are subject to special considerations when you are printing from PSF/MVS on TCP/IP-attached printers.

```
ACBPOOLSIZE                    1000
ADDRESSTRANSLATIONPOOLSIZE     1500
CCBPOOLSIZE                    150
DATABUFFERPOOLSIZE             160   32768
ENVELOPEPOOLSIZE               750
IPROUTEPOOLSIZE                300
LARGEENVELOPEPOOLSIZE          50
RCBPOOLSIZE                    50
SCBPOOLSIZE                    256
SKCBPOOLSIZE                   256
SMALLDATABUFFERPOOLSIZE        256
TCBPOOLSIZE                    512
TINYDATABUFFERPOOLSIZE         256
UCBPOOLSIZE                    100


KEEPALIVEOPTIONS INTERVAL 10 SENDGARBAGE FALSE ENDKEEPALIVEOPTIONS


GATEWAY
; * Network  First hop    Linkname Packet size Subnet mask Subnet value
  9           =            BPCLAN    2000        0.255.255.0  0.99.12.0
  DEFAULTNET 9.99.12.254 BPCLAN    2000        0.255.255.0  0
```

This section contains information about the statements, the special considerations that apply to them, and the changes they may make necessary. If you change any of the values in the TCP/IP profile, restart TCP/IP to pick up the changes.

For information about the TCP/IP profile and the statements described in this section, refer to:

- *IBM TCP/IP MVS Customization and Administration Guide*

- *IBM TCP/IP Performance and Tuning Guide*

DATABUFFERPOOLSIZE Statement The DATABUFFERPOOLSIZE statement defines the number and size of the data buffers. For printing on TCP/IP-attached printers, IBM recommends that you specify at least the following:

- 160 data buffers

- 32768 buffer size

SMALLDATABUFFERPOOLSIZE Statement The SMALLDATABUFFERPOOLSIZE statement defines the number of small data buffers. For printing on TCP/IP-attached printers, IBM recommends that you specify at least 256 small data buffers.

TINYDATABUFFERPOOLSIZE Statement The TINYDATABUFFERPOOLSIZE statement defines the number of tiny data buffers. For printing on TCP/IP-attached printers, IBM recommends that you specify at least 256 tiny data buffers.

KEEPALIVEOPTIONS Statement PSF relies on TCP to detect when a connection with a TCP/IP-attached printer is no longer usable. When no data has been exchanged between PSF/MVS and its connection partner, TCP sends keep-alive probes to the connection partner periodically. These periodic probes, called keep-alive transmissions, enable TCP to discover when a connection is no longer usable even if the connection partner is abruptly powered off or is no longer accessible through the network.

The frequency of keep-alive transmissions is controlled by the INTERVAL parameter on the KEEPALIVEOPTIONS statement. The frequency applies to all TCP applications that direct TCP to send keep-alive transmissions. The default frequency is after about two hours of inactivity.

For printing on TCP/IP-attached printers, IBM recommends that you specify a shorter interval than the default, such as 10 minutes, for the interval between keep-alive transmissions.

Also, if any target host requires that the keep-alive packet contain data, specify SENDGARBAGE TRUE. For example:

```
KEEPALIVEOPTIONS INTERVAL 5 SENDGARBAGE TRUE ENDKEEPALIVEOPTIONS
```

GATEWAY Statement The *Packet_size* parameter of the GATEWAY statement defines the maximum transmission unit (MTU) for the MVS host. For IBM network printers, the MTU size is fixed at 1024 bytes. The value cannot be adjusted.

Warning: MTU Size

The TCP/IP MTU size is coded to a small value of 1024. This small size means that the printer and the MVS host must work harder at data transfer than might be desired. Connecting IBM network printers to an MVS host over a TCP/IP connection **may** result in lower-than-expected throughput and performance. Refer to 4.4.4, "Understanding Printer Performance" on page 30 for suggestions on improving printer performance.

22.5 Verify the Printer Connection

To verify that the MVS system can establish a connection with the TCP/IP-attached 7913, ping the 7913 from the MVS system.

From a TSO session, enter the following command:

```
TSO PING ip_address
```

In JES2, enter the following command from the System Display and Search Facility (SDSF) menu 6:

```
ping ip_address
```

ip_address   Specifies the IP address of the 7913.

Following is an example of a successful and an unsuccessful ping:

Successful Ping

```
EZA0458I Ping V3R1: Pinging host 9.99.12.33
(Use ATTN to interrupt.)
EZA0463I PING: Ping #1 response took 0.084 seconds.
Successes so far = 1.
```

Unsuccessful ping:

```
EZA0458I Ping V3R1: Pinging host 9.99.12.33
(Use ATTN to interrupt.)
EZA0464I PING: Ping #1 timed out
```

22.6 Defining the Control Unit

If you have not already done so, define the communications control unit for the MVS host, such as the 3174 control unit, to MVS. Use either an MVS configuration program (MVSCP) or a hardware configuration definition (HCD), depending on the version of your MVS system:

- When using a version earlier than MVS 4.1.0, use an MVSCP.

- When using a version of MVS 4.1.0 or later, use an HCD or an MVSCP.

For more information about using these methods, refer to:

- *MVS/ESA Migration Planning:
  Dynamic I/O Configuration*

- *MVS/ESA Hardware Configuration:
  Using the Dialog*

22.7 Defining the Printer to JES

When a TCP/IP-attached printer is to be used with JES, it must be defined for deferred printing mode with JES.

22.7.1 JES2 Printer Definitions

The following shows the JES2 printer definition initialization member, located in the system PARMLIB.

```
FSS(FSS1),PROC=PSFPROC,HASPFSSM=HASPFSSM
PRT1    FSS=FSS1,MODE=FSS,PRMODE=(LINE,PAGE,SOSI1),
        CLASS=C,UCS=0,SEP,NOSEPDS,CKPTPAGE=100,
        DRAIN,MARK,TRKCELL=YES
```

Notes:

1. The above example is correct for JES2 3.11 and above. For earlier versions of JES2, the statement is named FSSDEF and would be stated as FSSDEF FSSNAME=FSS1.

2. The value you specify for the PROC parameter must match the name on the PSF/MVS Startup procedure.

22.7.2 JES3 Printer Definitions

The following shows an example of a JES3 printer definition. This example is not executable, but it is intended to help the JES3 systems programmer define the printer to the MVS host.

```
FSSDEF,TYPE=WTR,FSSNAME=FSS1,PNAME=PSFPROC,SYSTEM=SYS1,TERM=NO
DEVICE,JNAME=PRT1,JUNIT=(,SYS1,,OFF),FSSNAME=FSS1,
       MODE=FSS,PM=(LINE,PAGE,SOSI1),CHARS=(YES,GT12),
```

22.8 Setting up a Writer Proc

Determine if you will be using a new or an existing PRINTDEV (startup proc).

PSF/MVS supplies sample printdevs. Refer to the APSWPROB example in SYS1.PROCLIB.

Each TCP/IP-attached printer must be defined to PSF with a PRINTDEV statement in the PSF/MVS startup procedure. The following keyword is required on the PRINTDEV statement:

```
IPADDR='ip_address'
```

ip-address   Specifies the IP address for the 7913 or attachment, in dotted-decimal notation. Enclose the IP address in single quotes. Do **not** specify a hostname in place of the dotted-decimal address.

The following example shows a sample procedure, PSFPROC, that you can modify to suit your installation. The PRINTDEV statement shows the required IPADDR keyword.

No network printer-specific writer procedure is currently supplied by IBM. You can, however, copy the APSWPROT sample from the APAR medium and modify it for the network printers. Make sure that you specify 300-pel font libraries.[3]

---

[3] IBM network printers are 600-pel devices that appear to PSF/MVS as 300-pel devices.

```
//PSFPROC PROC
//*************** IBM NETWORK PRINTERS WRITER PROCEDURE ***************
//*
//*01* MODULE-NAME = PSFPROC
//*
//*01* DESCRIPTIVE-NAME = START PROCEDURE FOR PSF:
//*            TCP/IP ATTACHED IBM NETWORK PRINTERS
//*
//*01* NOTES = THE FULL NAME OF THE DEFAULT PAGEDEF IS
//*            P1A06462.
//*            THE FULL NAME OF THE DEFAULT FORMDEF IS
//*            F1A10110.
//*            THE FULL NAMES OF THE DEFAULT FONTS ARE
//*            X0GF10, X0GS10, X0TU10, AND X0GU10.
//*            THE FULL NAME OF THE SEPARATOR PAGE PAGEDEF IS
//*            P1V06483.
//*            THE FULL NAME OF THE SEPARATOR PAGE FONT IS
//*            X0GT15.
//*
//*
//*01* CHANGE-ACTIVITY :
//*
//**** END OF SPECIFICATIONS ***/
//STEP01   EXEC PGM=APSPPIEP,REGION=4096K
//JOBHDR OUTPUT PAGEDEF=V06483,    /* JOB SEPARATOR PAGEDEF        */
//       FORMDEF=A10110,CHARS=GT15 /* JOB SEPARATOR FORMDEF        */
//JOBTLR OUTPUT PAGEDEF=V06483,    /* JOB SEPARATOR PAGEDEF        */
//       FORMDEF=A10110,CHARS=GT15 /* JOB SEPARATOR FORMDEF        */
//DSHDR  OUTPUT PAGEDEF=V06483,    /* DS  SEPARATOR PAGEDEF        */
//       FORMDEF=A10110,CHARS=GT15 /* DS  SEPARATOR FORMDEF        */
//MSGDS  OUTPUT PAGEDEF=A06462,    /* MESSAGE DATASET PAGEDEF      */
//       FORMDEF=A10110            /* MESSAGE DATASET FORMDEF      */
//FONT300 DD  DSN=SYS1.FONT300,    /* SYSTEM FONTS - 300 PEL       */
//        DISP=SHR
//PSEG01  DD  DSN=SYS1.PSEGLIB,    /* SYSTEM PAGE SEGMENTS         */
//        DISP=SHR
//OLAY01  DD  DSN=SYS1.OVERLIB,    /* SYSTEM MEDIUM OVERLAYS       */
//        DISP=SHR                 /*                              */
//PDEF01  DD  DSN=SYS1.PDEFLIB,    /* SYSTEM PAGEDEFS              */
//        DISP=SHR
//FDEF01  DD  DSN=SYS1.FDEFLIB,    /* SYSTEM FORMDEFS              */
//        DISP=SHR
//* **********************************************************    */
//*            PRINTDEV                                           */
//* **********************************************************    */
//PRT1     CNTL
//PRT1      PRINTDEV FONTDD=*.FONT300,/* 300 PEL FONT LIBRARY DD   */
//          OVLYDD=*.OLAY01,         /* OVERLAY  LIBRARY DD        */
//          PSEGDD=*.PSEG01,         /* SEGMENT  LIBRARY DD        */
//          PDEFDD=*.PDEF01,         /* PAGEDEF  LIBRARY DD        */
//          FDEFDD=*.FDEF01,         /* FORMDEF  LIBRARY DD        */
//          JOBHDR=*.JOBHDR,         /* JOB HEADER SEPARATOR       */
//*                                  /*   OUTPUT                   */
//          JOBTRLR=*.JOBTLR,        /* JOB TRAILER SEPARATOR      */
//*                                  /*   OUTPUT                   */
//          DSHDR=*.DSHDR,           /* DATA SET HEADER            */
//*                                  /*   SEPARATOR                */
//          MESSAGE=*.MSGDS,         /* MESSAGE DATA SET OUTPUT    */
```

```
//            BUFNO=5,                /* NUMBER OF WRITE DATA BUFFERS */
//            PAGEDEF=A06462,         /* DEVICE PAGEDEF DEFAULT       */
//            FORMDEF=A10110,         /* DEVICE FORMDEF DEFAULT       */
//            CHARS=(GF10,            /* DEVICE                       */
//            GS10,TU10,GU10),        /* DEFAULT FONT SET             */
//            PIMSG=YES,              /* ACCUMULATE DATA SET          */
//*                                   /*   MESSAGES                   */
//            DATACK=BLOCK,           /* REPORT ALL DATA-CHECK        */
//*                                   /*   ERRORS                     */
//            TRACE=NO,               /* CREATE INTERNAL TRACE        */
//            FAILURE=WCONNECT,       /* PSF ACTION ON PRINTER        */
//*                                   /*   FAILURE                    */
//            TIMEOUT=REDRIVE,        /* PSF ACTION ON TIMEOUT        */
//            MGMTMODE=OUTAVAIL,      /* PRINTER MANAGEMENT MODE      */
//            DISCINTV=15,            /* DISCONNECT INTERVAL IN       */
//                                    /*   SECONDS                    */
//            IPADDR='xxx.xxx.xxx.xxx' /* IP ADDRESS FOR TCP/IP       */
//PRT1      ENDCNTL
```

Note:

> To specify a TCP/IP address space name other than the default, TCPIP, code the following exec statement in the writer procedure:
>
> ```
> //STEP01   EXEC PGM=APSPPIEP,REGION=4096K,PARM=(,,,,tcpip_name)
> ```
>
> where *tcpip_name* is the name of the TCP/IP address space. If this parameter is not coded, PSF/MVS uses the default name, TCPIP.

The IP address is the only required parameter. Other parameters may be set to facilitate printer sharing. For a description of the PRINTDEV statement, which is not given here, see the PSF/MVS *System Programming Guide*.

IPADDR   Specifies the IP address for the 7913, in dotted-decimal notation. Do **not** specify a hostname in place of the dotted-decimal address.

22.9 Configuring the 7913 for the LAN

The 7913 needs to be configured correctly for the type of LAN to which it will be attached. Do the configuration for the type of LAN you have:

- 22.9.1, "Configuring the 7913 for Ethernet"

-

22.9.1 Configuring the 7913 for Ethernet

1. Disconnect the 7913 from the electrical power source.

2. Set the TWINAX/COAX rotary switch to one of the following positions:

   - Coax 2 for 10base2 to coax

   - Coax 5 for 10base5 to coax

   - Coax T for 10baseT to coax

   - Twinax 2 for 10base2 to twinax

   - Twinax 5 for 10base5 to twinax

   - Twinax T for 10 baseT to twinax

22.9.2 Configuring the 7913 for Token Ring

1. Disconnect the 7913 from the electrical outlet.

2. Set the RINGSPEED on the 7913 to the correct LAN speed (4 mbps or 16 mbps):

   - Set to 4 for 4 mbps LANs

   - Set to 16 for 16 Mbps LANs

3. Set the PRINTERTYPE switch to one of the following:

   - Coax

   - Twinax

22.10 Configuring your Printer for IPDS

Using the printer operator panel, set up the printer for IPDS by setting the following parameters and values:

Menu	Item	Setting
IPDS	EMULATION	native
Note: Use 4312, 4317, 4324 provided that you have the correct level and service of PSF, otherwise use 4028 emulation.		
IPDS	FONTSUB	ON
IPDS	IPDS PORT	COAX or TWINAX

23.0 Two Ways to set the IP Address on the 7913

The I-data 7913 is a protocol converter that requires a unique IP address on a TCP/IP network.

TCP/IP addresses, called IP addresses, are written in dotted decimal notation, which means that each of their four byte quantities is written as a decimal number separated by dots. Because each piece of the IP address is one byte, the value of each piece must be between 0 and 255. Each byte must have a valid value. 9.9.9.9 is a valid IP address; 9.99.300.999 is not a valid address (both 300 and 999 are greater than 255).

There are two ways of setting the IP Address on the 7913 printer-to-host interface:

- The **Server-Client** model requires you to have:
    - An AIX or OS/2 workstation to serve as the BOOTP server
    - The 7913 acting as a BOOTP client

  To configure the IP address in this model, you must use the BOOTP component of TCP/IP, which is designed to configure diskless systems (like the 7913). The 7913 acts as a BOOTP client. Refer to 23.1, "Using the BOOTP Client-Server Model for the IP Address."

- The **Permanent Write** model that requires no BOOTP server and no 7913 acting as a client. In this method, a permanent IP address is written into the 7913's flash memory. Refer to 23.2, "Using Permanent Write for the IP Address of the 7913" on page 132.

23.1 Using the BOOTP Client-Server Model for the IP Address

This section describes how to set the IP address for the 7913 using a BOOTP server (on AIX or OS/2).

Configuring the BOOTP daemon involves two tasks:

- Editing the BOOTPTAB file
- Starting the BOOTP daemon

This section describes how to do these two tasks for AIX and OS/2 systems.

A Note on Examples

Adapt the following examples to your version of TCP/IP. The OS/2 examples, for instance, are for Version 3.0 of TCP/IP.

23.1.1 Setting up the BOOTPTAB File

The BOOTPTAB file contains a separate entry with configuration information for each 7913.

23.1.1.1 What the BOOTPTAB File Does

When a 7913 is initialized, it broadcasts its MAC address to the BOOTP daemon. The BOOTP daemon searches for a corresponding entry. If an entry is found, the BOOTP daemon returns information, such as IP address, defining the 7913 to the TCP/IP network.

23.1.1.2 Editing the BOOTPTAB File

AIX and OS/2 use a BOOTPTAB file with **almost** the same format.

- On AIX, the BOOTPTAB file is accessed under the /etc directory.

- In OS/2 using TCP/IP Version 3.0, the file is in the \mptn\etc directory.

To configure the BOOTPTAB file, you need to add the unique IP address value for each 7913 on the network.

Note: Root user authority is required to edit the BOOTPTAB file on AIX systems.

AIX BOOTPTAB file Example:

Following is an example of an AIX BOOTPTAB file entry for a 7913 on a Token Ring network ("ht=tr"):

```
7913-01:ht=tr:ha=0004AC9B0101:ip=9.99.12.134:
sm=255.255.255.0:gw=9.99.12.254:
```

Note: On AIX systems, the BOOTPTAB file has **no** spaces after the colons and no continuation character is required.

OS/2 BOOTPTAB file Example:

Following is an example of an OS/2 BOOTPTAB file entry for a 7913 on a Token Ring network (ht=token-ring):

```
7913-01: ht=token-ring: ha=0004AC9B0101: ip=9.99.12.134: \
sm=255.255.255.0: gw=9.99.12.254:
```

Note: On OS/2, each field is followed by a colon and a space, and the required line continuation character is a backslash (\).

23.1.1.3 Fields in the BOOTPTAB File

Following is a description of the fields in the BOOTPTAB file entry for a 7913:

7913-01   The first field is the hostname. The name is required. You can use any name you want.

ht   Identifies the host hardware type:

- For OS/2, the types are **6** or **token-ring** for Token Ring and **ethernet** for Ethernet.

- For AIX, the types are **tr** for Token Ring and **ether** for Ethernet.

In the example, a Token Ring 7913 is used.

ha   The MAC address of the 7913.

ip   The IP address to be assigned to the 7913.

sm   The Subnet Mask of the 7913.

gw   The Gateway address of the 7913.

Once the BOOTPTAB file has been edited, the next task is to start the BOOTP daemon. Use one of the following procedures:

- 23.1.2, "Starting the BOOTP Daemon on AIX Systems"
- 23.1.3, "Starting the BOOTP Daemon on OS/2 Systems" on page 132

23.1.2 Starting the BOOTP Daemon on AIX Systems

1. Login to the AIX host as root user.

2. Determine if BOOTP is running on the host, with the command:

   ```
   #ps -ef | grep -v grep | grep bootp
   ```

   If BOOTP is defined for background operation, an active BOOTP daemon is displayed. Otherwise, no BOOTP daemon is displayed.

3. If an active BOOTP daemon is not listed, enter:

   ```
   #grep bootp /directory/inetd.conf
   ```

   where *directory* may be `etc` or `usr/etc`.

   If a BOOTP daemon is present, it is listed with its parameters.

4. If a BOOTP daemon is not present, edit `/etc/inetd.conf` and make sure the line containing BOOTP and **tftp** are not commented out. If they are commented out, remove the pound sign (#) from the beginning of the lines. If the lines are not in the file, then add the following lines to the file:

   ```
   bootps dgram udp wait root /etc/bootpd bootpd
   ```

   and:

   ```
   tftp dgram udp nowait nobody /etc/tftpd tftpd -n
   ```

5. Start the BOOTPD daemon with the command:

   ```
   refresh -s inetd
   ```

   or enter the following two commands:

   a. The command returns the Process ID (PID) number for INETD:

      ```
      ps -ef | grep inetd
      ```

   b. Stop the BOOTPD daemon with the command:

      ```
      kill -1 inetdPID
      ```

   Note: If neither of these command options work, refer to the prolog file in `/etc/inetd.conf` for information on restarting INETD.

6. Turn the 7913 off, count to ten, then turn it on.

23.1.3 Starting the BOOTP Daemon on OS/2 Systems

To start the BOOTP daemon on OS/2 systems, do the following:

1. Determine if the BOOTP daemon is running on the BOOTP server:

   Locate the **bootpd.exe** file in the OS/2 task list by pressing **CTRL+Esc**. If the **bootpd.exe** is found, stop it by pressing mouse button two (normally the right button) and select **Close** from the pop-up menu.

2. Restart the BOOTP task by entering one of the following commands on the OS/2 command line:

   For BOOTP running in Foreground:

   ```
   bootpd -d -d -d -d -d -b
   ```

   For BOOTP running in Background:

   ```
   start bootpd -d -d -d -d -d -b
   ```

   -d   The **-d** parameter turns the debug option on. You can check for messages displayed in the BOOTP task window whenever one of the printers in the **bootptab** file is turned on.

   -b   The **-b** parameter broadcasts messages on a WAN.

3. Check the output of the BOOTPD command to ensure that it has read the entries in the BOOTPTAB file. There should be a line that looks something like:

   ```
   read 7 entries from c:\MPTN\ETC\bootptab
   ```

4. When you turn the power on to the printer, check the output of the BOOTPD command to ensure that it has received a request from the 7913's MAC (hardware) address.

23.2 Using Permanent Write for the IP Address of the 7913

This section describes the procedure for using a version of the I-data 7913 microcode that allows you to assign a permanent IP address to a 7913 and avoid having to have a permanent BOOTP server.

Check WWW Before Proceeding

The following procedure is provided here for your convenience. Before proceeding, you should verify that there is no more current procedure by accessing the following Web site:

```
http://www.printers.ibm.com/products/7913
```

Note: You may need to update the 7913 microcode before doing the procedure described in this section. Refer to 24.0, "Updating I-data 7913 Microcode" on page 135.

23.2.1 Level 85 I-data 7913 Microcode

The 85 level of 7913 microcode contains the BOOTP configuration enhancement. This enhancement allows the customer to assign the IP address, subnet mask, and gateway information from a local LAN segment and request the 7913 to save this information in flash memory. This enhancement is useful for those customers who have problems getting BOOTP to work across bridges and routers in their network.

The enhancement works as follows:

1. Update the "bootfile" (ida7913.cfg in this example) to contain a new reference called "default." The following is a sample configuration file:

```
i-data7913
factorymac on
localmac 00036E0004A9
early off
microcode /tcpip/etc/80085085
default 9.99.99.140,255.255.255.0,9.99.99.35
```

The first value is the IP address, the second value is the subnet mask, and the third value is the gateway address. Be sure to include all entries as they are required. Be sure there are no blank characters between the values. The comma (",") is the delimiter between the fields. There is, however, a blank character between the "default" keyword and the first value.

2. Ensure that the "bootfile" is referenced in the BOOTPTAB file. Keep in mind that the BOOTPTAB values must be correct for the local LAN segment and TCP/IP address to allow the 7913 to boot locally before you can download the values that will ultimately be used when the 7913 is moved to the remote LAN. The "bootfile" default values must be set up with the values that will be used on the remote LAN where the 7913 will ultimately be moved.

3. Whenever the 7913 is subsequently powered off and on, the 7913 will issue a BOOTP request up to 4 times with a 5 second wait between requests. If the 7913 does not receive a BOOTP reply, it will use the default values it has saved. If the 7913 does receive a BOOTP reply, then it will use the values received in the BOOTP reply.

If you want to revert back to the standard BOOTP method (not use the values in FLASH memory), you must change the "default" entry to contain the value "none." Then start bootpd and power off and on the 7913. This will cause the 7913 to erase the values in FLASH memory.

If at some later point in time you want to change the default in FLASH memory to new values, you must change the "default" values, start bootpd and power off and on the 7913 to cause it to load the new values.

If you do NOT specify this new "default" keyword, the 7913 operates as it does today, that is, it will issue BOOTP requests forever until it receives a BOOTP reply.

Drawback--New 7913 Microcode

There is one potential drawback to this enhancement. If you ever have the need to download new microcode, you have 2 choices: (1) move the 7913 back to the local LAN segment where BOOTP works and perform the download, or (2) somehow get BOOTP to work at the remote LAN segment. This issue becomes less of a concern as the stability of the microcode increases.

Any customer that runs the 85 level 7913 microcode will have this function. You can obtain this level of microcode by contacting either PSF/2 or PSF/6000 level 2 service.

23.2.2 Examples

23.2.2.1 OS/2 Example

LAN A: Local token-ring LAN with BOOTP server:

```
7913 factory installed mac address = 00036E0004a9
ip address for 7913 = 9.99.62.140
subnet mask = 255.255.255.0
gateway address = not required
```

LAN B: Remote token-ring LAN where 7913 will be located:

```
ip address for 7913 = 9.99.99.140
subnet mask = 255.255.255.0
gateway address = 9.99.99.35
```

BOOTPTAB:(located in \tcpip\etc\bootptab):

```
P7913: ht=6: ha=00036E0004a9: ip=9.99.62.140: sm=255.255.255.0:\
bf=/tcpip/etc/ida7913.cfg
```

BOOTFILE:(\tcpip\etc\ida7913.cfg):

```
i-data 7913
factorymac on
microcode /tcpip/etc/80085085
default 9.99.99.140,255.255.255.0,9.99.99.35
```

Note: Since "factorymac" is set on, "localmac" is not required. Since "early off" is not specified it defaults to off.

23.2.2.2 AIX Example

LAN A: Local token-ring LAN with BOOTP server:

```
7913 factory installed mac address = 00036E0004a9
ip address for 7913 = 9.99.62.140
subnet mask = 255.255.255.0
gateway address = not required
```

LAN B: Remote token-ring LAN where 7913 will be located:

```
ip address for 7913 = 9.99.99.140
subnet mask = 255.255.255.0
gateway address = 9.99.99.35
```

BOOTPTAB:(/etc/bootptab):

```
P7913: ht=6: ha=00036E0004a9: ip=9.99.62.140: sm=255.255.255.0:\
 bf=/etc/ida7913.cfg
```

BOOTFILE:(/etc/ida7913.cfg):

```
i-data 7913
factorymac on
microcode /tcpip/etc/80085065
default 9.99.99.140,255.255.255.0,9.99.99.35
```

Note: Since "factorymac" is set on, "localmac" is not required. Since "early off" is not specified it defaults to off.

24.0 Updating I-data 7913 Microcode

This appendix describes the procedure for updating the I-data 7913 microcode.

```
┌─ Check WWW Before Proceeding ──────────────────────────────────┐
│                                                                │
│  The following procedure is provided here for your convenience. Before │
│  proceeding, you should verify that there is no more current procedure by │
│  accessing the following Web site:                             │
│                                                                │
│  hppt://www.printers.ibm.com/products/7913                     │
│                                                                │
└────────────────────────────────────────────────────────────────┘
```

24.1 Introduction

When the 7913 is powered on, it sends a BOOTP request as a broadcast frame. The BOOTP server responds with a BOOTP reply.

If the BOOTP reply includes the name of a "bootfile," the 7913 then uses TFTP to read this file.The file holds configuration parameters defined by i-data. One of the parameters is named "microcode." It enables one to specify the name of the file that contains the flash image.

The 7913 then uses TFTP to read the contents of the flash image file.

TFTP is a lot like FTP, except user id and password are not required. It also has only a subset of FTP's functions. I-data is using a program interface to TFTP. You can also invoke it on the command line and use it in an interactive mode. It's a good idea to try the interactive mode after you've set up a TFTP daemon.

24.2 Setting up TFTP

You will need to set up the BOOTP Daemon on the System Running the BOOTP Daemon. The TFTP daemon is normally managed by the inetd super-daemon. The inetd starts a tftpd when a request is received. The tftpd satisfies the request and then dies. You'll need to configure inetd so it will perform this service. There is a procedure to do this for AIX and OS/2.

24.2.1 Procedure for AIX

As root, take the following steps:

1. smit
2. Communications Applications and Services
3. TCP/IP
4. Further Configuration
5. Server Network Services
6. Other Available Services
7. Super Daemon (inetd)
8. inetd Subservers

9. Add an inetd Subserver

10. List

The tftpd will be in the list only if it isn't already managed by the inetd.

You can also check `/etc/inetd.conf` to see whether the tftpd line is commented out. Use smit to update inetd.conf for tftpd, though. Don't update /etc/inetd.conf manually for tftpd as you would for the bootpd. Unfortunately smit doesn't allow you to put the bootpd under inetd. The /etc/inetd.conf file must be manually updated for the bootpd.

Ensure that there is no `/etc/tftpaccess.cfg` file. It can be used to control access to files by remote TFTP users. We don't need it.

24.2.2 Procedure for OS/2

For OS/2, TCP/IP v.20 is required.

1. Start tftpd by using TCP/IP Configuration located in the TCP/IP folder.

2. Select TCP/IP Configuration

3. Select the Autostart tab.

4. Check the box labeled "Enable this machine to start the inet super server."

5. Check the box labeled "Enable others to access your files by using TFTP." Also check the   "inetd" pushbutton.

6. Shutdown and restart the OS/2 system.

24.3 Uploading the Microcode

1. Obtain the Flash Image File from the following Web site:

   `ftp://ftp.software.ibm.com/printers/products/7913/service/0readme.txt`

2. Put the Flash Image File on the System Running the BOOTP Daemon. For example, the current flash image file is named as follows:

   ```
   token-ring: 80085095(microcode level 95)
   ethernet: 80086085 (microcode level 85)
   ```

   On AIX, it goes in /etc. On OS/2, it goes in c:\tcpip\etc. (That's right - the file MUST be placed on the c: drive. If you don't have a tcpip\etc subdirectory on the c: drive, create one, and place the microcode flash image file there.) THIS IS ESSENTIAL!!!!

   DO NOT rename the file. If it doesn't have a file type, don't give it one. Renaming the file will cause the 7913 to hang in a loop.

   On AIX, you must ensure that the file's permissions allow it to be read by anyone (TFTP users have login "nobody").

3. Create the i-data "bootfile." You can use any name you want.

   On AIX, it goes in /etc:

```
i-data7913
factorymac on
localmac 00036E0004A9
early off
microcode /etc/80086085
```

On OS/2, it goes in \tcpip\etc:

```
i-data7913
factorymac on
localmac 00036E0004A9
early off
microcode /tcpip/etc/80086085
```

"localmac" is optional, and is meaningful only if "factorymac" is off and you want to define a locally administered mac address to be used rather than the factory default. The default is off.

"early off" is optional, and will set Early Token Release off. Check with the LAN support personnel before setting this to on. The default is off. It's important that the slashes be in the Unix direction ("/"), even for OS/2.

On AIX, you must ensure that the file's permissions allow it to be read by anyone (TFTP users have login "nobody").

4. Adjust the bootptab Entry for the 7913.

   On AIX, add `bf=/etc/ida7913.cfg:` or whatever filename you used for the bootptab entry for the 7913.

   On OS/2, add `bf=/tcpip/etc/ida7913.cfg:` or whatever filename you used for the bootptab entry for the 7913.

   It's important that the slashes be in the Unix direction ("/"), even on OS/2.

5. Power Off and On the 7913.

   If it successfully downloads the microcode and a printer is attached, the 7913 automatically prints a TEST page prior to the load and after the load.

   Although the automatic TEST page does not indicate which (PROM or FLASH) is active, FLASH will be. Manual test pages generated later do indicate which is active.

Once the microcode is loaded into a 7913, the 7913 will use that flash microcode even if the bootfile specification is later removed from the bootptab entry for the 7913.

The easiest way to cause the 7913 to revert to its EPROM microcode is to attempt another microcode download and cause an error. This isn't very elegant, but it works.

Appendixes

Appendix A. Port Switching Printer Sharing

IBM network printers provide sharing of the printer through port switching. Port switching is done on the printer with no involvement from the host PSF driver.

A.1 Three Ports on Network Printers

Network printers switch automatically among three ports:

- Parallel port (standard)

- Host (twinax or coax) port (optional)

- LAN network port (optional)

Note: The Network Printer 12 is an exception: one empty slot is replaced by a serial port.

A.2 Port TMEOUT Governs Port Switching

The switching is done through the use of several timeout values, which are set on the printer operator panel. [4]

For each port type, there is a menu item and a timeout setting:

- For the parallel menu, it is PORT TMEOUT

- For the Coax and Twinax port, it is the PORT TMEOUT setting on the setup menus

- For the Token Ring or Ethernet menus, it is PORT TMEOUT

A.3 Port Switching Flow

The port switching is done according to the rule:

Print the jobs received on a port until no new jobs appear for the timeout value set for a port, then switch to the next port and do the same thing.

The following chart displays this logic:

1. **Check the Parallel Port:**

   a. If there is a job, print it, then wait for the PORT TMEOUT value before going on to step 1b.

   b. If there is no parallel job to print, check the host (Twinax/Coax) port.

2. **Check the Host Port:**

   a. If there is a job, print it, then wait for the PORT TMEOUT value before going on to step 2b.

   b. If there is no host job to print, check the LAN (Ethernet/Token Ring) port.

---

[4] For instructions on how to use the printer operator panel, refer to 3.1, "Printer Operator Panel Actions" on page 15 or to your printer's *User's Guide*.

3. **Check the LAN Port:**

   a. If there is a job, print it, then wait for the PORT TMEOUT value before going on to step 3b.

   b. If there is no LAN job to print, return to step 1 on page 141 and check the Parallel port.

Appendix B. 3174 Port and VTAM Numbering

The local addresses on the 3174 controller begin at origin zero. The VTAM definition for a port assignment uses orgin 2. Consequently, when making port assignments you need to correlate the 3174 and VTAM port addresses as follows:

3174 Port	VTAM or NCP
0	2
1	3
.	.
31	33

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Appendix C. Defining a Network Printer to CICS

This appendix provides you with a procedure showing the VSE/CICS panels you can use to configure a 3174 control unit for an IBM network printer.

CICS—MVS and VSE

This appendix describes how to configure VSE CICS to print to an IBM network printer. While no example is provided for MVS/CICS, the VSE procedure can be adapted to MVS.

C.1 Using the VSE/CICS Panels to Configure a Network Printer

C.1.1 Logging onto VSE/CICS

This is the first screen you see after you log on to VSE:

```
 IESADMSL.IESEADM            VSE/ESA FUNCTION SELECTION
                                                      APPLID: DBDCCICS
   Enter the number of your selection and press the ENTER key:

         1  Installation
         2  Resource Definition
         3  Operations
         4  Problem Handling
         5  Program Development
         6  Command Mode
         7  CICS-Supplied Transactions
 PF1=HELP                    3=SIGN OFF                        6=ESCAPE(U)
                             9=Escape(m)
```

C.1.2 Accessing the Hardware Configuration Screens

To access the hardware configuration screens using the standard VSE Panels, make the following selections:

1. Enter a "2" to display the screen for resource definitions:

```
 IESADMSL.IESEDEF             RESOURCE DEFINITION
                                                      APPLID: DB
   Enter the number of your selection and press the ENTER key:

         1  User Interface Tailoring
         2  File and Catalog Management
         3  Display VTOC
         4  Hardware Configuration and IPL
         5  Maintain VTAM Application Names
         6  Maintain VTAM Startup Options
         7  Maintain Dynamic Partitions
```

2. Enter "4" for Hardware Configuration:

```
IESADMSL.IESECFIG          HARDWARE CONFIGURATION AND IPL
                                                           APPLID: DB
   Enter the number of your selection and press the ENTER key:

            1  Configure Hardware
            2  Create Network Tape
            3  Tailor IPL Procedure
            4  Maintain Printer FCB
            5  Catalog Printer UCB
```

3. Enter "1" to configure the 3174 and coaxially attached printer:

```
ADM$HDWB            HARDWARE CONFIGURATION: UNIT ADDRESS LIST

OPTIONS: 2 = ALTER DEVICE TYPE CODE/MODE      3 = SELECT FOR FURTHER PROC
         4 = LIST SIMILAR DEVICES             5 = DELETE A DEVICE

   OPT     ADDR  DEVICE   DEVICE-TYPE  DEVICE SPECIFICATION  DEVICE  DE
                           CODE          MODE              DOWN  INC
     _     009   3270CONS  3277
     _     00C   2540-R    2540R
     _     00D   2540-P    2540P
     _     00E   1403      1403
     _     00F   PRT1      PRT1
     _     16C   3174-XXL  3791L
     _     16E   3174-XXL  3791L
     _     180   FBAV      FBAV
     _     200   3390-2    ECKD
     _     201   3390-2    ECKD
 POSITION NEAR ADDR == >  ___
PF1=HELP       2=REDISPLAY  3=END                5=PROCESS    6=ADD ADDR
               8=FORWARD    9=PRINT
```

The above panel shows your current system configuration. Note that you have
SNA configured 3174s defined at addresses 16C and 16E (indicated in bold).

Look at the 3174 at address 16C. To do that you place a "3" for "SELECT FOR
FURTHER PROCESSING" next to the 3174's entry and press enter.

4. You now see the configuration for your SNA 3174 16C:

```
  COM$ILUF        HARDWARE CONFIGURATION: SNA LOGICAL UNIT LIST

  ENTER OPTIONS (AND CHANGE THE FIELDS WITH OPTION 2)

OPTIONS: 2 = ALTER   4 = SHOW VTAM PARMS              CU-type: 3174  XXL
         5 = DELETE  6 = TERM-ID FOR AUTOINST         CU-ADDR: 16C
                                                      PU-name: A16C0001
   OPT   LOC    DEVICE   NETNAME   LOGAPPL   VTAMPARM  PRINT   AUTOINST
         ADDR                                TABLE     TO      MODEL   TERMID
     _   2      24X80    S0010001  _____   D32702S   ____    VSELU2A
     _   3      24X80Q   S0020001  _____   D32720S   ____    VSELU2Q
     _   4      SCSPRT   S0030001  DBDCCICS  PSCSPRT   ____            S003
     _   5      24X80    S0040001  _____   D32702S   ____    VSELU2A
     _   6      LU1PRT   S0050001  DBDCCICS  PLU1PRT   ____    _____ S005
     _   7      24X80    S0060001  _____   D32702S   ____    VSELU2A
     _   8      LU3PRT   S0070001  DBDCCICS  PLU3PRT   ____    _____ S007
     _   9      SCSPRT   S0080001  DBDCCICS  PSCSPRT   ____            S008
     _   10     24X80    S0090001  _____   D32702S   ____    VSELU2A
     _   11     24X80    S0100001  _____   D32702S   ____    VSELU2A
  POSITION NEAR ADDR == >  ___            LOCATE NETNAME == >  ____
  PF1=HELP       2=REDISPLAY  3=END                5=PROCESS   6=ADD LU
                 8=FORWARD    9=VTAM
```

As you can see, your control unit has a mix of displays and printers. Your SCS / LU_1 printers are indicated by a device type of LU1PRT and your DSE / LU_3 printers have a device type of LU3PRT.

Also note that your printers have a LOGAPPL of DBDCCICS. This means that CICS and the CICS report controller control the printer. Also note that the printers have a CICS TERM ID, for example S008. This is how the CICS Report controller refers to the printer.

Where did all these system definitions come from? As it turns out, most of the VTAM, and CICS information is provided in the base VSE system.

C.1.3 Entering a New Hardware Configuration

By pressing PF3 you can return to the Hardware configuration panel and define an SNA 3174 having a channel address of 16D. You can define a display on port 0, an LU_1 / SCS printer on port 1, and an LU_3 / DSE printer on port 2:

```
  COM$ILUF        HARDWARE CONFIGURATION: SNA LOGICAL UNIT LIST

  ENTER OPTIONS (AND CHANGE THE FIELDS WITH OPTION 2)

OPTIONS: 2 = ALTER   4 = SHOW VTAM PARMS                 CU-type: 3174  XXL
         5 = DELETE  6 = TERM-ID FOR AUTOINST            CU-ADDR: 16C
                                                         PU-name: A16C0001
  OPT   LOC    DEVICE   NETNAME   LOGAPPL  VTAMPARM   PRINT   AUTOINST
        ADDR                               TABLE       TO      MODEL   TERMID
   _     3     24X80Q   S0020001           D3272QS     ____   VSELU2Q
   _     4     SCSPRT   S0030001  DBDCCICS PSCSPRT     ____    _____   S003
   _     5     24X80    S0040001           D32702S     ____   VSELU2A
   _     6     LU1PRT   S0050001  DBDCCICS PLU1PRT     ____    _____   S005
   _     7     24X80    S0060001           D32702S     ____   VSELU2A
   _     8     LU3PRT   S0070001  DBDCCICS PLU3PRT     ____    _____   S007
   _     9     SCSPRT   S0080001  DBDCCICS PSCSPRT     ____    _____   S008
   _    10     24X80    S0090001           D32702S     ____   VSELU2A
   _    11     24X80    S0100001           D32702S            VSELU2A
  POSITION NEAR ADDR == >  ___             LOCATE NETNAME == >  ____
 PF1=HELP        2=REDISPLAY  3=END                 5=PROCESS    6=ADD LU
                 8=FORWARD    9=VTAM
```

Take the following steps to define the printer:

1. First, use PF6 to add a **control unit address**:

```
ADM$ADDR              HARDWARE CONFIGURATION: ADD A DEVICE

Enter the required data and press ENTER.


Specify the address or the address range of the selected device.

STARTING ADDRESS............ ___        This may be the starting address of
                                        an address range or the only address
                                        to be added.

END ADDRESS................. ___        This address specifies the upper
                                        limit of the address range to be
                                        added.


DEVICE NAME................. _____    The device you want to add or a "?"
                                        to get the group selection panel.


PF1=HELP      2=REDISPLAY  3=END
```

Enter a starting address of 16D. Since an SNA defined 3174 has only one address you can use 16D as your ending address also.

2. You could guess at the DEVICE name, but it is best to enter a "?" to see what choices the system gives you:

```
ADM$ADDR              HARDWARE CONFIGURATION: ADD A DEVICE

Enter the required data and press ENTER.


Specify the address or the address range of the selected device.

STARTING ADDRESS............ 16D        This may be the starting address of
                                        an address range or the only address
                                        to be added.

END ADDRESS................. 16D        This address specifies the upper
                                        limit of the address range to be
                                        added.


DEVICE NAME................. _____?    The device you want to add or a "?"
                                        to get the group selection panel.


PF1=HELP      2=REDISPLAY  3=END
```

3. The following panel is now displayed:

```
 ADM$HDWD                 HARDWARE CONFIGURATION: DEVICE GROUP

  ENTER A SELECTION NUMBER AND PRESS ENTER.

 First address of the device to be defined:  16D

   Telecommunication Devices              Other I/O Devices
    1 Local non SNA (Terminals/PS/2s)      5 Card Devices
    2 Local SNA (Controller)               6 Console Devices
    3 Telecom. Devices (NCP,CTCA)          7 Diskette Devices
    4 Subsystems: ICA/Token Ring           8 Disk Devices
                                           9 Tape Units
                                          10 Optical Character Readers
                                          11 Printers
                                          12 ESCON Directors
                                          13 Miscellaneous
                                          14 Unsupported Devices




    PF1=HELP       2=REDISPLAY  3=END

    _____? IS INVALID. SELECT THE GROUP YOUR DEVICE BELONGS TO.
```

4. Enter a "2" to define the local SNA 3174, and be taken to the next panel:

```
 ADM$DEVL                     SELECTION LIST: DEVICES

 SELECT ONE OF THE ENTRIES BY ENTERING 1.

                                 Address of the device to be defined:

  SEL      DEVICE      DESCRIPTION

   _       3274-X1A    Control Unit
   _       3174-XXL    Control Unit
   _       3174-GW     Control Unit with token-ring gateway
   _       3172        Interconnect Controller
   _
   _
```

5. In this example you will be defining a 3174 21L whose microcode is configured
   for SNA operation. Simply place a "1" in the space provided for 3174-XXL and
   press enter:

```
 COM$ILU0            HARDWARE CONFIGURATION: ADD DEVICE(S)

 Enter the required data and press ENTER.


 STARTING ADDR............... 2          This may be the starting address of
                                         an address range or the only address
                                         to be added.

 END ADDR.................... ___        This address specifies the upper
                                         limit of the address range to be
                                         added.

 DEVICE NAME................. _____    This is the device name (generic
                                         name) of the device to be addeded.
                                         Enter a ? to get the list of alll
                                         applicable device names.
```

6. Start by defining the first port, port 0 on the 3174. For SNA control units, this
   port has the logical local address of 2 and is already filled in. For information
   on this numbering scheme, refer to Appendix B, "3174 Port and VTAM
   Numbering" on page 143. Place a "?" in the space provided for DEVICE NAME

to see the list of defined devices. Pressing enter gives you the device selection list:

```
ADM$DEVL                     SELECTION LIST: DEVICES

SELECT ONE OF THE ENTRIES BY ENTERING 1.

                                Address of the device to be defined:

 SEL      DEVICE      DESCRIPTION

 _        24X80       24x80 screen                 e.g. 3278-2, PS/2CU,3192.
 _        24X80Q      24x80 screen, Query          e.g. PS/2DFT
 _        32X80       32x80 screen                 e.g. 3278-3, 3192
 _        43X80       43x80 screen                 e.g. 3278-4, 3192
 _        27X132      27x132 screen                e.g. 3278-5, 3192
 _        24X80C      24x80 screen, color          e.g. 3179, 3192
 _        24X80CPS    24x80 screen, color, PS, SOSI e.g. 5555
 _        32X80C      32x80 screen, color          e.g. 3192
 _        32X80CP     32x80 screen, color, PS      e.g. 3279-S3G
 _        LU1PSF      Advanced Function Printer     e.g. 3812, 3816
 _        LU3PRT      LU3 Printer                  e.g. 3268-2
 _        LU3PRTQ     LU3 Printer, Query
PF1=HELP       2=REDISPLAY  3=END
               8=FORWARD
```

7. To configure your simple display on port 0, simply place a "1" next to:

   `_        24X80       24x80 screen                 e.g. 3278-2, PS/2CU,3192.`

   and press enter.

8. Now comes a panel showing the current configuration of your control unit:

```
 COM$ILUF        HARDWARE CONFIGURATION: SNA LOGICAL UNIT LIST

 ENTER OPTIONS (AND CHANGE THE FIELDS WITH OPTION 2)

OPTIONS: 2 = ALTER   4 = SHOW VTAM PARMS                CU-type: 3174 XXL
         5 = DELETE  6 = TERM-ID FOR AUTOINST           CU-ADDR: 16D
                                                        PU-name: A16D0001
 OPT   LOC    DEVICE   NETNAME   LOGAPPL  VTAMPARM  PRINT   AUTOINST CICS
       ADDR                               TABLE     TO      MODEL    TERM ID
 _     2      24X80    S0740001  _____  D32702S   ___     VSELU2A
 _                     _____   _____  _____   ___     _____
 _                     _____   _____  _____   ___     _____
 _                     _____   _____  _____   ___     _____
 _                     _____   _____  _____   ___     _____
 _                     _____   _____  _____   ___     _____
 _                     _____   _____  _____   ___     _____
 _                     _____   _____  _____   ___     _____

 POSITION NEAR ADDR == > ____           LOCATE NETNAME == > ____
PF1=HELP        2=REDISPLAY  3=END              5=PROCESS    6=ADD LU
                            9=VTAM
```

9. Add the SCS printer to port 1 by pressing PF 6 ADD LU. This produces the HARDWARE CONFIGURATION: ADD DEVICE(S) panel. Remembering that the logical address is always 2 plus the actual port number (see Appendix B, "3174 Port and VTAM Numbering" on page 143), you will enter "3" as the STARTING ADDR and once again use a "?" to see the device name:

```
COM$ILU0              HARDWARE CONFIGURATION: ADD DEVICE(S)

Enter the required data and press ENTER.


STARTING ADDR.............. 3          This may be the starting address of
                                         an address range or the only address
                                         to be added.


END ADDR................... __          This address specifies the upper
                                          limit of the address range to be
                                          added.


DEVICE NAME................ _____? This is the device name (generic
                                      name) of the device to be added.
                                      Enter a ? to get the list of all
                                      applicable device names.
```

10. From the resulting screen, you will select an entry:

```
ADM$DEVL                    SELECTION LIST: DEVICES

SELECT ONE OF THE ENTRIES BY ENTERING 1.

                              Address of the device to be defined:

 SEL       DEVICE      DESCRIPTION

 _         24X80       24x80 screen                 e.g. 3278-2, PS/2CU,3192.
 _         24X80Q      24x80 screen, Query          e.g. PS/2DFT
 _         32X80       32x80 screen                 e.g. 3278-3, 3192
 _         43X80       43x80 screen                 e.g. 3278-4, 3192
 _         27X132      27x132 screen                e.g. 3278-5, 3192
 _         24X80C      24x80 screen, color          e.g. 3179, 3192
 _         24X80CPS    24x80 screen, color, PS, SOSI e.g. 5555
 _         32X80C      32x80 screen, color          e.g. 3192
 _         32X80CP     32x80 screen, color, PS      e.g. 3279-S3G
 _         LU1PSF      Advanced Function Printer     e.g. 3812, 3816
 _         LU3PRT      LU3 Printer                   e.g. 3268-2
 _         LU3PRTQ     LU3 Printer, Query
PF1=HELP       2=REDISPLAY  3=END
               8=FORWARD
```

11. As no NON IPDS LU_1 selection is displayed, you use PF8 to reach the next
    selection group:

```
ADM$DEVL                    SELECTION LIST: DEVICES

SELECT ONE OF THE ENTRIES BY ENTERING 1.

                              Address of the device to be defined:

 SEL       DEVICE      DESCRIPTION

 _         27X132      27x132 screen                e.g. 3278-5, 3192
 _         24X80C      24x80 screen, color          e.g. 3179, 3192
 _         24X80CPS    24x80 screen, color, PS, SOSI e.g. 5555
 _         32X80C      32x80 screen, color          e.g. 3192
 _         32X80CP     32x80 screen, color, PS      e.g. 3279-S3G
 _         LU1PSF      Advanced Function Printer     e.g. 3812, 3816
 _         LU3PRT      LU3 Printer                   e.g. 3268-2
 _         LU3PRTQ     LU3 Printer, Query
 _         LU3PRTS     LU3 Printer, PS, SOSI         e.g. 555x
 1         SCSPRT      SCS Printer
 _         SCSPRTQ     SCS Printer, Query
 _         SCSPRTS     SCS Printer, PS, SOSI         e.g. 555x
PF1=HELP       2=REDISPLAY  3=END
PF7=BACKWARD
```

12. Here you place a "1" next to the device called SCSPRT and press enter. Your control unit configuration now looks like this:

```
 COM$ILUF        HARDWARE CONFIGURATION: SNA LOGICAL UNIT LIST

 ENTER OPTIONS (AND CHANGE THE FIELDS WITH OPTION 2)

OPTIONS: 2 = ALTER   4 = SHOW VTAM PARMS              CU-type: 3174 XXL
         5 = DELETE  6 = TERM-ID FOR AUTOINST         CU-ADDR: 16D
                                                      PU-name: A16D0001
  OPT   LOC   DEVICE   NETNAME   LOGAPPL   VTAMPARM   PRINT   AUTOINST  CICS
        ADDR                                 TABLE     TO       MODEL   TERM ID
   _     2    24X80    S0740001  _____   D32702S    ____    VSELU2A
   _     3    SCSPRT   S0750001  DBDCCICS  PSCSPRT    ____    _____   S075
   _          _____   _____   _____   _____   ____    _____
   _          _____   _____   _____   _____   ____    _____
   _          _____   _____   _____   _____   ____    _____
   _          _____   _____   _____   _____   ____    _____
   _          _____   _____   _____   _____   ____    _____
   _          _____   _____   _____   _____   ____    _____
   _          _____   _____   _____   _____   ____    _____
   _          _____   _____   _____   _____   ____    _____
  POSITION NEAR ADDR == >  _____   _____    LOCATE NETNAME == >  ____
 PF1=HELP       2=REDISPLAY  3=END                 5=PROCESS    6=ADD LU
                            9=VTAM
```

Note that all of the information VTAM and CICS need to activate this printer has been provided for us from definitions provided by the base system.

13. To add your LU_3 / DSE printer, all you need do is repeat steps 9 on page 150 to 12. Starting with PF 6 ADD LU, enter a logical device of "4," and then select:

    _   LU3PRT   LU3 Printer   e.g. 3268-2

from the device selection list.

14. Your 3174 configuration now is as you wanted it to be and looks like this:

```
  COM$ILUF        HARDWARE CONFIGURATION: SNA LOGICAL UNIT LIST

  ENTER OPTIONS (AND CHANGE THE FIELDS WITH OPTION 2)

 OPTIONS: 2 = ALTER   4 = SHOW VTAM PARMS              CU-type: 3174 XXL
          5 = DELETE  6 = TERM-ID FOR AUTOINST         CU-ADDR: 16D
                                                       PU-name: A16D0001
   OPT   LOC   DEVICE   NETNAME   LOGAPPL   VTAMPARM   PRINT   AUTOINST  CICS
         ADDR                                 TABLE     TO       MODEL   TERM ID
    _     2    24X80    S0740001  _____   D32702S    ____    VSELU2A
    _     3    SCSPRT   S0750001  DBDCCICS  PSCSPRT    ____    _____   S075
    _     4    LU3PRT   S0670001  DBDCCICS  PLU3PRT    ____    _____   S067
    _          _____   _____   _____   _____   ____    _____
    _          _____   _____   _____   _____   ____    _____
    _          _____   _____   _____   _____   ____    _____
    _          _____   _____   _____   _____   ____    _____
    _          _____   _____   _____   _____   ____    _____
    _          _____   _____   _____   _____   ____    _____
    _          _____   _____   _____   _____   ____    _____
    _          _____   _____   _____   _____   ____    _____
   POSITION NEAR ADDR == >  _____   _____    LOCATE NETNAME == >  ____
  PF1=HELP       2=REDISPLAY  3=END                 5=PROCESS    6=ADD LU
                             9=VTAM
```

C.1.4 Activating the Printer Definition on VSE

Once the 3174 is configured for your needs, you need to tell VSE to place these new configurations into service. Do this by pressing PF5 (process) on the above screen. This takes you back to the hardware configuration screen where you will ask that your changes be processed and permanently added to the system definitions:

```
ADM$HDWB           HARDWARE CONFIGURATION: UNIT ADDRESS LIST

OPTIONS: 2 = ALTER DEVICE TYPE CODE/MODE     3 = SELECT FOR FURTHER PROC
         4 = LIST SIMILAR DEVICES            5 = DELETE A DEVICE

   OPT     ADDR  DEVICE   DEVICE-TYPE  DEVICE SPECIFICATION  DEVICE  DE
                             CODE           MODE             DOWN  INC
    _      009   3270CONS  3277
    _      00C   2540-R    2540R
    _      00D   2540-P    2540P
    _      00E   1403      1403
    _      00F   PRT1      PRT1
    _      16C   3174-XXL  3791L
    _      16D   3174-XXL  3791L
    _      16E   3174-XXL  3791L
    _      180   FBAV      FBAV
    _      200   3390-2    ECKD
 POSITION NEAR ADDR == >   ___
PF1=HELP       2=REDISPLAY  3=END                 5=PROCESS    6=ADD ADDR
               8=FORWARD    9=PRINT
```

PF5 (PROCESS) will build the necessary jobs to add the new 3174 and defined printers to the system configuration. VSE will then present the following panel:

```
 ADM$CRE1        HARDWARE CONFIGURATION: CATALOG STARTUP MEMBERS



Press ENTER to catalog the objects marked by an X. You may add or delete
an X as needed.


            X       IPL Procedures
            _       VTAM Book with Startup Options
            X       VTAM Books for Model Terminal Support
            _       VTAM Book for Local Non-SNA Terminals
            X       VTAM Book Local SNA Terminals
            _       VTAM Books for ICA attached Terminals
            X       CICS CSD Group for terminals-VSETERM1
            _       CICS CSD Group for terminals-VSETERM2
            _       CICS CSD Group for terminals-VSETERM3



 PF1=HELP      2=REDISPLAY  3=END
```

If you press enter now, VSE will set up the jobs that make the changes to VTAM, CICS and the systems IPL procedures, then brings you to the following panel:

```
  SUB$PRO5                        JOB DISPOSITION

 Enter the required data and press ENTER.


 JOB DESTINATION.............. 3           Enter 1 to submit the job to batch.
                                          Enter 2 to file in library.
                                          Enter 3 to do both.
 JOB NAME..................... STARTUP     The name under which the job watch.
                                          saved in VSE/ICCF.
 PRIORITY..................... 3           Priority 0-9 for this job.
 CLASS........................ *           Changing * has no effect.
 DISPOSITION.................. D           D,H,K or L. Changing * has no
 JOB ACCOUNTING..............  _____
 HOLD LIST IN QUEUE........... 1           Enter 1 to hold output in list
                                          Enter 2 to print output immedieatly.
 TIME EVENT SCHEDULING........ 2           Enter 1 if TIME EVENT SCHEDULI
                                          required, otherwise enter 2.
 OTHER PARAMETERS............. 2           Enter 1 to change any other PO
                                          parameters, otherwise enter 2.

  PF1=HELP       2=REDISPLAY  3=END
```

Entering "3" in the JOB DESTINATION field will save the jobs VSE created and
perform the necessary work to make the new control unit and printers active when
the system is next ipled.

C.1.5 Using the CICS Report Controller

One way to control job flow to Coax attached printers is by use of the CICS report
controller. This CICS transaction can be used to start and stop printing devices,
control check points, and route output. The report controller can be accessed from
the main VSE panel as follows.

From the main VSE panel enter PF6 ESCAPE(U). This takes you to a blank screen
where you can enter the transaction CEOS. To go to the primary Report Controller
screen:

```
  CEOS:  1                  CICS REPORT CONTROLLER

 Select one of the following options:

             1  Report selection.
             2  Printer selection.
             Selection ==>
```

To work with printers, enter "2." In this example you will be using a printer referred
to as S008. By entering 2 you can select the printer using the printer selection
panel shown below by entering S008 as the Printer name, or you can take a look at
all of the report controllers by just pressing enter:

```
  CEOS: 12                         PRINTER SELECTION


        You may list all printers or only those printers that match
        your selection criteria.

         Type your selection criteria:

           Printer name   ==>
           Destination    ==>
           Class          ==>              A-Z / 0-9
           Forms          ==>

         To select Status type a Y against one or more of the following:
           Printing       ==>              Released       ==>
           Waiting        ==>              Starting       ==>
           Stopped        ==>
           Aligning       ==>
           Unavailable    ==>
           Out of service ==>
           Paused         ==>
```

After you press enter, you see the following panel:

```
  CEOS: 121                      PRINTER LIST                1 TO    10 OF

  Enter Options(1=See/Change Characteristics   2=Start   3=Restart   4=Align
    5=Stop now   6=Stop after copy   7=Stop after report  8=Pause  9=Resume)
  OPT  PRINTER DESTINATION STATUS              CLASS FORMS REPORT NAME NUMBER
         S003              STOPPED               A
         S005              STOPPED               A
         S007    S007      STOPPED               A    STD
         S008    S008      STOPPED               A    STD
         S015              STOPPED               A
         S016              STOPPED               A
```

You see that printer S008 is currently in stopped status. Placing 2 in the options
column for S008 and pressing enter will start the printer. If the printer is correctly
connected the Status will quickly change from STARTING to WAITING for work, as
shown below:

```
  CEOS: 121                      PRINTER LIST                1 TO    10 OF

  Enter Options(1=See/Change Characteristics   2=Start   3=Restart   4=Align
    5=Stop now   6=Stop after copy   7=Stop after report  8=Pause  9=Resume)
  OPT  PRINTER DESTINATION STATUS              CLASS FORMS REPORT NAME NUMBER
         S003              STOPPED               A
         S005              STOPPED               A
         S007    S007      STOPPED               A    STD
         S008    S008      WAITING               A    STD
         S015              STOPPED               A
         S016              STOPPED               A
```

Pressing PF3 will bring you back to the main panel (shown) above. This time you
will enter 1 to select a report to print. The next panel you see shows the jobs
avaiable for printing:

```
CEOS: 111                     REPORT LIST                55 TO   71 OF

 Enter Options (1=See/Change Characteristics 3=Print 5=Delete 6=Hold 8=Browse)
OPT   NAME      USERDATA        NUMBER STATUS    FORMS CLS PAGES CPY PRI DEST
      COPYMEM                   00514 READY(D)         A     3   1   3  SYSA
      CATCOPY                   00529 READY(D)         A     3   1   3  SYSA
      CATCOPY                   00531 READY(D)         A     3   1   3  SYSA
      CATCOPY                   00533 READY(D)         A     3   1   3  SYSA
      COPYMEM                   00536 READY(D)         A     6   1   3  SYSA
      COPYMEM                   00538 READY(D)         A     6   1   3  SYSA
  *   UDPROC2                   00216 HELD(L)          A     9   1   5  S007
      U5ACTS12                  00217 HELD(L)          A   170   1   4  S007
      INSGEN                    00146 HELD(H)          A     6   1   3  SYSA
      ICCFDUSR                  00180 HELD(H)          A     3   1   3  SYSA
      IESPNDT                   00168 READY(D)         Q    11   1   3  SYSA
      SKPWRNDT                  00172 READY(D)         Q     4   1   3  SYSA
      SKPWRNDT                  00173 READY(D)         Q     4   1   3  SYSA
      POWERGEN                  00166 READY(K)         Q    13   1   3  SYSA
      ALLOCATE                  00513 READY(D)         Q     4   1   3  SYSA
      IESELOGO                  00175 HELD(H)          Q    15   1   3  SYSA
      IESELOGO                  00179 HELD(H)          Q    15   1   3  SYSA
```

Job UDPROC2 (shown in bold) is the job you wish to print; however, you wish to print it on printer S008, not S007. Placing a 1 (1=See/Change Characteristics) in the options column for this job and pressing enter will allow you to do this. The following panel appears:

```
CEOS: 1111                 REPORT CHARACTERISTICS            Page 1 o

  NAME      USERDATA        NUMBER STATUS    FORMS PAGES  PRMODE
  UDPROC2                   00216  HELD(L)         00009


  TITLE :  NON-CICS CREATED REPORT
```

Enter the required values for one or more characteristics:

```
    Class          ==> A          A-Z / 0-9
    Disposition    ==> L          D | H | K | L
    Copies         ==> 001        1-255
    Priority       ==> 5          1-9
    Destination    ==> S007
    Start page     ==> 00001
    End page       ==> 00009
    Separator page ==> NO         Yes | No
```

Now, change the designation field from S007 to S008 by typing over the field and pressing enter. You are now returned to the Report list and can see that the DEST field has changed for your job to S008:

```
CEOS: 111                     REPORT LIST                    55 TO    71 OF

 Enter Options (1=See/Change Characteristics 3=Print 5=Delete 6=Hold 8=Browse)
OPT   NAME      USERDATA       NUMBER STATUS    FORMS CLS PAGES CPY PRI DEST
      COPYMEM                  00514 READY(D)          A     3   1   3  SYSA
      CATCOPY                  00529 READY(D)          A     3   1   3  SYSA
      CATCOPY                  00531 READY(D)          A     3   1   3  SYSA
      CATCOPY                  00533 READY(D)          A     3   1   3  SYSA
      COPYMEM                  00536 READY(D)          A     6   1   3  SYSA
      COPYMEM                  00538 READY(D)          A     6   1   3  SYSA
 *    UDPROC2                  00216 HELD(L)           A     9   1   5  S008
      U5ACTS12                 00217 HELD(L)           A   170   1   4  S007
      INSGEN                   00146 HELD(H)           A     6   1   3  SYSA
      ICCFDUSR                 00180 HELD(H)           A     3   1   3  SYSA
      IESPNDT                  00168 READY(D)          Q    11   1   3  SYSA
      SKPWRNDT                 00172 READY(D)          Q     4   1   3  SYSA
      SKPWRNDT                 00173 READY(D)          Q     4   1   3  SYSA
      POWERGEN                 00166 READY(K)          Q    13   1   3  SYSA
      ALLOCATE                 00513 READY(D)          Q     4   1   3  SYSA
      IESELOGO                 00175 HELD(H)           Q    15   1   3  SYSA
      IESELOGO                 00179 HELD(H)           Q    15   1   3  SYSA
```

To print the job, simply place a 3 (PRINT) in the options column. Looking at our PRINTER LIST panel, you see that the system is requesting that the correct forms be loaded on the printer:

```
CEOS: 121                    PRINTER LIST                     1 TO    10 OF

 Enter Options(1=See/Change Characteristics   2=Start   3=Restart   4=Align
   5=Stop now   6=Stop after copy   7=Stop after report 8=Pause  9=Resume)
OPT   PRINTER DESTINATION STATUS              CLASS FORMS REPORT NAME NUMBER
      S003                STOPPED               A
      S005                STOPPED               A
      S007    S007        STOPPED               A   STD
      S008    S008        PAUSED   (FORMS "    ") A   STD   UDPROC2
      S015                STOPPED               A
      S016                STOPPED               A
```

For printers defined in the manner described above, it does not matter if the printer is a continuous forms or sheet feed type device, because any time the form specified in the job does not match the form that the system believes is currently on the printer, the report controller will ask you to verify that the correct forms are loaded by entering "9=Resume" in the printer's option field. When you have done so, the printer's status will change to PRINTING and the job will be printed.

Appendix D. Using JES328X as Printer Controller

The IBM JES/328X Print Facility can be used in the MVS or VSE environments to route print output from a variety of applications to IBM network printers. The facility supports IPDS and SCS print streams. The JES/328X Print Facility can be used in the MVS and VSE environments by any application that directs output to the JES spool, for example, GDDM 2.1.

D.1 Flow of Operations

An overview of the flow of output is as follows:

- Output is **generated** by JES2, JES3, TSO, CICS, or some other application.

- That output is **spooled** to JES2 or JES3 and can be manipulated by JES commands.

- The output can be **routed** to the network printers by JCL, TSO Allocate, or JES/328X DSPRINT commands. Since the printers are released at the end of a data set, they can be shared with other applications.

D.2 Setting up JES328x as Printer Controller

To set up JES/328X as a print controller, you will need to set up:

- LOGMODES table

- VTAM

- JES2 or JES3

For detailed information, consult *JES/328X Print Facility: Program Description and Operations*, SB11-8776.

Appendix E. Updating Coax/Twinax NIC Microcode

This appendix describes the procedure to update the microcode of the Coax/Twinax NIC.

┌─ **This Procedure Done by SE's Only** ─────────────────────────────┐

 The following procedure is provided here for your information only. The
 procedure is performed by IBM SE's and not by customers. The reason for this
 is that the microcode update process is performed by using a special
 Centronics-like cable connecting a PC to the 26-pole Centronics-like port on the
 NIC's faceplate.

└──┘

The procedure is as follows:

1. Get cable (P/N 69H2907).

2. Get a PC with DOS or OS/2 and a parallel port.

3. Attach the cable from the parallel port on the system to the parallel-like connector on the twinax or coax NIC.

4. Load the new code and LPTOUT.EXE into the same directory.

5. Turn the printer on and wait until it is READY.

6. Obtain a printer configuration page with this series of operator panel actions:

   a. Press ONLINE to take the printer offline.

   b. Press MENU to display the TEST MENU.

   c. Press ITEM to display the CONFIG PAGE item.

   d. Press ENTER to print the configuration page.

7. Press ONLINE to put the printer back on line.

8. Load the new code with one of the following commands entered at the DOS or OS/2 command line:

   ```
   copy mc.ext lpt1:
   ```

   ```
   lptout mc.ext
   ```

9. The printer operator panel should say I/O INITIALIZING. **Important:** Do not turn off the printer until Ready is shown on the operator panel.

10. The microcode update process will now proceed. The process takes about ten minutes.

11. When the printer returns to READY, print a **printer** configuration page using the sequence in step 6.

12. Compare the printer configuration page obtained in step 6 to the one obtained from step 11 to verify the changes.

Appendix F. Coax/Twinax NIC Physical Specifications

NIC	Rectangle measuring 88 MM in width and 127 MM in length.
NIC faceplate	• A Test push button • A 26-pole version of the IEEE 1284 Type C connector • 1 LED (labelled "Sync") • 1 BNC connector (twin or dual impedance, that is, dual purpose)
Power requirements	5 Volt at 250 mAmps with maximum voltage of +/- 5%
Temperature range	No parts will be warmer than 70 C. The air temperature within the NIC will not exceed 55 C.

Appendix G. Bibliography

G.1 AS/400

- *AS/400 Local Device Configuration Guide*, SC41-3121

G.2 MVS

- *PSF/MVS Systems Programming Guide*
- *MVS/ESA Migration Planning: Dynamic I/O Configuration*
- *MVS/ESA Hardware Configuration: Using the Dialog*

G.3 System/36

- *Changing your System Configuration*, SC21-8291-01.

G.4 VM

- *VM/ESA Migration Planning: Dynamic I/O Configuration*
- *VM/ESA Hardware Configuration: Using the Dialog*

G.5 VSE

- *PSF/VSE Application Programming Guide*, S544-3666
- *PSF/VSE Program Directory*, G544-3805
- *PSF/VSE System Programming Guide*, S544-3665

G.6 Printer Specific Publications

- *IBM Network Printer 12: User's Guide*, S544-5370
- *IBM Network Printer 17: User's Guide*, S544-5343
- *IBM Network Printer 24: User's Guide*, S544-5378

G.7 General Publications

- *Advanced Function Presentation: Printer Summary*, G544-3135-10
- *Advanced Function Presentation: Printer Information*, G544-3290
- *IBM Cabling System—Planning and Installation Guide*, GA27-3361
- *IBM 5299 Terminal Multiconnector Model 3 Planning, Installation, and Problem Analysis Guide*, GA27-3749
- *IBM Network Printers: IPDS and SCS Technical Reference*, S544-5312
- *IBM Network Printers: PCL5e and PostScript Level 2 Technical Reference*, S544-5344

- *Input/Output Configuration Program (IOCP) User's Guide*, GC38-0097, GC38-0401, GC38-0097 (depending on OS)

- *JES/328X Print Facility: Program Description and Operations Manual*, SB11-8776.

- *NCP SSP Generation and Loading Guide*, SC31-6221

- *Sending ASCII Data and PCL Commands to IBM Network Printers over Coax and Twinax*

- *Using the IBM Cabling System with Communications Products*, GA27-3620

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This apparatus is approved under approval No. NS/G/1234/J/100003 for the indirect connections to the public telecommunications systems in the United Kingdom.

Glossary of Terms and Abbreviations

A

APO. Automatic print orientation.

B

bind. Result of the command (BIND) sent by VTAM to an LU to establish a VTAM-to-LU session.

C

coax. A cable consisting of one conductor within and insulated from another conductor.

COR. Computer Output Reduction.

CPI. Characters per inch.

CR. Carriage return.

D

DSC. Data stream compatibility (with 3270 Information Display System).

DSE. Data Stream Emulation.

DW/36. Display Write/36.

F

FF. Form feed.

FGID. Font Global Identifier.

FLASH. A form or electronically erasable memory (like PROM).

FM. Format management.

FSA. Functional Subsystem Application. An area within a PSF FSS that drives and manages a single printer.

FSS. Functional Subsystem. The PSF address space created by JES.

FTP. File Transfer Protocol (TCP/IP).

G

GCSGID. Graphic Character Set Global ID.

H

HPT. Host Print Transform (AS/400)

I

IPDS. Intelligent Printer Data Stream.

IRQ. Intervention required.

L

LBM. Left binding margin.

LFE. Load font equivalent (command).

LID. Logical ID.

LPI. Lines per inch.

LU. Logical Unit.

M

MPL. Maximum page length.

MPP. Maximum print position.

N

NCP. Network Control Program.

NL. New line.

O

OCL. Operator Control Language.

P

PDM. Printer Driver Machine (VM).

POR. Power-On Reset.

POWER. A VSE command processor.

PROM. Programmable Read Only Memory.

PSM. Proportionally spaced machine.

S

S/36. IBM System/36.

SCS. SNA character string.

SDLC. Synchronous Data Link Control.

SFCM. Spool File Conversion Machine.

SSP. System Support Program.

T

3270 Printer. An IBM printer that attaches to a host through a Control Unit, like the 3174.

TBM. Top Binding Margin.

TFTP. Trivial File Transfer Protocol (TCP/IP).

TSO. Time Share Option.

twinax. A cable made of two twisted wires inside a shield.

V

VPS. VTAM printer support program.

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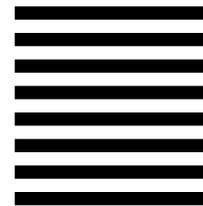G544-5241-03

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