I-O Print Box RPC
Reverse Protocol Converter

ASCII to Twinax/Coax Protocol Converter for IBM Twinax Printers

Quick Setup & User's Guide

Version 1.01

I-O Print Box RPC Reverse Protocol Converter Version 1.01
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Caution! The I-O Print Box RPC interface is static sensitive. Make sure you do not damage the card with static electricity. Take ESD (electrostatic discharge) precautions as you would with any static-sensitive device. These precautions include:

1. Wear a wrist strap or similar static-discharge device during installation.

2. Be aware that some work surroundings, such as carpet, floor mats, dry air from winter heating, etc., can cause static buildup.

PREFACE

I-O is pleased to introduce you to the I-O Print Box RPC External Printer Interface. With the wide range of printing environments found in business today, you can depend on the quality and reliability that has made I-O the leader in printer interface technology.

The first section of this user's guide contains a **QUICK SETUP GUIDE** which provides an easy-to-use setup for the I-O Print Box RPC.

The four sections contained in this User's Guide will give you the information you need to get the most from your interface.

1. **INTRODUCTION** - Provides an overview of the I-O Print Box RPC, including emulations and printer compatibility.

2. **INSTALLATION** - Provides instructions for installation, connecting to the host and printer, and switch settings.

3. **CONFIGURATION** - Explains the configuration process and the use of I-O Command Pass-Thru™.

4. **PROBLEM RESOLUTION** - Provides a detailed troubleshooting guide.

Great care has been taken in the preparation of this manual. If you encounter inaccuracies or omissions, please contact us at the address listed in this manual, Attn: Printer Interface Specialist.

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I-O Print Box RPC
Reverse Protocol Converter

ASCII to Twinax/Coax Protocol Converter for IBM Twinax Printers

Quick Setup Guide

Version 1.01

Thank you for buying the I-O Print Box RPC Reverse Protocol Converter. This Quick Setup Guide is designed to help you get up and running in a short amount of time.

Unpacking

Check the box for freight or water damage. If any damage is evident, please contact your carrier immediately.

The package should contain the following items:

- Print Box RPC Reverse Protocol Converter
- Wall-mount transformer
- Twinax V-connector or Coax adapter cable
- RS-232 serial and Centronics parallel cable
- I-O Print Box RPC Quick Setup and User's Guide

Installation

The I-O Print Box RPC is easy to install and requires no special tools. Follow these steps to connect and setup the I-O Print Box RPC:

1. Power off the printer.
2. Connect the PC/LAN or UNIX host to the "Parallel In" or "Serial In"

connector. A description of the cable requirements is found in Appendix B.

3. Connect the 9-pin Twinax V-adapter or Coax adapter to the 9-pin connector labeled "Twinax/Coax" on the back panel of the I-O Print Box RPC.

4. For a twinax printer, connect the twinax cable from the printer to either one of the twinax connectors on the V-connector. For a coax printer, connect the coax cable from the printer to the coaxconnector on the adapter cable.

Note: The second end of the twinax V-connector must remain unused. Additional twinax devices or the twinax host must not be attached to the twinax V-connector.

5. Connect the wall-mounted transformer from the power outlet to the interface's "9V" power connector.

6. Power on the Print Box by pressing the "I/O" power switch and proceed to configure the Print Box.

Configuring the I-O Print Box RPC Setup Options

Set the Print Box up for operation by using the LCD front panel display with its four option switches. This is done in the "Setup Menu." The options available to use with your twinax or coax printer are shown starting on page 3-3 of the User's Guide.

After connecting the Print Box, you can use your twinax or coax printer just like an ASCII printer from your PC or UNIX host by defining the twinax or coax printer in the host software as an IBM Proprinter or an Epson FX printer.

1 INTRODUCTION

The I-O Print Box RPC is a reverse protocol converter that lets you print ASCII host (PC, PC LAN, UNIX, AIX, etc.) print jobs formatted for an IBM Proprinter or Epson FX printer on an IBM twinax or coax system printer.

The I-O Print Box RPC accepts all Epson FX and Proprinter formatting commands, then selectively converts and passes on only the commands that match the capabilities of the twinax or coax printer. For example, the command to print 12 CPI (characters per inch) is sent if the Print Box is attached to the IBM twinax 4234, 5219, or 4214 printers, which are capable of printing 12 CPI, but is ignored if attached to the 5224, 5225, 5256, or 3262, which cannot print 12 CPI.

In coax mode, the 12 CPI command must be selected if it is to be sent to the host system. This means that you do not have to remove any complex formatting commands from your documents before they are printed on the twinax or coax printer. Appendix A lists the ASCII commands and the Print Box interpretation for your twinax or coax printer.

The I-O Print Box RPC is very simple to use. All configuration on the twinax side is automatic because the twinax printer identifies its address and printing capabilities via twinax protocol. For coax operation, you need to define a few simple items about the capabilities of your printer.

The ASCII side only requires that you configure whether Proprinter II or Epson FX input protocol will be used by the ASCII host. If the serial input is used, the serial input parameters (i.e., baud rate, parity, etc.) must be matched to the host serial output parameters.

Unpacking

When you receive the I-O Print Box RPC, check the packaging for water or physical damage, and notify the carrier immediately if any damage is evident.

INTRODUCTION

The package should contain the following items:

- I-O Print Box RPC Reverse Protocol Converter
- Wall-mount transformer
- Twinax output V-connector or coax adapter cable
- RS-232 serial and Centronics parallel cable
- I-O Print Box RPC Quick Setup and User's Guide

Keep the original packaging in case the I-O Print Box RPC needs to be moved or shipped.

Compatible Printers

In twinax mode, the I-O Print Box RPC uses IBM SCS commands (non-IPDS). The following is a list of IBM twinax printers recognized and supported by the Print Box:

5256 Model 1, 2, 3 (5262 emulating 5256 Model 3)
5224 Model 1, 2
5225 Model 1, 2, 3, 4
4214 Model 2 (4210 emulating 4214 Model 2)
5219 Model D01, D02 (3812 emulating 5219)
4234 Model 2 (non-IPDS)

In coax mode, the I-O Print Box RPC uses LU1 IBM SCS commands. The coax printer needs to support the LU1 data stream. The user configures capabilities such as 10, 12, 15 CPI, and LPI settings. The following printers have been tested and function properly with the Print Box in coax mode:

3268
3287
4214 Model 1
4224

Compatible third-party twinax printers should function with the I-O Print Box RPC, but their compliance with IBM twinax or coax specifications cannot be assured.

2 INSTALLATION

The I-O Print Box RPC is easy to install and requires no special tools. Refer to the illustrations of the front and back panels of the Print Box (see figures below), and follow the instructions connect and set up the I-O Print Box RPC.

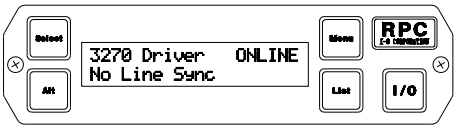

Figure 2-1
I-O Print Box RPC Front Panel

LCD Display - This displays the current status of the I-O Print Box RPC, and is used to perform tests and configure the settings. During operational "ONLINE" mode, the top line displays Twinax, Coax, or diagnostics mode ("3270 Driver" shown in Figure 2-1), then the operation of the Print Box ("ONLINE" shown in Figure 2-1). The lower line displays "Line Sync" or "No Line Sync" with the printer, and any error status.

Select - When the I-O Print Box RPC is in operating mode, pressing "Select" places the Print Box into configuration mode. While the operator is viewing different options, pressing "Select" will "select" the displayed option as the configuration option.

Alt - Pressing "Alt" modifies the displayed option.

Menu - Pressing "Menu" moves to the next menu group, if possible.

List - Pressing "List" displays the next setup item.

I/O - Powers the Print Box ON and OFF.

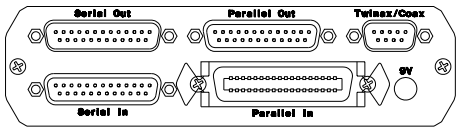

Figure 2-2
I-O Print Box RPC Back Panel

9 V - Power receptacle for connecting the 9 VAC power supply.

Parallel Out - Diagnostic port used in troubleshooting or in test modes. See Chapter 4, Problem Resolution.

Parallel In - Centronics compatible ASCII data is received when selected from the front panel.

Serial In - When selected from the front panel, RS-232 serial ASCII data is received at the baud rate selected.

Twinax/Coax - The 9-pin to twinax V-connector automatically configures the Print Box for connecting a twinax printer on power up or the 9-pin coax connector configures for a coax printer.

Serial Out - This port is not used on the I-O Print Box RPC.

Connecting to the Host and Printer

Take the following steps to connect the I-O Print Box RPC to your ASCII host and twinax or coax printer.

Note: Make sure power is OFF on the printer and the Print Box before connecting any cables.

1. If Centronics compatible input is desired, connect a parallel cable from the 36-pin "Parallel In" port on the Print Box to the parallel port on the ASCII host (PC, LAN, UNIX, AIX, etc.).

2. If RS-232 serial input is desired, connect a serial cable compatible with the 25-pin "Serial In" Print Box connector and the serial port of the host computer. If you are using an IBM PC compatible serial port, the IBM serial cable part number 8509386 or equivalent has been tested and found to work. Please refer to Appendix B for cable requirements.

Notes: It is recommended that a parallel adapter cable longer than six feet or a serial cable of over 25 feet not be used. The printer can be located further from the host since the twinax or coax cable from the printer to the Print Box can be up to 5,000 feet in length.

The interface does not allow a parallel and a serial ASCII host to be connected simultaneously.

3. Connect the twinax V-connector or the coax adapter cable to the 9-pin "Twinax/Coax" connector on the back of the Print Box.

4. Connect the twinax cable from the printer to either one of the twinax connectors on the V-connector or the coax cable from the coax printer to the Print Box coax adapter cable.

Note: The second end of the twinax V-connector must remain unused. Additional twinax devices or the twinax host must not be attached to the twinax V-connector.

5. If you are printing to a coax printer, please follow the printer's user manual to set the default language to U.S./Canada. This is necessary on coax printers, but the I-O Print Box RPC will automatically request the desired language setting on twinax printers.

Connecting Power

To connect the I-O Print Box RPC to power, plug the wall-mounted transformer into a standard 110 or 220 VAC power outlet, then plug the center post connector into the 9V receptacle on the back panel of the Print Box.

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3 CONFIGURATION

After connecting the I-O Print Box RPC, you can use a twinax or coax printer just like an ASCII printer from your PC or UNIX host. Simply define the twinax or coax printer as an IBM Proprinter or Epson FX printer in your host software, and send print jobs in the usual manner. (The printer definition used must match the front panel "Printer Emulation" selection.)

Note: Some high-capability word processing programs (e.g., Windows Printer Driver or WordPerfect) and desktop publishing programs may issue extensive page positioning commands that exceed the capabilities of the attached twinax or coax printer. In these cases, it is recommended that you define the printer as a DOS or generic printer in the software to reduce the complexity of the output documents.

Using the Front Panel

The LCD front panel was designed to be easy for the operator to configure and use the I-O Print Box RPC. To review or alter the configuration proceed as follows:

1. Power on the Print Box by pressing the **I/O** switch. A twinax or coax adapter cable must be attached, or an error message will be displayed. The Print Box then proceeds to the "ONLINE" condition as noted in the upper right-hand corner of the display.

2. Place the Print Box into the "OFFLINE" condition by pressing **Select**. (Note "OFFLINE" in upper right-hand corner.)

3. The display now gives you the choice of returning to the "ONLINE" operation by pressing **Select** or proceeding to the configuration menus by pressing **Menu**. Press **Menu** to continue.

4. Enter the "Test Menu" by pressing **List** to list items in that menu, or proceed to the next menu by pressing **Menu**. Press **Menu** to display the **Setup Menu**.

5. Proceed to the next menu by pressing **Menu** or list the Setup Menu items by pressing **List**.

6. The first Setup Menu item, "Printer Emulation" is displayed on the top line. Item options are shown on the second line. An asterisk in the first position indicates that the option is the current active selection.

   Press **Alt** to alter the displayed option.

   Press **Select** to select this displayed option as the active selection. An asterisk will appear in front of the selection.

   Press **List** to list the next item in the menu.

   Press **Menu** to exit the setup menu and go to the next menu.

7. Follow the instructions in Step 6 above to review and change the menu item settings desired. When all changes have been made, press **Menu** until you reach the "OFFLINE" display. Pressing **Select** will then return the Print Box to normal operation.

The I-O Print Box RPC Front Panel

The following is a list of the LCD Front Panel Menu options of the Print Box and an brief explanation of their usage. To indicate their usage, the following keys are used: (C/T) applies to both twinax and coax, (T) is a twinax only option, (C) is a coax only option. The default is shown with an asterisk (*).

Test Menu

ASCII Self-Test (C/T) - Prints configuration data and self-test to an ASCII parallel printer attached to the "Parallel Out" diagnostics port.

EBCDIC Self-Test (C/T) - Prints the same test as the ASCII self-test, but it is printed on the attached twinax or coax printer. This is followed by a character set "barber pole" pattern until power is turned off.

Diagnostics Test (T) - This test will test all of the twinax circuitry and then prints the results to an ASCII parallel printer attached to the "Parallel

Out" port. Refer to the section on Problem Resolution for more information.

Hard Loopback Test (C/T) - The Print Box will continuously "poll" itself. This test is only for a technician to debug the circuitry.

Setup Menu

Printer Emulation (C/T) *IBM PPDS (dot-matrix)
Epson FX

Defines which command sets are used when there are differences between Epson FX and IBM Proprinter commands.

Diagnostic Mode (C/T) *Off
On

This turns OFF or ON the diagnostic print mode that prints to an ASCII parallel printer attached to the "Parallel Out" diagnostic port all actions of the Print Box. Refer to the section on Problem Resolution for more information.

ASCII Character Set (C/T) *PC Set 2 - CP437
Code Page 850

The received ASCII characters are defined as either Code Page 850 or PC Set 2 - CP437

Non-busy on Commands (T) *Normal
No Error Check

The twinax protocol requires printers to report busy after a command is received. Some faster IBM printers and some third party printers do not do this. You can disable the Print Box error checking on this function if required.

Non-busy on Data (T)

*Normal
No Error Check

The twinax protocol requires printers to report busy after any data is received. Some faster IBM printers and some third party printers do not do this. You can disable the Print Box error checking on this function if required.

Fix MPP on CPI change (C/T)

*Yes fix MPP with CPI
No, change CPI only

IBM printers maintain a MPP (Maximum Print Position) even when the CPI (Characters Per Inch) changes. If you had been printing in 10 CPI the MPP would have been 132. If the CPI changes to 15 CPI the MPP would remain at 132, even though the printer could print 198 characters. If selected, the Print Box will adjust the MPP to its maximum amount on every CPI change.

Sheet Feed Commands (C/T)

Twinax: *Not Supported
Use Bin Commands

Coax: *Not Supported
Use FC byte (the IBM 4028 printer uses this method)
Use SD byte (the IBM 3912 printer uses this method)

If your IBM printer supports sheet feeder commands you can select them, or disable them if no sheet feeder is used. The sheet feed commands are used as bin selection on coax and twinax laser printers.

Fix Hor. Pos. on CPI (C/T)

*Yes - Fix Horizontal Position when CPI changes
No

If the ASCII command changes CPI in the middle of a line such as at print position 60, the IBM printer treats it as 6 inches at 10 CPI and 4 inches at 15 CPI. Thus overprints and gaps can result. If enabled the Print Box will adjust the printer to better match what the ASCII printer does.

Printer CPI support (C)

*Only 10 CPI, Printers with only 10 CPI - 3287, 3268
10 and 15 CPI, Printers supporting 10 & 15 CPI
10 12 & 15 CPI, Printer with this support - 4224, 4234

For coax printers, the operator needs to select the CPI support available on the coax printer. (This is readable by the Print Box with twinax printers)

PPM commands for NLQ (C)

*Disabled, Ignore NLQ, or no printer support
Enabled 4214, Two type Draft/NLQ as in 4214
Enabled 4224/30/34, Three type Draft/Text/NLQ as used in 4224, 4230 and 4234

Select the type of command to control for your coax printer

Send LF for ESC J (C/T)

Enabled, Sends a LineFeed(LF) when ESC J is received
*Disabled, Ignores any ESC J received

ESC J can be used to move the ASCII printing down x/216 of an inch. Since twinax and coax printers cannot do this, you can select how an ESC J received from the ASCII host will be treated.

Change CR to NL (C/T)

Enabled
*Disabled

This is an "Auto Feed" function. Some ASCII jobs expect the printer to do a New Line (NL=CR + LF) when a CR (Carriage Return) is received. You can enable or disable this function.

LPI commands to 5256 (T) *Normal 5256
Send LPI to 5256

A true 5256 printer will halt and report an error if an LPI command is received. Some printers that report to the host as a 5256 (such as the 5262) can receive LPI commands. You can select the Print Box to send LPI commands, or a normal 5256 without LPI commands.

UNIX LF (LF=NL) (C/T) *Disabled
Enabled

UNIX and other hosts expect that a Line Feed (LF) will position to the start of the next line. This is a New Line (NL) function in IBM. You can select this feature, or deselect it where an ASCII LF sends an EBCDIC LF.

PC Support +5 fix (C/T) *Disabled
Enabled

IBM PC Support has an error of 5 print positions when there is a CPI change in the middle of the line. To correct this, the Print Box has this feature. When enabled, and the Fix Hor. Pos. on CPI is enabled, and the Print Box will adjust five positions further on the horizontal line.

Command Pass Thru (CPT) (C/T) *Enable
Disable

Enable or disable the Command Pass Thru feature as explained below. This is useful if the twinax or coax printer has a command pass thru feature that you wish to use.

Input Data Source (C/T) *Parallel
Serial

Select RS-232 serial or Centronics compatible parallel.

Input Baud Rate (C/T) *9600
Select from 38.4K, 19.2K, 9600, 4800, 2400, 1200, 600, or 300

Parity (C/T) *None
Select from Odd, Even, or None

Data Bits (C/T) *8
Select from 8 or 7

Stop Bits (C/T) *1
Select from 1 or 2

Power On Settings (C/T) ***10 CPI 6 LPI
Select from these:

10 CPI 6 LPI
15 CPI 6 LPI
10 CPI 8 LPI
15 CPI 8 LPI
No settings made

These are the characters per inch (CPI) and the lines per inch (LPI) commands that are initially sent to the printer when the Print Box is powered on. These can be overridden by CPI and/or LPI commands issued by the incoming PC print jobs.

Set Factory Defaults

Pressing **Select** will restore the optional settings to the factory default selections.

Command Pass-Thru™

The I-O Command Pass-Thru feature can be used to access all of the built-in features of a printer, even if those features are not normally available through the ASCII host software. Printer-specific command sequences are inserted into the data sent to the twinax or coax printer from the host. The Print Box recognizes these special sequences and "passes the command through" to the printer. The steps below describe how to use I-O Command Pass-Thru.

1. Find the command for the print feature in the printer's manual.

2. Convert the printer command to EBCDIC hexadecimal.

3. Place the Command Pass-Thru delimiter **&%** into the document at the point where the feature to take effect. This signals the start of the print feature. Enter the printer command in EBCDIC hexadecimal code, then enter the delimiter **&%** again.

   You may enter a space between hexadecimal code pairs to make the command easier to read, however, do not put spaces between the delimiter and the hexadecimal characters.

4. To change the print feature back, move the cursor to the point in the text where the print feature is to be changed. Enter the delimiter, the new printer command, and then the delimiter again.

   For example:

   2B D2 04 29 00 0F is the command in EBCDIC hexadecimal code for 15 CPI printing on printers supporting this feature. 2B D2 04 29 00 0A is the command in hexadecimal for 10 CPI printing. So, to begin 15 CPI printing, enter the command as follows:

   &%2B D2 04 29 00 0F&%

   Then, to change printing back to 10 CPI, enter:

   &%2B D2 04 29 00 0A&%

Notes: Only characters from 00 to FF are recognized (alphabetical characters must be in upper case).

Errors in the Command Pass-Thru sequence will cause the Print Box to ignore the command and printing will resume at the point the error occurred.

Command Pass-Thru may invalidate horizontal spacing. Although the command is displayed on the screen, the Print Box treats it as a command and it is not printed. If part of the sequence is printed, an error has been made while entering the codes. Check the document and make sure you are using the correct format and EBCDIC hexadecimal characters.

Avoid sending codes that would move the print position during

Command Pass-Thru. Since the Print Box does not process these commands, it cannot keep track of the print position changes, and this may affect the position of following characters and page layout.

I-O Command Pass-Thru strings can also be sent to the printer by typing them on the ASCII host screen and pressing the screen print key.

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4 PROBLEM RESOLUTION

This chapter provides information to help analyze and solve possible problems with the I-O Print Box RPC.

Before calling your I-O dealer for assistance, perform the diagnostic tests described below. Then look for the problem in the tables in this chapter and try the suggested actions to solve it. If you still have problems, contact your I-O dealer and have the following information ready:

- Serial number of I-O Print Box RPC
- Type of ASCII host
- Date of purchase
- Model of twinax or coax printer
- Description of problem error message
- Diagnostic results

Performing Diagnostics

The I-O Print Box RPC diagnostics will provide you with information on any error condition identified by the Print Box, as well as documentation of its operation.

Diagnostic Port

You can use the Print Box diagnostic port to print out error conditions and documentation of the operation. You will need an ASCII parallel printer and a Centronics-type, standard, IBM PC parallel 25-pin to 36-pin printer cable (not supplied).

Take the following steps to set up and perform diagnostics through the Print Box diagnostic port.

1. Connect the parallel printer cable's 25-pin connector to the "Parallel Out" on the I-O Print Box RPC (see Figure 2-2).

2. Connect the parallel printer cable's 36-pin connector to the printer's port. Make sure the parallel printer is powered on and is ready to print.

3. Power on the attached EBCDIC printer and then the Print Box.

4. Enable Diagnostic mode from the front panel as follows:

   With the Print Box in "ONLINE" mode (ONLINE upper right).

   Press **Select** to take "OFFLINE".

   Press **Menu twice** to get to "Setup Menu".

   Press **List twice** to get to "Diagnostic Mode" option.

   Press **Alt** to alter selection from "*Off" to "On".

   Press **Select** to activate the selection, now shows "*On".

   Press **Menu** to return to "OFFLINE" selection.

   Press **Select** to return to Diagnostics "ONLINE" operation.

5. To end the diagnostics mode, repeat Step 4, changing "On" to "Off." This setting is constantly monitored, and the function can be activated even while a document is printing to capture a problem later. Allow for a delay in printing caused by the size of the ASCII printer's buffer.

A list of statements documenting the sequence of the operation and conversions performed by the Print Box is printed. A sample printout from the diagnostic port is shown on the next page.

Note: Activating the diagnostic port significantly slows down printing speed and may cause the Line Sync LED on the twinax printers to flash.

Sample Twinax Diagnostic Printout

Twinax Driver (c) SDE Rev 1.00 12-06-94

Communication established - at Address 3

ID - 2D = 5219D01

```
0         |          1          |          2
2D0802D02002C002C0402C042C083C03C0
B1310B2490AB62CB8300B222B124441401
  J a K        F    H     B   A d  D  {

49 2D 4F 20 50 72 6F 64 75 63 74 73 20 54 68 61 74 20 57 6F 72 6B 0C

0              |          1
C6D4D998A8AA4388A4E9990
906079644332038130669 2C
I-O Products That Work
```

Sample Coax Diagnostic Printout

Coax Driver (c) 1994 SDE Rev 1.00 12-06-94

Communication established with printer

Printer Registers.

```
Addr 0   1  2   3   4   5  6   7   8  9   A  B  C   D  E   F
0000-20  04 00  00  00  00 00  00  00 00  01 40 15  10 10  00
0010-00  06 01  00  00  0D 03  00  00 00  00 00 00  00 00  00
0020-00  00 00  00  00  00 00  00  00 00  00 00 00  00 00  00
0030-00  00 00  00  00  00 00  00  00 00  00 00 00  00 00  00
0040-00  00 00  00  00  00 00  00  00 00  00 00 00  00 00  00
```

Print Buffer.

```
Addr 0   1  2   3  4   5  6  7   8  9  A  B  C  D  E   F
0100-2B  C6 02  0C 2B  C2 02 42  2B C1 02 84 0D   .F...B..A.d.
```

ASCII data.

```
49 2D 4F 20 50 72 6F 64 75 63 74 73 20 54 68 61 74 20 57 6F 72 6B 0C
```

Printer Registers.

```
Addr   0   1  2   3  4   5  6  7   8   9  A  B  C  D   E  F
0000-20  04 00  00 00  00 00 00  00 00  01 40 15 10 10  00
0010-00  06 01  00 00  17 03 00  00 00  00 00 00 00 00  00
0020-00  00 00  00 00  00 00 00  00 00  00 00 00 00 00  00
0030-00  00 00  00 00  00 00 00  00 00  00 00 00 00 00  00
0040-00  00 00  00 00  00 00 00  00 00  00 00 00 00 00  00
```

Print Buffer.

```
Addr       0   1  2   3  4   5  6  7   8  9  A  B  C  D  E   F
0100-C9  60  D6 40  D7 99  96 84 A4  83 A3 A2 40 88 81  I-O
0110-A3  40  36 96  99 92  0C                          Products
                                                       That Work.
```

I-O Print Box RPC Self-Tests

The front panel is used to a perform self-test. Refer to Chapter 3, Configuration, for a complete description of front panel usage.

To enter the front panel Test Menu, do the following:

1. With the Print Box in "ONLINE" mode (ONLINE upper right), press **Select** to take the interface "OFFLINE."

2. Press **Menu** to get to "Test Menu."

To perform a self-test, press **List** twice to display the EBCDIC self-test option, then press **Select**. The results of an internal self-test, the software version, and the setup selections are printed out on the attached twinax or coax printer. An example of the self-test printout is shown on the pages 4-6 and 4-7.

To test the diagnostic port, enter the "Test Menu" again and press **List** once to display the ASCII self-test option, then press **Select**. The self-test printout is printed on an ASCII parallel printer connected to the diagnostic port (see "Diagnostic Port" on page 4-1).

To test twinax communications (this test is unavailable for coax), disconnect the twinax cable from the twinax V-connector (connected to the I-O Print Box RPC "Twinax/Coax" port), but leave the "V" cable connected to the Print Box. Press **List** three times to display the Diagnostics Test option, then press **Select**. A comprehensive diagnostic self-test is performed and "Test Complete" or a description of any errors identified is sent to the parallel printer attached to the diagnostic port (see "Diagnostic Port" on page 4-1).

Note: If the twinax cable is not disconnected, you may receive the error message "Input Data Available Bit Bad."

The final test is for use by a repair technician with an oscilloscope. A twinax or coax loopback signal is generated. Press **List** three times in coax mode or four times in twinax mode to display the Hard Loopback test option, then press **Select** to select the test.

Sample Twinax Self-Test Printout

TWINAX Driver (c) 1994 SDE Rev 1.00 12-06-94

Configuration Selections:

Printer Emulation . . . . . .:	IBM -PPDS
Debug Mode . . . . . .:	Off
ASCII Character Set . . . . . .:	PC Set 2 - CP437
Test BUSY on Twinax commands . . . . . .:	Normal
Test BUSY on Twinax data . . . . . .:	Normal
Adjust MPP on CPI changes . . . . . .:	Change MPP on CPI changes
Send Sheet Feeder Commands . . . . . :	Off
Adjust Hor. Pos. on CPI changes . . . . . .:	On
Send a LF when ESC J received . . . . . :	Off
Change CR into NL . . . . . :	Off
Send LPI commands to 5256 ID . . . . . .:	Off
UNIX LF (Change LF into NL) . . . . . .:	Off
PC Support +5 position fix . . . . . .:	Off

RAM OK
ROM OK

ASCII cp437 to EBCDIC Translate Table

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0:	00	00	40	F0	7C	D7	79	97	68	71	45	40	40	40	40	40
1:	00	00	4F	F1	C1	D8	81	98	DC	9C	55	40	40	40	59	8F
2:	00		7F	F2	C2	D9	82	99	51	9E	CE	40	40	40	40	DA
3:	00	00	7B	F3	C3	E2	83	A2	42	CB	DE	BB	40	40	40	8D
4:	00		5B	F4	C4	E3	84	A3	43	CC	49	40	40	40	40	40
5:	00	B5	6C	F5	C5	E4	85	A4	44	CD	69	40	40	40	40	40
6:	00	00	50	F6	C6	E5	86	A5	47	DB	9A	40	40	40	A0	40
7:	2F	00	7D	F7	C7	E6	87	A6	48	DD	9B	40	40	40	40	40
8:		00	4D	F8	C8	E7	88	A7	52	DF	AB	40	40	40	40	90
9:	00	00	5D	F9	C9	E8	89	A8	53	EC	00	40	40	40	40	B3
A:		00	5C	7A	D1	E9	91	A9	54	FC	BA	40	40	40	40	4B
B:			4E	5E	D2	4A	92	C0	57	B0	B8	40	40	40	8C	40
C:		00	6B	4C	D3	E0	93	6A	56	B1	B7	40	40	40	40	40
D:		00	60	7E	D4	5A	94	D0	58	B2	AA	40	40	40	80	EA
E:		00	4B	6E	D5	5F	95	A1	63	B3	8A	40	40	40	40	40
F:		00	61	6F	D6	6D	96	00	67	B4	83	40	40	40	40	40

ASCII cp850 to EBCDIC Translate Table

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0:	00	00	40	F0	7C	D7	79	97	68	71	45	40	40	8C	EE	CA
1:	00	00	4F	F1	C1	D8	81	98	DC	9C	55	40	40	AC	59	8F
2:	00		7F	F2	C2	D9	82	99	51	9E	CE	40	40	72	EB	BF
3:	00	00	7B	F3	C3	E2	83	A2	42	CB	DE	BB	40	73	ED	B9
4:	00		5B	F4	C4	E3	84	A3	43	CC	49	40	40	74	CF	B6
5:	00	B5	6C	F5	C5	E4	85	A4	44	CD	69	65	40	40	EF	B5
6:	00	00	50	F6	C6	E5	86	A5	47	DB	9A	62	46	75	A0	40
7:	2F	00	7D	F7	C7	E6	87	A6	48	DD	9B	64	66	76	AE	9D
8:		00	4D	F8	C8	E7	88	A7	52	DF	AB	AF	40	77	8E	90
9:	00	00	5D	F9	C9	E8	89	A8	53	EC	AF	40	40	40	FE	BD
A:		00	5C	7A	D1	E9	91	A9	54	FC	BA	40	40	40	FB	B3
B:			4E	5E	D2	4A	92	C0	57	B0	B8	40	40	40	FD	DA
C:		00	6B	4C	D3	E0	93	6A	56	B1	B7	40	40	40	8D	FA
D:		00	60	7E	D4	5A	94	D0	58	80	AA	B0	40	6A	AD	EA
E:		00	4B	6E	D5	5F	95	A1	63	B3	8A	B2	40	78	BC	40
F:		00	61	6F	D6	6D	96	00	67	B4	8B	40	9F	40	BE	40

Sample Coax Self-Test Printout

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Active Configuration Selections:

Printer Emulation	IBM -PPDS
Debug Mode	Off
ASCII Character Set	PC Set 2 - CP437
Adjust MPP on CPI changes	Change MPP on CPI changes
Send Sheet Feeder Commands	Disabled
Adjust Hor. Pos. on CPI changes	Yes
CPI support on printer	Only 10 CPI
Send PPM commands for NLQ	Off
Command-Pass-Thru (CPT) enabled	Enabled
Send a LF when ESC J received	Off
Change CR into NL	Off
UNIX LF (Change LF into NL)	Off
PC Support +5 position fix	Off
Input Data Source	Parallel

RAM OK
ROM OK

ASCII cp437 to EBCDIC Translate Table

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0:	00	00	40	F0	7C	D7	79	97	68	71	45	40	40	40	40	40
1:	00	00	4F	F1	C1	D8	81	98	DC	9C	55	40	40	40	59	8F
2:	00		7F	F2	C2	D9	82	99	51	9E	CE	40	40	40	40	DA
3:	00	00	7B	F3	C3	E2	83	A2	42	CB	DE	BB	40	40	40	8D
4:	00		5B	F4	C4	E3	84	A3	43	CC	49	40	40	40	40	40
5:	00	B5	6C	F5	C5	E4	85	A4	44	CD	69	40	40	40	40	40
6:	00	00	50	F6	C6	E5	86	A5	47	DB	9A	40	40	40	A0	40
7:	2F	00	7D	F7	C7	E6	87	A6	48	DD	9B	40	40	40	40	40
8:		00	4D	F8	C8	E7	88	A7	52	DF	AB	40	40	40	40	90
9:	00	00	5D	F9	C9	E8	89	A8	53	EC	00	40	40	40	40	B3
A:		00	5C	7A	D1	E9	91	A9	54	FC	BA	40	40	40	40	4B
B:			4E	5E	D2	4A	92	C0	57	B0	B8	40	40	40	8C	40
C:		00	6B	4C	D3	E0	93	6A	56	B1	B7	40	40	40	40	40
D:		00	60	7E	D4	5A	94	D0	58	B2	AA	40	40	40	80	EA
E:		00	4B	6E	D5	5F	95	A1	63	B3	8A	40	40	40	40	40
F:		00	61	6F	D6	6D	96	00	67	B4	83	40	40	40	40	40

ASCII cp850 to EBCDIC Translate Table

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
0:	00	00	40	F0	7C	D7	79	97	68	71	45	40	40	8C	EE	CA
1:	00	00	4F	F1	C1	D8	81	98	DC	9C	55	40	40	AC	59	8F
2:	00		7F	F2	C2	D9	82	99	51	9E	CE	40	40	72	EB	BF
3:	00	00	7B	F3	C3	E2	83	A2	42	CB	DE	BB	40	73	ED	B9
4:	00		5B	F4	C4	E3	84	A3	43	CC	49	40	40	74	CF	B6
5:	00	B5	6C	F5	C5	E4	85	A4	44	CD	69	65	40	40	EF	B5
6:	00	00	50	F6	C6	E5	86	A5	47	DB	9A	62	46	75	A0	40
7:	2F	00	7D	F7	C7	E6	87	A6	48	DD	9B	64	66	76	AE	9D
8:		00	4D	F8	C8	E7	88	A7	52	DF	AB	AF	40	77	8E	90
9:	00	00	5D	F9	C9	E8	89	A8	53	EC	AF	40	40	40	FE	BD
A:		00	5C	7A	D1	E9	91	A9	54	FC	BA	40	40	40	FB	B3
B:			4E	5E	D2	4A	92	C0	57	B0	B8	40	40	40	FD	DA
C:		00	6B	4C	D3	E0	93	6A	56	B1	B7	40	40	40	8D	FA
D:		00	60	7E	D4	5A	94	D0	58	80	AA	B0	40	6A	AD	EA
E:		00	4B	6E	D5	5F	95	A1	63	B3	8A	B2	40	78	BC	40
F:		00	61	6F	D6	6D	96	00	67	B4	8B	40	9F	40	BE	40

PROBLEM RESOLUTION

Problem Resolution Guide

Use the following table as a guide to possible solutions to common problems with the I-O Print Box RPC or the EBCDIC

Problem	Probable Cause	Solution
Twinax printer	does not indicate "busy" when data received and the Major Error message is displayed Some non-IBM twinax printers normally do not indicate "busy" after receipt of a command or data.	Activate the diagnostic port (see "Diagnostic Port" on page 4-1) to determine if this is the problem. If this is indicated, select "No Error Check" on front panel "Non-Busy" options to instruct the I-O Print Box RPC to ignore the error; it will not affect the printing.
Vertical spacing of the printing is not consistent	The vertical spacing commands are too complex for the limited capabilities of your twinax or coax printer.	Print the job again using the diagnostic port (see Diagnostic Port on page 4-1) to list the ASCII commands being sent from the PC.
ASCII commands are printed out on the twinax or coax printer	The emulation you selected on the front panel is incorrect.	Print a self-test (see "I-O Print Box RPC Self-Tests" on pages 4-4, 4-7) to determine whether EPSON or IBM mode is selected and if the Code Page 437 or Code Page 850 character is selected. Verify that the active code page is appropriate for the printer driver selected in the software and reset the front panel settings if they are not.

Indicated Errors

Some errors will be displayed on the LCD front panel of the I-O Print Box RPC (see Figure 2-1). The errors involving the printer are as follows:

Parity Err - A parity error is generally caused by defective cabling or poor connections to the printer. If the error occurs frequently, check the cables for problems. Press **Select** to take the Print Box "OFFLINE." When **Select** is pressed again to return to "ONLINE" the error will be cleared.

Major Err - Indicates that the printer has experienced a major error which may or may not affect the printed output. If the problem occurs consistently, or if the Print Box resets often in coax mode, activate the diagnostic port to print out more details regarding the error (see "Diagnostic Port" on page

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APPENDIX A

ASCII Command Translation Table

The following table lists ASCII commands and the I-O Print Box RPC interpretation in relation to the capabilities of the twinax or coax printer. All ASCII commands received on the parallel or serial port are either utilized or purged from the data stream sent to the EBCDIC printer.

Command					
ASCII	**DEC**	**HEX**	**Description**	**Printer Emulation**	**Interpretation**
BEL	7	07	Beeper	Proprinter and Epson	EBCDIC BEL command is sent which sounds the alarm and takes the printer off-line
BS	8	08	Backspace	Proprinter and Epson	For printers supporting EBCDIC BACKSPACE, command is sent; for other printers the position is changed using SET ABSOLUTE HORIZONTAL POSITION command
HT	9	09	Tab horizontally	Proprinter and Epson	A blank space is printed (TAB not supported)
LF	10	0A	Line feed	Proprinter and Epson	EBCDIC LINE FEED command is sent
VT	11	0B	Tab vertically	Proprinter and Epson	Line feed is sent (TAB not supported)

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
FF	12	0C	Form feed	Proprinter and Epson	EBCDIC FORM FEED command is sent
CR	13	0D	Carriage return	Proprinter and Epson	EBCDIC CARRIAGE RETURN command is sent
SO	14	0E	Select double-width (1 line)	Proprinter and Epson	5 CPI sent to 4214M2 (twinax) ignored on all other printers
SI	15	0F	Select condensed mode	Proprinter and Epson	Twinax: 15 CPI sent (ignored on 5256 printer). Coax: Front panel setting 15 CPI is sent to the printer
DC1	17	11	Select printer	Proprinter and Epson	Ignored (not supported)
DC2	18	12	Cancel condensed mode	Proprinter and Epson	Twinax: 10 CPI sent (ignored on 5256 printer) Coax: If Only 10 CPI is selected, this is ignored, if not, 10 CPI is sent
DC3	19	13	Deselect printer	Proprinter and Epson	Ignored (not supported)
DC4	20	14	Cancel double-width (1 line)	Proprinter and Epson	5 CPI for single line only on 4214M2 (Twinax) returned to 10 CPI, otherwise ignored
CAN	24	18	Cancel line	Proprinter and Epson	Ignored (not supported)

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
DEL	127	7F	Delete character	Proprinter and Epson	Ignored (not supported)
ESC SO	14	0E	Select double-width (1 line)	Proprinter and Epson	5 CPI sent to 4214M2 (Twinax), ignored on all other printers
ESC SI	15	0F	Select condensed mode	Proprinter and Epson	Twinax: 15 CPI sent (ignored on 5256 printer) Coax: Ignored if set to 10 CPI only, if not, 15 CPI sent to printer
ESC EM	25	19	Automatic sheet feeder on/off	Proprinter and Epson	Twinax: Epson command #2 or B selects back paper bin on 4214 and 5219 only; otherwise front bin selected Coax: As above, but following front panel setting
ESC SP	32	20	Set inter-character space	Proprinter and Epson	Ignored (not supported)
ESC !	33	21	Master select	Proprinter and Epson	Ignored (not supported)
ESC #	35	23	Cancel MSB control	Proprinter and Epson	Ignored (not supported)

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC $	36	24	Set absolute print position	Proprinter and Epson	Twinax: EBCDIC SET ABSOLUTE HORIZONTAL POSITION command is sent Coax: CR and space positioning sent
ESC %	37	25	Select user-defined set	Proprinter and Epson	Ignored (not supported)
ESC &	38	26	Define user-defined characters	Proprinter and Epson	Ignored (not supported)
ESC *	42	2A	Select graph-ics mode	Proprinter and Epson	Ignored (not supported)
ESC -	45	2D	Turn under-lining on/off	Proprinter and Epson	Twinax: EBCDIC START and END UNDERLINE command sent to 5219. SET ABSOLUTE HORIZONTAL POSITION and re-strike with underline sent to all other printers Coax: BS and re-strike are activated

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC /	47	2F	Select vertical tab channel	Proprinter and Epson	Ignored (not supported)
ESC 0	48	30	Select 1/8-inch line spacing	Proprinter and Epson	9/72-inch sent (ignored on 5256 printer)
ESC 1	49	31	Select 7/72-inch line spacing	Proprinter and Epson	Twinax: 7/72-inch sent (ignored on 5256 printer) Coax: 8 LPI selected if LPI commands are set on front panel
ESC 2	50	32	Select 1/6-inch line spacing	Epson	Twinax: 12/72-inch (6 LPI) sent (ignored on 5256 printer) Coax: 6 LPI selected if LPI commands are set on front panel
ESC 2	50	32	Select programmable line spacing	Proprinter	Twinax: n/72-inch command previously set by ESC A is activated Coax: Closest LPI selected for LPI commands set on front panel

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC 3	51	33	Select n/216 line spacing	Proprinter and Epson	Twinax: (n/3)/72-inch sent (ignored on 5256 printer) Coax: Closest LPI selected for LPI commands set on front panel
ESC 4	52	34	Select italic mode	Epson	Ignored (not supported)
ESC 4	52	34	Set top-of-form	Proprinter	Current vertical format sent to establish new top-of-form
ESC 5	53	35	Cancel italic mode	Epson	Ignored (not supported)
ESC 5	53	35	Turn automatic line feed on/off	Proprinter	If following parameter is 1 (01h or 31h), LF added to each CR. If following parameter is 0 (00h or 30h), function is canceled.
ESC 6	54	36	Printable code area expansion	Epson	Ignored (not supported only Code Page 437 or 850 supported, not duplicate control codes)
ESC 6	54	36	Select international character set	Proprinter	Ignored (not supported only Code Page 437 or 850 supported)

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC 7	55	37	Cancel ESC 6	Epson	Ignored (not supported)
ESC 7	55	37	Select standard character set	Proprinter	Ignored not supported)
ESC 8	56	38	Disable paper- out sensor	Proprinter and Epson	Ignored (not supported on EBCDIC printers)
ESC 9	57	39	Enable paper-out sensor	Proprinter and Epson	Ignored (paper-out always enabled on EBCDIC printers)
ESC :	58	3A	Copy ROM into RAM	Epson	Ignored (not supported)
ESC :	58	3A	Select elite pitch	Proprinter	Twinax: 12 CPI sent to 4214 and 5219 printers. Ignored on 5256 printer. 10 CPI sent to all other printers. Coax: 12 CPI sent if selected by front panel
ESC <	60	3C	Select uni-directional mode (1-line)	Proprinter and Epson	Ignored (not supported)

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC =	61	3D	Set MSB to 0	Epson	Ignored (not supported only Code Page 437 or 850 supported)
ESC =	61	3D	Define user-defined characters	Proprinter	Ignored (not supported)
ESC >	62	3E	Set MSB to 1	Proprinter and Epson	Ignored (not supported only Code Page 437 or 850 supported)
ESC ?	63	3F	Reassign graphics mode	Proprinter and Epson	Ignored (not supported)
ESC @	64	40	Initialize printer	Proprinter and Epson	Commands to reset printer functions to defaults are sent
ESC A	65	41	Select n/72-inch line spacing	Epson	Twinax: n/72-inch sent (ignored on 5256 printer) Coax: Closest LPI selected for LPI commands set on front panel
ESC A	65	41	Set n/72-inch line spacing	Proprinter	Twinax: n/72-inch sent if selected by following ESC (32h) command (ignored on 5256 printer) Coax: Closest LPI selected for LPI commands set on front panel

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC B	66	42	Set vertical tabs	Proprinter and Epson	Ignored (not supported LF sent)
ESC C	67	43	Set page length in lines	Proprinter and Epson	Page length set to number of lines defined by following parameter
ESC C	0 67	00 43 00	Set page length in inches	Proprinter and Epson	Ignored (not supported)
ESC D	68	44	Set horizontal tabs	Proprinter and Epson	Ignored (not supported tabs treated as spaces)
ESC E	69	45	Select emphasized mode (bold)	Proprinter and Epson	Character sent. SET ABSOLUTE HORIZONTAL POSITION sent to place printhead over character, then character sent again
ESC F	70	46	Cancel emphasized mode	Proprinter and Epson	Cancels emphasized mode commands

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC G	71	47	Select double-strike mode (bold)	Proprinter and Epson	Same as ESC E
ESC H	72	48	Cancel double-strike mode	Proprinter and Epson	Cancels double-strike mode commands
ESC I	73	49	Printable code are expansion	Epson	Ignored (not supported only Code Page 437 or 850 supported)
ESC I	73	49	Select font	Proprinter	Twinax: NLQ or DRAFT set on 4214 (0, 1, 4, 5 selects Draft; 2, 3, 6, 7 selects NLQ); ignored on all other printers Coax: NLQ Draft and Text is sent as selected on front panel.
ESC J	74	4A	Perform n/216-inch or n/180 line feed	Proprinter and Epson	A LF is sent if front panel setting for ESC J is active; if not, ignored.
ESC K	75	4B	Select single density graphics	Proprinter and Epson	Ignored (not supported)

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC L	76	4C	Select double density graphics	Proprinter and Epson	Ignored (not supported)
ESC M	77	4D	Select elite pitch	Proprinter and Epson	Twinax: 12 CPI sent to 4214 and 5219 printers. Ignored on 5256 printer 10 CPI; sent to all other printers. Coax: 12 CPI is sent if selected on front panel.
ESC N	78	4E	Set skip-over- perforation	Proprinter and Epson	Ignored (not supported)
ESC O	79	4F	Cancel skip-over- perforation	Proprinter and Epson	Ignored (not supported)
ESC P	80	50	Select pica pitch	Epson	Twinax: 10 CPI sent. Ignored on 5256 printer. Coax: If 10 CPI only is sent it is ignored; if not, 10 CPI is sent.
ESC P	80	50	Begin or end proportional spacing	Proprinter	Proportional spacing selected on 5219 printer; ignored on all others 0131 begins proportional spacing 0030 ends proportional spacing)

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC Q	81	51	Set right margin	Epson	Line length set as defined by following parameter
ESC Q	81	51	Deselect printer	Proprinter	Ignored (not supported)
ESC R	82	52	International character set	Epson	Ignored (not supported only Code Page 437 or 850 supported)
ESC R	82	52	Restore default tab settings	Proprinter	Ignored (tabs not supported are treated as spaces)
ESC S 0	83 00	53 00	Select superscript mode	Proprinter and Epson	Superscript set on 5219 printer; ignored on all other printers
ESC S 1	83 01	53 01	Select subscript mode	Proprinter and Epson	Subscript set on 5219 printer; ignored on all other printers
ESC T	84	54	Cancel superscript/subscript	Proprinter and Epson	Superscript canceled on 5219 printer; ignored on all other printers
ESC U	85	55	Turn unidirectional mode on/off	Proprinter and Epson	Ignored (not supported)

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC W	87	57	Turn double-width on/off	Proprinter and Epson	Double-width command sent to 4214M2 (twinax) printer (01 or 31 selects 5 CPI; 00 or 30 returns to 10 CPI); ignored on all other printers
ESC X	88	58	Set left and right margins	Proprinter and Epson	Ignored (not supported)
ESC Y	89	59	High-speed double density graphics	Proprinter and Epson	Ignored (not supported)
ESC Z	90	5A	Quadruple density graphics	Proprinter and Epson	Ignored (not supported)
ESC \	92	5C	Set relative position	Epson	Ignored (not supported space is sent)
ESC \	92	5C	Print characters from symbol set	Proprinter	Ignored (not supported)
ESC ^	94	5E	Select 9-pin graphics	Epson	Ignored (not supported)
ESC ^	94	5E	Print 1 character from symbol set	Proprinter	Ignored (not supported)
ESC _	95	5F	Turn overscore on/off	Proprinter and Epson	Ignored (not supported)
ESC a	97	61	NLQ justification	Proprinter and Epson	Ignored (not supported)

Command					
ASCII	DEC	HEX	Description	Printer Emulation	Interpretation
ESC b	98	62	Set vertical tabs in channels	Proprinter and Epson	Ignored (not supported)
ESC i	105	69	Turn immediate mode on/off	Proprinter and Epson	Ignored (not supported)
ESC j	106	6A	Perform n/216-inch reverse LF	Proprinter and Epson	Ignored (not supported)
ESC k	107	6B	Select NLQ font	Proprinter and Epson	Ignored (not supported)
ESC l	108	6C	Set left margin	Proprinter and Epson	Ignored (not supported)
ESC p	112	70	Turn proportional mode on/off	Proprinter and Epson	Proportional mode turned on or off on 5219 printer; ignored on all other printers
ESC r	114	72	Select printing color	Proprinter and Epson	Ignored (not supported)
ESC s	115	73	Turn half-speed mode on/off	Proprinter and Epson	Ignored (not supported)
ESC t	116	74	Select character table	Proprinter and Epson	Ignored (not supported)
ESC x	120	78	Select NLQ or draft	Proprinter and Epson	Twinax: NLQ or DRAFT set on 4214 (00 or 30 selects draft; 01 or 31 selects NLQ); ignored on all other printers. Coax: Draft of NLQ is sent as selected on front panel

APPENDIX B

Interface Cable Requirements

36-Pin Centronics Compatible Parallel Input

Signal Pin	Return Pin	Signal	Direction	Description
1	19	$\overline{\text{STROBE}}$	IN	Strobe pulse to read data in. Pulse width must be minimum .5 sec. at interface.
2 3 4 5 6 7 8 9	20 21 22 23 24 25 26 27	DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7 DATA8	IN IN IN IN IN IN IN IN	These signals represent information in bits 1 to 8 of parallel data respectively. Each signal is HIGH when data is logical 1 and LOW when it is logical 0.
10	28	$\overline{\text{ACKNLG}}$	OUT	A LOW pulse of minimum width of 4 sec. A low indicates that data has been received and that the printer is ready to accept more data.
11	29	BUSY	OUT	A HIGH signal indicates that the printer cannot receive data. It goes HIGH on each data byte received.
12	30	PE	OUT	HIGH when printer reports out of paper.
13	--	SLCT	OUT	High when interface is in normal mode.
14	--	$\overline{\text{AUTO}}$ $\overline{\text{FEED}}$	IN	THIS SIGNAL IS NOT SUPPORTED BY INTERFACE.
15	--	NC	--	Not used
16	--	GND	--	Logic ground

APPENDIX B

Signal Pin	Return Pin	Signal	Direction	Description
17	--	CGND	--	Chassis ground
18	--	NC	--	Not used
19-30	--	GND	--	Twisted pair ground returns listed above
31	--	$\overline{\text{INIT}}$	IN	Defined to reset and clear the printer when OW; THE RESET AND CLEAR ARE NOT SUPPORTED
32	--	$\overline{\text{ERROR}}$	OUT	This signal goes LOW when the printer reports an error state such as out of paper.
33	--	GND	--	Logic ground
34	--	NC	--	Not used
35	--	HIGH	--	Pulled up to +5V through a 3.3K ohm resistance
36	--	$\overline{\text{SLCTIN}}$	--	NOT SUPPORTED

25-Pin Centronics Compatible Parallel Output Diagnostic Port

Signal Pin	Return Pin	Signal	Direction	Description
1	21	$\overline{\text{STROBE}}$	OUT	Data strobe to printer. Pulse width is nominally 1 µsec.
2 3 4 5 6 7 8 9	22 22 22 22 23 23 23 23	DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7 DATA8	OUT OUT OUT OUT OUT OUT OUT OUT	These signals represent information in bits 1 to 8 of parallel data respectively. Each signal is HIGH when data is logical 1 and LOW when it is logical 0. The setup and high times are nominally 1 µsec.
10	24	$\overline{\text{ACKNLG}}$	IN	A LOW pulse of minimum width of 1 sec indicates that data has been received and that the printer is ready to accept more data.
11	25	BUSY	IN	When HIGH the Interface will not send more data.
12	35	PE	IN	HIGH when printer reports out of paper.
13	--	SLCT	IN	High when printer is selected.
14	--	$\overline{\text{AUTO}}$ $\overline{\text{FEED}}$	OUT	The Interface holds this HIGH.
15	--	$\overline{\text{ERROR}}$	IN	This signal goes LOW when the printer reports an error state such as out of paper.
16	--	$\overline{\text{INIT}}$	OUT	LOW Resets Printer. The Interface hold this HIGH.
17	--	$\overline{\text{SLCTIN}}$	OUT	LOW selects printer. Interface holds this LOW
18-25	--	GND	--	Logic Grounds

APPENDIX B

25-Pin RS-232 Serial Input Port

The 25-pin serial input connector was designed to appear the same as an IBM Proprinter serial connector. The connections are as follows:

Pin Number	Signal Name	Direction
1	Chasis Ground (CG)	--
2	Transmit Data (TXD)	OUT
3	Receive Data (RXD)	IN
4	Request To Send (RTS)	OUT
5	Clear To Send (CTS)	IN
6	Data Set Ready (DSR)	IN
7	Logic Ground (GND)	--
20	Data Terminal Ready (DTR)	OUT

If you are using an IBM PC compatible serial output, the serial cable needed to input data to the I-O Print Box RPC is equivalent to IBM part number 8509386. An example of this cable is shown below to help you to obtain or make a cable to function with the Print Box

Computer - Female 25-pin Male 25-pin - **I-O Print Box**

PIN SIGNAL SIGNAL PIN

1 - Chasis Ground (CG) _____ (CG) Chasis Ground - 1
2 - Transmit Data (TXD) _____ (RXD) Receive Data - 3
3 - Receive Data (RXD) _____ (TXD) Transmit Data - 2
4 - Request to Sent (RTS) _____ (CTS) Clear to Send - 5
|
8 - Data Carrier Detect (DCD) ___+
5 - Clear to Send (CTS) _____ (DTR) Data Transmit Ready - 20
6 - Data Set Ready (DSR) _____ (RTS) Request to Send - 4
7 - Logic Ground (GND) _____ (GND) Logic Ground - 7
20 - Data Terminal Ready (DTR) _____ (DSR) Data Set Ready - 6

Manufacturer's One Year Limited Warranty (United States)

The following warranty applies only to products purchased and operated within the United States.

I-O Corporation (I-O) warrants this product against defects in material and workmanship for a period of one year commencing from date of purchase by the original customer, when operated and maintained in accordance with I-O's published specifications. I-O's liability shall be limited, at its option and expense, to refund to buyer the actual amount paid by buyer or to repair or replace any defective or nonconforming product or part thereof, F.O.B. I-O's authorized repair depot. Buyer may obtain a replacement product by meeting the terms of the I-O Customer On-Site Exchange Repair Policy in effect at the time of the request.

THE EXPRESS WARRANTY SET FORTH ABOVE IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES. OTHERWISE, THE PRODUCTS ARE SOLD AS IS WITHOUT FURTHER OBLIGATION OR LIABILITY ON THE PART OF I-O. I-O EXPRESSLY EXCLUDES ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCEPT AS EXPRESSLY SET FORTH HEREIN, IN NO EVENT SHALL I-O BE LIABLE FOR ANY CLAIMS OR DAMAGE ARISING DIRECTLY OR INDIRECTLY FROM THE FURNISHING OR FAILURE TO FURNISH PRODUCTS, SPARE OR REPLACEMENT PARTS, INFORMATION OR SERVICES HEREUNDER. UNDER NO CIRCUMSTANCES SHALL I-O BE LIABLE IN ANY WAY FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO LOST BUSINESS OR PROFITS, WHETHER OR NOT FORESEEABLE AND WHETHER OR NOT BASED ON BREACH OF WARRANTY, CONTRACT, OR NEGLIGENCE.

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Customer On-Site Exchange Repair Policy

Terms, Conditions, and Limitations
Effective May 1, 1994[a]

For products covered by the I-O Corporation (I-O) Manufacturer's Limited Warranty (United States), I-O's Customer On-Site Exchange (COE) Repair Policy provides customers with a replacement unit for a defective product, subject to the following terms and conditions:

Call Customer Support

- If a product fails call I-O Customer Support for assistance at (801) 972-1446.

Verify Product Failure

- I-O will verify the product serial number, warranty coverage and product failure.

* You are responsible for assisting in verifying the product failure.

- When I-O Customer Support verifies a product failure they will issue a Return Merchandise Authorization (RMA) number for the failed product.

Replacement Units

- Replacement units are shipped from I-O's stock of refurbished units, subject to availability.

- Replacement units carry the same warranty as remaining on the original product.

- I-O's COE Repair Policy applies only to warranted product failures. Buyer guarantees payment for non-warranted product repairs or replacement.

Customer On-Site Exchange Repair Policy
(Continued)

Return Your Failed Unit

- When you return the failed product it must be shipped freight prepaid. Always note the RMA number on the outside of the package.

Install the Replacement Unit

- You are responsible for installing the replacement unit.
- After receiving the replacement unit please call I-O Customer Support if any assistance is required.

[a] I-O reserves the right to change the terms and conditions of this policy without notice.

Manufacturer's One Year Limited Warranty (International)

The following warranty applies only to products purchased or operated outside the United States.

I-O Corporation (I-O) warrants this product against defects in material and workmanship for a period of one year commencing from date of purchase by the original customer, when operated and maintained in accordance with I-O's published specifications. I-O's liability shall be limited, at its option and expense, to refund to buyer the actual amount paid by buyer or to repair or replace any defective or nonconforming product or part thereof, F.O.B. I-O's authorized repair depot. Buyer may obtain warranty service by meeting the terms of the I-O Return-to-Depot Repair Policy in effect at the time of the request.

THE EXPRESS WARRANTY SET FORTH ABOVE IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES. OTHERWISE, THE PRODUCTS ARE SOLD AS IS WITHOUT FURTHER OBLIGATION OR LIABILITY ON THE PART OF I-O. I-O EXPRESSLY EXCLUDES ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCEPT AS EXPRESSLY SET FORTH HEREIN, IN NO EVENT SHALL I-O BE LIABLE FOR ANY CLAIMS OR DAMAGE ARISING DIRECTLY OR INDIRECTLY FROM THE FURNISHING OR FAILURE TO FURNISH PRODUCTS, SPARE OR REPLACEMENT PARTS, INFORMATION OR SERVICES HEREUNDER. UNDER NO CIRCUMSTANCES SHALL I-O BE LIABLE IN ANY WAY FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO LOST BUSINESS OR PROFITS, WHETHER OR NOT FORESEEABLE AND WHETHER OR NOT BASED ON BREACH OF WARRANTY, CONTRACT, OR NEGLIGENCE.

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Return-to-Depot Repair Policy

Terms, Conditions, and Limitations
Effective May 1, 1994[a]

For products covered by the I-O Corporation (I-O) Manufacturer's Limited Warranty (International), I-O's Return-to-Depot (RTD) Repair Policy provides customers with warranty service for a defective product, subject to the following terms and conditions:

Call Customer Support

- If a product fails call I-O Customer Support for assistance at:

  (801) 972-1446 for all locations outside the United States.

Verify Product Failure

- I-O will verify the product serial number, warranty coverage and product failure.
- You are responsible for assisting in verifying the product failure
- When I-O Customer Support verifies a product failure they will issue a Return Merchandise Authorization (RMA) number to authorize return of the failed product.

Select Your Preferred Repair Location

- I-O's Customer Support Representative will assist you in identifying the nearest I-O authorized repair depot.
- I-O's Customer Support Representative will provide you with an RMA transmittal form referencing the assigned RMA number and the authorized repair depot address.

Return-to-Depot Repair Policy

(Continued)

Return Your Failed Unit

- Return the failed product to the I-O authorized repair depot previously identified, enclosing the RMA transmittal form. When you return the failed product it must be shipped freight prepaid.

- I-O's RTD Repair Policy applies only to warranted product failures. Buyer guarantees payment for non-warranted product repairs.

Install Your Repaired Unit

- I-O's authorized repair depot will service the faulty unit and return it to you, freight prepaid.

- You are responsible for installing the returned unit.

- After receiving the repaired unit please call I-O Customer Support if any assistance is required.

[a] I-O reserves the right to change the terms and conditions of this policy without notice.

Manufacturer's One Year Limited Warranty (European Area)

The following warranty applies only to products purchased and operated within the European Area.

I-O Corporation (I-O) warrants this product against defects in material and workmanship for a period of one year commencing from date of purchase by the original end-user, when operated and maintained in accordance with I-O's published specifications. I-O's liability shall be limited, at its option and expense, to refund to original end-user the actual amount paid by original end-user or to repair or replace any defective or nonconforming product or part thereof, F.O.B. I-O's authorized repair depot. Original end-user may obtain a replacement product by meeting the terms of the I-O Customer On-Site Exchange Repair Policy in effect at the time of the request.

THE EXPRESS WARRANTY SET FORTH ABOVE IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES. OTHERWISE, THE PRODUCTS ARE SOLD AS IS WITHOUT FURTHER OBLIGATION OR LIABILITY ON THE PART OF I-O. I-O EXPRESSLY EXCLUDES ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCEPT AS EXPRESSLY SET FORTH HEREIN, IN NO EVENT SHALL I-O BE LIABLE FOR ANY CLAIMS OR DAMAGE ARISING DIRECTLY OR INDIRECTLY FROM THE FURNISHING OR FAILURE TO FURNISH PRODUCTS, SPARE OR REPLACEMENT PARTS, INFORMATION OR SERVICES HEREUNDER. UNDER NO CIRCUMSTANCES SHALL I-O BE LIABLE IN ANY WAY FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO LOST BUSINESS OR PROFITS, WHETHER OR NOT FORESEEABLE AND WHETHER OR NOT BASED ON BREACH OF WARRANTY, CONTRACT, OR NEGLIGENCE.

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Customer On-Site Exchange Repair Policy

Terms, Conditions, and Limitations
Effective June 1, 1997[a]

For products covered by the I-O Corporation (I-O) Manufacturer's Limited Warranty (European Area), I-O's Customer On-Site Exchange (COE) Repair Policy provides original end-users with a replacement unit for a defective product, subject to the following terms and conditions:

Call Customer Support

- If a product fails call I-O Customer Support for assistance at 44(0) 1908 567722.

Verify Product Failure

- I-O will verify the product serial number, warranty coverage and product failure.
- You are responsible for assisting in verifying the product failure.
- When I-O Customer Support verifies a product failure they will issue a Return Merchandise Authorization (RMA) number for the failed product.

I-O Ships Replacement Unit

- Replacement units are shipped from I-O's stock of refurbished units, subject to availability.
- I-O will invoice you for full retail value of the replacement unit upon shipment from I-O.
- Replacement units carry the same warranty as remaining on the original product.
- I-O's COE Repair Policy applies only to warranted product failures. You must pay for non-warranted product repairs or replacement.

Customer On-Site Exchange Repair Policy
(Continued)

Return Your Failed Unit

- When you return the failed product it must be shipped freight prepaid. To insure proper tracking always note the RMA number on the outside of the package.
- I-O will issue you a credit (reversing the replacement unit invoice amount) when the failed product is received by I-O.
- If you do not return the failed product (or pay the replacement unit invoice) within 14 calendar days of the date the replacement unit is shipped from I-O, your warranty coverage and service will be suspended on all I-O products you own.

Install the Replacement Unit

- You are responsible for installing the replacement unit.
- After receiving the replacement unit please call I-O Customer Support if any assistance is required.

[a] I-O reserves the right to change the terms and conditions of this policy without notice.

DELCARATION OF CONFORMITY

EUROPEAN COMMUNITY COMPLIANCE STATEMENT:

This product is in conformity with the protection requirements of EC Council Directives 72/23/EEC, and 89/336/EEC on the approximation of the laws of the Member States relating to: Standard EN60950 (Safety of Information Technology Equipment); Standard EN50082-1 (Generic Immunity Standard for Residential, Commercial, and Light Industrial Products); and Standard EN55022 (Limits and Methods of Measurement of Radio Interference from Information Technology Equipment).

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

DECLARATION OF CONFORMITY

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