I-O 8150, 8155, 8160 Emulator Cards

for
PC to IBM System/36, /38 and AS/400 Communications

Quick Setup & User's Guide

Version 1.1

I-O Emulator Card	Version 1.1
8160XX-OMAN01-110	Revision Date: September, 1996

U.S.A.:
I-O Corporation
2256 South 3600 West
Salt Lake City, Utah 84119
(801) 973-6767 • Fax: (801) 974-5683

I-O Corporation (UK):
I-O Corporation (UK)
9 Ash Close
Abbots Langley
Hertfordshire, England WD5-0DN
44(0) 1923 269 542 • Fax: 44(0)1923 286 505

International:
I-O Corporation
2256 South 3600 West
Salt Lake City, Utah 84119
(801) 973-6767 • Fax: (801) 974-5683

Customer Support:
I-O Corporation
2256 South 3600 West
Salt Lake City, Utah 84119
(801) 972-1446 • Fax: (801) 973-8042

Internet:
http://www.iocorp.com

PREFACE

The Emulator Card, when used with IBM software, allows an IBM or compatible personal computer (PC) with a ISA, PCMCIA standard 2.0 or higher slot or Plug-n-Play capable to be connected to an IBM System/36, /38, or AS/400. A licensed copy of IBM application software, such as ClientAccess/400, PC Support/400, OS/2 Communications Manager, Rumba®, Enhanced 5250 Emulation, or other third party IBM compatible software is required.

The first section of this user's guide contains a **QUICK SETUP GUIDE** which provides an easy-to-use setup for the Emulator Card.

The seven sections contained in the User's Guide contains the information needed to get the most from your emulator card.

1. **INTRODUCTION** - Provides an overview of the Emulator Card.

2. **HARDWARE INSTALLATION** - Explains the simple installation process for the hardware for the Emulator Card.

3. **SOFTWARE INSTALLATION** - Explains the software installation and setup options required for each of the I-O Emulator Cards.

4. **ENABLER SOFTWARE** -Explain how to enable the 8155 PCMCIA card and the 8160 Plug-n-Play Card.

5. **DIAGNOSTIC SOFTWARE** - Details complete Diagnostics.

6. **ADAPTER HANDLER SOFTWARE** - Explain how to use the custom adapter handler for each emulator card. This is not required.

7. **CONFIGURATION CONFLICT RESOLUTION** - Complete problem solving guide.

Caution! The Emulator Card is static sensitive.

Take precautions as you would with any static-sensitive device. Some of these precautions include:

Be aware that some work surroundings, such as carpet, floor mats, dry air from winter heating, etc., can cause static buildup. To prevent a static discharge, touch a grounded surface (such as an exposed twinax connector on a cable attached to the host) before handling the card. Do not touch components on the card. Handle the card by the edges only.

TABLE OF CONTENTS

TABLE OF CONTENTS

I-O 8150, 8155, 8160 Emulator Card

for
PC to IBM System/36, /38 and AS/400 Communications

Quick Setup Guide

Version 1.1

The I-O Emulation Card has been designed for simple installation and ease of use. The installation requires very few steps, however, if this Quick Setup Guide does not contain enough information, please refer to the User's Guide for detailed installation.

Note: The I-O Emulator Card is a static-sensitive device. Keep the card in the protective bag until you are ready to install it.

The package should contain the following items:

- I-O Emulator Card
- I-O Quick Setup and User's Guide
- I-O Utility Software Diskette
- Auto-terminate T-connector

Note: The I-O Emulator Card has been sent with a 3 1/2" diskette. If your system requires a 5 1/4" diskette, please contact Customer Support at (801) 972-1446.

QUICK SETUP

Installing the I-O 8150 Emulator Card

The following is an outline of the installation steps for all I-O 8150 Emulator Card. Complete only those steps that are applicable:

1. Power off the PC.
2. Remove the PC cover, and find an empty expansion slot..
3. Set the DIP switches (refer to Appendix B in the User's Guide).
4. Carefully insert the I-O 8150 emulator card into the expansion slot.
5. Replace the PC cover.
6. Connect the twinax cable to the I-O 8150 emulator card.
7. Install the I-O diagnostic software.
8. The default I/O port address is: 2718H; the default interrupt level is: 5; the default memory address is: DC00H.
9. Execute the diagnostics DIA-EA program.
10. Install the IBM (or compatible) software.
11. Verify the cable addresses.
12. Begin emulation procedure.

Installing the I-O 8155 Emulator Card

The following is an outline of the installation steps for all I-O 8155 Emulator Cards. Complete only those steps that are applicable:

1. Power off the PC and other devices attached to the PC.
2. Locate an empty PCMICA expansion slot in the PC.

3. Discharge static electricity from your body by touching a grounded surface.

4. Hold the card by its edges and insert the card into the expansion slot with the arrow up.

5. Firmly press the card itno the PCMCIA socket.

6. Power on your PC.

Installing the I-O 8160 Emulator Card

The following is an outline of the installation steps for all local I-O 8160 emulator cards. Complete only those steps that are applicable:

1. Power off the PC.

2. Remove the PC cover, and find an empty expansion slot.

3. Carefully insert the I-O 8160 emulator card into the expansion slot.
4. Replace the PC cover.

5. Connect the twinax cable to the I-O 8160 emulator card.

6. Install the I-O diagnostic software (see “Installing the Software” below).

7. The default I/O port address is: 2718H; the default interrupt level is: 5; the default memory address is: DC00H.

8. Check the Plug-n-Play manager to verify the card is recongized. If there is a problem, see the manual.

9. Execute the diagnostics DIA-PNP program.

10. Install the IBM (or compatible) software.

11. Verify the cable addresses.

12. Begin emulation procedure.

QUICK SETUP

Installing the Utility Software

The following is an outline of the installation steps for the Enabler (adapter handler) and diagnostics software for the I-O 8150, 8155, and 8160 emulation cards. Complete only the steps needed.

The following conventions help you identify information you need:

Bold	Indicates a command to type in.
<ENTER>	Indicates the key to press to execute the command.
Underline	Indicates an option you are to select.
UPPERCASE	Indicates a file name, or directory name.

During the installation process, you may be asked to enter the drive indicator of your hard disk or diskette drive (such as C: or A: respectively). If your hard disk or diskette drive is something other than C: or A: , enter the correct drive indicator.

1. Insert the Utility Software Diskette in your diskette drive.
2. When using DOS, type the following:
   <ENTER>
   Install <ENTER>
3. When using Windows, select File, Run. Type in **A:\SETUP.EXE**. Click OK.
4. Follow the instruction on the screen.
5. The installation routine will automatically modify the autoexec.bat and config.sys files.
6. When the installation is finished, remove the installation diskette and store it in a safe place.
7. Reboot the PC.

Stating Emulation

From the directory where the IBM or other third party IBM compatible software is installed, execute the startup command. Refer to the appropriate user's guide for more detailed information.

Starting the Enabler (Adapter Handler)

If the software being used is not IBM's and requires an adapter handler, the I-O utility software installation program has copied an adapter handler to the directory where you installed the I-O software. Simply copy the ***.EXE** files from the I-O directory to the appropriate emulation directory. Then execute **D5250AH.EXE**. Some products that require an adapter handler are manufactured by NetSoft, Synapse, Attachmate, and Andrew.

Ending Emulation

To end emulation, refer to the appropriate user's guide for the software application being used.

This page left intentionally blank.

I-O 8150, 8155, 8160 Emulator Card

for
PC to IBM System/36, /38 and AS/400 Communications

User's Guide

Version 1.1

I-O Emulator Card
8160XX-OMAN01-110

Version 1.1
Revision Date: September, 1996

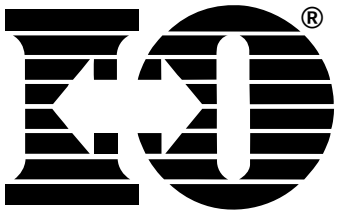
U.S.A.:
I-O Corporation
2256 South 3600 West
Salt Lake City, Utah 84119
(801) 973-6767 • Fax: (801) 974-5683

I-O Corporation (UK):
I-O Corporation (UK)
9 Ash Close
Abbots Langley
Hertfordshire, England WD5-0DN
44(0) 1923 269 542 • Fax: 44(0)1923 286 505

International:
I-O Corporation
2256 South 3600 West
Salt Lake City, Utah 84119
(801) 973-6767 • Fax: (801) 974-5683

Customer Support:
I-O Corporation
2256 South 3600 West
Salt Lake City, Utah 84119
(801) 972-1446 • Fax: (801) 973-8042

Internet:
http://www.iocorp.com



"Products That Work"

This page left intentionally blank.

1 INTRODUCTION

The I-O 8150, 8155, 8160 emulation cards allow an IBM or compatible personal computer (PC) to be connected to an IBM System /36, /38, or AS/400. The card is installed into a PC, and enables the PC and PC printer to emulate (act like) host devices while allowing access to PC applications.

PC Requirements

The following systems are required to use the I-O Emulator Card:

- IBM PC, PC/XT, PC/AT, 386, 486 Pentium or compatible personal computer
- Floppy drive
- DOS version 3.3 or higher
- 640K RAM memory
- Licensed copy of IBM software
- Card Service Software 2.0 (optional, but recommended for PCMCIA)

Unpacking

When the card is received, check the package for water or shipping damage, and contact the carrier if any damage is evident. The shipping package should contain the following:

- I-O Emulator Card
- I-O Quick Setup and User's Guide
- I-O Utility Software Diskette
- Auto-terminate T-connector

Note: The Emulator Card has been sent with a 3 1/2" diskette. If your system requires a 5 1/4" diskette, please contact I-O Customer Service at (801) 972-1446.

Keep the original packaging in case the card must be reshipped.

INTRODUCTION

What is a Plug and Play (PnP) System?

A PC is considered a Plug and Play system if it contains one or a combination of the following software components:

- PnP system BIOS
- PnP operating system (such as Windows 95\98)
- PnP Configuration Utility

If a system does not contain any of these software components it is not considered a PnP system. It is possible to upgrade a non-PnP (Legacy) system to a PnP system by simply adding one of these components, such as Windows 95\98.

A PnP system BIOS will configure a PnP adapter with the boot ROMS within the system. A PnP operating system will configure all PnP adapters on the system which were not configured by the system BIOS, or all of the cards if no PnP BOIS is present. A PnP Configuration Utility or Resource Manager will configure PnP adapters in a similar manner as a PnP operating system.

If the operating system of the computer contains support for PnP devices, no external Configuration Utility is needed. This is the case with Windows 95\98.

If the operating system of the computer does not contain support for PnP devices, such as MS-DOS or Windows 3.1, then a Configuration Utility can be implemented as an application program. The Configuration Utility of a PnP system is usually supplied by the computer manufacturer. One example of this type of program is the ISA Configuration Utility, or ICU.

5250 Emulator Card Software Comparison Chart

	IBM Enhanced 5250	IBM Client Access/400
IBM Workstations Emulated - Standard 80 column - 132 column - Color - Graphics	 5291 -- 5292-1 5292-2	 3196, 3197C 3180-2 5292-2
IBM Printers Emulated (text or graphics)	5256 5219	5256, 5224, 5219, 3812-1
Number of Multiple Sessions	2	5
Keyboard Support (IBM PC) - (XT) - 83 key - (AT) - 84 key - (Enhanced) - 101 key	 Yes Yes Yes	 Yes Yes Yes
Keyboard Mapping and Templates (5250 or PC)	Yes	Yes
Custom Keyboard Mapping	Yes	Yes
International Keyboard Support	Yes	Yes
Hot Keying Between Active Concurrent Host & PC/DOS sessions: - Direct Session Access - Round Robin Access	 No Yes	 Yes Yes
Record/Playback	Yes	No
RAM Memory Used	128K- 277K	+200K
PC Printer Drivers Provided	Yes	Yes, 17 IBM, 1 HP

	IBM Enhanced 5250	IBM Client Access 400
Bi-Directional File Transfer Support: - IBM's FSU (File Support Utility) - IBM's FTF (File Transfer Facility) - IBM's PC Support/36, 38, AS/400 - ETU (Emulator Transfer Utility) - Decision Link	 Yes Yes Yes Yes Yes	 Yes Yes Yes Yes Yes
Application Interface (API) - IBM Version 1.2 and 2.1	Yes	Yes
Diagnostic and Line Sync (self-test)	Yes	Yes
Substitution for Customized Column Separators	Yes	Yes
IBM Host Supported	S/36, /38, AS/400	AS/400

2 HARDWARE INSTALLATION

Caution! The I-O Emulator Card is static sensitive.

Take precautions as you would with any static-sensitive device. Some of these precautions include:

Be aware that some work surroundings, such as carpet, floor mats, dry air from winter heating, etc., can cause static buildup. To prevent a static discharge, touch a grounded surface (such as an exposed twinax connector on a cable attached to the host) before handling the card. Do not touch components on the card. Handle the card by the edges only.

Installing the I-O Emulator Cards

Follow these instructions to install the I-O 8150, 8155, 8160 Emulator Cards into a PC. Complete only those steps that are applicable:

1. Power off the PC and other devices attached to the PC.

2. For the 8150 and 8160, follow the PC user's guide for removing the PC cover. Set the cover aside, and save the screws for reassembly.

3. Locate an empty expansion slot in the PC. If the PC has an expansion slot cover, remove it. Save the screw to hold the card in place.

4. Discharge static electricity from your body by touching a grounded surface, such as the PC chassis, then remove the card from the anti-static bag.

5. Set the DIP switches on the 8150 card (refer to Appendix B). For the 8150, the default I/O port address is: 2718H; the default interrupt level is: 5; the default memory address is: DC00H.

6. Hold the card by its edges (do not touch the components or circuitry), and insert the card into the expansion slot.

7. Firmly press the card into the PC socket connector. See Figure 2-1, for the 8150 and 8160. The 8155 is installed.

8. 8150 and 8160 only: align the slot on the bracket with the expansion slot cover hole. To align, gently lift or press down on the end opposite the bracket and connector until properly aligned. If the slot is not properly aligned, the card will not seat correctly in the bus of the PC and the card will not function properly.

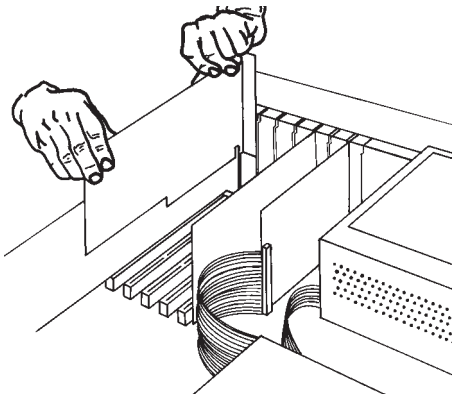


Figure 2-1

9. Insert and tighten the screw, replace and fasten the PC cover, and replace the monitor.

Connecting the Card to the Host

Take the following steps to connect the emulator to the host system.

1. Attach the host twinax cable to either one of the twinax connectors. The T-connector automatically terminates when attaching one cable and automatically cables through when attaching two cables.

2. Locate the connector on the emulator card at the back of the card.

3. Attach the T-connector.

4. Power on the PC and other devices.

Windows 95/98 Configuration for the I-O 8150

After installing the 8150, the Windows 95/98 Device manager should recongize the 8150 card during the normal boot up procedure. To check this, go to Device Manager under Control Panel, and see if there is a device entry. If there is no entry then do the following:

1. Go to the Control Panel and choose, “Add New Hardware”.
2. When it asks to search the system, select “No”.
3. Select “Other Device” and click Next.
4. Choose “Have Disk”
5. Insert the diskette into the floppy drive.
6. Select “Browse” and go to the floppy drive.
7. Select OK.
8. The Hardware Wizard will install the card. Shut down the system and restart the computer.
9. Return to the Control Panel to see if the device entry is there.

Windows 95/98 Configuration for the I-O 8155

After installing the I-O 8155-PC CARD for the first time and booting the PC, Windows 95/98 detects the hardware and requests a diskette containing the setup files.

1. Insert the I-O Utility Software Diskette when prompted and type the drive letter containing the diskette.
2. Select the radio button Driver supplied with card . This will load the **DCI5250.VxD** file from the diskette
3. Verify that the **SET ENB5250=C:\8155** statement is in the **AUTOEXEC.BAT** file.

4. Either Edit or create the batch file called **WINSTART.BAT** located in the **WINDOWS** directory. Add the following lines to the **WINSTART.BAT** file:

   C:\8155\D5250AH
   C:\NSMIDRNG\ROUTER\NSTWINAX (Your path may be different)
   PAUSE (optional)

5. Perform a PC Shutdown and restart the PC so that the changes made take effect.

Configuring the I-O 8160 Emulator Card

The following procedures describe the steps to configure the I-O 8160. If you are installing this adapter in a non-Plug and Play computer, please read the section on non-Plug and Play Installation. Non-Plug and Play systems are those systems which do not meet the system software requirements described earlier.

Plug and Play Systems

The 8160 is fully compatible with the Plug and Play standard. When the 8160 is installed in a PnP system, it will be ***configured automatically when the system is powered on*** regardless of the operating system used.

Non Plug and Play Systems (Legacy systems)

The 8160 can be configured in Legacy systems. The 8160 adapter has been shipped with a Configuration Utility for this 8160 which will allow the user to select the system resources in legacy systems.

In Legacy systems all resources for this adapter are set by the DOS Configuration Utility (DCFG2550) program. The adapter is not enabled until the Enabler (ENB5250) program is executed. When running the IBM emulation program or IBM adapter handler with PC Support, you must use the Configuration Utility and Enabler.

Note: Since non-PnP systems do not have a resource manager, care must still be taken to prevent potential resource conflicts with other emulations

(legacy cards). The DCFG5250 program will enable the user to configure the 8160 and will attempt to identify potential conflicts, however, care must be taken to preven conflicts.

MS-DOS and Windows 3.1x Configuration for the I-O 8160

Since MS-DOS and Windows 3.1 do not contain integral PnP support, an external system resource manager myst be used. In PnP systems this resource manager will most likely be shipped with the PC. The 8160 will automatically be detected and have its resources assigned by the resource manager of the PnP system. While the functions performed by a system resource manager are well-defined, the interfaces that the various managers present to the user vary, and it is there for impossible to describe each one in the manual. In non-PnP systems the user must execute the DCFG5250 and ENB5250 programs.

With either PnP or non-PnP systems the ***DCI5250.386*** *Virtual Device Driver (VxD) should be used with programs such as IBM Client Access/400 or Personal Communications AS/400*. This will provide for seamless operation with the 8160.

Windows 95\98 Configuration for the I-O 8160

After installing the 8160, the Windows 95/98 Device Manager should recognize the 8160 card. Use the following steps to install the 8160.

1. Install the 8160 card in an available ISA slot.

2. Power on the PC. Windows will display the message *New hardware found* with a dialog box indicating the 8160 card has been detected.

3. A second dialog box will then appear prompting the user to install the utility software for the 8160. Insert the I-O Utility Software Diskette and press Enter. Follow the installation screen instructions.

4. Remove the I-O Utility Software Diskette, shutdown and restart the computer. You are now ready to Install your emulation software.

To observe the resources and/or make modifications assigned by Windows 95/98 for the I-O 8160 card, perform the following steps:

1. From the Control Panel, select System .
2. Select the Device Manager Tab .
3. Double-click on 5250 Emulation Adapters .
4. Double-click on the entry for the 8160 .
5. Select the Resources Tab . The display will now show the adapter card's resources. You may make modifications here if there is a conflict that prevents the I-O 8160 from functioning.

Windows NT Configuration for the I-O 8160

Perform the following steps to install the I-O 8160 in a PC running under Windows NT:

1. Insert the I-O Utility Software Diskette in your floppy drive.
2. Click "Start", "Run", and type in **A:\SETUP.EXE**.
3. Accept all defaults, except on the screen to choose your type of card; choose PNP card.
4. At the "Setup Complete" screen, click OK .
5. Remove the Utility diskette from the diskette drive.
6. Shut down Windows NT and power off your computer.
7. Install the I-O 8160 Card and restart the PC.
8. When the PC returns to the Windows NT Desktop, go to "Control Panel" and double-click on the "Devices" icon.
9. Scroll down until the device "**IBMTwx**" is displayed.

If the Startup status is not "Automatic":
Click on the "IBMTwx" entry.
Click the "Startup" button.
Select the "Automatic" Startup type.
Click OK".
The status should then change to Automatic.

10. Repeat Step 9 for the "**IBMTwxNM**" and "**IBMTwxSN**" entries. The status should then change to Automatic.

11. Shutdown and Restart the PC.

This page intentionally left blank.

3 SOFTWARE INSTALLATION

This chapter will give instructions for installing the Enabler and diagnostic software. Complete only the steps needed.

The following conventions help you identify information you need:

Bold	Indicates a command to type in.
<ENTER>	Indicates the key to press to execute the command.
Underline	Indicates an option you are to select.
UPPERCASE	Indicates a file name, or directory name.

During the installation process, you may be asked to enter the drive indicator of your hard disk or diskette drive (such as C: or A: respectively.) If your hard disk or diskette drive is something other than C: or A:, enter the correct drive indicator.

Installing the Software

Before beginning the software installation, make a backup copy of the I-O software, using the following steps.

1. Type **Diskcopy A: A:** and follow the prompt.

2. Store the original disk in a safe place.

Install the software onto the PC hard drive.

3. At the DOS prompt, select the drive the software diskette is installed then type install.
   A: <Enter>
   Install<Enter>

4. When using Windows, select File, Run. Type **A:\SETUP.EXE**. Click OK.

5. Follow the instructions on the screen.

6. When the installation is finished, remove the software diskette and store it in a safe place then reboot the PC.

7. This completes the I-O software installation.

Installing the IBM Software

The Emulator Card is supported by IBM software. Refer to and follow the IBM user's guide for complete installation instructions.

Note: Only licensed copies of the IBM software are to be used with the I-O Emulator Card.

PC Support/400

To install PC Support/400, the IBM PC Support AS/400 diskettes are required.

To install PC Support/400, take the following steps:

1. Run **INSTALL.EXE** on the IBM PC Support disk.

2. Select ENHANCED 5250 EMULATION for the installation, and follow the installation instructions.

3. Start PC Support by typing: **STARTPCS.BAT**

Enhanced 5250 Emulation

To install IBM's Enhanced 5250 Emulation program, run **INSTALL.EXE** on the IBM diskette.

OS/2

The Emulator is compatible with OS/2 Version 2.0 and later. To install the IBM software, refer to and follow the IBM user's guide for complete installation instructions.

Third Party Software

If the software being used is not IBM's and requires an adapter handler, the Emulation Card has included the adapter handler. Simply copy ***.EXE** from the emulator directory to the required directory, then execute **D5250AH.EXE.** Some of the companies requiring an adapter handler for their software include: NetSoft, Synapse, Attachmate, and Andrew.

Configuring the Host

Configure the host for the display and printer devices at the appropriate cable addresses. The devices will vary depending on the software being used. Refer to the software installation manual for the correct device types. PC Support/400, ClientAccess/400 and OS/2 Communications Manager require a device type of 5150 Model 1. The system operator can assist with host configuration.

This page left intentionally blank.

4 ENABLER SOFTWARE FOR THE I-O 8155 AND I-O 8160

This chapter describes the Enabler software, which is used to configure and enable the I-O 8155 PCMCIA and 8160 Cards.

Enabler Environment String

Before you run the Enabler software, the enabler environment string must be set. This is normally done in your AUTOEXEC.BAT file. The installation utility described in the previous chapter explains the changes to the AUTOEXEC.BAT file.

The enabler environment string provides a method for the I-O software to find configuration programs and information. The enabler and configuration programs use it to find the CFG5250.DAT file, and the configuration program uses it to find the help files PCCFG.XDB and XVIEW.EXE.

The enabler environment string is in the form of:

ENB5250=C:\<directory>

where <C:> and <directory> specify the location of the I-O software.

Configuration Program

The configuration program is used to customize various configuration options for your system. The configuration program does not place the I-O emulation cards in an operational state; it simply provides a method of specifying the configuration information that is to be used when the I-O emulator card is actually enabled by the Enabler program.

Starting the Enabler

To run the configuration program, change directories to the directory in which you installed the software and type:

pccfg<ENTER>

ENABLER SOFTWARE

The configuration program displays the main menu at the top of the screen, and the current configuration in a window at the bottom. Context-sensitive help is available by pressing the F1 key.

If the following message appears:

Cannot open cfg5250.dat Press any Key to Continue

exit the configuration program and check to see that the CFG5250.DAT file exists, and that it is in the directory indicated by the enabler environment string.

The configuration program presents a series of menus that allow you to select the configuration that works for your system. To select a menu item, use the cursor keys to select the item, and then press the <ENTER> key. On some menus, a shortcut key is available to select some menu items; these keys are indicated by a character of the item being in uppercase. Pressing the <ESC> key returns you to the previous menu, without changing the current selection.

Main Menu

The main menu allows the selection of either the Hardware menu or the Exit menu.

Hardware Menu

The Hardware menu provides menu items for selecting the controller, base I/O port address, memory segment address, interrupt level, and card socket. Selecting any of these items results in the display of the appropriate menu to select values for that item. However, depending upon the current card controller selection, some menu items may not be accessible.

PCMCIA Card Controller

The PCMCIA Card Controller menu allows the selection of the method used to configure the I-O 8155. There are two methods available: via software using Card Services, or hardware using a selection for the type of PCMCIA card controller hardware in your system.

Card Services is an industry-standard software driver that is used to enable PCMCIA Cards. This driver was provided with your PC. The Card Services driver is not provided with the I-O 8155. The I-O 8155 can work with Card Services version 2.00 or greater.

By using Card Services to enable all PCMCIA Cards, it is possible to avoid conflicts between the cards and with other system components. **Using Card Services is the recommended method of enabling the I-O 8155.**

When the Card Services menu item is selected on the PCMCIA Card Controller menu, the "Values Assigned By" menu appears. This menu allows further customization of the Card Services configuration. There are three choices:

Values Assigned By Card Services

With this selection, Card Services searches all sockets for the I-O 8155, and assigns the base I/O port address, the memory segment, and the interrupt level. This is the recommended method.

Values Assigned By User

With this selection, Card Services is used to enable the I-O 8155, but the selection of all values (including the socket) must be done by the user.

Values Assigned by Enabler

With this selection, Card Services searches all sockets for the I-O 8155, and is used to enable the card, but the Enabler program chooses the values from the CFG5250.DAT file.

If the "Values Assigned By" selection is either Card Services or Enabler, the base I/O port address, memory segment address, interrupt level, and socket items on the Hardware menu are inaccessible, because user selected values would be ignored.

When Card Services is selected, the PCDD5250.SYS device driver must be loaded via your CONFIG.SYS file.

Note that using Card Services with any of the "Values Assigned By" selections is preferable to using any of the hardware-specific selections, as the use of Card Services is more likely to avoid configuration conflicts.

ENABLER SOFTWARE

If your system does not have Card Services, then one of the hardware controllers should be selected. These selections directly control the hardware of the PCMCIA Card sockets. It is important to remember that the configuration of the base I/O port address, memory segment address, interrupt level, and socket are now the responsibility of the user. The user must make the proper selections for these items on the Hardware menu when using a hardware controller. The enabler program currently supports the IBM Thinkpad, Intel 82365 PCIC, Sharp PHIC, and Toshiba ICCCNT controllers.

The Intel selection should be used if your system is using the Intel 82365 or compatible controller. Many systems use this controller; select this if you are unsure which controller is in your system. The Sharp controller supports the 67XX/68X series laptop systems. The Toshiba controller is found in the 45XX series laptop systems. Newer Toshiba laptops use an Intel-compatible controller.

Base I/O Address

The Base I/O Address item on the Hardware menu allows the selection of the base port address of a range of 8 ports that can be used by the I-O emulators. The default value is 0118, indicating a range of ports from 0118 to 011F hex, inclusive.

Note: This menu item is inaccessible if Card Services is used as the PCMCIA Card Controller, and the the values are to be assigned by Card Services or the Enabler.

Segment Address

The Segment Address item on the Hardware menu allows the selection of an 8k memory segment to be used by the I-O emulator cards. The default value is DC00 hex. If an extended memory manager is in use, you may need to exclude the segment to be used by the I-O emulator cards.

Note: This menu item is inaccessible if Card Services is used as the PCMCIA Card Controller, and the the values are to be assigned by Card Services or the Enabler.

Using Memory Management Software

When using a 386, 486, or Pentium computer, "extended" or "expanded" memory management software (such as Windows or DOS EMM386), may need to be configured to exclude the memory area occupied by the I-O Emulators. The CONFIG.SYS file may need to be modified. Using any text editor locate the command DEVICE =C:\DOS\EMM386.EXE. At the end of this line, add the option X= xxxx-yyyy to exclude the memory used by the I-O emulator cards.

For example, if the card is configured at DC00, the command would be:

Device=C:\DOS\EMM386.EXE X=DC00-DFFF

Interrupt Level

The IRQ item on the Hardware menu allows the selection of an interrupt request level that will be used by the I-O emulator cards. The default value is 5. In most systems, interrupt request levels cannot be shared.

Note: This menu item is inaccessible if Card Services is used as the PC Card Controller, and the the values are to be assigned by Card Services or the Enabler.

Socket (8155 only)

The Socket item on the Hardware menu allows the selection of the socket into which the I-O 8155 is inserted. The default value is 1.

Note: This menu item is inaccessible if Card Services is used as the PCMCIA Card Controller, and the the values are to be assigned by Card Services or the Enabler.

Exit Menu

The Exit menu provides a way of exiting the configuration program. The configuration changes you have made may be saved or discarded. If they are discarded, the configuration remains unchanged.

ENABLER SOFTWARE

Enabler Program

The Enabler program is used to enable the I-O emulator. This program is run automatically by the Diagnostic and Adapter Handler software. It may also be called from the DOS command line in order to test your configuration.

In order for the Diagnostic and Adapter Handler programs to find the Enabler program, you must have the enabler environment string set to the appropriate directory in the AUTOEXEC.BAT.

To run the Enabler program from the DOS command line, type:

ENB5250<ENTER>

The Enabler program displays its title, and then displays Card Services information, if Card Services has been selected as the PCMCIA Card Controller. The emulator is then enabled, and the configured values displayed, unless an error is detected, in which case, an error message is displayed. The Enabler program then exits.

If the Enabler program displays an error message, refer to the following section on Enabler errors. If the Enabler program reports success, but the I-O emulator does not seem to work, refer to Chapter 7, Configuration Conflict Resolution.

Enabler Errors

The following list describes the I-O emulator Enabler error codes and possible corrective action that can be taken. The corrective action is intended to help the user resolve the problem without having to make a service call.

0001 Invalid calling parameter.

This is an internal error that should be reported to your customer support representative. This error indicates a communication problem between the Enabler and the calling program, for example, DIA-PCC.COM or D5250AH.COM. Please have the names and version numbers of the Enabler and the calling program ready when you call customer support.

0002 Unable to open configuration data file.

The CFG5250.DAT file cannot be located. Check to be sure that it exists, and that it is in the directory pointed to by the ENB5250 environment string.

0003 Unknown enabler filename value.
0004 Invalid port address value.
0005 Invalid memory segment value.
0006 Invalid interrupt level value.
0007 Invalid interrupt share value.
0008 Invalid base value.
0009 Invalid socket value.
000A Invalid assign value.

These errors all indicate syntax problems in the CFG5250.DAT file. Rerun the configuration program PCCFG.EXE to correct the problem.

000B Unable to open card device driver PCDD5250.SYS.

The I-O emulator device driver PCDD5250.SYS cannot be located in memory. Ensure that there is a DEVICE=PCDD5250.SYS line for it in the C:\CONFIG.SYS file. Reboot the system, and ensure that it is loaded by looking for its installation message. Note, this device driver is only used if Card Services is selected as the PC Card Controller.

000C Unable to get software status from PCDD5250.SYS.
000D Unable to configure using PCDD5250.SYS.

These errors indicate a communication problem between the Enabler and the PCDD5250.SYS device driver. Ensure that DOS version 3.3 or greater is being used.

000E Unable to access configuration option register.

A read back of the configuration option register has failed. Check to make sure that the correct socket was selected.

000F There is no Manufacturer ID tuple in the CIS.

While examining the Card Information Structure (CIS), the Manufacturer ID tuple was not found. The I-O emulator may be defective.

0010 Invalid function reported by PCDD5250.SYS.

This is an internal error that should be reported to your customer support representative. This error indicates a communication problem between the Enabler and PCDD5250.SYS device driver. Please have the names and version numbers of the Enabler and the PCDD5250.SYS device driver ready when you call.

0011 Card Services is not installed.

The Card Services function is not installed on the system. Card Services (and Socket Services) is usually supplied with the system as a device driver to be loaded via CONFIG.SYS or as a TSR program. Card Services is not supplied with the I-O emulator. Check your CONFIG.SYS and AUTOEXEC.BAT files for the appropriate commands to load your system's Card Services.

0012 This error code is not currently used.

0013 No sockets are available.

Card Services is reporting that there are no PC Card sockets on the system. Check your Card Services configuration.

0014 The I-O Emulator is not installed or is defective.

Card Services has searched all sockets for the I-O emulator, and has not found it. Check to ensure that the I-O emulator is inserted properly. On some systems, once this error has occurred, the system must be hard reset (power off, not via Control-Alt-Delete) before trying again, to force Card Services to reread the information from each socket.

0015 Cannot register with Card Services.

In order to use Card Services to configure the I-O emulator, the Enabler must register with Card Services as a Card Services client. This error indicates

that Card Services is rejecting the registration. This may be because there are too many registered clients already. Check your Card Services documentation.

0016 The Port Address selected is not available.

This error indicates that the base I/O port address that was selected for the I-O emulator is already allocated for another use. Resolution of this problem depends on the current "Values Assigned By" selection.

If the values are assigned by Card Services, then this error means that all port addresses being managed by Card Services are already allocated. Either you must remove some other device(s) that is using port addresses, or refer to your Card Services documentation for instructions on modifying the range of port addresses that Card Services manages.

If the values are assigned by the user, then you must change the port address to an available value, or remove some other device(s), or refer to your Card Services documentation for instructions on modifying the range of port addresses that Card Services manages.

If the values are assigned by the Enabler, then you must refer to your Card Services documentation for instructions on modifying the range of port addresses that Card Services manages, or remove some other device(s), or change the port address that the Enabler is trying to use. To change the port address that the Enabler is to use, do the following:

1. Make a backup copy of the CFG5250.DAT file.

2. Using an ASCII text editor, such as EDIT, edit the CFG5250.DAT file.

3. Locate the line near the beginning of the file that begins with PORT=.

4. The first value after the equal sign in the PORT= line is the value that the Enabler is using. For example, if the line is:

   PORT=0118,0218,0318,0418,2718,2418,2518,2618,FFFF;

   then the Enabler is using port address 0118 hex.

5. Change the line to put a different port address first. For example, to use port address 2718 hex, change the line to:

   PORT=2718,0118,0218,0318,0418,2418,2518,2618,FFFF;

   Be sure to separate each value with a comma, and do not insert any spaces or tabs. Make sure the last value is FFFF.

6. Save the CFG5250.DAT file, and rerun the Enabler.

Also, see Chapter 7, Configuration Conflict Resolution.

0017 The I-O Emulator is locked by another user.

Card Services is reporting that the I-O emulator is in use by another of its clients. This may happen if another enabler has been run. You will need to use the other enabler to release the I-O emulator, or reboot the system.

0018 The Interrupt level selected is not available.

This error indicates that the interrupt level that was selected for the I-O emulator is already allocated for another use. Resolution of this problem depends on the current "Values Assigned By" selection.

If the values are assigned by Card Services, then this error means that all interrupt levels being managed by Card Services are already allocated. Either you must remove some other device(s) that is using interrupts, or refer to your Card Services documentation for instructions on modifying the range of interrupt levels that Card Services manages.

If the values are assigned by the user, then you must change the interrupt level to an available value, or deconfigure some other device(s), or refer to your Card Services documentation for instructions on modifying the range of interrupt levels that Card Services manages.

If the values are assigned by the Enabler, then you must refer to your Card Services documentation for instructions on modifying the range of interrupt levels that Card Services manages, or deconfigure some other device(s), or

change the interrupt level that the Enabler is trying to use. To change the interrupt level that the Enabler is trying to use, do the following:

1. Make a backup copy of the CFG5250.DAT file.

2. Using an ASCII text editor, such as EDIT, edit the CFG5250.DAT file.

3. Locate the line near the beginning of the file that begins with INT=.

4. The first value after the equal sign in the INT= line is the value that the Enabler is using. For example, if the line is:

   INT=0005,0004,0003,0007,FFFF;

   then the Enabler is using interrupt level 5.

5. Change the line to put a different interrupt level first. For example, to use interrupt level 3, change the line to:

   INT=0003,0005,0004,0007,FFFF;

   Be sure to separate each value with a comma, and do not insert any spaces or tabs. Make sure the last value is FFFF.

6 Save the CFG5250.DAT file, and rerun the Enabler.

0019 Cannot lock configuration.

Once the port address and interrupt level has been allocated using Card Services, the Enabler calls Card Services again to lock the configuration. This error is posted if Card Services fails to lock the configuration. Refer to your Card Services documentation for possible causes.

001A The Memory Segment selected is not available.

This error indicates that the memory segment that was selected for the I-O emulator is already allocated for another use. Resolution of this problem depends on the current "Values Assigned By" selection.

If the values are assigned by Card Services, then this error means that all 8k memory segments being managed by Card Services are already allocated. Either you must deconfigure some other device(s) that is using

memory, or refer to your Card Services documentation for instructions on modifying the range of memory that Card Services manages.

If the values are assigned by the user, then you must change the memory segment to an available value, or deconfigure some other device(s), or refer to your Card Services documentation for instructions on modifying the range of memory that Card Services manages.

If the values are assigned by the Enabler, then you must refer to your Card Services documentation for instructions on modifying the range of memory that Card Services manages, or deconfigure some other device(s), or change the memory segments that the Enabler is trying to use. To change the memory segments that the Enabler is trying to use, do the following:

1. Make a backup copy of the CFG5250.DAT file

2. Using an ASCII text editor, such as EDIT, edit the CFG5250.DAT file.

3. Locate the line near the beginning of the file that begins with MEM=.

4. The Enabler tries all the memory segments listed on this line. For example, if the line is:

   MEM=DC00,CC00,C000,C400,C800,D000,D400,FFFF;

   then the Enabler is trying each of these segments in order.

5. Change the line to add another segment to try. For example, to add the segment CA00, change the line to:

   MEM=CA00,DC00,CC00,C000,C400,C800,D000,D400,FFFF;

   Be sure to separate each value with a comma, and do not insert any spaces or tabs. Make sure the last value is FFFF.

6. Save the CFG5250.DAT file, and rerun the Enabler.

Also, see Chapter 7, Configuration Conflict Resolution.

001B There is no Device ID tuple in the CIS.

While examining the Card Information Structure (CIS), the Device ID tuple was not found. The Device ID tuple should be the first tuple in the CIS.

Usually this error indicates that the attribute memory, which contains the CIS, is not accessible. Check to make sure that the I-O emulator is inserted properly, and the correct socket was selected.

001C There is no Checksum tuple in the CIS.

While examining the Card Information Structure (CIS), the Checksum tuple was not found. The I-O emulator may be defective.

001D The CIS checksum is incorrect.

While examining the Card Information Structure (CIS), the checksum calculated was incorrect. The I-O emulator may be defective.

001E Cannot unmap attribute memory.

After examining the Card Information Structure (CIS) in attribute memory, the Enabler calls Card Services to map in normal memory. This error indicates that Card Services has returned an error on this function. Refer to your Card Services documentation for possible causes.

0020 Unknown error code.

This is an internal error that should be reported to your Customer Support representative. Please have the names and version numbers of the Enabler and the PCDD5250.SYS device driver ready when you call.

This page left intentionally blank.

5 DIAGNOSTIC SOFTWARE

To run the Diagnostics, ensure that the diagnostic program DIA-PCC.COM is located in your working directory and type:

C:\<directory>\DIA-EA (8150)
DIA-PCC (8155)
DIA-PNP (8160)

at the DOS prompt.

Note: The drive letter is required if the drive holding the diagnostics is not the default drive.

The diagnostic software will run the enabler software prior to executing the diagnostics. This is necessary so that the I-O Emulator Card is enabled and mapped into the PC. The values for the I/O, memory and interrupt locations will be passed to the diagnostic program from the enabler. If the enabler has already been executed before executing the DIA-PCC diagnostics, a message will appear indicating that the I-O Emulator Card has already been enabled.

Main Menu

On startup, the following screen is displayed:

```
                I-O Diagnostics Version 1.0
          Copyright Development Concepts Inc., 1994
   Port Address=0118    Interrupt Level=5   Segment Address=DC00

Enter
1 to run the test once,
2 to have the test loop, or
3 to exit to DOS

Enter selection:_
```

DIAGNOSTIC SOFTWARE

The top three lines of all screens display the program header, which includes the program name and version number, the copyright notice, and the current adapter settings. The values for the Port Address, Interrupt Line and Memory Segment Address are the values passed from the I-O Emulator Card enabler. Following the header is a list of choices for the user.

The diagnostic program waits for the user to enter a selection. The selection is typed, followed by the <ENTER> key. An unrecognized entry to any selection results in a beep from the PC speaker.

Entering:

'1' will result in the diagnostics being run once.
'2' will result in the tests being run a user-specified number of times. (This mode is useful when searching for an intermittent problem.)
'3' exits the diagnostic program and returns control to MS-DOS.

Running the Tests

If option '1' on the main menu is selected, the diagnostic tests are run once. If any test fails, an error code and error message are displayed. Otherwise the user is asked whether the online tests should be run.

If you enter 'NO', several tests run which check the adapter in an offline mode.

If you enter 'YES', a list of active addresses is displayed, and you are prompted for the station addresses to use. Either one primary address, or a primary and a secondary address may be entered. A 'N' is entered for the secondary address if only one address is to be used. A “test complete” message is displayed and you are prompted to hit the enter key, which causes the main menu to be redisplayed.

If option '2' on the main menu is selected, the diagnostic tests are set to loop. You are then asked how many times to loop. This loop count may be set from 1 to 999 times, with an entry of 0 indicating an infinite number of loops.

Note: The PC must be rebooted to cancel the infinite loop.

You are next asked whether the diagnostics should pause when an error is detected.

If the response is 'NO', any errors detected by the diagnostics are displayed; however, the diagnostics will immediately clear the screen and restart on the next pass of the tests.

If you respond 'YES', any error detected is displayed, and the user must hit the <ENTER> key to continue.

Note: The tests may also be canceled when an error is detected, by entering a 'C'.

Functions Tested

Each pass of the diagnostic tests begins by ensuring that the diagnostic ID byte can be read from the emulator. If it cannot be read, the error message stating that the adapter is failing or not installed is given. Otherwise, the I/O and memory spaces are tested.

These tests ensure that the emulator is responding to the correct I/O and memory addresses. Included in these tests is a RAM test of the RAM on the adapter board, and readback tests of the I/O and memory-mapped addresses of the adapter. In addition, tests are performed to ensure that the adapter is not responding to I/O addresses as memory accesses.

Communications are tested next by sending various twinax commands and data through each cable adapter of the I-O Emulator in an offline mode. A IO poll, an activate write, an activate read, and several queueable commands are used. Proper operation of the DMA circuitry is verified through these tests, and the various status bits are checked for proper operation.

The cable adapter counters are then tested. Checks are made to ensure that the counters increased at the proper rate, and are readable and controllable by the software.

Following the counter tests, interrupts are tested to ensure that interrupts are generated at the correct times, at the correct interrupt levels, and are not generated when the I-O Emulator Card is inhibited from generating interrupts.

If the online tests are not selected, the transmit inhibit and wrap data latches are tested in an offline mode. These latches are normally used to detect

twinax cable activity. Various errors may be reported by the diagnostics if these latches do not set or reset correctly.

If the online tests are selected, a scan of the station addresses currently active on the twinax cable is made, and the user is prompted to enter one or two station addresses to use during the online tests. These tests ensure that the transmit inhibit and wrap data latches mentioned above work correctly, and also ensure that the actual twinax connection is working by receiving and transmitting data over the twinax to the host computer.

Error Code Problem Determination

The following list describes the I-O Emulator Card Diagnostic error codes and possible corrective action that can be taken. The corrective action is intended to help the user resolve the problem without having to make a service call. Refer also to Chapter 7, Configuration Conflict Resolution.

0002 The Emulator is failing, or is not installed at the specified port address.

Definition: The software did not read the proper emulator identification code at the I/O address for the Diagnostic ID byte.

Action:

1) Check to make sure that the board is properly installed and seated within the slot. If the Card Services enabler has not been used, then make sure that the emulator is located in the proper slot.

2) Make sure the enabler has been run and that the board has been detected. Use the Card Services enabler whenever possible in order to avoid I/O conflicts.

3) If using an enabler other than the Card Services, verify that there is not an I/O address conflict with another board within the system. If there is an I/O conflict then either change the conflicting board address or change the I-O emualtor settings in the enabler program.

4) The I-O emulator may need to be replaced. Try another card if one is available. If another emulator is available and works then the original emulator needs to be serviced. If

the second card is still failing then there most likely is still an I/O conflict within the system. Please refer to the conflict resolution section for further information.

0005 The high order bits of the diagnostic test point byte did not initialize correctly.

Definition: The high order data bits located in the memory location of the diagnostic test point byte were not set to zero.

0006 Adapter RAM visible with POR latch set.

Definition: The RAM memory on the adapter card was able to be read even though the POR latch was still set. The RAM memory should not be read until the POR latch is reset.

0007 RAM low address error at offset xxxx.

Definition: The RAM memory on the adapter card did not pass the memory addressing test with the low address values. The value in xxxx indicates the memory location which failed and should be recorded.

0008 RAM value error at offset xxxx.

Definition: The RAM memory on the adapter card did not pass the memory data value test. The value read at the memory location indicated by xxxx did not match the value written.

0009 RAM high address error at offset xxxx.

Definition: The RAM memory on the adapter card did not pass the memory addressing test with the high address values. The value in xxxx indicates the memory location which failed and should be recorded.

Action: 1) All of the above errors may be due to a memory conflict within the PC. Most of the newer PC's all have a memory manager which needs to have a section of memory excluded and reserved for the emulator. Exclude

the memory space required for the emulator RAM. Please refer to the conflict resolution section for further information.

2) The local adapter RAM may be failing. Repeat the diagnostic test and see if the value for xxxx is consistent. If the value is consistent, the adapter RAM may be bad and the adapter needs to be serviced. Try another card if one is available. If the second card works then the original card needs to be serviced. If the second card is still failing then there most likely is a memory conflict within the system. Please refer to the conflict resolution section for further information.

000A Cable Adapter 1 Register visible with POR latch set.
000B Cable Adapter 2 Register visible with POR latch set.
000C Cable Adapter 1 Register readback error.
000D Cable Adapter 2 Register readback error.
000E Cable Adapter 1 Register initialization error.
000F Cable Adapter 2 Register initialization error.

Definition: These tests check the twinax cable adapter registers which are mapped into the upper 2K of the emulator memory space. A read/write test is done with and without the POR (Power On Reset) latch set. They are also checked for the proper initial values.

Action: 1) All of the above errors may be due to a memory conflict within the PC. Check the memory manager to verify that the proper memory segment and size has been excluded and reserved for the emulator. It is also possible that there is a memory conflict with another adapter within the PC. Check to make sure that the adapter RAM is not located within the same space as another adapter. Please refer to the conflict resolution section for further information.

2) The emulator may be failing. Repeat the diagnostic test and see if the error is consistent. If the error is consistent then the card needs to be serviced.

0010 POR latch reset by memory access.

Definition: The POR (Power on Reset) latch was reset by a memory cycle rather that an I/O cycle.

Action: 1) If this error occurs there is a problem with the emulator. The emulator needs to be replaced.

0011 Cable Adapter 1 System available bit not set after data sifted through receiver.
0012 Cable Adapter 2 System available bit not set after data sifted through receiver.
0013 Cable Adapter 1 Frame pattern timeout.
0014 Cable Adapter 2 Frame pattern timeout.
0015 Cable Adapter 1 Bad pattern data read on poll frame 1.
0016 Cable Adapter 2 Bad pattern data read on poll frame 1.
0017 Cable Adapter 1 Activate expected not set for activate write.
0018 Cable Adapter 2 Activate expected not set for activate write.
0019 Cable Adapter 1 Activate data incorrect.
001A Cable Adapter 2 Activate data incorrect.
001B Cable Adapter 1 Bad registers after activate write.
001C Cable Adapter 2 Bad registers after activate write.
001D Cable Adapter 1 Interrupt bit not set in diagnostic test point byte.
001E Cable Adapter 2 Interrupt bit not set in diagnostic test point byte.
001F Cable Adapter 1 Activate expected not set for activate read.
0020 Cable Adapter 2 Activate expected not set for activate read.
0021 Cable Adapter 1 Bad pattern data read on activate read.
0022 Cable Adapter 2 Bad pattern data read on activate read.
0023 Cable Adapter 1 Bad registers after activate read.
0024 Cable Adapter 2 Bad registers after activate read.
0025 Cable Adapter 1 Queue data incorrect.
0026 Cable Adapter 2 Queue data incorrect.
0027 Cable Adapter 1 Bad registers after queue data.
0028 Cable Adapter 2 Bad registers after queue data.
0029 Cable Adapter 1 Counter register readback error.
002A Cable Adapter 2 Counter register readback error.

Definition: These are all internal register and off-line testing functions within the emulator.

Action: If one of these errors occurs then the problem is most likely the emulator. It is still possible that a memory conflict may be occurring, however, it is more likely that the emulator will need to be replaced.

002B Cable Adapter 1 Incorrect counter value.
002C Cable Adapter 2 Incorrect counter value.

Definition: There are two counters on the board that are tested and checked for the proper count. If the count value is incorrect these errors will appear.

Action: Repeat the test and check for any errors. If the same error occurs, then the emulator is failing and needs to be replaced.

002D Cable Adapter 1 Interrupt occurred while level disabled.
002E Cable Adapter 2 Interrupt occurred while level disabled.

Definition: This error indicates that a counter interrupt occurred when the interrupt control register was disabled.

Action:
1) Verify that another adapter card within the PC is not sharing the same interrupt level as indicated by the Interrupt Level field in the diagnostics. This may be a problem if Card Services was not selected when running the enabler.

2) The emulator is failing and needs to be replaced.

002F Cable Adapter 1 Counter interrupt occurred too soon.
0030 Cable Adapter 2 Counter interrupt occurred too soon.

Definition: The counter interrupts on the emulator have occurred before they were expected.

0031 Cable Adapter 1 Interrupt at wrong level.
0032 Cable Adapter 2 Interrupt at wrong level.

Definition: An interrupt occurred from the emulator but it occurred on the wrong interrupt line.

0033 Cable Adapter 1 No counter interrupt.
0034 Cable Adapter 2 No counter interrupt.

Definition: The emulator did not generate an interrupt to the PC on the interrupt line selected.

Action: The emulator is failing and needs to be replaced.

0035 Cable Adapter 1 Station address is inactive.
0036 Cable Adapter 2 Station address is inactive.

Definition: This error is posted if the software does not detect a command from the host with the station address requested. The diagnostics will search for a command from the host for about 10 seconds before posting this message.

Action:

1) Check to make sure that both the Twinax Cable assembly and twinax cables are connected and secured to the emulator.

2) Verify that the twinax cable is connected to the host system.

3) Check with the system operator and verify that the station address selected is configured and operational from the host system.

4) Restart the diagnostic program and select another station address to see if another station address is active.

5) Replace the Twinax Cable assembly and twinax cable and try again.

6) The emulator is failing and needs to be replaced.

0037 Cable Adapter 1 Station address is in use.
0038 Cable Adapter 2 Station address is in use.

Definition: This message indicates that a response has been detected from another workstation and that the station address selected is already in use. A station address conflict can exist if this station address is used.

Action:

1) Rerun the diagnostics selecting another station address.

2) Disconnect all other devices on the twinax line so that the emulator is the only device on the twinax cable. Rerun the diagnostics with the same station address.

3) There may be conditions with either a twisted pair environment and/or very fast PC's that may create this error message. Some twisted pair environments extend the transmission of the command from the host for several extra micro-seconds. This extended time in combination with a very fast PC may cause this error. If the user and system operator are confident that no other device is using this station address, then this error message can be ignored. If the emulation software permits, the user can execute the emulation program and it will be operational regardless of this diagnostic error.

4) If this is the only error and the board operates properly online, then the condition in item 3 above may exist and this error should be ignored. If the emulation card does not operate properly online then the I-O 8155 or Twinax Cable assembly is failing and needs to be replaced.

0039 Cable Adapter 1 Wrap data latch did not set when online data received.

003A Cable Adapter 2 Wrap data latch did not set when online data received.

Definition: The diagnostics detected online data but the internal wrap data latches did not detect the online data.

Action:

1) The Twinax Cable assembly may not be properly connected to the I-O emulator. Make sure there is a good connection.

2) The Twinax Cable assembly may be failing and requires replacement.

3) The I-O emulator board is failing and needs to be replaced.

003B Cable Adapter 1 Wrap data latch would not reset during online test.

003C Cable Adapter 2 Wrap data latch would not reset during online test.

Definition: The receive data latches can not be cleared to their reset state.

Action:
1) There may be noise or a bad connection on the twinax cable or twisted pair environment. Replace the connection with new cable or move the unit to another location and repeat the test.

2) The Twinax Cable assembly may be failing and requires replacement.

3) The I-O emulator board is failing and needs to be replaced.

003D Transmit inhibit latch not functioning.

Definition: The twinax transmitters did not get inhibited/disabled. This error will occur if the I-O emulator board transmitted a response to a poll command.

003E Wrap data latch would not reset during offline test.

Definition: Both of the receive data latches did not reset during the offline test.

Action:
1) The Twinax Cable assembly may be failing and requires replacement.

2) The I-O emulator is failing and needs to be replaced.

003F The twinax cable connector is not empty.

Definition: There has been activity detected on the twinax cable prior to the start of the offline wrap tests.

Action: 1) Remove the twinax cable from the Twinax Cable assembly. The Twinax Cable assembly must be connected to I-O emulator but must not have any twinax cable connected on the ends.

2) The I-O emulator or Twinax Cable Assembly needs to be replaced.

040 Wrap data latch did not set during offline test.
0041 Wrap data latch did not reset during offline test.

Definition: The external diagnostic wrap test did not execute properly. The receive data latches did not set or reset properly during this test.

Action: 1) The Twinax Cable Assembly needs to be connected to the I-O emulator. Please make sure that the 15 pin connector end of the Twinax Cable Assembly is properly secured to the card.

2) The Twinax Cable Assembly is defective and needs to be replaced.

3) The I-O emulator is failing and needs to be replaced.

0042 Cable Adapter 1 Online queue data incorrect.
0043 Cable Adapter 2 Online queue data incorrect.

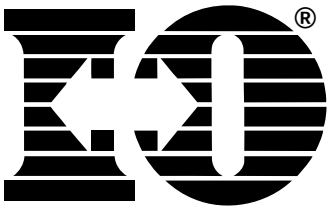
Definition The proper command sequence was not received by the board in response to the poll command. This test is only executed when the online tests are executed in response to the prompt in the diagnostics.

Action: 1) Verify that the twinax cable is properly connected to the I-O emulator and host system.

2) Check with the system operator to make sure a device has been configured on the host for the port and station address required by the diagnostics.

3) Verify that no other device is on the line using the same station address. If a device is using same address then the wrong information may be seen by the device under test.

4) If all of the above have been verified, then the I-O emulator needs to be replaced.



This page left intentionally blank.

6 ADAPTER HANDLER SOFTWARE

This section describes the procedure used to invoke the I-O emulator card Enhanced Adapter Handler software (D5250AH).

Compatibility

D5250AH is fully compatible with IBM's Enhanced 5250 Adapter Handler (E5250AH) and may be used in place of E5250AH on the I-O emulator card, the IBM Enhanced 5250 Display Station Emulation Adapter, the IBM 5250 Emulation PCMCIA Adapter, and all boards fully compatible with the IBM boards.

To use D5250AH.EXE in place of the IBM adapter handler, perform the following:

1) copy the following files from the install directory or release diskette into your PCS directory:

   - D5250AH.EXE
   - AHANDEA.EXE
   - AHANDPC7.EXE

2) Using an ASCII editor, replace all references to "E5250AH" in your STARTPCS.BAT file with "D5250AH".

Software Interface

D5250AH provides a software interface between the IBM PC DOS Router Software (and all third party compatible routers) and the twinaxial hardware.

ADAPTER HANDLER SOFTWARE

Software Startup

To start the D5250AH, enter the following at the DOS command prompt:

D5250AH [/Mx] [/Iyy] [/Lz] [/U] [/P] [/?]

The items in the brackets are optional parameters. **The brackets themselves are not entered**. The parameters M,I,L,U,P may be entered in upper or lower case letters; parameter values are entered in hexadecimal notation.

The **/Mx** parameter specifies a memory segment at which the local 8K adapter RAM is mapped into. The 'x' value may be in the range from A-F. The adapter RAM is mapped into the specified DOS memory segment at offset C000. If this parameter is not specified the adapter RAM is mapped in at DC00:0.

for example: *D5250AH /Mf*
maps the adapter RAM in segment 'F'

The **/Iyy** parameter specifies the port I/O address. The values 'yy' are used to form a port address as 2yy8. If the '/Iyy' parameter is not specified the port address is assumed to be 2718.

for example: *D5250AH /I72*
specifies port address 2728

The **/Lz** parameter specifies a hardware interrupt level to be used as the emulator's interrupt. The value 'z' must be in the range of 2-7. If the 'Lz' parameter is not specified the hardware interrupt level of '5' is used.

for example: *D5250AH /L7*
specifies interrupt level 7

The /P parameter specifies the emulator card installed is a I-O emulator PC7. The PC7 defaults to port hex 2728, interupt 5.

for example: *D5250AH /P*
maps the emulator at segment DC00,
port 2728, interrupt 5

The **/U** parameter specifies that the adapter handler is to be removed from memory (i.e. unloaded):

for example: *D5250AH /U*

The **/?** parameter specifies summary help to be displayed.

for example: *D5250AH /?*

This page left intentionally blank.

7 CONFIGURATION CONFLICT RESOLUTION

This section is intended to aid the user in determining if there is an I/O address or memory address conflict with the system. These steps will aid in resolving a conflict.

I/O Conflicts

The I-O 8155 reports to Card Services that it is a LAN card. Various Card Services drivers will try to place this LAN card in an area were they believe most LAN cards should be mapped. If the Card Services device driver cannot locate the I-O 8155, it may be necessary to add some option switches to the Card Services device driver statement in the CONFIG.SYS file. This may be especially true if there is another LAN type card (such as an Ethernet card) plugged into the system. Please refer to the manual for your Socket and Card Services device drivers for possible option switches.

Listed below are some simple DOS debug commands which will help to determine if the I-O emulator can be identified. If these commands execute with the proper results, then there should not be an I/O conflict. The value used with the 'i' and 'o' commands should start at the base address indicated by the Enabler. The Enabler software must be run prior to executing these commands. For example, if the Enabler located the I-O 8155 at an base I/O port address of 2718 hex, then the following commands could be used:

```
C> debug<ENTER>
-i 271E          ;this reads I/O location 271E and should return
D0               ;with a value of D0, which is the ID byte.
-o 271E          ;set POR latch
-o 271C          ;reset POR latch
-i 271A          ;read memory address register at I/O location 271A
FD               ;should return FD
```

If the value FD hex is not read, there is probably an I/O conflict.

Memory Conflicts

Memory conflict problems tend to be the most common problems encountered and are often easily resolved. There are several diagnostic

and emulation program messages which appear that generally indicate that the required space for the I-O emulator has not been reserved. Some of these messages are:

No room in PC address space for 5250 RAM (IBM 5250 terminal emulation)

TWX 1315 Adapter Random Memory Is Full (AS/400 PC Support)

Error 0006 - Adapter RAM visible with POR latch set (I-O Diagnostics)

Expanded Memory Managers

The most common memory conflict problem is due to the use of an Expanded Memory Manager without an 'exclude' statement. Most new PCs are 386, 486, and Pentium machines and tend to have an Expanded Memory Manager included. These memory managers try to maximize the amount of RAM space available for the system. The I-O emulator has 8K bytes of RAM already resident on the board which needs to be mapped into the memory space of the PC.

It may be necessary to modify the system's CONFIG.SYS file in order to reserve this 8K byte block of memory for the I-O emulator. The I-O emulation is typically located at DC00-DDFF space, but can be located at other 8K memory boundary locations. Some example spaces are D800-D9FF, C400-C5FF, etc. To reserve an 8K memory space at address DC00, add the following to your CONFIG.SYS files for the respective memory manager. If a different memory manager is used, please find the proper syntax for excluding the space required for the I-O emulator.

QEMM386 (Quarterdeck Office Systems)

DEVICE=C:\QEMM\QEMM386.SYS ARAM=DC00-DDFF

EMM386 (Microsoft Corporation)

For DOS:
DEVICE=C:\DOS\EMM386.EXE X=DC00-DDFF

or

For Windows:
DEVICE=C:\WINDOWS\EMM386.EXE X=DC00-DDFF

You may also need to make similar changes to ensure that the Expanded Memory Manager is not trying to use memory space that Card Services is controlling.

Card Services Memory Management (8155 only)

In order to avoid memory conflicts, the Card Services driver on your system may need to be configured with respect to the memory space that it manages. Following are some examples.

The IBM Card Services driver utilizes a program called the Card Resources Manager to specify the memory that Card Services can use. The memory range is specified on the DEVICE= line in the CONFIG.SYS file that loads the CRM For example, the line:

DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF

gives control of the C800 to CFFF hex range of memory paragraphs to Card Services. If you try to configure the I-O 8155 using Card Services at DC00 hex, Card Services will reject the configuration. In this case, you would need to modify the line above to:

DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-DDFF

while ensuring that this expanded range does not conflict with other devices.

CONFIGURATION CONFLICT RESOLUTION

Earlier versions of the Phoenix Card Services driver have a DEVICE= line parameter to set the first available segment for Card Services. For example, the line:

```
DEVICE=C:\PCMPLUS\PCMCS.EXE /ADDR=C0
```

This indicates that the first segment that can be assigned by Card Services is C000 hex. You may need to move this up (for example, to C800 hex) if it conflicts with VGA memory.

Newer versions of the Phoenix Card Services driver have an initialization file, called PCM.INI, which contains configuration information. To set the first segment that can be assigned by Card Services to C800 hex, change the PCMCS= line to

```
PCMCS= /ADDR=C8
```

In addition to memory space, some Card Services drivers can be configured for interrupt levels and port addresses. Refer to your Card Services documentation for more information.

Other Memory Conflicts

If a hardware PC card controller is used it may be possible to have a conflict with another adapter card that uses a large block of memory space or the same block. If a conflict occurs then the I-O emulator should be moved to another area of memory. It is up to the user to change the memory segment used by the Enabler and the emulation program.

APPENDIX A

Specifications

General

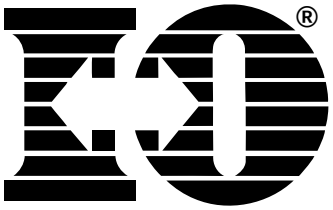
Host Systems:	IBM System/36, /38 and AS/400
Controller Systems:	IBM 5251-12, 5294, 5394, and 5494 I-O 8294/8394 Series
Interface:	15-pin connector with auto-terminating twinax V-connector for connection to host PCMCIA adapter plug
Software Supported:	User supplies licensed software: PC Support/400, ClientAccess/400, Rumba®, IBM Enhanced 5250 Emulation, or third party equivalent

Physical

Board size:	
8150	4.25 x 4.25 (10.5 x 10.5 cm)
8155	PCMCIA Type II
8160	6.50x2.25 (15.9 c 5.7 cm)

Environmental

Operating temperature:	0 C to 50 C (32 F to 110 F)
Storage temperature:	-40 to 70 C (-24 F to 160 F)
Relative humidity:	10 to 90% non-condensing



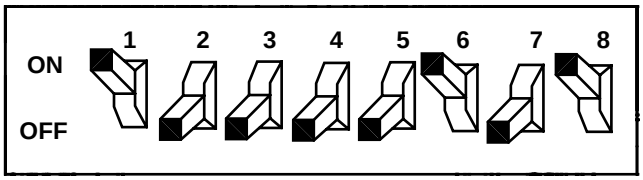
This page left intentionally blank.

APPENDIX B

DIP Switch Settings for I-O 8150

Switch settings are used to specify the area of IBM PC memory to be used for communication with the I-O 8150 Emulator Card. Check the switches and change the settings on the switches if necessary, as shown below.

Use a pointed object to change the switch settings. Set switches 1 through 8 as illustrated below. Slide the switch down to turn the switch OFF. The possible switch settings are as shown below and in the following table:



The factory setting is 2718. If this conflicts with another device on your system, select an unused address from the table below and modify the switches.

Additional addresses and their switch settings are found in the following table.

APPENDIX B

I/O Address	1	2	3	4	5	6	7	8
2408	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON
2418	ON	OFF	OFF	OFF	ON	OFF	OFF	ON
2428	OFF	ON	OFF	OFF	ON	OFF	OFF	ON
2438	ON	ON	OFF	OFF	ON	OFF	OFF	ON
2448	OFF	OFF	ON	OFF	ON	OFF	OFF	ON
2458	ON	OFF	ON	OFF	ON	OFF	OFF	ON
2468	OFF	ON	ON	OFF	ON	OFF	OFF	ON
2478	ON	ON	ON	OFF	ON	OFF	OFF	ON
2488	OFF	OFF	OFF	ON	ON	OFF	OFF	ON
2498	ON	OFF	OFF	ON	ON	OFF	OFF	ON
24A8	OFF	ON	OFF	ON	ON	OFF	OFF	ON
24B8	ON	ON	OFF	ON	ON	OFF	OFF	ON
24C8	OFF	OFF	ON	ON	ON	OFF	OFF	ON
24D8	ON	OFF	ON	ON	ON	OFF	OFF	ON
24E8	OFF	ON	ON	ON	ON	OFF	OFF	ON
24F8	ON	ON	ON	ON	ON	OFF	OFF	ON
2508	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
2518	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
2528	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON
2538	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
2548	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON
2558	ON	OFF	ON	OFF	OFF	OFF	OFF	ON
2568	OFF	ON	ON	OFF	OFF	OFF	OFF	ON
2578	ON	ON	ON	OFF	OFF	OFF	OFF	ON
2588	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
2598	ON	OFF	OFF	ON	OFF	OFF	OFF	ON
25a8	OFF	ON	OFF	ON	OFF	OFF	OFF	ON
25B8	ON	ON	OFF	ON	OFF	OFF	OFF	ON

I/O Address	1	2	3	4	5	6	7	8
25C8	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
25D8	ON	OFF	ON	ON	OFF	OFF	OFF	ON
25E8	OFF	ON	ON	ON	OFF	OFF	OFF	ON
25F8	ON	ON	ON	ON	OFF	OFF	OFF	ON
2608	OFF	OFF	OFF	OFF	ON	ON	OFF	ON
2618	ON	OFF	OFF	OFF	ON	ON	OFF	ON
2628	OFF	ON	OFF	OFF	ON	ON	OFF	ON
2638	ON	ON	OFF	OFF	ON	ON	OFF	ON
2648	OFF	OFF	ON	OFF	ON	ON	OFF	ON
2658	ON	OFF	ON	OFF	ON	ON	OFF	ON
2668	OFF	ON	ON	OFF	ON	ON	OFF	ON
2678	ON	ON	ON	OFF	ON	ON	OFF	ON
2688	OFF	OFF	OFF	ON	ON	ON	OFF	ON
2689	ON	OFF	OFF	ON	ON	ON	OFF	ON
26A8	OFF	ON	OFF	ON	ON	ON	OFF	ON
26B8	ON	ON	OFF	ON	ON	ON	OFF	ON
26C8	OFF	OFF	ON	ON	ON	ON	OFF	ON
26D8	ON	OFF	ON	ON	ON	ON	OFF	ON
26E8	OFF	ON	ON	ON	ON	ON	OFF	ON
26F8	ON	ON	ON	ON	ON	ON	OFF	ON
2708	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON
2718	**ON**	**OFF**	**OFF**	**OFF**	**OFF**	**ON**	**OFF**	**ON**
2728	OFF	ON	OFF	OFF	OFF	ON	OFF	ON
2738	ON	ON	OFF	OFF	OFF	ON	OFF	ON
2748	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
2758	ON	OFF	ON	OFF	OFF	ON	OFF	ON
2768	OFF	ON	ON	OFF	OFF	ON	OFF	ON
2778	ON	ON	ON	OFF	OFF	ON	OFF	ON
2788	OFF	OFF	OFF	ON	OFF	ON	OFF	ON
2798	ON	OFF	OFF	ON	OFF	ON	OFF	ON

APPENDIX B

I/O Address	1	2	3	4	5	6	7	8
27A8	OFF	ON	OFF	ON	OFF	ON	OFF	ON
27B8	ON	ON	OFF	ON	OFF	ON	OFF	ON
27C8	OFF	OFF	ON	ON	OFF	ON	OFF	ON
27D8	ON	OFF	ON	ON	OFF	ON	OFF	ON
27E8	OFF	ON	ON	ON	OFF	ON	OFF	ON
27F8	ON	ON	ON	ON	OFF	ON	OFF	ON

APPENDIX C

The following are file names for the programs located on the I-O emulator card diagnostic diskettes:

I-O 8150 Files

AHANDEA.EXE	Adapter handler
D5250AH.EXE	Adapter handler
AHANDPC7.EXE	Adapater handler
DCFG5250.EXE	Configuration
DFG5250.SAV	Configuration backup
CFG5250.DAT	Configuration Data
DCFG5250.XDB	Configuration data file
DCFG52TP.XDB	Configuration data file
IO8250.XDB	Configuration Program
DIA-EA.COM	Diagnostics
ENB5250.EXE	Enabler
ENB5250.HLP	Enabler help
ENBSTART.EXE	Enabler startup
XVIEW.EXE	Help
TAD.ICO	Icon
DCI5250.386	System Information
README.TXT	Text file
UTILDISK.TXT	Utility disk information
GETW95C.EXE	Windows 95\98 Information

I-O 8155 Files

AHANDPC7.EXE	Adapter handler
AHANDEA.EXE	Adapter handler
D5250AH.EXE	Adapter handler
PCDD5250.SYS	Card Services Interface device driver file
DCFG52PT.XDB	Confuration data file
CFG5250.DAT	Configuration data file
IO8250.XDB	Configuration data
PCDD5250.COM	Configuration data backup file
CFG5250.SAV	Configuration data backup file
DCFG5250.EXE	Configuration program
DCFG5250.XDB	Configuration program data file

PCCFG.EXE	Configuration program executable file
PCCFG.XDB	Configuration program formatted help data file
XVIEW.EXE	Configuration program help executable file
ENB5250.HLP	Diagnostics
ENB5250.EXE	Enabler
CFG5250.SAV	Enabler help
ENB5250.EXE	Enabler program executable file
ENBSTART	Enables start-up
XVIW.EXE	Help
TAD.ICO	Icon
DCI5250.386	System Information
README.TXT	Text file
UTILDISK.TXT	Utility disk I-O
GETW95C.EXE	Wings Information

I-O 8160 Files

D5250AH.EXE	Adapter handler
AHANDEA.EXE	Adapter handler
AHANDPC7.EXE	Adapter handler
DCFG5250.EXE	Configuration
CFG5250.SAV	Configuration backup file
IO8252.XDB	Configuration Program
DCFG5250.XDB	Configuration data file
CFG5250.DAT	Configuration data file
DIA-PNP.COM	Diagnostics
ENB5250.EXE	Enabler
ENB5250.HLP	Enabler help
ENBSTART.EXE	Enabler Startup
XVIEW.EXE	Help
DCI5250.386	System Information
README.TXT	Text file
UTILDISK.TXT	Utility disk information
GETW95C.EXE	Windows 95\98 Information

APPENDIX D

Software License Agreement

IMPORTANT -- READ THIS AGREEMENT CAREFULLY BEFORE OPENING THE SOFTWARE PACKET. By opening the sealed packet containing the software, you indicate your acceptance of the following terms and conditions. If you do not agree with these terms and conditions, do not open the packet or install the software and return the packet to I-O Corporation.

GRANT OF LICENSE. Subject to the terms and restrictions set forth herein, I-O Corporation (I-O) grants to you the right to use one copy of the enclosed software program or subsequent upgrade (SOFTWARE) on a single terminal connected to a single computer (i.e. single CPU). If you install the SOFTWARE on a network server, you must purchase a separate copy of the SOFTWARE for each computer terminal that will be used to operate the SOFTWARE.

COPYRIGHT RESTRICTIONS. The SOFTWARE is owned by I-O or its suppliers and is protected by the United States copyright laws and international treaty provisions. You may either (i) make one copy of the SOFTWARE solely for backup and archival purposes provided that you reproduce all copyright and other proprietary notices that are on the original copy of the SOFTWARE provided to you, or (ii) transfer the SOFTWARE to a single hard disk provided that you keep the original solely for backup or archival purposes. You may not copy the written materials accompanying the SOFTWARE.

OTHER RESTRICTIONS. You may not rent or lease the SOFTWARE. You may transfer your interest in this License on a permanent basis provided you retain no copies or versions thereof and the recipient agrees to the terms of this Agreement. You may not reverse engineer, decompile, disassemble, or create derivative works from the SOFTWARE. BREACH OF RESTRICTIONS. Breach of the copyright or any other restriction herein shall revoke the license granted without further action or notice by I-O.

LIMITED WARRANTY. I-O warrants this product for a period of ninety (90) days commencing from the date of purchase by the original end-user that: (i) the SOFTWARE will substantially conform to the applicable user documentation and (ii) that the magnetic media and the user documentation

(if any) are free from defects in material and workmanship. 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 warranty service by meeting the terms of the I-O's Customer On-Site Exchange Repair Policy (for the those within the Continental United States) or I-O's Return- to-Depot Repair Policy (for those outside the Continental United States) 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.

GENERAL PROVISIONS. You acknowledge and agree that (i) you have independently determined that the SOFTWARE licensed hereunder meets your intended requirements, and (ii) you have sole responsibility for the installation, use and results obtained from the SOFTWARE.

You acknowledge and agree that the SOFTWARE is subject to restrictions and controls imposed by the United States Export Administration Act (ACT) and the regulations thereunder. You agree and certify that neither the SOFTWARE nor any direct product thereof is being or will be acquired, shipped, transferred or reexported, directly or indirectly, into any country prohibited by the ACT and the regulations thereunder or will be used for any purpose prohibited by the same.

This Agreement is governed by the laws of the State of Utah, USA. The provisions of the Uniform Commercial Code as therein adopted shall apply to this transaction.

Should you have any questions regarding this agreement, or if you wish to contact I-O Corporation, please write I-O Corporation, 2265 South 3600 West, Salt Lake City, Utah 84119, or call (801) 973-6767.

This page left intentionally blank.

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.

This page left intentionally blank.

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.

This page left intentionally blank.

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.

This page left intentionally blank

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.

GLOSSARY

active session - The host session currently being used, as opposed to an inactive session.

adapter - A card that provides communications between part of a device and the processor.

address - In a computer, the location where the data is stored.

API (Application Program Interface) - System software that provides resources to create user interface features and to route programs or data.

APO (Auto Print Orientation) - Software decides by the size of the page if the data is to be printed in landscape or portrait orientation.

application - Software program used on a personal computer (PC).

ASCII (American Standard Code for Information Interchange) - The coding used in personal computer systems. Systems that link personal computers to IBM mainframes must include a translating device to translate the two codes.

attribute - A characteristic, such as bold and italic.

auto configure - Configures a program automatically during the initialization process.

automatic printer sharing - Automatically switches from PC printing to host printing and vice versa.

backup - To save information or data onto a diskette for a second copy.

base memory - standard memory used in a PC from 40 to 640 K.

BIOS (Basic Input/Output System) - A set of programs encoded
in read- only memory (ROM) of IBM PC-compatible computers that facilitate the transfer of data and control instructions between the computer and peripherals.

blank character - A character that is not displayed but occupies a position on the display screen.

buffer - An area in the memory that holds data temporarily.

cache memory - RAM (random access memory) set aside to store the most frequently accessed information stored in RAM.

character - A letter of the alphabet, a number, punctuation

mark, or any other symbol that represents information.

character set - A set of alphabetic, numeric, and special characters that may be displayed or printed by a system unit or device.

code page - Set of coded characters often displayed as an array or code table.

column separator - A vertical line used to separate one field from another.

command - An instruction that directs the system to perform a particular operation.

command keys - The keys on the top row(s) of the keyboard that are used to request a preassigned function of the system.

Command Pass-Thru™ - This feature allows access to all of the built-in features of a printer, even if these features are not normally available through the host software. Printer-specific command sequences are placed into the data sent to the printer from the host. The emulator recognizes these sequences and "passes the command through" to the printer.

configuration - Software setup of a computer program or system.

connector - A plug connected to a cable that fastens to a port on the back of a device.

COR (Computer Output Reduction) - Rotates data processing reports to landscape orientation and then compresses the text to fit 198 column by 66 lines on a page.

cpi - Characters per inch.

cursor - A character which indicates the positionat which the data entered will occur.

default - The value assumed when no other value is specified.

default setting - The standard setting for a feature which automatically appears unless the user selects a different setting.

delimiter - A character that marks the beginning and/or ending of a unit of data.

DIP switch - Used to provide user-accessible configuration settings.

direct access - A hot key sequence used to take the user directly to the next host session configured.

display screen - A cathode ray tube that is used to display alphanumeric characters.

display station - An input/ output device containing a display screen and an attached keyboard. Also called a terminal.

DOS (Disk Operating System) - A single user operating system developed by Microsoft. DOS can be referred to as PC-DOS for the PC, PS/1, and PS/2 series, or referred to as MS-DOS for non-IBM PCs.

DOS EMM386 - Memory management software.

dot matrix - A text printer that prints a series of dots to create characters.

driver - A program routine that contains instructions necessary to control the operation of a peripheral.

duplex - Prints on both sides of the paper.

EBCDIC (Extended Binary Coded Decimal Interchange Code) - A standard computer character set used to represent 256 standard characters. IBM mainframes use EBCDIC coding.

emulation - The duplication or imitation of one device by another device.

emulator card - A card that is installed into a PC, which enables the PC and PC printer to emulate host devices while allowing access to PC applications.

expanded memory - Area between 640K and 1M used as base memory.

extended memory - Memory that has been added to allow programs greater than 640K of RAM to run on a computer.

FGID (Font Global Identifier) - Font identifier used by IBM to standardize typestyle numbers used globally.

field attributes - Control characters stored in the character buffer in the first character position of a field.

field - An undefined area that contains a certain type of data.

file extension - A three letter suffix used to describe a file's contents (in addition to a DOS file name).

file transfer - A process used to transfer a file from one storage location to another.

font - (1) A collection of characters of a given typeface and size. (2) Used generically to mean the collection of coded fonts, font character sets, and code pages. (3) A font file that

contains characters that must be used in conjunction with a code page file.

form feed - The advancing of a form in the printer to the top of the next page by a code sent to the printer from the computer

hex (hexadecimal) - A number system with a base of sixteen, numbers used are digits 0-9 and alpha A-F.

hex transparency - See Command Pass-ThruTM

host - The central controlling processing unit in a twinax environment.

hot key - A selected key or key combination that accesses a menu command.

HP mode - Third party printer, if compatible, will receive HP LaserJet commands.

IBM mode - Same as HP, but will receive IBM LaserJet commands.

intensity - The brightness level used to display the characters on the screen.

I/O (Input/Output) - Transferring of data between the central processing unit and a peripheral device. Each transfer is an output from one device and an input into another device.

IRQ - Interrupt Request

keyboard template - Keys on a keyboard.

key click - Keys will make clicking sounds when depressed unless disabled.

landscape - A printing orientation in which the text prints across the length of a page.

LED (light emitting diode) - A light located on the back of the emulator card that lights up when communicating with the host.

line feed - A character code that advances the printer to the next line.

logical unit (Abbreviated as LU) - Manages the exchange of data between the user and host application.

lpi (lines per inch) - The number of lines per vertical inch of paper.

macros - Keystrokes that have been saved and which can be played back.

memory address - A code number that specifies a specific area in a computer's random access memory (RAM).

message line - See status message.

microcode - One or more micro instructions.

Microsoft Windows ™- Windowing environment and application user interface (API) for DOS that brings some of the graphical user interface features to IBMformat.

motherboard - The main board in the PC which other boards are installed.

nonshifted - Allows keys to be entered as characters or functions similar to when a shift key is not held down on a PC or typewriter.

PCMCIA - Personal Computer Memory Card Industry Association.

PC Support - An IBM host/PC communications program that provides the emulator card with access to virtual disk, virtual printer, and shared folder functions.

pitch - The number of characters per horizontal inch, or the positioning intervals of characters in a line of text.

pixel - The smallest displayable unit on a video screen, out of which the displayed image is constructed.

portrait - A printing orientation in which the text prints across the width of a page.

PPDS (Personal Printer Data Stream) - A printer programming language for some IBM laser printers.

prompt - A display symbol, word, or phrase that requests the user to enter data from the keyboard.

RAM (Random Access Memory) - A storage device in which data is entered and retrieved in a non-sequential manner.

record/playback - Keyboard macro used to save keystrokes and then play them back.

resident - Program is in memory.

root directory - Directory that contains a list of files stored on that disk.

Round Robin - A hot key sequence used to take the user sequentially through the highest host session, then to the Printer Control Screen, and then to DOS.

scan code - Code used to transmit data from the keyboard to the PC.

session - An active connection between the terminal emulation

and a host system. A session is opened when the user signs on.

set text orientation - Text is printed in a specified orientation regardless of paper size when using this command.

simplex - Prints on only one side of the paper.

status attributes - An option used to define how the status line is displayed

status line - An information line displayed on screen that displays information to the operator concerning the processing of the text.

status message - Information on the last line of the display screen that tells the operator about display station conditions.

third-party - Software and/or hardware made from a company other than by the original manufacturer.

truncate - Breaks off a part of a number or character string.

twisted pair - A pair of small insulated wires commonly used in telephone cables that are twisted around each other to minimize interference from other wires in the cable.

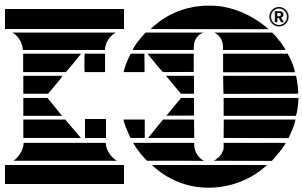
upper memory block - A block of memory between the 640K unit of conventional memory and 1MB running on MS-DOS or an IBM-compatible computer.

virtual disk - Allows the user to assign a portion of the host disk to the PC.

virtual printer - Allows users to print data from the PC to a host system printer.

workstation - A display station or printer.

INDEX



"Products That Work"

This page left intentionally blank.

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

"Products That Work"

This page left intentionally blank.