IBM

5250 Express Hardware

User's Manual

OPTIONS
by IBM

Note!

Before using this information and the product it supports, be sure to read the general information in Appendix B.

First Edition (June 1997)

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Safety: Read First

Attention: Before installing the option, read the *Safety Information* booklet that is included with the option.

About This Book

This book [1] contains information on the IBM 5250 Express adapters. The book is divided into the following parts:

Part 1: Abbreviated installation instructions (For detailed directions, see Part 2.)

Part 2: Product information, installation and usage information

Part 3: Reference information, including:

- Helpful hints for configuring the IBM 5250 Express PC Card and for using DOS and Windows 3.1
- Cabling information
- Adapter error codes
- Ordering information

Part 4: Service, warranty, notices and trademarks information

This book includes a glossary and an index.

> **Note:** The illustrations in this book might be slightly different from your hardware and software.

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1 *IBM 5250 Express Hardware Manual, S88H-0277 (part number 88H0277) replaces the following publications:*

- *IBM 5250 Emulation Family Installation and Test Instructions/Hardware Maintenance, and Service, G571-0391 (part number 31H5233)*
- *IBM 5250 PCI Adapter Installation and Test Instructions Addendum, G571-0020-00 (part number 88H0211)*

Part 1. Quick Installation Guide

The IBM 5250 Express adapters let you access an IBM System/36, System/38, or Application System/400 host that supports twinaxial protocol from a PC that is designed to one of the following architecture standards:

- PC AT
- ISA
- EISA
- PCI
- PCMCIA

In addition to this manual, the option package contains:

- An IBM 5250 Express adapter
- IBM 5250 Express Adapter Support Diskettes
- *Safety Information* booklet
- *Software Program License Agreement*
- *IBM 5250 Family Specification Sheet*

Depending on the option that you purchased, your package might also contain a cable and an emulation software kit.

This section provides an overview of the option installation instructions. For detailed instructions, see Part 2.

Although the installation and configuration procedures are different based on the IBM 5250 Express adapter and PC you are using, the process of installing and configuring the adapter is similar for all the IBM 5250 Express adapters:

1. Turn off your PC and any attached devices.
2. Install the adapter in the PC using the directions provided with your PC.
3. Insert a backup copy of Support Diskette #2 in your A: drive.
4. Turn on your PC and devices.
5. Run the test configuration program to prepare the adapter for testing.
6. Run the offline tests to check the installation of the adapter. Follow the directions that appear on the screen.
7. After the testing is completed, remove the support diskette from the A: drive and reboot your PC.
8. Run the installation program to install any support files that are required for your configuration.
9. Contact the host system administrator, and then connect the PC to the host.

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If you have trouble with the adapter after it is connected to the host, reboot the PC with the backup copy of Support Diskette #2 in the A: drive and run the online tests.

Product Description

> **Note:** Be sure to keep your proof of purchase, because it might be needed to receive warranty service.

The IBM 5250 Express adapters enable PCs that are designed to IBM PC AT, ISA, EISA, PCI, and PCMCIA architecture standards to attach to any IBM System/36, System/38, or Application System/400 (AS/400) host that supports twinaxial protocol. The adapters are attached to the host either locally through the host Twinaxial Workstation Controller or remotely through a 5294, 5394, or 5494 Remote Control Unit. The adapters also support either local or remote host attachment through the 6299 Midrange Hub or the 7299 Express Hub.

The cables for these adapters let you connect the adapters directly to shielded twisted-pair (IBM Data Connector), unshielded twisted-pair, and twinaxial cabling. The adapter cables bridge directly from the adapter to the host cabling system, without requiring a series of multiple cables and baluns.

When the adapters are used with compatible 5250 emulation programs, they provide 5250 display station and printer emulation functions. The adapters are supported by a variety of IBM 5250 emulation programs for the DOS, DOS/Microsoft Windows**, and OS/2 environments.

For information about the IBM 5250 emulation programs that are supported for these environments, see "Emulation Software" on page 5.

For information on adapter compatibility with specific PCs, contact your IBM Marketing Representative, IBM Authorized Advanced Products Dealer, or IBM Authorized Value Added Dealer, or go to the technical support web page. For information about the web page, see Appendix A, "Technical Support" on page 47.

What's New

The IBM 5250 Express adapters provide you with the same user-friendly features as the previous IBM 5250 Emulation Family adapters. They also provide these additional functions:

- Support for up to seven 5250 emulation stations

  The previous adapters supported only two physical host addresses. To use the additional host addresses, you must have emulation software that supports the additional stations.

- Support for the IBM 5250 Express Data Stream

  The IBM 5250 Express adapters support both the optimized mode and the 2 Mbps mode of the IBM 5250 Express Data Stream. To use the IBM 5250 Express Data Stream, your host and your 5250

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emulation program must support the data stream. For detailed information about the IBM 5250 Express Data Stream, see:

- "IBM 5250 Express Data Stream"
- The Networking Hardware Product Offerings Home Page (For the URL, see Appendix A, "Technical Support" on page 47.)

- Support for ISA Plug-n-Play

  The IBM 5250 Express ISA Adapter supports Plug-n-Play (PnP). This feature lets you use PnP software applications. This feature can also help you troubleshoot PCs that have problems with PnP. You can disable this feature for non-Plug-n-Play (non-PnP) software applications.

- Supports increased adapter resource selections

  The IBM 5250 Express adapters offer a wider range of I/O, memory, and interrupt selections than the previous adapters.

IBM 5250 Express Data Stream

The IBM 5250 Express Data Stream provides the following modes of operation to increase performance:

Optimized mode

Compared to the standard 5250 data stream, optimized mode reduces the number of bits that are required to transmit the same amount of data. The IBM 5250 Express Data Stream in optimized mode on a supported AS/400 host (for example, the IBM AS/400 Advanced Entry 9401 Model 150) provides almost twice the media throughput to the IBM 5250 Express adapters as compared to other 5250 devices.

2 Mbps mode

This mode doubles the line speed from 1 Mbps mode to 2 Mbps mode. For this mode to run, the AS/400 host (for example, the IBM AS/400 Advanced Entry 9401 Model 150) and all the devices on a Twinaxial Workstation Controller port (up to seven devices for each port) must be capable of running software that supports the IBM 5250 Express Data Stream.

> **Note:** If any device on the port does not support 2 Mbps mode, the line speed remains at 1 Mbps mode.

When both optimized mode and 2 Mbps mode are operational, the media throughput is almost four times greater compared to other 5250 devices.

> **Note:** Although the media performance is increased, the actual performance improvements vary depending on the PC and AS/400 processor speeds, memory, and application load. For more information, see the Networking Hardware Product Offerings Home Page. For the URL, see Appendix A, "Technical Support" on page 47.

IBM 5250 Express Adapter Support Diskettes

The IBM 5250 Express Adapter Support Diskettes, which are provided with the adapter, contain test, configuration, and support files:

Test files

These files provide standalone diagnostics for testing the supported IBM 5250 Express adapters.

Configuration files

These files configure your adapter as is required for testing. Your emulation software might require a different configuration than the tests require.

Installation and support files

These files provide adapter support for various emulation software packages, such as:

- IBM 5250 Express Program
- Client Access
- Personal Communications

For directions on installing the adapter support files, see "Using the IBM 5250 Express Installation Program" on page 20.

These adapter support files are provided as a convenience. To obtain the latest level of adapter support files, contact customer support for the emulation software that you are using.

Emulation Software

This section provides information about the compatible IBM 5250 emulation programs for DOS, Windows**, and OS/2 environments. For the latest information about which programs support the new features that are available with the IBM 5250 Express adapters, contact the provider of the emulation software or see the Networking Hardware Product Offerings Home Page. For the URL, see Appendix A, "Technical Support" on page 47.

Note: Before installing an emulation program, make sure that the following requirements are met:

- The PC is correctly connected to the host cabling system.
- The host is turned on and operating correctly.
- The system administrator has assigned at least one display station address for your use.

IBM DOS

The following IBM 5250 emulation programs are available for DOS 5.0 and later:

- Enhanced 5250 Emulation Program Version 2.4 and later
- 5250 Express Program Version 4.0 and later
- PC Support 36/38 using the DP5250.COM emulation program that is supplied with the IBM Enhanced 5250 Emulation Program Version 2.4 or later

- PC Support/400 Version 2 Release 1 WSF, and later releases
- Client Access/400 for DOS
- Client Access/400 for DOS with Extended Memory

IBM OS/2

> **Note:** In the OS/2 environment, these programs only support attachment to the AS/400.

The following IBM 5250 emulation programs are available for IBM OS/2 2.0 and later:

- 5250 Emulation for Windows Version 1.0 and later under the WIN-OS/2 environment of OS/2 2.1 (display emulation only)
- Enhanced 5250 Emulation Program Version 2.4 and later as a full-screen application in the Virtual DOS Machine (VDM) environment of OS/2 2.1 (display and printer emulation)
- 5250 Express Program Version 4.0 and later as a full-screen application in the Virtual DOS Machine (VDM) environment of OS/2 2.1 (display and printer emulation)
- IBM Communications Manager-based program products with 5250 emulators (for example, Extended Services for OS/2 or IBM Communications Manager/2 Version 1.1)
- Communications Manager/400 feature of PC Support/400
- Client Access/400 for OS/2
- RUMBA/400 running under OS/2, requires both Communications Manager and PC Support to be running.
- Personal Communications AS/400 Version 4.0

Microsoft Windows

The following IBM 5250 emulation programs are available for Microsoft Windows:

- 5250 Emulation for Windows Version 1.0 and later
- RUMBA/400 feature of PC Support/400
- Client Access/400 for DOS, including RUMBA/400 and PC 5250 for Windows
- Personal Communications AS/400 Version 4.1 and later

Microsoft Windows 95

The following IBM 5250 emulation programs are available for Windows 95:

- IBM AS/400 Client Access, Version 3, Release 1, Modification 1 and later
- IBM Personal Communications AS/400 Windows 95 Version 4.1 and later

The following IBM 5250 emulation programs are available for Windows 95 when running under a **DOS window**:

- Enhanced 5250 Emulation Program Version 3.0 and later
- 5250 Express Program Version 4.0 and later

Microsoft Windows NT

The following IBM 5250 emulation programs are available for Windows NT:

- IBM AS/400 Client Access, Version 3, Release 1, Modification 1 and later
- IBM Personal Communications AS/400 Windows NT Version 4.1 and later

Installing an IBM 5250 Express Adapter

To install an IBM 5250 Express adapter, you must install the adapter hardware into your PC and install any support files that are required for your adapter.

You might also need to update your CONFIG.SYS file so that adequate memory is reserved for the adapter. For more information, see "Memory Managers" on page 37.

Hardware Requirements

To install the adapter, you must have the following hardware:

- One of the following:
  - For an IBM 5250 Express ISA Adapter, a PC that is designed to the IBM PC AT, ISA, or EISA standard
  - For an IBM 5250 Express PCI Adapter, a PC that is designed to the PCI standard
  - For an IBM 5250 Express PC Card, a PC that supports a PCMCIA Release 2.0 or later Type II or Type III card

Note: For information about IBM 5250 Express adapter compatibility with specific PCs, contact your IBM Marketing Representative or Authorized IBM Dealer or go to the technical support web page. For information about the web page, see page 47.

- A 3.5-inch diskette drive
- An approved cable that has a standard DB15 socket D-shell connector for attachment to the adapter on one end and an appropriate connection to the host cabling system on the other end (If you did not order this cable as part of your adapter, see page 45 for ordering information.)

- For IBM 5250 Express PC Card, the cable and driver/receiver pod assembly (cable pod) that is provided with the adapter is also required. This assembly has a miniconnector for attachment to the adapter card and a standard DB15-pin D-shell connector for attachment to host cabling system.

If you are using the IBM 5250 Express ISA Adapter (in plug-n-play mode) or the IBM 5250 Express PCI Adapter, and you have configuration problems or you cannot establish communications with the host, upgrading the BIOS in the PC might resolve the problem. For more information, see "Upgrading Your BIOS" on page 14.

Installing the Adapter

Using the directions provided with your PC, install the adapter. You can install:

- The IBM 5250 Express ISA Adapter in any ISA or EISA expansion slot that is available.
- The IBM 5250 Express PCI Adapter in any PCI expansion slot that is available.
- The IBM 5250 Express PC Card in any Type II or III PCMCIA expansion slot.

After you install the adapter, configure the adapter for testing and run the diagnostics. For testing directions, see "Preparing to Run the Diagnostics" on page 9.

Special instructions for installing the IBM 5250 Express PC Card:

1. Turn off your PC.

   Warning: Before installing the cable pod, power off the PC. Attaching the cable pod while the PC is powered on might cause your PCMCIA socket to fail.

2. Hold the PCMCIA card with the word PCMCIA on the label pointing toward the PCMCIA slot and facing up. (See Figure 1 on page 9.)

3. Insert the PCMCIA card, 68-pin end first, into the PCMCIA slot.

> **Note:** Do *not* insert the 22-pin end of the PCMCIA card into the PCMCIA slot.

4. Firmly press the PCMCIA card into the slot.

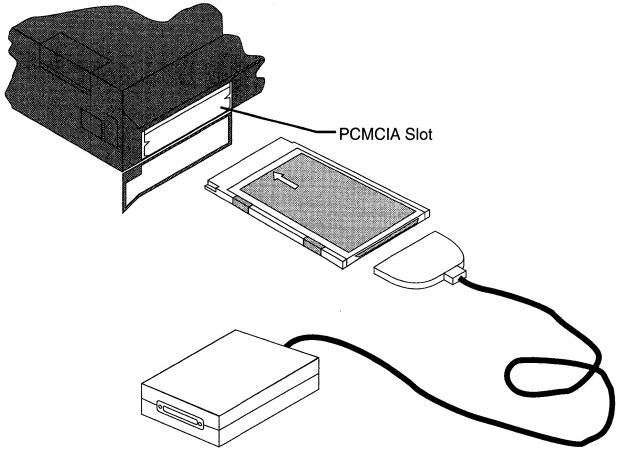

Figure 1. Installing the Adapter into the PCMCIA Slot

Preparing to Run the Diagnostics

Notes:

1. For the latest information about preparing for the diagnostics and running the diagnostics, see the README file on Support Diskette #2.
2. The configuration file that is used for testing can also be used to configure the IBM 5250 Express PC Card for some emulation software. For more information, see "Special Instructions for Configuring the IBM 5250 Express PC Card" on page 25.

Before you can run the diagnostics, you must create a testing configuration for the type of adapter that you are using. To create and test the configuration that is used when running the diagnostics:

1. Insert your backup copy of Support Diskette #2 in the A: drive and power on your PC. The 5250 Emulation Adapter Tests screen, similar to the one shown in Figure 2 on page 10, appears.

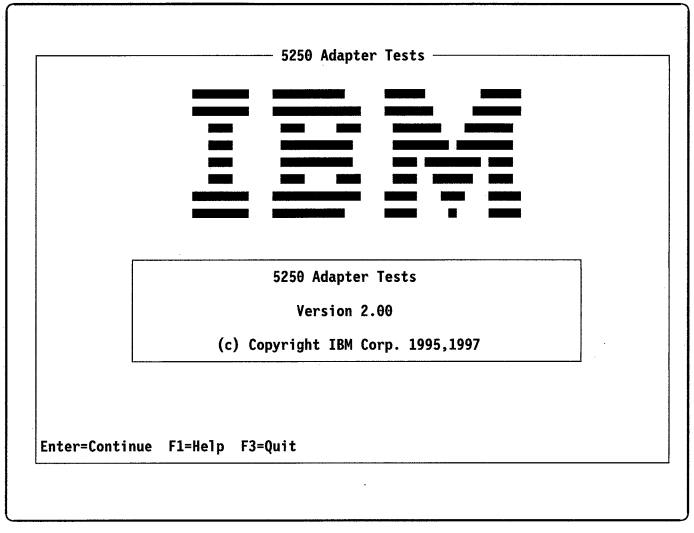

Figure 2. 5250 Emulation Adapter Tests Screen

2. At the 5250 Emulation Adapter Tests screen, press Enter:
   - If your Adapter Support Diskette was configured before, the 5250 Emulation Adapter Test Menu (similar to the one shown in Figure 7 on page 17) appears. Continue with step 2 under "Testing the Adapter" on page 16.
   - If your Adapter Support Diskette has never been configured, the 5250 Adapter Configuration Menu (similar to the one shown in Figure 3) appears. Continue with step 3 on page 11.

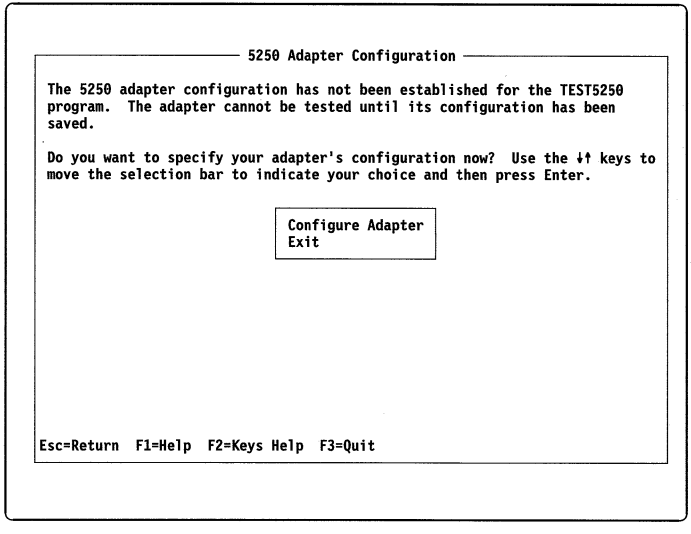

Figure 3. 5250 Adapter Configuration Menu

3. From the 5250 Adapter Configuration screen, select the Configure Adapter option. The Select Adapter Type screen, similar to the one shown in Figure 4, appears.

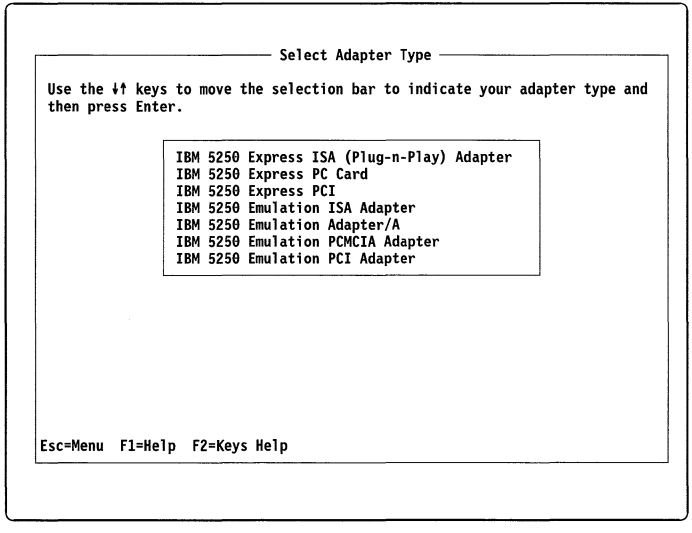

Figure 4. Select Adapter Type Screen

4. Use the arrow keys to highlight the type of adapter that you have and then press Enter. Selecting the adapter creates a configuration file for the adapter. Follow the messages that appear until your adapter configuration is saved.

Note: Your diskette should be write enabled. If you receive an error when saving the configuration to the diskette, verify that the write protection switch on the diskette is closed.

5. When the message shown in Figure 5 appears, press any key to continue. The 5250 Adapter Configuration Menu appears again.

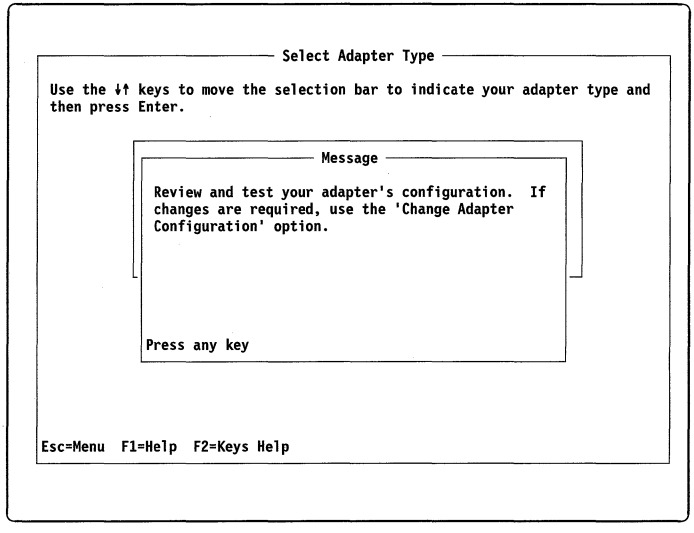

Figure 5. Adapter Type Saved Completion Message

6. From the 5250 Adapter Configuration Menu, select the Test Adapter Configuration option. The adapter configuration is tested:
   - If the `Adapter configuration testing has successfully completed` message appears, the configuration test completed successfully. To test the adapter functions, go to "Running the Diagnostic Tests" on page 15.
   - If the adapter configuration testing fails, you might need to change the configuration settings. For information about changing the test configuration settings, see the directions for your adapter:
     - "IBM 5250 Express ISA Adapter" on page 13
     - "IBM 5250 Express PCI Adapter" on page 14
     - "IBM 5250 Express PC Card" on page 14
7. After successfully configuring the adapter, press the Esc key to exit the 5250 Adapter Configuration screen. Continue with "Running the Diagnostic Tests" on page 15.

IBM 5250 Express ISA Adapter

The IBM 5250 Express ISA Adapter is shipped with Plug-n-Play (PnP) mode enabled to assist you in configuring the adapter:

- If you have a PC or operating system that configures PnP devices, the resources for your IBM 5250 Express ISA Adapter are automatically configured. It is recommended that you leave the adapter in PnP mode. For configuration information, see "Configuring the IBM 5250 Express ISA Adapter in PnP Mode."
- If you do not have a PC or an operating system that configures PnP devices, the IBM 5250 Express ISA Adapter operates similar to the Enhanced 5250 Display Station Emulation Adapter. For configuration information, see "Configuring the IBM 5250 Express ISA Adapter in Non-PnP Mode."

To determine whether the adapter is in PnP mode, select the View Adapter Configuration option.

Configuring the IBM 5250 Express ISA Adapter in PnP Mode

If you have a PC or an operating system that configures PnP devices and the adapter is in PnP mode, the I/O, memory, and interrupt values are automatically configured when you select the **Express ISA Adapter** from the Select Adapter Type menu.

When in PnP mode, the resources cannot be changed. If you experience memory, I/O, or interrupt problems while in PnP mode, upgrading the BIOS in your PC might solve the problem. For directions, see "Upgrading Your BIOS" on page 14.

If you cannot upgrade your BIOS or if upgrading your BIOS does not resolve the problem, put the adapter in non-PnP mode. For directions see, "Changing between PnP and Non-PnP Modes" on page 14.

Configuring the IBM 5250 Express ISA Adapter in Non-PnP Mode

When the IBM 5250 Express ISA Adapter is in non-PnP mode, you configure it like an Enhanced 5250 Display Station Emulation Adapter, except for the I/O value. (There are no I/O switches on the IBM 5250 Express ISA Adapter.)

To configure the I/O value:

1. From the Change Adapter Configuration screen (similar to the one shown in Figure 21 on page 35), select the **Change I/O Port** option.
2. Specify an I/O value. The value that you select is programmed into the adapter.
3. Exit the configuration and test program by pressing the appropriate function keys and following any directions that appear. The new I/O value is now being used.

> **Note:** If the new I/O value is not being used, power the PC off and then on.

To configure the memory or interrupt values, use the directions in "Changing Individual Configuration Settings" on page 36.

Changing between PnP and Non-PnP Modes

The IBM 5250 Express ISA Adapter is shipped with PnP mode enabled. To change between modes:

1. From the Change Adapter configuration menu, either:
   - Disable PnP mode (that is, use non-PnP mode) by selecting the **Disable Plug-n-Play** option from the Change Adapter Configuration menu.
   - Enable PnP mode by selecting the **Enable Plug-n-Play** option from the Change Adapter Configuration menu.
2. Exit the configuration and test program by pressing the appropriate function keys and following any directions that appear.
3. Power off the PC. The next time that you power on the PC, the adapter will be in the new mode.

Note: Pressing Ctrl+Alt+Del does not reset the mode.

IBM 5250 Express PCI Adapter

The IBM 5250 Express PCI Adapter is automatically configured by the PC's BIOS. If you cannot establish communications with the host from an IBM PC that has a IBM 5250 Express PCI Adapter installed, upgrading your BIOS might solve the problem. For directions, see "Upgrading Your BIOS."

Upgrading Your BIOS

To upgrade the BIOS of an IBM PC:

1. Find the date of your BIOS by going into the system setup when you boot your PC.
2. Check the IBM File Library WEB site to determine whether there is a later version of BIOS for your PC. The IBM File Library WEB site that has the latest BIOS upgrade files is located at:

   `www.pc.ibm.com/listfiles.html`
3. Search for your specific IBM PC. If there is a flash BIOS upgrade date later than on your PC, download the file to your PC and follow the instructions that come with the file.

Note: If you have a non-IBM PC, contact the manufacturer of your PC for the latest BIOS upgrade.

IBM 5250 Express PC Card

To configure and test the IBM 5250 Express PC Card:

1. Copy your DOS Card and Socket Services drivers from your PC operating system to the root directory of the backup copy of Support Diskette #2.

2. Add the following lines to the CONFIG.SYS file that is on your backup copy of Support Diskette #2. Insert these lines before the DEVICE=\CSDD5250.SYS line:

   ```
   DEVICE=A:\socket_service_driver
   DEVICE=A:\card_service_driver
   ```

   where, *socket_service_driver* and *card_service_driver* are the names of your Socket and Card Services drivers.

   For example, IBM-DOS 6.1 provides Socket Services for some PCs. If your PC is an IBM ThinkPad 720, you could use the PCMSS.EXE and PCMCS.EXE files that are provided with DOS 6.1. Your CONFIG.SYS file might look like this:

   ```
   DEVICE=A:\DOS\HIMEM.SYS
   DEVICE=A:\DOS\EMM386.EXE NOEMS X=C000-CFFF
   DOS=HIGH,UMB
   DEVICEHIGH=A:\DOS\PCMSS.EXE /APOFF
   DEVICEHIGH=A:\DOS\PCMCS.EXE /ADDR=C0 /IRQ=10
   DEVICEHIGH=A:\ENB5250\CSDD5250.SYS
   ```

For more information about using Card Services, see the documentation that was provided with your PC or your operating system.

If problems occur with Card and Socket Services when you configure and test the adapter, point enabling your adapter might resolve the problems. For directions, see "Point Enabling the Controller" on page 28.

Running the Diagnostic Tests

The testing procedure is the same for the IBM 5250 Express ISA Adapter, the IBM 5250 Express PCI Adapter, and the IBM 5250 Express PC Card. Before you can run the diagnostic tests, you must configure the adapter for testing. For configuration directions, see "Preparing to Run the Diagnostics" on page 9.

You can run either of these tests:

Offline test

This test checks the adapter when it is not connected to the host. To make sure that the adapter is installed and functioning, run this test after you install the adapter in the PC and before you connect the adapter to the host.

To run offline testing, the adapter cable assembly must be attached at the D-shell connector with the other end or ends of the adapter cable assembly disconnected from your host cabling system.

Note: This test does not check communication with the host.

Online test

This test checks the adapter and communication with the host when your adapter is connected to the host. To make sure that the adapter is functioning and communicating with the host, run this test after you connect the adapter to the host.

At least one host station address is required for running the online test. Ask your system administrator for the station addresses. Valid station addresses are 0 through 6.

Which of the tests you run depends on whether the adapter is connected to the host. The procedure for the tests is the same, except that you specify the station addresses when you run the online test and the PC is connected to the host.

Warning: Before you connect the adapter to or disconnect the adapter from the host, contact the system administrator for the host system. Connecting the adapter to the host can disrupt other workstations on the same line.

Display Station Addresses

Ask your system administrator for the number of station addresses that you plan to use. The first station address must be for a display station. The second station address can be for either a printer or another display station.

Circle the station addresses that you plan to use:

0 1 2 3 4 5 6

Testing the Adapter

To run the tests:

1. Insert the backup copy of Support Diskette #2 in the A: drive and power on your PC. The 5250 Emulation Adapter Tests screen, similar to the one shown in Figure 6, appears.

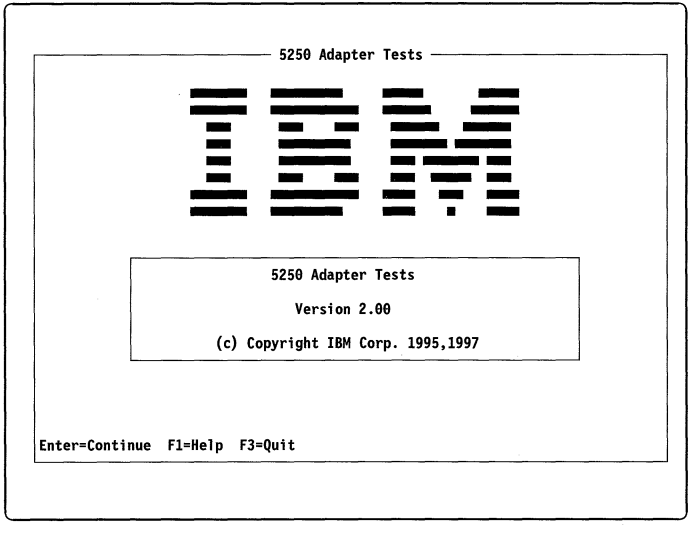

Figure 6. 5250 Emulation Adapter Tests Screen

2. Press Enter. The 5250 Emulation Adapter Test Menu, similar to the one shown in Figure 7, appears.

Note: If this screen does not appear, the adapter has not been configured for testing. For directions, see "Preparing to Run the Diagnostics" on page 9.

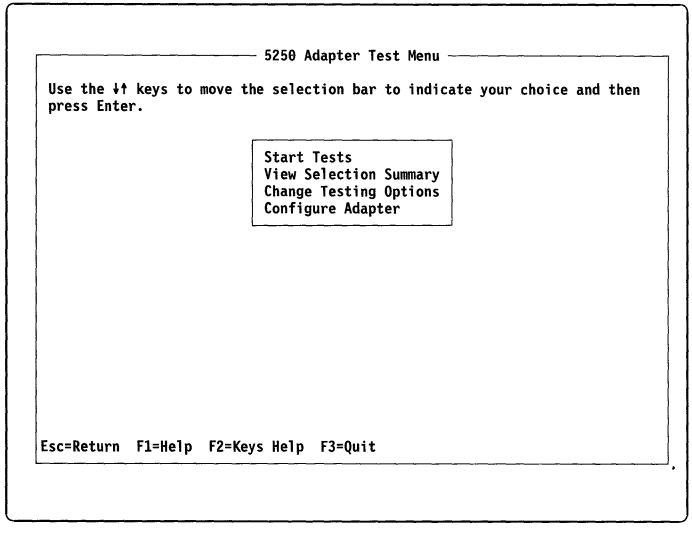

Figure 7. 5250 Emulation Adapter Test Menu

3. Use the up and down arrow keys to move the selection bar to the "Change Testing Options" option. Then press Enter. The Change Test Options screen, similar to the one shown in Figure 8, appears. To move between fields on this screen, use the up and down arrow keys.

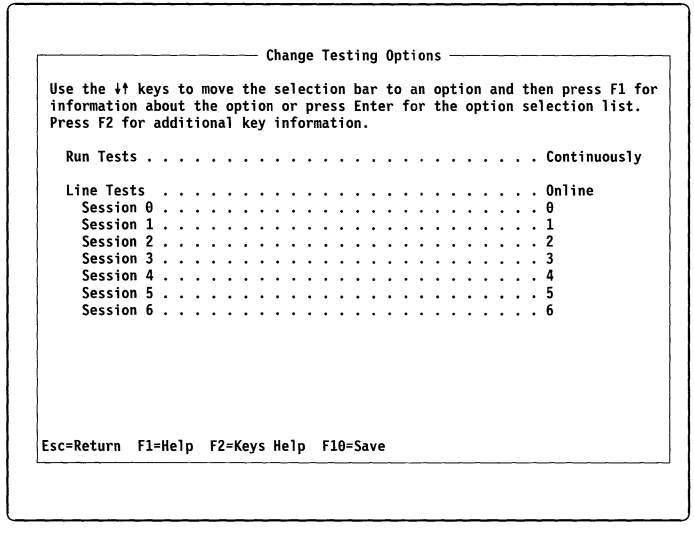

Figure 8. Change Testing Options Screen

4. At the 'Run Tests' field, press Enter to display the selection list for the field. Use the arrow keys to position the selection bar on one of the following and then press Enter:

   Once
   This option runs the tests one time. When the tests complete, the results appear.

   Continuously
   This option runs the tests until either an error occurs or you stop the tests by pressing Esc. Use this option when you are having intermittent problems with the adapter.

5. In the 'Line Tests' field, choose one:

   Offline Use this option when your adapter is *not* attached to the host.

   Online Use this option when your adapter is attached to the host. This option checks the adapter and communication with the host when your adapter is connected to the host.

   If you select the Online test, the 'Primary address' and 'Secondary address' fields appear. The primary address is required. If you are not using a secondary address, specify 'None' for the 'Secondary address' field.

6. To save your options, press F10.

7. Press Esc to return to the 5250 Emulation Adapter Test Menu, similar to the one which is shown in Figure 9.

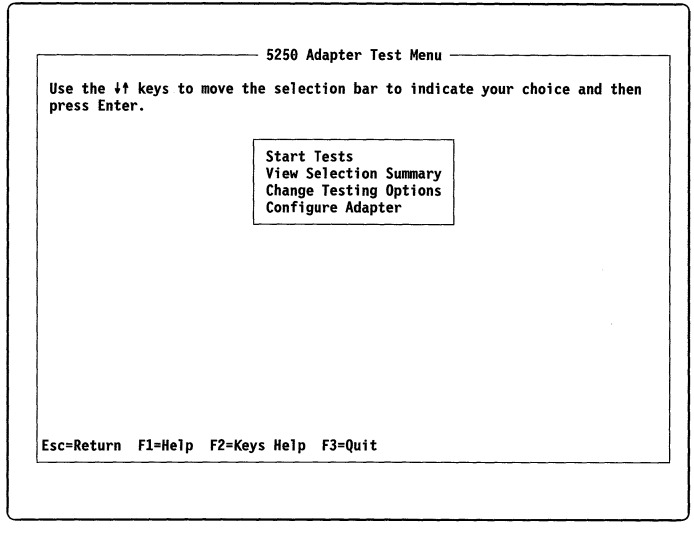

Figure 9. 5250 Emulation Adapter Test Menu

8. When the 5250 Emulation Adapter Test Menu appears again, highlight **Start Tests** with the selection bar and press Enter. While the tests run, the 5250 Adapter Tests screen, similar to the one shown in Figure 10, appears.

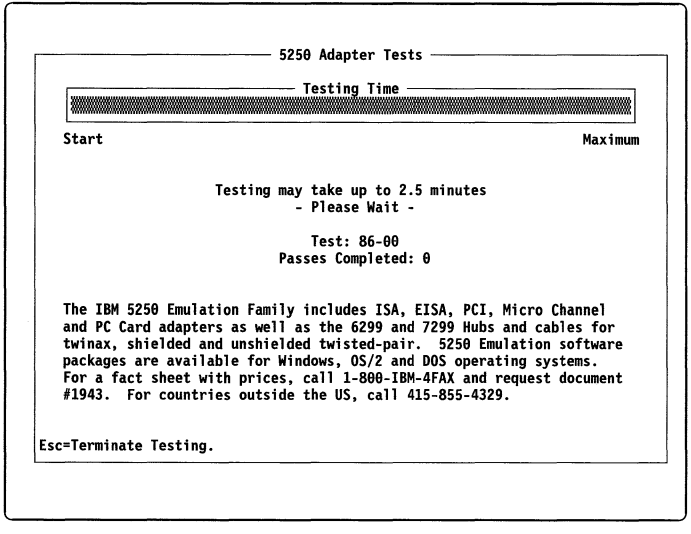

Figure 10. 5250 Adapter Tests Screen

Notes on the time required for testing:

1. When you run the online tests, the testing time varies based on the host response time.
2. On some fast PCs, testing might complete in a few seconds.

When the tests complete, a 5250 Adapter Testing Results screen that is similar to the one shown in Figure 11, appears.

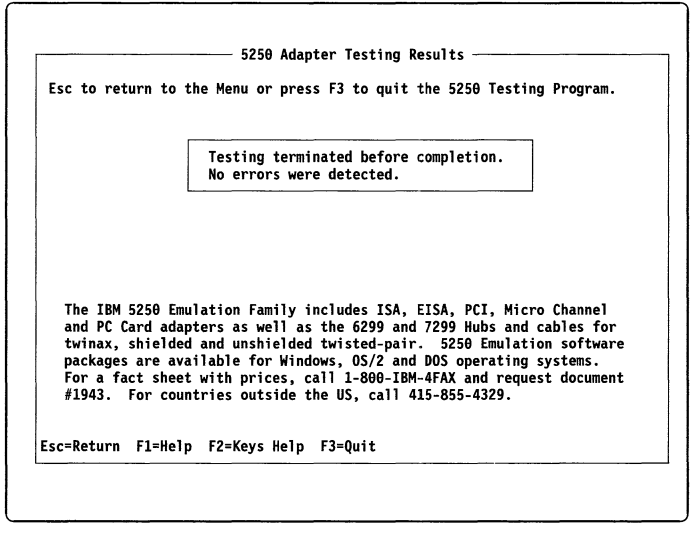

Figure 11. 5250 Adapter Testing Results Screen

If an error number or an error message appears, write down all the error information and see "Adapter Error Codes" on page 41.

To end the testing program, press F3. Remove the diskette from the A: drive. Then press any key to reboot the PC.

Using the IBM 5250 Express Installation Program

The IBM 5250 Express Installation Program is located on the IBM 5250 Express Adapter Support Diskettes. You *must* run this installation program after you install, configure, and test the adapter hardware so that any support that is necessary for your configuration can be added. For directions, see "Preparing to Run the Diagnostics" on page 9.

Before running the IBM 5250 Express Installation Program, you must install your 5250 emulation program. For the IBM 5250 Express Installation Program to work correctly, it must find your emulation software.

If you have not already done so, make backup copies of the support diskettes. For information about creating backup diskettes, see the documentation provided with your operating system.

Running the IBM 5250 Express Installation Program

Before running the installation, read the README.TXT file located on the root directory of the IBM 5250 Express Adapter Support Diskette #2. If you have a printer available you can print the file. You could also view this file using a PC editor or display it by doing the following:

1. Insert the backup copy of the Support Diskette #2 into the A: drive of a PC.
2. Change to the A: drive.
3. Enter the following command:

   ```
   TYPE README.TXT | MORE
   ```

4. To see the next screen of information, press Enter.

You will also be able to view or print (if a printer is available) the README.TXT file from the installation program.

You must run the installation program from the operating system environment that you intend to use because some of the options available during the installation are operating system dependent.

While running the installation, please note the following:

1. Have all your IBM 5250 Express Adapter Support Diskettes ready. The IBM 5250 Express Installation Program prompts you when you need to insert a different diskette.

2. Because the IBM 5250 Express Installation Program runs from diskette, when you start the program, thirty or more seconds might pass before text appears on your screen.
3. Pressing Enter or clicking on the OK button will accept any current selection or input and continue running the installation.
4. Pressing ESC or clicking on the Cancel button will ignore any current selection or input and exit the installation program.
5. If you are asked to enter information and you make a mistake while typing, press the BACKSPACE key and retype the information.

Installing under the DOS Operating System

Note: Before running the IBM 5250 Express Installation Program, you must install your 5250 emulation program.

To run the installation program under DOS operating system:

1. Insert your backup copy of Support Diskette #1 into the A: drive.
2. Type **A:INSTALL** and press Enter.
3. Follow the directions that the installation program provides.

Installing under the OS/2 Operating System

Important: To install the program under OS/2, you **must** use the INSTALL2 command. If you use the INSTALL command instead of the INSTALL2 command, WIN-OS2 might hang.

Before running the IBM 5250 Express Installation Program, you must install your 5250 emulation program.

To run the installation program under OS/2 Version 2.11 or later:

1. Insert your backup copy of Support Diskette #1 into the A: drive.
2. At an OS/2 command prompt, type **A:INSTALL2** and press Enter.
3. Follow the directions that the installation program provides.

Installing under the Windows 3.1x Operating System

> **Note:** Before running the IBM 5250 Express Installation Program, you must install your 5250 emulation program.

To run the installation program under the Windows 3.1*x* operating system:

1. Insert your backup copy of Support Diskette #1 into the A: drive.
2. From the Program Manager window, select File and then select the Run option.
3. At the command line prompt, type **A:INSTALL** and select the **OK** button or press Enter.
4. Follow the directions that the installation program provides.

Installing under the Windows 95 Operating System

> **Note:** Before running the IBM 5250 Express Installation Program, you must install your 5250 emulation program.

To run the installation program under the Windows 95 operating system:

1. Insert your backup copy of the Support Diskette #1 into the A: drive.
2. From the Task Bar, select Start. The Start menu appears.
3. From the Start menu, select the Run option.
4. At the command line prompt, type **A:INSTALL** and select the **OK** button or press Enter.
5. Follow the directions that the installation program provides.

Installing under the Windows NT Operating System

> **Note:** Before running the IBM 5250 Express Installation Program, you must install your 5250 emulation program.

To run the installation program under Windows NT, do one of the following:

- If installing under Windows NT version 3.5, follow the instructions in "Installing under the Windows 3.1x Operating System."
- If installing under Windows NT version 4.0 or later, follow the instructions in "Installing under the Windows 95 Operating System."

Connecting the PC to the Host System

CAUTION:
To avoid possible injury, turn off the PC and unplug it from the power outlet before you connect cables to or disconnect cables from the host system cabling.

After installing the adapter, attach the adapter to the host system cabling using the directions in the documentation for the host system. For a list of IBM cables for attaching the PC to different cabling systems, see "Connecting Cable Kits" on page 45. If you use either

standard twinaxial or shielded twisted-pair cabling and your PC is the last station on the twinaxial line, make sure that your PC is terminated correctly.

The adapter and cable are now capable of communicating with the host system using emulation software. For information about the emulation software that your adapter supports, see "Emulation Software" on page 5.

If you have any adapter hardware problems after your PC is online to the host system, run the online tests using the directions in "Running the Diagnostic Tests" on page 15.

Service Information

If your adapter needs to be serviced:

1. Turn the PC off.
2. Disconnect the cable assembly from the adapter.

   Important: Do *not* disconnect the adapter cable from the host cabling system. Disconnecting it might affect other display stations that are connected to the same line.
3. Have the failing PC and/or adapter serviced. The Adapter Support Diskette is required when your adapter is serviced.

   Warning: If you are required to send a PC that contains a fixed-disk drive to be serviced, back up all files. *Normal shipping and handling can result in permanent loss of data on your fixed-disk drives.* For the backup procedure, see to the documentation provided with your operating system. If you want to ship your PC, see the installation manual provided with your PC for instructions.

To obtain warranty service, contact your place of purchase or call IBM at 1-800-426-7378 (1-800-IBM-SERV).

> **Note:** When you return your adapter for service, provide any error code and message information to the service personnel to help them locate the problem.

Helpful Hints

Special Instructions for Configuring the IBM 5250 Express PC Card

The IBM 5250 Express Adapter Support Diskettes that are provided with the IBM 5250 Express adapters include support programs that the IBM 5250 Express PC Card might require for emulation software that runs under DOS or Windows 3.1. For the latest information about the support programs that are included, see the README file on Support Diskette #2.

Changing the Adapter Configuration Using Card Services

The Change Adapter Configuration option displays current configuration information and lets you change the IBM 5250 Express PC Card settings or the PCMCIA support method used.

There are two methods of providing support to the PCMCIA adapter. This section provides directions for the Card Services for DOS method. The other method, point enabling (directly programming), is explained in "Point Enabling the Controller" on page 28. For best results, use Card Services for DOS for PCMCIA support. Card Services is special software that manages how the PCMCIA cards are configured in your PC. Card Services is customized to operate with your PC hardware and resolves configuration conflicts among PCMCIA adapters.

Card Services is usually provided as device drivers by either the manufacturer of the PC or the DOS operating system. For additional information about Card Services, see the documentation provided with your PC, your operating system, or your version of Card Services.

If you are not using Card and Socket Services, you may point enable some PCMCIA controller hardware to enable your adapter. If you point enable your controller hardware instead of using Card Services, you must select system interrupts, I/O port addresses, and memory mapped addresses that the PC and other adapters are not using. You also need to know which type of PCMCIA controller is used in your PC and the address of the controller. For more information, see "Point Enabling the Controller" on page 28.

> **Note:** The support for point enabling might not work on every PC.

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Configuring the Adapter

1. Complete steps 1 (page 9) through 3. The Adapter Configuration Menu, similar to the one shown in Figure 4 on page 11, appears.
2. From the Adapter Configuration Menu, select Adapter Configuration. The Change Adapter Configuration screen, similar to the one shown in Figure 12, appears.

   If a screen similar to the one in Figure 12 does not appear, see "Point Enabling the Controller" on page 28.

```
                    Change Adapter Configuration

Adapter:  IBM 5250 Express PC Card
Support:  PCMCIA Card Services for DOS

                          Change I/O Port List
                          Change Memory List
                          Change Interrupt List
                          Change PCMCIA Support
                          Save Changes


IBM 5250 Express PC Card Configuration
  I/O Port List:   0318  0608  0728  0A38  2418  2508  2718  3A38  4408
                   4518  5718  5A38  6518  7408  8718  9A38
  Memory List:     DC00  CC00  C000  C400  C800  D000  D400  D800  C200
                   C600  CA00  CE00  D200  D600  DA00  DE00
  Interrupt List:  5  3  4  7  6  9  10  11  12  14  15


Esc=Return  F1=Help  F2=Keys Help  F10=Save
```

Figure 12. Change Adapter Configuration Screen

This screen shows the current configuration settings and lets you change:

- I/O Port List
- Memory List
- Interrupt List
- PCMCIA Support

Note: The Change PCMCIA Support option is included so that if you decide not to use Card Services, you can quickly access the Change 5250 Emulation PCMCIA Adapter screen.

3. From the Change Adapter Configuration screen, select the option that you want to change. The Change Interrupt screen, similar to the one shown in Figure 13, appears showing all the possible values for that option.

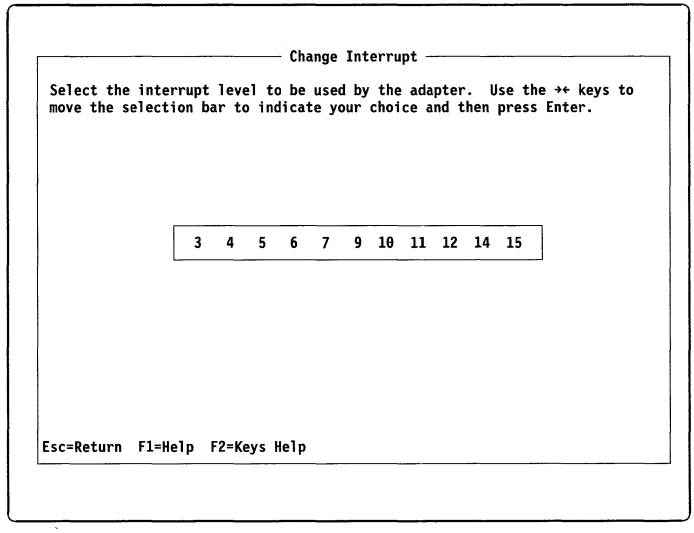

Figure 13. Change Interrupt Screen

4. Specify the values that are available for Card Services to assign for the 5250 emulation adapter. If a value is followed by an asterisk, the value is unavailable for Card Services to assign for the adapter. You can change whether a value is available to Card Services by using the arrow keys to highlight the value whose availability you want to change and then pressing Enter:

   - A value that was available becomes unavailable, and an asterisk appears next to it.

- A value that was unavailable becomes available, and the asterisk next to it disappears.

For example, if there is an asterisk next to interrupt level 4 and you want interrupt level 4 to be available, use the arrow keys to highlight 4 and then press Enter. The asterisk disappears, and interrupt level 4 is available for Card Services to assign.

When you have reconfigured your adapter, verify that the adapter is functioning correctly by running the tests using the instructions in "Testing the Adapter" on page 16.

Point Enabling the Controller

It is recommended that you use Card Services support 2.00 or 2.01. Higher levels of Card Services might also work. Card Services manages your PC resources for all your PCMCIA adapters.

If you are not using Card and Socket Services, you may point enable some PCMCIA controller hardware to enable your adapter. If you point enable your controller hardware instead of using Card Services, you must select system interrupts, I/O port addresses, and memory mapped addresses that the PC and other adapters are not using. You also need to know which type of PCMCIA controller is used in your PC and the address of the controller.

Note: The support for point enabling might not work on every PC.

Selecting the wrong configuration information can cause hardware conflicts in your PC. The conflicts can cause the adapter tests or your 5250 emulation program to fail.

If a program fails, you must turn your PC off and on to clear all the hardware conflicts. Rebooting your PC by pressing the Ctrl+Alt+Del keys does not always clear hardware conflicts.

To point enable the adapter configuration:

1. From the 5250 Adapter Configuration Menu, select the Select Adapter Type option. The Select Adapter Type screen, similar to the one shown in Figure 14 on page 29, appears.

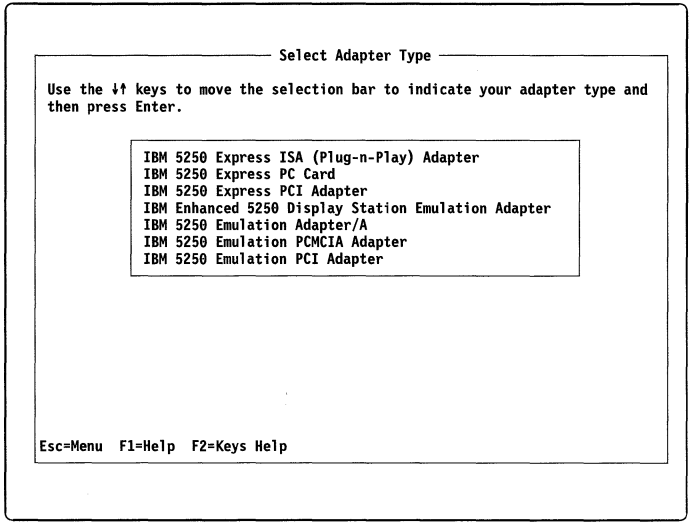

Figure 14. Select Adapter Type Screen

2. From the Select Adapter Type screen, select the IBM 5250 Express PC Card option. The configuration program might use questions or messages, similar to the one shown in Figure 15, to prompt you for information.

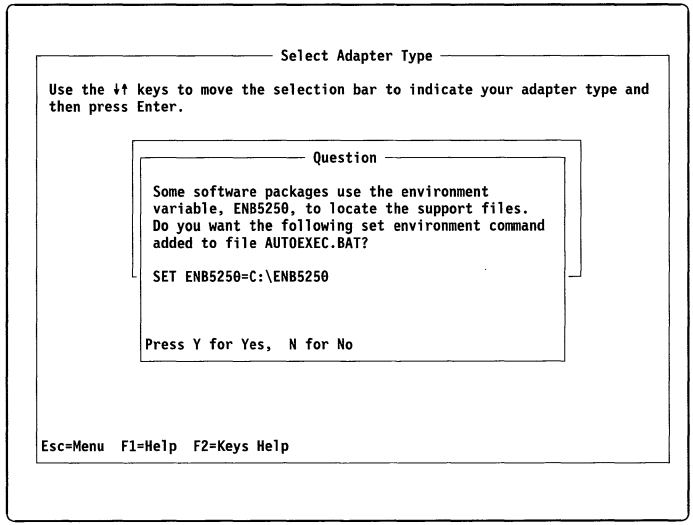

Figure 15. Configuration Prompt

3. Answer the configuration questions by pressing Y or N. The 5250 Adapter Configuration Menu, similar to the one shown in Figure 16, appears.

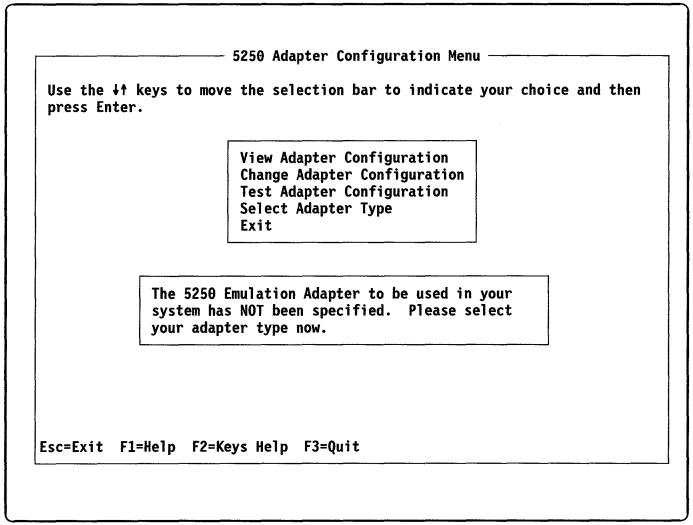

Figure 16. 5250 Adapter Configuration Menu

4. From the 5250 Adapter Configuration Menu, select the Change Adapter Configuration option. The Change Adapter Configuration screen, similar to the one shown in Figure 17, appears.

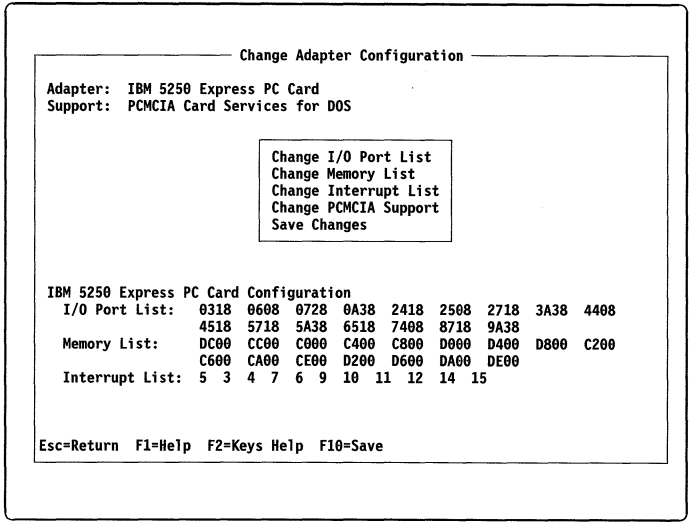

Figure 17. Change Adapter Configuration Screen

5. If the Support field on the Change Adapter Configuration screen does not indicate 'Point Enable':

   a. From the Change Adapter Configuration screen, select the Change PCMCIA Support option. The Change PCMCIA Support screen, similar to the one shown in Figure 18, appears.

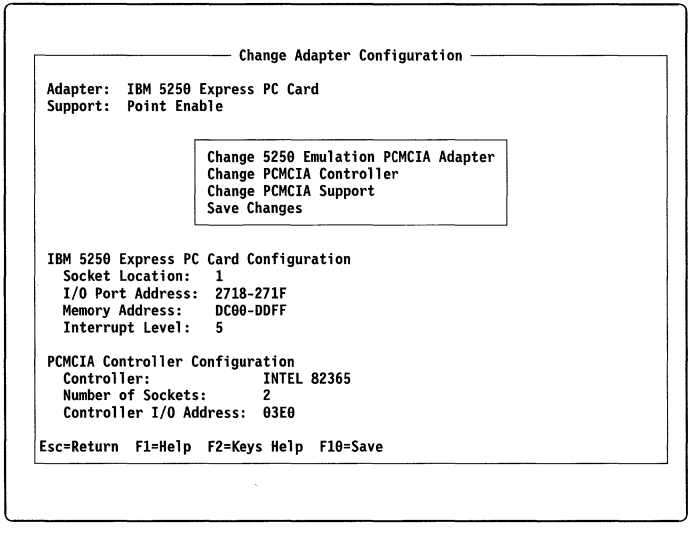

Figure 18. Change PCMCIA Support Screen

   b. From the Change PCMCIA Support Screen, select the Point Enable option. The Change Adapter Configuration screen appears again.

6. Change your adapter configuration settings as required using the directions in "Changing Adapter Configuration Settings" and in "Changing PCMCIA Controllers" on page 32.

Changing Adapter Configuration Settings

To change adapter configuration settings:

1. From the Change Adapter Configuration screen, select the 'Change 5250 Emulation PCMCIA Adapter' option. The 'Change 5250 Emulation PCMCIA Adapter' screen, similar to the one shown in Figure 19 on page 32, appears.

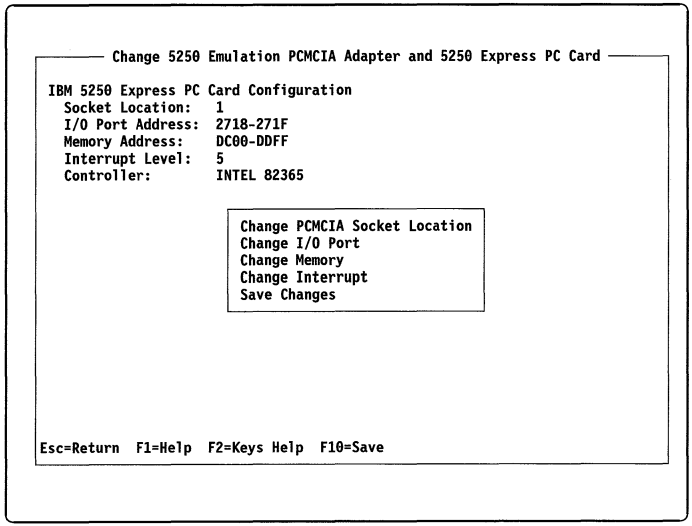

Figure 19. Change 5250 Emulation PCMCIA Adapter Screen

This screen shows the configuration settings that are being used and lets you change adapter configuration information, including:

- PCMCIA socket location
- I/O port
- Memory address range
- Interrupt level

2. Change the socket location, I/O port, memory address range, and interrupt level settings as needed.

   To change the settings, use the arrow keys to highlight the value that you want and then press Enter. When a range of addresses is needed, select the first address in the range and the program calculates the end of the range.

> **Note:** The full range used is shown on the View Adapter Configuration screen. For information about viewing the configuration settings that are being used, see "Viewing the Adapter Configuration" on page 34.

3. Do one of the following:

   - To save your changes, press **Y**.
   - To exit the configuration program without saving your changes, press **N**.

When you have configured your adapter, verify that the adapter is functioning correctly by running the offline test using the instructions in "Testing the Adapter" on page 16.

Changing PCMCIA Controllers

1. From the Change Adapter Configuration screen, select the 'Change PCMCIA Controller' option. The Change PCMCIA Controller screen, similar to the one shown in Figure 20 on page 33, appears. This screen shows the available controllers and lets you change the controller I/O address and the type.

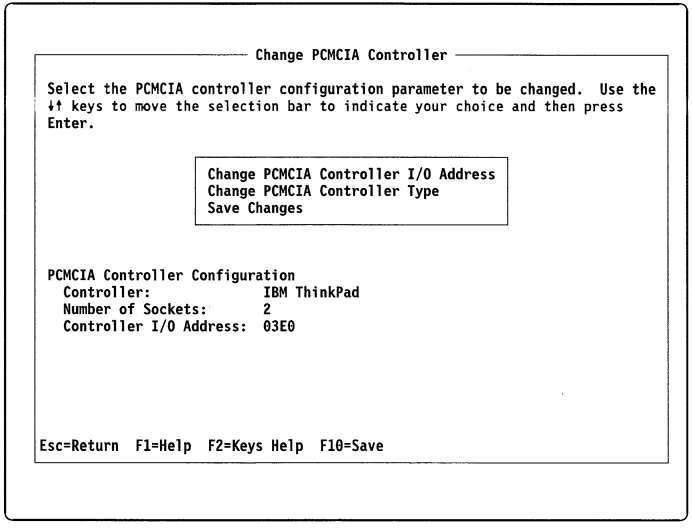

Figure 20. Change PCMCIA Controller Screen

2. Select the controller option in Table 1 that best matches your PC. To change the controller I/O address and the controller type, use the arrow keys to highlight the value that you want and then press Enter. When you set the controller I/O address, select the first address in the range and the program calculates the end of the range. The full range is shown on the Direct Programming screen.

Table 1. Supported PCMCIA Controllers

PCMCIA Controllers	**PCs**
IBM ThinkPad	IBM ThinkPad
SHARP PHIC	Sharp 6700 Labtops[2]
Toshiba ICCCNT	Toshiba 3300SL
Intel** 82365SL PCIC	• AST • NEC • Some Toshiba PCs • Many other PCs

If your PC is not listed, try the option for the Intel 82365SL PCMCIA support chip. Many PCs use this PCMCIA support chip. If the Intel 82365SL PCMCIA support chip option does not

[2] *To use the adapter with the SHARP PC-6700, configure an IC Card Com Port:*

a. Press the setup key on the Sharp keyboard
b. Under the Setup Option for Floppy Driver and IC cards, select **IC Card Com Port** *and enter the requested information.*

work for your PC, ask your dealer which controller to use or contact the manufacturer of your PC.

3. When you are done making changes, do one of the following:
   - To save your changes, press F10.
   - To return to the Change Adapter Configuration screen, without saving your changes, press Esc.

To verify that the adapter is functioning correctly, run the offline test using the instructions in "Running the Diagnostic Tests" on page 15.

Helpful Hints for DOS and Windows 3.1

Viewing the Adapter Configuration

To view the configuration settings that your adapter is using, select the View Adapter Configuration option from the 5250 Adapter Configuration Menu. This option displays:

- Which adapter is specified in the configuration
- The configuration settings for the adapter

If there is a problem with your configuration, an error message appears.

To return to the 5250 Adapter Configuration Menu, press Esc.

Automatically Reconfiguring the Adapter

The Automatic Configuration option verifies that the adapter is installed and then selects an available memory range that the adapter can use. The Automatic Configuration option does not select an interrupt level.

Before you can use the automatic configuration option, the emulation adapter must be installed. Do not use the automatic configuration option when emulation software is running.

> **Note:** If the system locks up during automatic configuration, change the I/O port and memory settings using the directions in "Changing Individual Configuration Settings" on page 36.

To automatically configure the adapter:

1. From the 5250 Adapter Configuration Menu, select the Change Adapter Configuration option. The Change Adapter Configuration screen, similar to the one shown in Figure 21, appears.

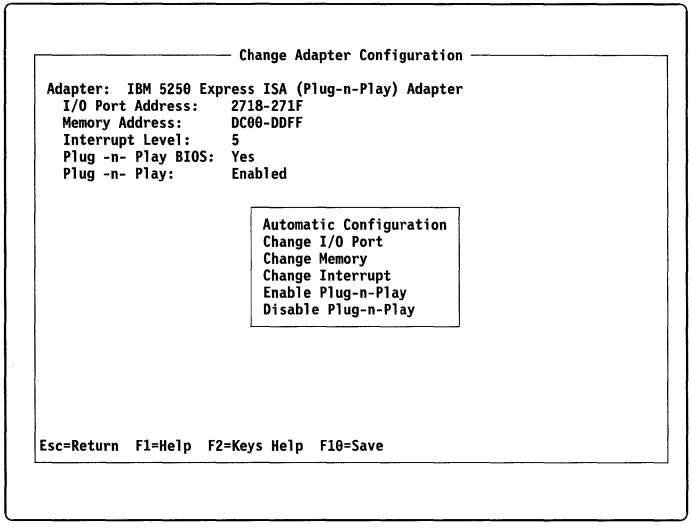

Figure 21. Change Adapter Configuration Screen

2. From the Change Adapter Configuration screen, select the Automatic Configuration option. The Automatic Configuration screen, similar to the one shown in Figure 22, appears. This screen shows you information about the Automatic Configuration option while the program selects an I/O Port and Memory Address ranges.

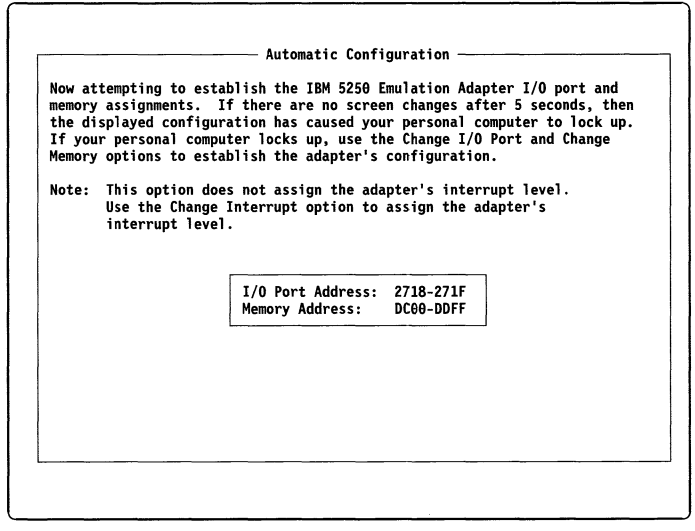

Figure 22. Automatic Configuration Screen

3. From the Change Adapter Configuration screen, select the Change Interrupt option. The Change Interrupt screen, similar to the one shown in Figure 23, appears.

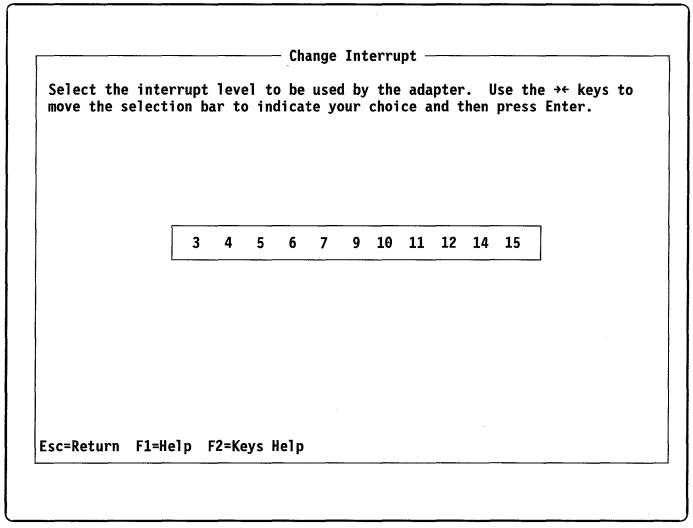

Figure 23. Change Interrupt Screen

4. Use the arrow keys to highlight an interrupt level and then press Enter. *For most systems, the default interrupt level (5) works.*

Changing Individual Configuration Settings

If your emulation adapter uses the same I/O port, memory address, or interrupt level as another component or device, your computer might lock up.

To resolve the problem, change the setting for the adapter or for the component or device:

1. From the Change Adapter Configuration screen, similar to the one shown in Figure 24, select the appropriate option.

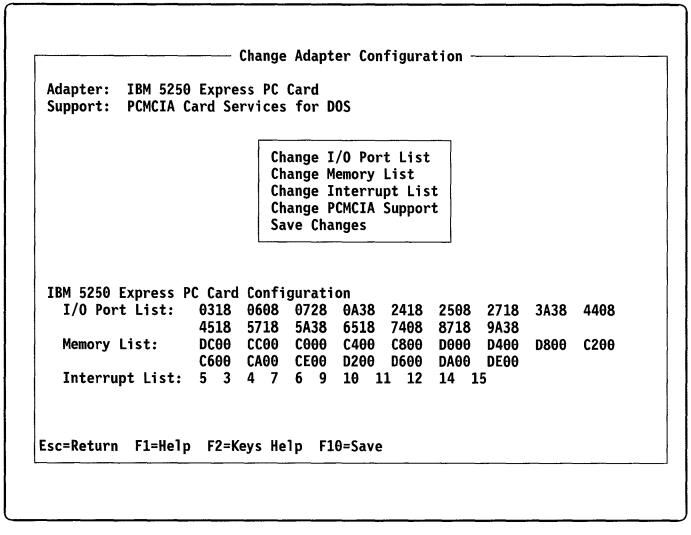

Figure 24. Change Adapter Configuration Screen

2. Select a new value. To save the new value, press F10. To return to the 5250 Adapter Configuration Menu without saving any changes, press Esc.

Memory Managers

The adapter requires 8 KB of available memory. If you are using a memory manager, make sure that some space is reserved to install the adapter and any other I/O adapters.

If you are using PCMCIA Card Services to enable your adapter, you might need to reserve more than the 8 KB space required for the adapter. Card Services support might require extra space for managing PCMCIA adapters.

For example, if your PC uses memory manager EMM386.SYS, the following command in the CONFIG.SYS file reserves a 32 KB space, starting at segment address 0xC000 for installing I/O adapters.

```
DEVICE=EMM386.EXE NOEMS X=C000-C7FF
```

In this example, the 5250 adapter uses 8 KB of space. The remaining 24 KB of space is available for other adapters to use and for Card Services to use when managing your PCMCIA adapters.

For more information, see the documentation provided with your memory manager and Card Services.

Note: You must restart your PC for any changes that you make in the CONFIG.SYS file to have affect.

Cabling

You can use the following types of cabling:

- Twinaxial (See page 38.)
- Unshielded Twisted Pair (See page 39.)
- IBM Cabling System (See page 41.)

Twinaxial Cabling

When using twinaxial cabling, the following rules apply:

- When attaching a workstation to the workstation line, the minimum distance between two Integrated Cable Assemblies is 1 meter (3.3 feet).
- Any workstation line can have a maximum of 11 junctions. Each display, printer, PC, cable splice, or station protector is a junction.
- If the last workstation on a line (other than a PC) does not have the Cable Thru feature, it must remain the last workstation on that line.

- The maximum cabling distance between the host and the last workstation or PC on a twinaxial cable depends on the type of transmission:
  - In 1 Mbps mode, the maximum distance is 1525 meters (5000 feet).
  - In 2 Mbps mode, the maximum distance is 1220 meters (4000 feet).

Figure 25 is an example of how to connect devices using twinaxial cabling. For more information about arranging devices, see the installation or device configuration information for your host.

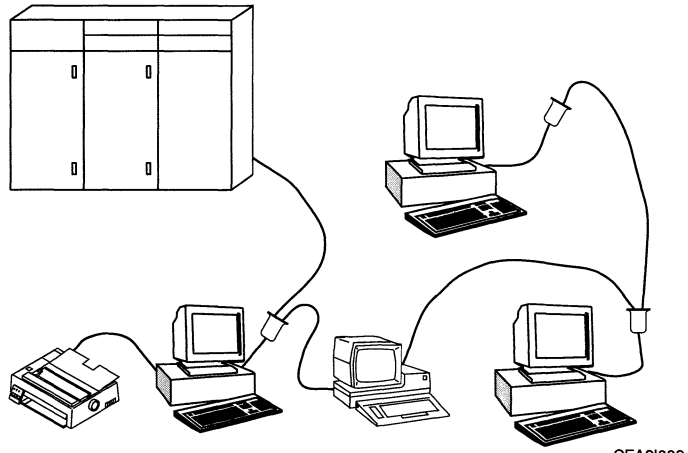

Figure 25. Twinax Connection Diagram

Unshielded Twisted Pair Cabling

You can run twinax signals through unshielded twisted pair (UTP) cabling by using twinax to UTP baluns and one of the following hubs:

- IBM 5299
- IBM 6299
- IBM 7299

For more information about UTP cabling for twinax devices, see:

- *IBM 7299 Express Hub for AS/400 Planning, Installation, and Maintenance Guide*, S05J-3355-00
- *IBM 6299 Midrange Hub Planning, Installation, and Maintenance Guide*, G571-0362
- *IBM 5299 Terminal Multiconnector Model 3 Planning, Setup, and Maintenance Guide*, GA27-3749

When using UTP cabling between the host and the hub, the following rules apply:

UTP connections through a 5299

- In 1 Mbps mode, the maximum distance between the host and the 5299 or any workstation is 304.8 meters (1000 feet). In 2 Mbps mode, this distance is derated to 228.6 meters (750 feet).
- In 1 Mbps mode, the maximum distance between the 5299 and any workstation is 274.3 meters (900 feet). In 2 Mbps mode, this distance is derated to 198.1 meters (650 feet).

UTP connections through a 6299

- The maximum distance between the host and the 6299 is 670.5 meters (2200 feet) using category 5 (CAT 5) wiring.
- The maximum distance between the 6299 and any workstation is 670.5 meters (2200 feet) using CAT 5 wiring.

Note: The 6299 does not support operation in 2 Mbps mode.

UTP connections to the host through a 7299

The IBM 7299 will support operation in 2 Mbps mode. For information about distances to the host, see the documentation provided with the 7299.

When twinaxial cabling is used between the host and the hub, the following rules apply:

UTP connections through a 5299

- In 1 Mbps mode, the maximum distance between the host and the 5299 or any workstation is 609.6 meters (2000 feet). The maximum distance between the 5299 and any workstation is 274.3 meters (900 feet).
- In 2 Mbps mode, the maximum distances are those listed in Table 2. For distances that are not listed, determine the distance from the values given in Table 2. For example, if you used 274.3 meters (900 feet) of twinax between the 5299 and the host, you could use up to 137.1 meters (450 feet) of TTP to connect each workstation.

Table 2. Maximum Cable Distances When Using 2 Mbps Mode

Twinax (Host to 5299)	UTP/TTP (5299 to Workstation)
<3 meters (<10 feet)	228.6 meters (750 feet)
152.4 meters (500 feet)	213.3 meters (700 feet)
182.8 meters (600 feet)	182.8 meters (600 feet)
243.8 meters (800 feet)	152.4 meters (500 feet)
304.8 meters (1000 feet)	121.9 meters (400 feet)
365.7 meters (1200 feet)	91.4 meters (300 feet)
426.7 meters (1400 feet)	60.9 meters (200 feet)
487.6 meters (1600 feet)	30.4 meters (100 feet)
548.6 meters (1800 feet)	<3 meters (<10 feet)

UTP connections through a 6299

The maximum distance between the host and the 6299 is 4000 feet.

Figure 26 is an example of how to connect devices using UTP cabling. For more information about arranging devices, see the installation or device configuration information for your host.

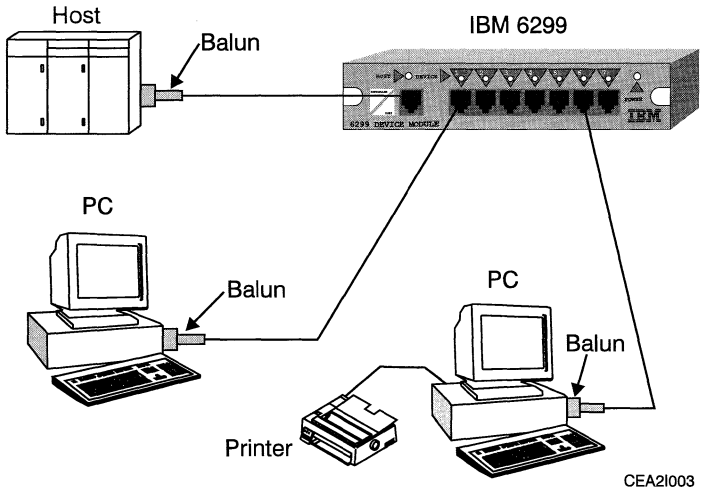

Figure 26. UTP Connection Diagram

IBM Cabling System

When using the IBM Cabling System (ICS), the maximum "equivalent" distance between the host and the last workstation on the ICS cable is 5000 feet.

To calculate the "equivalent" distance, use the formula: ***a*+2*b*+1.5*c*** where:

a Is the actual length of type 1 or type 2 cable
b Is the actual length of type 8 cable
c Is the actual length of type 6 or type 9 cable

For more information about arranging devices, see the installation or device configuration documentation for the host.

Adapter Error Codes

Adapter problems can be caused by:

- Adapter and system configuration conflicts
- Host system conditions
- Cable problems
- Adapter problems

If you receive an error code during offline or online testing, check this section for information about the error code.

3501-xx

A memory problem was detected. In most cases, this means that another adapter or system memory is occupying the same memory space that the adapter is attempting to use. **Configure the adapter to use another memory location or change the memory assignment of the conflicting adapter to a new memory space.**

Sometimes, expanded or extended memory managers, such as EMM386, can cause the memory conflict. **Exclude the memory manager from using the same space as the adapter**. For example, if the adapter is configured to use memory space CC00-CDFF, EMM386 is excluded from this memory space by the following statement in your DOS CONFIG.SYS file:

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=CC00-CDFF
```

In some 386 or higher PCs, the memory manager statement *must* be present to reserve space for adapters. If the memory manager statement is not present, system memory is placed in the adapter memory space that is needed for the adapter. If you receive this error, you might need to make space available for your adapter. Add EMM386.EXE to your CONFIG.SYS file and exclude space for your adapter. For information about EMM386, see your DOS manual.

3505-xx

A problem was detected during offline testing. During offline testing, the cable assembly must be *connected* at the D-shell connector on the adapter or at the cable pod that the IBM 5250 Express PC Card uses. (The D-shell connector contains 15 pins that are arranged in two rows in a housing that looks similar to a capital D.) The other end or ends of the cable assembly must be *disconnected* from the Host system. These disconnected ends would normally attach to your cabling system. If your adapter was not disconnected from your cabling system, the voltages applied to the cable during testing can cause other attached terminals to momentarily fail. **Run the offline test again with the cable connected as described in the explanation above.**

If you run the testing program (TEST5250) on more than one PC at the same time and the PCs are cabled to each other, the offline or the online tests might fail on computers that would otherwise complete the tests successfully. **Besides making sure that your PC is disconnected from the host, make sure that your PCs are not cabled together when running the offline test.**

If failures occur after you correct any cabling problems, the offline testing components of the adapter might be defective. Failure of offline testing components does not necessarily prevent the adapter from being used for terminal emulation. If online testing is successful, you can still use the adapter for terminal emulation.

3508-xx

A problem was detected during online testing. The online tests check the host response to transmissions from your adapter. Before the online tests can run, the station addresses that you selected are tested to determine whether they are available for use. If your station addresses are not currently available, the following error messages can appear:

- Host Polls not received.

  This error can be the result of improper cable connections or host conditions. **Check to make sure that your cable is properly connected and that your host system is operational.**

- Station Address already in use.

  Another terminal is already responding to the station addresses that you selected. Online testing cannot continue until your selected addresses are available for use. **You must resolve the conflict by changing your addresses or by changing the station addresses in the conflicting terminal.** If you are not sure which station addresses you should be using, contact your system administrator.

After determining that your station addresses are available, the tests send a transmission from the adapter to check the host response. If the host does not respond as expected, an error is reported. This error can be caused by the following problems:

- After the check to determine whether the addresses are available, another terminal starts using your station addresses.
- Your host is unavailable or a host condition exists that causes the host not to respond as expected. **Wait a short time and restart the test to check whether the host condition changes.**
- Multiple PCs are running the online tests at the same time and do not have unique station addresses assigned.
- Another PC that is not properly disconnected from the host cabling system is running the offline test.
- Another terminal that the adapter could not detect is using your station addresses. Some cabling systems do not allow the adapter to examine the response of other terminals. When using these cabling systems, station addresses that are already in use appear as available.
- A cabling problem exists that causes errors in the reception or transmission of data by the adapter.
- Your adapter might be defective.

3512-xx

There is a problem with the memory mapped communications registers on the adapter. This problem might be a memory conflict with another adapter's memory. **Configure the adapter to use another memory space.**

If you are using the point enable support for the IBM 5250 Express PC Card, try turning the PC off and then on. If the condition persists, using Card Services might resolve the problem.

3514-xx

A communication problem was detected on your adapter. The adapter is probably defective. If you also experience a communication problem when using your terminal emulation software, your adapter is defective.

3546-xx

There is an interrupt problem with the adapter or PC. The interrupt that was selected for the adapter might be assigned to another adapter or component. **Use a different interrupt on the adapter or change the interrupt assignment of the interfering adapter or component.**

The adapter requires the exclusive use of an interrupt level, even if your PC is capable of sharing interrupts. If an exclusive interrupt is not selected for the adapter, your 5250 emulation program or PC might not operate properly.

> **Attention:** It is possible that this test of the interrupts for your adapter can pass even though exclusive assignment of an interrupt was not granted. The sample time to detect interfering interrupts is a few seconds. Interrupts that occur infrequently might escape detection.

3553-xx

Adapter I/O port read or write failed. This problem might be caused by an I/O space conflict with another adapter or with your PC. **Reconfigure your adapter to use another I/O space and restart the tests.**

3588-xx

The adapter was not detected. This test tries to read the adapter identification code in the assigned I/O space for the adapter. **Make sure that the adapter selected in the adapter configuration identifies the correct adapter.** For example, you should have the IBM 5250 Express PCI Adapter configured if you have a PCI bus PC.

Usually, the adapter is not correctly seated. **Reseat the adapter or use a different slot.**

Ordering

This section lists the part numbers for:

- Adapter FRU kits
- Connecting cable kits
- Publications

Adapter FRU Kits

The following table provides part numbers and descriptions for the field replaceable unit (FRU) kits.

Description	Part Number
PC/AT, ISA, and EISA Card	88H0245
PCI Card	82H4718
PC Card	88H0253
Cable Pod	88H0261

Connecting Cable Kits

The following table provides part numbers and descriptions for the connecting cable kits.

Description	IBM Part Number
Data Connector Cable DB15 D-shell connector to an IBM Data Connector	60G1043
UTP Cable DB15 D-shell connector to an industry standard RJ-11 jack	60G1042
UTP Cable DB15 D-shell connector to an industry standard RJ-45 jack, pins 4 and 5 active	31H5087
Integrated Cable Assembly DB15 D-shell connector to a Twinaxial Y	6403635

Publications

The following publications can be purchased from IBM Software Manufacturing Solutions. To order, call 1-800-879-2755 (Monday-Friday 6:30 a.m.-5:00 p.m. Mountain Time).

Title	IBM Part Number	IBM Form Number
IBM 5250 Express Hardware Manual [3]	88H0277	S88H-0277
IBM 5250 Express Program User's Guide	88H0191	G571-2221
IBM 5250 Emulation for Windows User's Guide	11H1309	G571-0390

[3] *This publication includes the 3.5-inch IBM 5250 Express Adapter Support Diskette.*

Appendix A. Technical Support

Installation and technical support, including problem diagnosis and resolution, is provided by the IBM 5250 Emulation Support Center in Charlotte, North Carolina. This support is accessed in call-back mode through the IBM Support Center. In the United States, you may call the **IBM Support Center at 1-800-237-5511** anytime and receive a return call within eight business hours (Monday-Friday, 8:30 a.m.-5:00 p.m., eastern time).

If you get an automated response when you call the IBM Support Center, select the **AS/400** option. *The IBM 5250 Express adapters do not require a support contract.*

The IBM 5250 Technical Support Center also maintains a bulletin board system (BBS) that contains tips, user information, and program updates. The BBS is available 24 hours a day. You can call the IBM 5250 Technical Support Center BBS at 704-594-3799 anytime using an asynchronous modem. The BBS supports communications up to 14.4KB with 8 bits, no parity, and 1 stop bit.

You might also be able to obtain corrective service and information from the PC Company BBS at 1-919-517-0001. The BBS supports communications up to 14.4KB with 8 bits, no parity, and 1 stop bit. This BBS is mirrored on the Internet as follows:

```
FTP.PC.IBM.COM
```

Program updates might also be available through the World Wide Web. For program updates, refer to the Networking Hardware Product Offerings Home Page on the Internet at URL:

```
http://www.networking.ibm.com/5250
```

In Canada, you may call 1-800-565-3344 to obtain support.

Outside the United States, Puerto Rico, or Canada, contact your local IBM representative or your Authorized IBM Supplier for information on program services.

When you call, you should have the following information available:

- DOS version
- Emulation program type and version
- Type of IBM 5250 Express adapter
- PC brand, model, RAM memory, amount of free disk space, operating system, and operating system level
- Host system model and host operating system level
- The specific steps and other relevant details to reproduce your problem.

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- **Customer number**

  If you have an IBM AS/400, System/36, or System/38, your customer number is associated with the host serial number. To find out what your customer number is, call the IBM Support Center at 1-800-237-5511 and ask to be routed to the control desk.

  When you are connected to the control desk, inform the customer support representative that you have an IBM mid-range host and that you need to access your customer number. The customer support representative can help you route a call to the 36WSEM—Location 153 area of the IBM RETAIN Customer Support System.

Appendix B. Notices

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Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

IBM is not responsible for any radio or television interference caused by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Avis de conformité aux normes d'Industrie Canada

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouiller : *Appareils numériques*, NMB-003 édictée par Industrie Canada.

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Warranty Period*: Three Years

Machine: IBM 5250 Express PCI Adapter
Warranty Period*: Three Years

Machine: IBM 5250 Express PC Card
Warranty Period*: Three Years

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If you transfer a Machine to another user, warranty service is available to that user for the remainder of the warranty period. You should give your proof of purchase and this Statement to that user. However, for Machines which have a life-time warranty, this warranty is not transferable.

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Glossary

This glossary includes terms and definitions from the *American National Dictionary for Information Systems*[4] and the *Information Technology Vocabulary.*[5]

Numerics

1 Mbps mode. When a twinax port is transmitting data at 1 Mbps. This is the standard data transmission rate.

2 Mbps mode. When a twinax port is transmitting data at 2 Mbps. This is the Express data transmission rate.

5250 Express Data Stream. A method by which 5250 emulation devices can gain additional throughput, yielding increased performance. Supports the following modes of operation: optimized mode and 2 Mbps mode.

A

adapter. In this manual, one of the supported IBM 5250 Express adapters.

adapter cable. In this manual, an approved connecting cable with a standard DB15 socket D-shell connector for attachment to the adapter on one end and with an appropriate connector for attachment to the establishment host cabling system on the other end.

address. (1) A character or group of characters that identifies a register, a particular part of storage, or some other data source or destination. (A) (2) A unique address of an individual display station. (3) In data communication, the unique code assigned to each device or workstation connected to a network.

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4 *The American National Dictionary for Information Systems, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies may be purchased from the American National Standards Institute, 11 West 42 Street, New York, New York 10036. Definitions are identified by the symbol (A) after the definition.*

5 *The Information Technology Vocabulary, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1). Definitions of published parts of this vocabulary are identified by the symbol (I) after the definition; definitions from draft international standards, committee drafts, and working papers being developed by the ISO/IEC JTC1/SC1 are identified by the symbol (T) after the definition, indicating that final agreement has not yet been reached among the participating National Bodies of SC1.*

C

cable pod. In this manual, the assembly provided with the PCMCIA card, which has a thin 15-pin connector for attachment to the PCMCIA card on one end and a standard DB15 pin D-shell connector on the other end.

Cable Thru feature. A special feature that allows more than one display station (except the 5251 Model 2 or 12) and/or more than one printer to be attached to a single cable path.

card. An adapter card that is installed in the PC to enable it to be connected to another device or to increase the size of the computer's memory.

communicate. The transmission and reception of data.

CONFIG.SYS. A PC file that contains the device driver assignments.

configuration. The group of machines, devices, and programs that make up a data processing system.

configure. To connect the devices, workstations, programming, and the host system to each other by using addresses.

controller. A device used to coordinate and control the operation of one or more devices.

cursor. A moveable spot of light on the display device, usually indicating where the next character will be entered.

D

D-shell connector. A D-shaped connector, like the connector on the cable that connects the Integrated Cable Assembly to the PC.

data stream. The sequence of characters being transmitted over a line.

device. The generic term for a piece of equipment or a mechanism; for example, the PC display or the PC attached printer.

device address. A unique address of an individual display station.

device type. The number assigned to a unit or box in a system, such as 5150 (the IBM Personal Computer system).

diagnostic. Pertaining to the investigation of the cause of an error.

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

diskette drive. The device that rotates the diskette disk.

display station. (1) A device that includes a keyboard from which an operator can send information to the system and a display screen on which an operator can see the information sent to or the information received from the system. (2) See also *workstation*.

display station address. A unique address of an individual display station.

E

emulate. To imitate one system with another, primarily by hardware, so that the imitating system accepts the same data, executes the same programs, and achieves the same results as the imitated system. (A)

emulation. The use of a device or program that emulates another device or program.

emulation program. A program that allows you to imitate an IBM 5250 workstation and use the functions of a host system.

execution. The process of carrying out an instruction or instructions of a computer program by a computer. (I) (A)

F

field replaceable unit (FRU). An assembly that is replaced in its entirety when any one of its components fails. The PCMCIA card and the cable pod are examples of FRUs.

H

host. In this manual, any system that supports a twinaxial interface/protocol.

host cabling system. In this manual, an approved cabling media and architecture that provides terminal and workstation attachment to the host controller or the remote control unit.

I

Integrated Cable Assembly. A cable that connects the Enhanced 5250 Display Station Emulation Adapter to the workstation line. This cable automatically terminates the line when a second line is not connected.

interrupt level. A path used to get the processing unit's immediate attention.

initialize. To prepare for use. For example, to format a diskette and to initialize registers, and/or program variables to the condition previously determined by a program.

input/output (I/O). Pertaining to input, output, or both. (A)

L

line. The cable from the host computer or controller to which one or more workstations are attached.

local workstation. A workstation that is attached directly to the host system with twinaxial cable.

M

megabyte. 1,048,576 bytes of information.

O

offline. Not controlled directly by or not communicating with a host computer system.

on-card memory. The memory contained on the 5250 emulation adapter.

online. Being controlled directly by or directly communicating with a host computer system.

operating system. A program that supervises the execution of user programs by the computer.

optimized mode. The state of a device when it is sending or receiving data to or from the host in a compressed format. The number of bits required to transmit the same amount of data is reduced compared to the standard 5250 data stream.

P

poll. To determine whether any remote device on a telecommunication line is ready to transmit data.

port. (1) The part of the system unit or controller to which cables for workstations are attached. (2) The part of the Integrated Cable Assembly to which the workstation line may be connected.

power-on self test (POST). A series of diagnostic tests that are run automatically by a device when the power is turned on.

R

reference diskette. In this manual, the system reference diskette that came with your PC.

remote workstation. A workstation that is attached directly or indirectly to the host system via some communication channel.

S

session. (1) The period of time in which the host system and one of the devices are communicating. (2) The logical connection between the host system and a workstation. The session may be established for a display station or for a printer.

station address list. A list of workstation addresses that a session may use.

system expansion slots. Slots located in the PC or expansion unit. They allow for additional devices to be installed on the PC.

system operator. A person who uses a display station that is designated as the system device to activate certain system functions and control and monitor system operation.

system unit. The part of the PC that contains the central processing unit.

T

terminated line. A transmission line with a resistance attached across its far end equal to the characteristic impedance of the line, so that no reflection and no standing waves are present when a signal is placed on it at the near end.

terminator. A device used to terminate a transmission line.

twinaxial cable. A physical cable consisting of two conductors, usually small copper tubes or wires insulated from each other, within and insulated from another conductor of larger diameter, usually copper tubing or copper braid.

twinaxial protocol. In this manual, the data communication protocol and signal levels that can be transmitted over twinaxial, shielded-pair, or unshielded twisted-pair cabling media.

W

workstation. An input/output device consisting of a display station and/or printer that allows you to send and receive information from a host system.

workstation address. The address assigned to a workstation that enables the host system to communicate with it.

workstation line. The cable from a host computer or the chain of workstations to which a workstation is connected.

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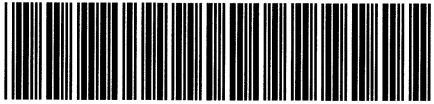
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