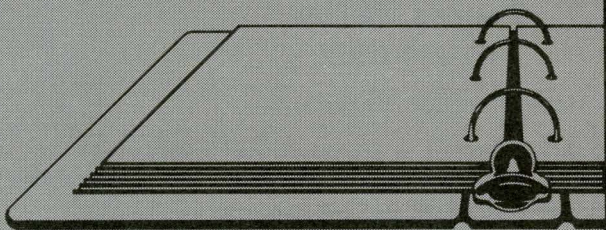# MultiTech® Systems

MultiCom5250PC™
Twinaxial Connection
5250 Emulation

Software Manual

Owner's Manual
P/N 82007200

MultiCom5250PC Software

Record of Revisions

Revision	Description
A (04/07/91)	Manual released. All pages at revision level A.

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Introduction to Multicom5250PC

1.1
Introduction

Before you begin using MC5250PC, here is a summary of what it can do and how it will help you be more productive with your personal computer (PC). Other chapters discuss setup and operation.

1.2
What Is an Emulator?

Many different types of computers are available today. Each computer system has its own rules for communicating and it will send information to and accept information from only certain types of devices, such as display stations and printers.

Emulator is the term used for computer programs that let one computer imitate, or emulate, another device for the purpose of transferring information. MC5250PC is an Emulator that lets your PC imitate devices with which IBM System/3x and AS/400 computer systems routinely exchange information. Your PC can then receive the same information, run the same programs, and produce the same results as real IBM 5250 display stations and printers.

Note that 5250 refers to all display stations and printers that MC5250PC can emulate, regardless of their model numbers. Display stations are sometimes called terminals, but this manual always refers to them as display stations or simply displays.

1.3
Why Do You Need an Emulator?

Your PC can already perform a large variety of tasks. MC5250PC makes it even more powerful by giving it the ability to connect to an IBM System/34, System/36, System/38 or AS/400 computer system, whether it be across the hall or across the country. You can then transfer information just like a real 5250 display station or printer.

You can see how an Emulator saves time and money by making a single machine do the work of several. MC5250PC is just one member of the MultiCom5250 family, products that handle a wide range of communications needs.

A Chapter For Those Who Don't Like To Read Manuals

2.1
Introduction

This chapter summarizes the basic steps needed to connect your PC to a System/3x or AS/400 host computer and communicate like a real 5250 display. It also helps experienced users get the Emulator running quickly.

2.2
Setup and Preparation

1. Make sure your PC, communications link and host system meet all of the Emulator's requirements.

2. Install the required hardware.

3. Fill out the Configuration Worksheet.

4. Turn on your PC and start DOS.

5. Work from a back-up copy of the software.

6. Work from the correct disk drive and directory.

7. Make sure your cursor is at the DOS prompt. Enter the following command to start the Configuration Editor:

    ```
    MC5250C
    ```

8. Edit the default configuration file with the items from the Worksheet. Save the edited file.

9. Select **Quit** from the Main Menu to return to DOS.

2.3
Basic Emulation

1. Make sure your cursor is at the DOS prompt. Enter the following
   command to start the Emulator:

   MC5250

2. Press **Enter** as directed on the startup screen, or wait three seconds
   and emulation will begin automatically.

3. Establish a connection to the host.

4. Use your PC like a real 5250 display station and communicate with
   the host.

2.4
Quitting

1. Finish any communications you are conducting with the host.

2. Disconnect from the host. **NOTE:** If your host required you to sign on,
   be sure to sign off with all LU's before disconnecting.

3. Press both **Shift** keys at the same time.

4. Select **Quit** from the Main Menu.

5. Select **Yes** from the next menu. Control will then return to DOS.

PC Usage

3

3.1
Introduction

This chapter explains the PC keys used for operating MC5250PC and helps new users make a back-up copy of the software. The key names and symbols used here are based on a standard IBM PC keyboard. Your keyboard may be somewhat different. See your PC manual for more information on your specific keyboard.

3.2
How to Use the MC5250PC Menus

MC5250PC is menu-driven, so you don't have to type complex commands on your keyboard. Instead, menus will pop-up on your screen to let you select options or enter information.

Find the PC keys you will need on your keyboard while you read about their functions. We have included a sample of each of the common menu types. You may also want to practice using these keys with the menus in the Configuration Editor.

The keys discussed here operate only the pop-up menus which are part of MC5250PC. Any menus you receive from the host with which you communicate are not the same.

The menu operation keys do not apply in emulation mode, which is when your PC is actually working like a

5250 display station. Press both **Shift keys** ⬆
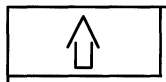
at the same time to bring up the menus when you are in emulation mode.

NOTE: When you see two key names separated by a dash in this manual, remember that you should hold down the first key while you press the second key. For example, **Shift-Shift** means you should press both **Shift keys** at the same time.
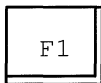
Press the [F1] **function key** anytime you are

working with menus to see a help window explaining the menu option with which you are currently working. You may want to think of F1 as the help key.

3.2.1
Selecting Options from Lists

The most common menus are lists from which you can select options. One option on the list will be highlighted. You can move the highlight through a list using the up and down **arrow keys.**
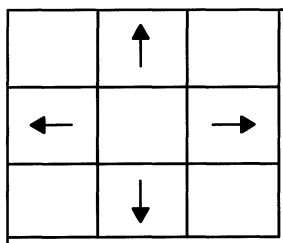
After you move the highlight to the option you want,
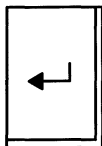
press the **Enter key** [←] to accept this option.

NOTE: Although the **Enter key** is sometimes called the **return key**, this manual always refers to it as **Enter**.

One of three things will happen when you press the **Enter** key.

- On some menus, **Enter** will accept the option you selected and take you back to the previous menu.

- On other menus, **Enter** will take you forward to the next menu to configure the item you selected.

- If there are only two possible choices for an item (for example, **Yes** or **No**), **Enter** will toggle between choices. (Toggle means to switch back and forth.) It will leave you on the current menu and switch to the opposite setting. The highlight will stay where it is, and the new value will be displayed on the menu.

Instead of using the **arrow keys** and **Enter**, you can press the first character (whether it is a letter or a number) of the menu option you want to select. Entering the first character will either move the highlight and toggle an option or bring up the next menu. When more than one option on a menu begins with the same character, the options are labeled **A.**, **B.**, etc.

Here is an example of a menu on which you can select an option from a list. The shading indicates that the **Edit** option is highlighted.

```
┌─────────────┐
│ Edit        │
│ Create      │
│ Delete      │
│ Quit        │
└─────────────┘
```

Suppose you want to select **Create** from the above menu. You should move the highlight to that option with the **down arrow key** and then press **Enter** to select it and go on to the next menu. Or you can make your selection faster by just pressing the **C** key.
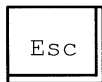
The **escape key**   │ Esc │   takes you out of a menu and

back to the previous menu. On menus where **Enter** takes you forward, **Esc** will take you back and accept all the currently displayed values. On menus where **Enter** takes you back and accepts your selection, **Esc** will take you back without making any changes.

Press the **numeric keypad minus key**   │ − │   if you

want to ignore all changes you have made on a menu. All the settings will return to the way they were when you came into the menu. Then you can select different options or press the **escape key** to go back to the previous menu.

3.2.2
Selecting Options from Tables

Some menus, such as the sample below, are tables instead of lists. One option will be indicated by a highlight or an arrow.

```
                    Select PC Attribute

              01   02    03    04    05    06    07
      10     11   12    13    14    15    16    17
      20     21   22    23    24    25    26    27
      30     31   32    33    34    35    36    37
      40     41   42    43    44    45    46    47
      50     51   52    53    54    55    56    57
      60     61   62    63    64    65    66    67
  → 70 ← 71   72    73    74    75    76    77

        F2 70       F4 F0      F6 78      F8 F8
```

Use the **arrow keys** to move the indicator up, down, left or right on a table. Then press **Enter** to select the highlighted option.

The **Enter key**, **escape key** and **numeric keypad minus key** work the same for tables as they do for lists.

3.2.3
Entering Values

Use the **number keys** across the top row of your keyboard when you are asked to type a numeric value into a reserved portion of your screen called an input field.

```
┌─────────────────────────────────────┐
│ ‖                                 ‖ │
│ ‖  Enter new value in hex:       ‖ │
│ ‖                                 ‖ │
└─────────────────────────────────────┘
```

Note that hexadecimal values also use the letters ⌈ A ⌉

through ⌈ F ⌉

Press **Enter** to accept the numeric value you type and go back to the previous menu.

Press the **numeric keypad minus key** if you want to restore the field to the way it was when you came into the window.

Press the **escape key** if you want to go back to the previous menu and keep the value that was displayed when you came into the window.

3.2.4
Entering Device Names and Filenames

In other cases, you will be asked to type a device name or a filename.

```
┌─────────────────────────────────────────┐
│ ‖                                     ‖ │
│ ‖  Copy     Enter device or filename ‖ │
│ ‖                                     ‖ │
│ ‖  _____ ‖ │
│ ‖                                     ‖ │
└─────────────────────────────────────────┘
```

Give your files names that will help you recognize them later. It may be a good idea to write down your filenames so you can remember them more easily.

Some input fields allow you to type only a filename while others will let you include extensions and directory paths. See your DOS manual for more information on filename extensions and pathnames.

Press **Enter** to accept the device name or filename you type.

Press the **numeric keypad minus key** if you want to restore the field to the way it was when you came into the window.

Press the **escape key** if you want to back up to the previous menu without entering a filename.

3.2.5
Editing Keys

You can use the following editing keys to change any value, device name or filename before you press **Enter** to accept it.

Most of the editing keys affect the cursor, which is a marker to show where the next character you type will display on your screen. The cursor is usually highlighted or flashing, and it may be a block or underline.

Pressing the **right arrow key** moves the cursor one position to the right. The **left arrow key** moves it one position to the left.

The **backspace key** [←] moves the cursor to the

left, erasing characters as it goes. The **delete key**

[Del] erases the character at the current cursor
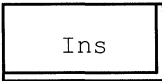
position and shifts characters to the right of the cursor to fill in the gap. The **down arrow key** erases everything in the current input field.

The **home key** [Home] moves the cursor to the

beginning of an input field. The **end key** [End]

moves it to the end of an input field.

The program automatically overwrites characters at the

cursor position unless you use the **insert key** [Ins]

to enter new characters to the left of existing characters. (Your cursor shape will change to a half-height block to remind you that you are in insert mode.) Press the **insert key** again to return to overwrite.

3.2.6
Non-Standard Menus

Not all of the MC5250PC menus fall neatly into one of the above categories. Some are non-standard menus that will be described individually later in this manual. Many of these menus use the **function keys**

| F2 | through | F10 | which perform specific

functions which will be noted on the individual menus.

Use the following chart for quick reference to the PC keys used with MC5250PC:

PC Key	Function
Shift-Shift	Bring up menus from emulation mode
F1	Get help with menu options
Arrow Keys	Highlight options on lists or tables
1st Character of Option	Select that option from list and toggle next option or bring up next menu
Enter	Select highlighted option
	Toggle options
	Accept information entered
Escape	Back up to previous menu
Numeric Keypad Minus	Restore current menu options to original settings
Letter Keys A-Z	Type device names or filenames
Number Keys 1-0	Type numeric values, device names or filenames
Letter Keys A-F	Used with number keys to type hex values
Right Arrow	Move cursor right one position
Left Arrow	Move cursor left one position
Backspace	Move cursor left, erasing characters

PC Key	Function
Delete	Erase character at cursor position
Down Arrow	Erase current input field
Home	Move cursor to beginning of input field
End	Move cursor to end of input field
Insert	Toggle insert mode in current input field
F2-F10	Specific tasks as noted on non-standard menus

3.3
Making a Back-Up Copy of MC5250PC

If you are not already working from a back-up copy of the master diskette included in your software package, follow the directions below to make a back-up copy of MC5250PC. Then you can work from the back-up and put your master diskette away for safe-keeping. The files on your master diskette are listed in Chapter 6.

You will need to use your PC and DOS. See your PC manual or DOS manual if you need more information about using your PC or any of the DOS commands or features.

After you turn on your PC and start DOS, the steps you should follow to make a back-up depend on whether your PC has a hard disk and a floppy drive or only floppy drives. Choose the steps that match your PC from those below.

3.3.1
If Your PC Has a Hard Disk and a Floppy Drive . . .

Follow these steps to copy files from your master diskette to your hard disk. On a hard disk, related files are usually grouped together into directories. We recommend that you put the MC5250PC files into a directory as described below.

1. Use the MKDIR command to create a new directory on your hard disk. Then use the CHDIR command to get into the new directory.

2. Insert your master diskette into the floppy drive.

3. Use the COPY command to copy files from your master diskette into the new directory on your hard disk.

4. Use the DIR command to see a list of the files in the new directory. Make sure all files were successfully copied from your master diskette.

5. Store your master diskette in a safe place.

6. Remember to use the CHDIR command to get into the correct directory each time you run the software. You might also want to use the PATH command to allow you to access files in other directories. The PATH command may be included in your DOS AUTOEXEC.BAT file; see your DOS manual for more information.

3.3.2
If Your PC Has Only Floppy Drives . . .

Follow these steps to copy files from your master diskette to a blank floppy diskette.

1. Insert a blank diskette into the active floppy drive.

2. Use the FORMAT command to prepare the blank diskette for storing data.

3. Insert your master diskette into the other floppy drive.

4. Use the COPY command to copy files from your master diskette to the formatted blank diskette.

5. Use the DIR command to see a list of the files on your back-up diskette. Make sure all files were successfully copied from your master diskette.

6. Store your master diskette in a safe place.

Basic Operation

4.1
Introduction

This chapter explains:

- How to start the Emulator, communicate with your host and stop the Emulator.

- What the screen and keyboard on a 5250 display station are like and how to use your PC screen and keyboard instead.

- Differences between using an Emulator and a real 5250 display station.

- How to use your Emulator to do the same jobs that a real 5250 does.

You should find everything you'll need to know about 5250's in this chapter. If you want detailed technical descriptions, refer to the IBM manuals listed in Appendix B.

MC5250PC lets you do more things than a real 5250 display station, and it also lets you do some things more easily. We encourage you to use the special features explained in Chapter 5 after you learn the basics.

4.2
Before You Start

Before you start the Emulator, you should make sure all the steps described in the setup and preparation section have been completed. Someone else will probably do the setup for you. You should check that:

- All hardware has been installed, both inside and outside your PC.

- All cables are firmly attached to the proper connectors.

- You are working from a back-up copy of the software and the master diskette is safely stored away.

- The software has been properly configured for your hardware and host system.

Make sure all equipment is turned on and functioning properly. You should also find out if you need to use a controller and/or modem, dial a phone number or take any other steps before communicating.

4.3
Starting the Emulator

Turn on the IBM 5250 controller, if one is used. Turn on your PC and start DOS. Make sure you are working from the proper disk drive and directory. Make sure your cursor is at the DOS prompt. Type the following command and press **Enter** to start the Emulator:

```
MC5250
```

You will then see the MC5250PC startup screen.

NOTE: The command line shown above contains only one command, which tells DOS to start the Emulator. You can, however, include several options on your command line, including one to specify a configuration file other than the default. See Chapter 5 for information on command line options.

Press **Enter** to begin emulation, or wait three seconds and emulation will begin automatically. The startup banner will disappear and your PC screen will look like the screen of a 5250 display station. Some of the keys on your keyboard will now perform the functions of 5250 keys.

Your screen may be mostly blank or it may have menus or data from the host system. You may see a flashing number in the upper left corner of your screen. It's just to let you know that you aren't communicating yet.

Across the bottom of the screen will be a line of abbreviations and numbers. This is called the status line and it contains information about the current condition of your system. Later you will learn how to use this information.

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If you have ever used a real 5250 display, you may recall various lights and indicators on the side or bottom of the screen. The status line on your PC serves the same purpose as those lights.

Your PC is now emulating a real 5250 and is ready to communicate with the host. You should now perform the steps needed to actually start communications, as described in the next section.

4.4
Starting Communications

Starting communications is easy. However, there are many different ways in which it can be done. It depends on how the host is set up, what kind of communications equipment is used, and how everything is connected together, so we can't tell you exactly what you have to do for your particular setup. Remember that the system administrator must be informed that you intend to communicate so the host can generate a line definition for your device.

Some general procedures for starting communications are given below. You should get specific information from the person who installed your equipment and from someone at the host system.

In the simplest case, communications will begin automatically when you start emulation, and you don't have to do anything else. In most setups, however, you will have to do one or more of the following:

• Make a connection.

• Sign on to the host system.

• Start host applications.

Skip any step that does not apply to you.

4.4.1
Making a Connection

A communications connection between your PC and the host computer is necessary in order to transfer data.

If your PC is attached directly to the host, or if your controller is connected to a direct line, you can skip this section because a permanent connection already exists. A direct line may be a direct telephone line (also called a dedicated, leased or private line) or a connection not involving telephone lines (such as through cables to a host in the same building).

If your controller is connected to a switched (also called dial-up) line, proceed as follows:

1. Locate the switch or button on your communications equipment that alternates between DATA and TALK (or VOICE). Set this switch to TALK.

2. Lift the telephone receiver and dial the number of the host computer.

3. If the host is set up for a modem to answer automatically, you will hear a high-pitched tone. If a person answers, ask this person to switch the equipment to DATA. When this is done you will hear the tone.

4. When you hear the tone, switch your equipment to DATA and hang up your telephone receiver. Your PC is now connected to the host. If your equipment has a Modem Ready (MR) light, it will be lit to show that the communications connection is established.

If you get a busy signal when you call the host, try again later or use an alternate number if available. If the modem does not answer, call a person at the host and ask to have the line activated or reset.

4.4.2
Signing On

Once a connection is established, you may need to tell the host who you are (just as you say who you are when you start talking to a person on the phone). This is called signing on. If you are required to sign on, menus or messages from the host will appear on your screen instructing

you what to do. Usually you will be instructed to enter an account name,
a user ID or a password.

4.4.3
Starting Host Applications

You may need to tell the host what you want to do - payroll, order entry,
looking up records, etc. These tasks are called applications or programs.
The host may send you a menu from which you select the application you
want, or you may need to type a command.

4.5
Keyboard

A 5250 keyboard has some keys which are not found on a PC keyboard.
The Emulator allows you to use keys which do exist on your PC keyboard
to perform the same functions as these 5250 keys.

Your MC5250PC package includes some diagrams of keyboards. These
are called keyboard templates. One template is for the standard PC
keyboard, one is for the PC AT keyboard and one is for the PC enhanced
keyboard. Find the template that matches your PC keyboard and keep it
handy so you can refer to it while you are working.

Some keys on the template are marked with 5250 key names or data
characters. This shows you which key you should press on your PC
keyboard to emulate each 5250 key. For example, to perform the action
of the 5250 FIELD EXIT key, you would press the PC key that is marked
FIELD EXIT on the template.

One side of the template is for 5250 layout and the other side is for PC
layout, and some of the 5250 key names are in different places on the
two sides. Use the side that applies to your **Keyboard Layout**
configuration.

Note that the templates are for standard key arrangements. If the keys on your PC keyboard are arranged slightly differently, you should go by PC key name instead of key position. For example, your left **Shift** key, regardless of its position, always emulates the 5250 left SHIFT key.

These key assignments apply only during emulation and not when you are working with the Emulator menus.

This table lists the standard functions of operation keys found on a real 5250 display station. These keys communicate with the host and manipulate the information on the screen. Note that some host applications may redefine these key functions.

ARROW KEYS	Move cursor one position left or right or one line up or down.
ATTN	(Attention) Notifies host that you are ready to sign on, start new task or change tasks.
CMD	(Command) Followed by another keystroke to perform a special function assigned by host application. ERROR RESET cancels CMD.
DEL	(Delete) Erases character at cursor position.
DUP	(Duplicate) Copies information from same location in previous record.
ENTER/REC ADV	(Enter/Record Advance) Sends information on screen to host.
ERASE INPT	(Erase Input) Clears all information from screen and moves cursor to beginning of first input field.
ERROR RESET	Resets CMD, HELP, INS and SYS REQ. Also unlocks keyboard if locked due to error condition.
FIELD ADVANCE	Moves cursor to beginning of next input field.
FIELD BACKSPACE	Moves cursor to beginning of current input field or to beginning of previous input field if already at beginning of current input field.

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FIELD EXIT	Same as FIELD ADVANCE and also justifies data in current input field if field is defined as right-adjust.
FIELD +	Same as FIELD EXIT.
FIELD -	Allowed only in numeric input fields. Same as FIELD EXIT and also makes value negative. In signed numeric fields, inserts a minus sign in last position. In numeric fields, indicates negative value by changing last digit to letter.
HELP	Displays help message from host if available. ERROR RESET returns to normal display screen.
HOME	Moves cursor to beginning of first input field.
INS	(Insert) Enters new character(s) to the left of existing characters. ERROR RESET returns to overwrite.
NEW LINE	Moves cursor to beginning of next line.
PRINT	Asks host to send information to printer.
ROLL KEYS	Scroll information on screen up or down.
SYS REQ	(System Request) Notifies host that you are ready to sign on, start new task or change tasks. Press ENTER/REC ADV after pressing SYS REQ. Pressing ERROR RESET before ENTER/REC ADV cancels request.

4.6
Display Status Line

A real 5250 or 3180 display station has status indicators along the side or bottom of its screen to provide information about the current status of the display and the host. Your emulated display station's status line provides the same information that the indicators provide, plus some additional information as well.

The indicators the Emulator uses in display LU status lines are shown and described below. Some status line indicators refer to the advanced options described in Chapter 5. Do not be concerned if you do not understand those indicators yet, because they will not appear unless you use the advanced options. They are listed here for reference purposes and to give a complete description of the status line.

NOTE: The status line for printers is somewhat different and it is described in Chapter 5.

Different indicators will occupy the same locations on the status line at different times. You will not see all of these indicators at the same time.

Emulator	**5250/3180**	**Description**
LU #n	None	This number indicates the currently active LU (1 through 7). Your keyboard and screen currently represent this LU.
RR-CC 3180	R/C	These numbers indicate the row and column of the cursor position on the emulated screen.
PLAY	None	This indicator reminds you when you are using the **Playback** command.
RECORD	None	This indicator reminds you when you are using the **Record** command.
PAUSE	None	This indicator reminds you when you are using the **Pause** command.

Emulator	5250/3180	Description
WAIT	None	This indicator reminds you when you are using the **Wait** command.
CM	None	This 5292 graphics display LU is operating in standard character mode.
GM	None	The host has switched this 5292 graphics display LU into graphics mode.
SA	System Available	The 5250 controller is operating and ready. (If you are attached directly to a host without a controller, the host is operating and ready.) This indicator must be on in order to communicate.
MW	Message Waiting	The host has sent a message to your display station. To view the message, follow the instructions for the particular host application you are using.
KS	Keyboard Shift	Your display station keyboard is in shifted mode. When you press the keys you will get upper case characters and functions.
IM	Insert Mode	Your display screen is in insert mode. New data that you type will be displayed to the left of existing data. When this indicator is off, data that you type will overwrite the existing data.
II	Input Inhibited	Your keyboard is locked either because your display station is waiting for the host to respond or because of an error condition.

Emulator	5250/3180	Description
Vd:	None	This LU is assigned to use host virtual disk space for the indicated PC disk drive (A or B).
→←	None	This 3180 display LU is operating in standard 80-column screen mode.
←→	None	The host has switched this 3180 display LU into wide screen mode.
Sn	N/A	This number is the station address (0 through 6) the host uses to identify this LU.
HH:MM	None	This shows the current time in hours and minutes. This clock is set from the DOS time at Emulator startup.

In special circumstances, the following indicators may overwrite the normal status line.

Emulator	5250/3180	Description
KEYBOARD LOCKED	None	You have locked your keyboard either by using the **Lock** menu or by configuring for **Keyboard Lock** at startup. To unlock your keyboard, press **Shift-Shift** and enter the proper combination on the **Lock** menu.
EXTERNAL DISPLAY	None	Your keyboard has been locked by an application program using the API for this LU. The application is handling all input, so no keyboard input is needed from you. The application will unlock your keyboard when it is finished.

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4.7
Pop-up Menus

MC5250PC has menus to let you use some special features. Press both **Shift** keys at the same time to see the menus. The following window, which is called the Main Menu, will appear in the upper left corner of your screen:

```
Help
Copy
Keys
Lock
Quit
```
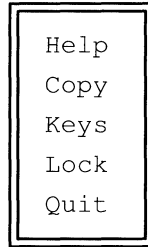
Chapter 3 explains how to select options from menus. For basic operation, you will need to use only **Help**, which provides assistance with MC5250PC, and **Quit**, which ends MC5250PC and takes you back to DOS. The other options are explained in Chapter 5, Special Features.

To remove the Main Menu from your screen and resume emulation, press the **Esc** key.

4.8
Getting Help

Selecting the Help option from the Main Menu will tell you how to get help with the other menus, options and messages in MC5250PC.

When you need help with a window on your screen, press **F1**. You will then see information explaining what to do next. The help text also may refer you to this manual for more information. If the word MORE is in the bottom right corner of the help window, use your up and down arrow keys to see additional help text. Press **Esc** to get out of a help window.

NOTE: Pressing the emulated 5250 HELP key displays host system help screens when they are available.

4.9
Quitting the Emulator

Quitting the Emulator is like turning off your 5250 display station.

Before you quit, you should finish any applications you are running on the host. If you signed on to the host when you started, be sure to sign off. If you used the hot-key feature described in Chapter 5, make sure you end any programs that you started while the Emulator was resident before you quit.

To quit the Emulator first press both **Shift** keys to bring up the Main Menu. Select the **Quit** option from the Main Menu and another menu will appear:

```
Yes
No
```

Select **Yes**.

Control will return to DOS and your PC will operate just like an ordinary PC again.

If you established a phone connection when you started communications, you should now terminate the connection. Again, the exact procedure depends on your equipment, but usually you just switch the communications equipment from DATA to TALK.

Important: Always follow the above procedure when you quit the Emulator. If you do not:

- You could lose some or all of your data.

- You could continue to be charged for host computer time even after you quit the Emulator.

- You could be unable to make a phone connection or unable to sign on the next time you attempt to communicate. (If this occurs you will need to ask someone at the host system to reset the line.)

You may receive various types of messages, system error codes and signals during emulation.

Sometimes the Emulator itself will display messages. These messages may ask you to wait while the program carries out an instruction you gave it, let you know that an instruction has been completed or inform you of certain error conditions.

NOTE: If the Emulator needs to display a message but cannot because there is not enough memory, you will hear two low beeps. This may occur if you configured all seven LU's to have IBM API compatibility.

At other times you may see a four-digit system error code in the upper left corner of your screen. The system error codes are explained in Appendix D.

You may also get other messages from the host system. The instructions for the host application you are using or a person at the host system should provide you with information about host messages.

Following is an alphabetical list of the Emulator messages, their meanings and any action you need to take when they appear either at the DOS prompt or while the Emulator is running. If a message appears on your screen while the Emulator is running, you can also get an explanation of the message by pressing the **F1** key.

```
*** ATTENTION ***

LU #n: CHANGE FONT
```

A type font change is needed on the emulated 3812/5219 printer.

```
*** ATTENTION ***

LU #n: DEVICE
```

Your printer is not turned on.

```
*** ATTENTION ***

LU #n: EXCEPTION n
```

Data from the emulated 3812/5219 printer contains a formatting error.
Since the host sends 3812/5219 printer exception messages and they
may differ from application to application, you should call someone at
the host system for information on correcting the error.

```
*** ATTENTION ***

LU #n: FORMS
```

Your printer is out of paper or the paper is jammed.

```
*** ATTENTION ***

LU #n: GRAPHIC xx
```

Data from the host contained an illegal graphics command for the
printer. Note that some data characters may not have been printed.

```
*** ATTENTION ***

LU #n: HOST
```

The host has sent a bell command to the emulated 5250 printer. On a
real 5250 printer, this sounds a bell to get your attention. Instead of
sounding a bell on your PC printer, the Emulator displays this
message.

```
*** ATTENTION ***

LU #n: OFFLINE
```

The Emulator is telling the host that your printer is not ready to receive
data. Make sure your PC printer is ready and select **Host Printer** from
the menu on the printer LU screen.

```
*** ATTENTION ***

LU #n: SETUP
```

A paper change is needed on the emulated 3812/5219 printer.

```
*** ATTENTION ***

LU #n: UNAVAILABLE
```

No station address is available for the indicated LU. The **Primary Station Address** and **Alternate Addresses** specified in the configuration are being used by other LU's in your Emulator or by other devices on the same twinaxial cable. You cannot use this LU.

You can work with the LU's that are available, change your configuration to use a different address if another one is available, or wait until the other users are finished.

```
BACKGROUND PROGRAM MAY CRASH SYSTEM
```

You selected **Quit** from the Main Menu, and another program is running in the background. Quitting without ending the resident program first will terminate both the Emulator and the resident program, and may have more severe consequences.

Press **Esc** or **Enter** to clear this message. Then select **No** from the menu to continue emulation until you end the other program. Or select **Yes** and risk the consequences of quitting the Emulator with the other program still resident.

```
CURRENTLY LOADED MICROCODE AND
CONFIGURATION DO NOT MATCH
```

You have restarted MC5250PC and the configuration file does not match the LU information on the 5250 twinax card. You either changed the LU configuration or used a different configuration file.

To correct the problem, either use the correct LU configuration or reload the microcode. To reload the microcode, do either of the following things and then restart MC5250PC:

Configure **Yes** for **Restart with Power On**.

Turn your PC off and back on.

EMULATOR IS RESIDENT

This message appears when you hot-key to DOS, reminding you that the Emulator is still running. If it appears as soon as you start the Emulator it means the Emulator was configured for **Automatic Hot-Key** or was already running. Press the hot-key when you want to go back to emulation.

ERROR IN OR UNABLE TO FIND CONFIGURATION FILE

The configuration file you selected either does not exist, or it cannot be read because it has an error or the wrong format. This message refers to the configuration file which you specified on the MC5250 command line, or if you did not specify a configuration filename on the command line it refers to the configuration file MC5250.CNF.

Make sure you spelled the filename correctly and that you did **not** type the .CNF extension on the command line. Make sure the file you want to use is in your directory.

Errors can be caused by a damaged, defective or unformatted disk, exposure to magnets, or data that was partly erased or overwritten. "Wrong format" means you tried to read a file that was not created for use by MC5250PC.

Specify a different filename, type the filename without the extension, copy the file you want to use from elsewhere or create a new file.

ERROR IN OR UNABLE TO FIND STARTUP OVERLAY FILE

The program cannot find or cannot read the startup overlay file. This is a file with a .OVL extension. Check your directory to make sure it was copied to your working disk or directory.

MEMORY ALLOCATION ERROR (LU)

Your PC does not have enough memory available to support the display and printer LU's you currently have configured.

MEMORY ALLOCATION ERROR (PRINTER)

Your PC does not have enough print buffer memory to support the Emulator as it is currently configured and the other programs you are running. You may be able to make more memory available in the following ways:

End other programs running in the background.

Configure fewer LU's to use virtual disk.

Configure fewer LU's as 3180 displays.

Specify **No** for **Save Graphics RAM**.

Specify **No** for **IBM Color Handling**.

Add more memory to your PC.

MEMORY ALLOCATION ERROR (VIDEO)

Your PC does not have enough video buffer memory to support the Emulator as it is currently configured and the other programs you are running. You may be able to make more memory available in the following ways:

End other programs running in the background.

Configure fewer LU's to use virtual disk.

Configure fewer LU's as 3180 displays.

Specify **No** for **Save Graphics RAM**.

Specify **No** for **IBM Color Handling**.

Add more memory to your PC.

NOT ALLOWED IN PRINTER LU

You cannot use the **Copy** or **Keys** option on the Main Menu from a printer LU. If you want to use either of these options, you must switch to a display LU.

NOT ENOUGH MEMORY TO LOAD EMULATOR (nnK REQUIRED)

Your PC does not have enough memory available to support the
Emulator and other programs you are running. See Chapter 6 for PC
memory requirements.

You may be able to make more memory available by ending other
programs that are running or by restarting DOS.

PLEASE WAIT

Wait a few seconds while the program carries out a command. This
message will disappear when the command has been completed.

UNABLE TO ACTIVATE ANY LOGICAL UNITS

MC5250PC requires at least one active LU in order to run. No LU's
can be activated because the station address(es) specified in the
configuration are currently being used by other devices connected to
the twinaxial cable.

Either configure a different station address as described in Chapter 8
or wait until another user finishes and a station address becomes
available.

UNABLE TO FIND MC5250 CARD

Either no 5250 twinax card is installed in your PC or the card
addresses in the configuration do not match the switch settings on the
card.

UNABLE TO FIND AUTO PLAYBACK FILE

The file you specified for the -P option on the command line does not
exist. Check your directory to be sure you have the correct filename,
that you spelled it correctly and that the file was copied to your working
disk or directory.

UNABLE TO FIND HELP FILE

The program cannot find the help file MC5250.HLP. Check your directory to make sure it was copied to your working disk or directory.

UNABLE TO FIND MICROCODE FILE

The program cannot find the file MC5250.MIC, which contains the microcode for the 5250 twinax card (or MC5250.SMC, which contains the microcode for the MC5250 card). Check your directory to make sure the microcode file was copied to your working disk or directory.

UNABLE TO OPEN OR CREATE FILE

Possible causes are:

You entered an invalid filename or did not enter any filename. The directory contains too many files.

The file does not exist.

The diskette is write-protected.

The disk is damaged, defective or unformatted.

UNABLE TO WRITE TO FILE OR DEVICE

Possible causes are:

There is not enough room on the disk.

The diskette is write-protected.

You attempted to **Append** or **Overwrite** an existing file and the file is write-protected (does not have write-access under DOS; see your DOS manual).

The disk is damaged, defective or unformatted.

The PC printer is turned off, offline, out of paper, unplugged, disconnected or is showing some type of error indicator.

WRONG MONITOR TYPE IN CONFIGURATION

The Emulator will not load if your **Monitor** type in the configuration does not match your actual hardware. Edit your configuration file and select the correct **Monitor** type for your PC.

WRONG VERSION OF MICROCODE

You tried to use an obsolete MC5250PC microcode file. Copy the microcode file MC5250.MIC (or MC5250.SMC) from your master diskette.

Special Features

5

5.1
Introduction

This chapter describes some additional features of MC5250PC, including the following:

- Hot-key for background mode operation.

- Using more than one logical unit.

- Emulator menus and options.

- Emulating printers.

- Using a 3180 display in wide screen mode.

- Using an alternate configuration file.

- Using the Keystroke Compiler.

5.2
Hot-Key

The hot-key feature lets you switch back and forth between 5250 emulation and PC applications by just pressing two designated keys. One program can then operate in the foreground while another operates in the background.

For example, you may want to start a job on the host, and while that job is running use your PC to work on something else totally unrelated. Or you may want to do something that is related to what you are doing on the host, such as update a file on your PC. You can also run programs on your PC that communicate with the host through the Application Program Interface (API), described later in this chapter.

The default hot-key is **Alt-Esc**. If you wish, you can use the Configuration Editor to redefine the hot-key as **Alt** with some other keystroke. See Chapter 8 for details.

When you press the hot-key, you will go back to the DOS screen and you will see the message:

EMULATOR IS RESIDENT

You will also see the above message if you try to start the Emulator when it is already resident. In that case, press the hot-key to go into emulation.

The hot-key makes the MC5250PC program resident in the PC memory. This means the Emulator continues to reside in the PC memory and continues to operate even though you don't see it.

You can enter a DOS command or start another program while the Emulator is resident. Press the hot-key again when you want to go back to emulation. You can hot-key back into the Emulator whether or not something else is running.

If you hot-key out of the Emulator again, you will go back to whatever program or command is running, and you will continue from wherever that program or command left off. If nothing else is running, you will go back to DOS.

The host can continue to print on your PC printer after you hot-key. If you want to use your printer exclusively for a PC application, make sure you assign it to be a DOS printer as directed later in this chapter.

If the Emulator requires your attention while it is operating in the background, it will alert you. If the Message Waiting (MW) status line indicator is turned on, you will hear three beeps. If an ATTENTION condition occurs, you will immediately go back to emulation and the ATTENTION message will be on your screen.

The Emulator will no longer be resident in memory after you **Quit**.

Before quitting, always end any programs that you started while the Emulator was resident. Otherwise, when you **Quit** the Emulator these programs will be canceled, you may lose the files that the programs were using and you may see some leftover data or other strange effects on your screen.

The Emulator provides background process protection that alerts you if another program is running in the background when you try to **Quit** the Emulator. This safety feature is described under the discussion of the **Quit** option later in this chapter.

Programs that you started before the Emulator will continue to operate normally after you **Quit**.

Note that you can cause the Emulator to automatically become resident at startup, either by specifying **Yes** for **Automatic Hot-Key** in the configuration or by specifying the -R option on the MC5250 command line. Command line options are discussed later in this chapter.

At certain times, the hot-key may be delayed or ignored by DOS. For example, if you press the hot-key while typing out a file with the DOS TYPE command, you will not go back to emulation until the TYPE command is finished. Or if you press the hot-key while DOS is in the process of starting (initializing) a program, the hot-key is ignored. If you press the hot-key and nothing happens within a few seconds, simply press it again.

There are also certain times when the hot-key is ignored by the Emulator. The hot-key is ignored when an Emulator ATTENTION window is on your screen, or when a **Copy**, **Playback** or **Record** command is executing. These commands are described in the section on menu options.

If your PC has an AT keyboard or enhanced keyboard, you can use **Sys Req** for the hot-key in addition to the other key that is defined as the hot-key.

Note to PC Support Users: Please note the following information if you are using PC Support/36 with SSP 5.1 or if you are using PC Support/38. The MC5250PC hot-key and LU selection keys operate as usual with the following exception concerning the LU with which you are using PC Support:

• The hot-key keystroke from the mini-menu will be **Alt-Esc** even if you reconfigured your hot-key as a different keystroke. If you have only one LU configured, pressing **Alt-Esc** from the mini-menu will take you to DOS. If you have more than one LU configured, pressing **Alt-Esc** from the mini-menu will take you to the second LU and the hot-key and LU selection keys will resume their normal operation.

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With MC5250PC you can emulate up to seven separate 5250 display stations or printers at once. These emulated devices are called logical units or LU's. The host computer does not know that the LU's are not real devices; it simply identifies each LU by a number. Use the Configuration Editor to set up your printer and display LU's the way you want them and the way the host expects them.

You can use all your LU's at the same time. You might, for example, receive data to the printer with one LU while you work interactively on a completely unrelated application with another LU. Or you might run an inquiry program on LU #1 and a data entry program on LU #2; you could look at a file on LU #1, find the information you need, then switch to LU #2 and enter this information into the program on LU #2.

Your PC keyboard and screen are always assigned to only one LU at a time. This is called the active LU and its LU number is displayed on the status line. The other LU's communicate invisibly and are said to be operating in the background.

If the active LU is a display station, your keyboard and screen represent the keyboard and screen of an IBM 5250 display station. If the active LU is a printer, your screen will have information about the printer and a menu that you can use to control the printer.

All LU's act independently of each other. When you enter data on your keyboard, the host knows which LU it is from. When the host sends data to you, it is put on the right LU screen or printer and doesn't affect any other LU's.

When you start the Emulator, the active LU is always LU #1.

To switch to a different LU, hold down the **Alt** key and press the number of the desired LU. For example, to switch to LU #2 you would press **Alt-2**. If you press **Alt** with a number of an LU that is configured as **No Device**, this keystroke is ignored.

5.4
Menus and Options for Displays

To use the options on the Emulator menus, first press both **Shift** keys at the same time. You will see the Emulator Main Menu:

```
Help
Copy
Keys
Lock
Quit
```
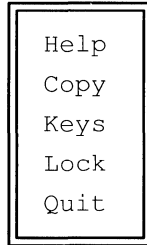
Now select the desired option from this menu. These options are described below.

Note that this is the same menu discussed briefly in Chapter 4.

5.4.1
Help

This option will tell you how to get help with the other menus, options and messages in MC5250PC.
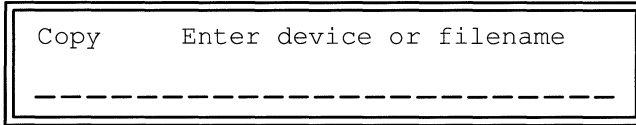
Help is also available for each individual window by pressing the **F1** key when the window is on your screen.

5.4.2
Copy

Use this option to create a permanent record of the information on your screen by copying it to a disk file or the printer. Disk files created by the **Copy** command are for later use when you are not connected to a host. (To record and playback files during emulation, use the **Keys** command described in the next topic.)

All data from the emulated 5250 screen is copied. The 5250 attribute characters are replaced by spaces. The status line and the menu windows are not copied.

When you select this option you will see the following window:
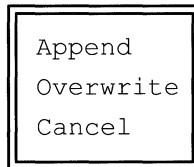
```
Copy      Enter device or filename


_____
```

Enter either the name of the disk file to which you want to copy the screen or the appropriate DOS device name if you want to copy to the printer.

The device name is what DOS uses to identify your printer. This name is usually LPT1. If you are not sure which device name to enter, find out from the person who installed your PC printer. Before specifying a device name, make sure you are not already using the Emulator to print data on that device.

If you specify a file that already exists, you will get this menu:

```
Append
Overwrite
Cancel
```

Append preserves the data that is already in the file and adds the new screen data to the end.

Overwrite replaces data already in the file with data from the screen. All the old data is erased. The file contains only data from the current screen.

Cancel takes you back to the previous window so you can enter a different filename. The existing file is not changed.

Note that you can also copy by pressing **Alt-PrtSc** during emulation instead of selecting the Copy option from the menu. When you press **Alt-PrtSc**, the screen data will be copied to the same device or file that was specified for the last copy. If this was a disk file, the new screen data will be appended to the end of the existing file. If no copy has yet been performed when you press **Alt-PrtSc**, you will see the **Copy** window asking you to enter a device or filename. (If your PC has an enhanced keyboard, you should press **Alt-*** instead of **Alt-PrtSc**.)

5-6

5.4.3
Keys

This option displays the following menu:

```
Playback Keystrokes
  Record Keystrokes
```

The **Keys** feature lets you retrieve (**Playback**) keystrokes from a file as
though you were actually typing them on your 5250 keyboard, and also
lets you save (**Record**) keystrokes for later playback.

Playing back keystrokes from a file is faster and more accurate than
entering them by hand. By entering and checking your data before you
connect to the host, you can reduce telephone costs and host computer
time.

Playback is also a convenient way of handling repeated data or
keystroke sequences, since you need to type them only once and then
you can play them back as often as necessary.

The **Record** command lets you save keystrokes to a disk file during a
host work session. You can create keystroke files while you are not
connected to a host, by using a text editor or word processing program
and the MC5250K program described later in this chapter.

NOTE: Record and **Playback** are designed for use while you are
connected to a host, and they may operate differently when not
connected.

5.4.3.1
Playback Keystrokes

When you select the **Playback** option you will see the following window:

```
Playback Enter device or filename

_____
```

Enter the name of the file from which you want to play back keystrokes. This must be a file that was created by either the **Record** command or the MC5250K program.

You can halt the **Playback** operation by pressing both **Shift** keys at the same time. You will see this menu:

```
Pause
Stop
```
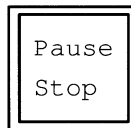
Select **Pause** if you want to temporarily suspend **Playback** (for example, if you want to type some data manually). Press **Shift-Shift** again when you want to resume playing back keystrokes from the file.

Select **Stop** if you want to cancel **Playback** completely.

5.4.3.2
Record Keystrokes

You use this command to store keystrokes in a file for future use by the **Playback** command. When you select **Record** you will see the following window:

```
Record   Enter device or filename

_____
```
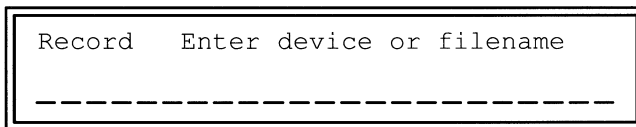
Enter the name of the file to which you want to **Record** keystrokes.

If you specify a file that already exists you will see the following menu:

```
Append
Overwrite
Cancel
```
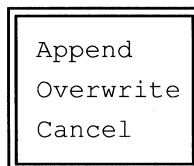
Append preserves the data that is already in the file and adds new keystrokes to the end.

Overwrite replaces data already in the file with new data. All the old data is erased. The file contains only keystrokes from the current session.

Cancel takes you back to the previous window so you can enter a different filename. The existing file is not changed.

All keystrokes that you type from now on will be recorded in the file until you halt the recording process.
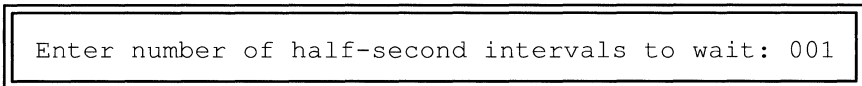
To halt the recording process, press both **Shift** keys at the same time. You will see:

```
Pause
Wait
Stop
Quit
```
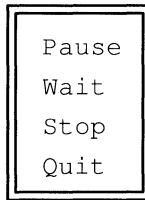
Select **Pause** to temporarily suspend recording of keystrokes. Then press both **Shift** keys again to continue recording.

The **Wait** option lets you set a specific amount of time for the Emulator's **Playback** operation to pause in the file you are currently recording.

Select **Wait** and you will see the following window, which lets you specify the number of half-second intervals you want Playback to wait before continuing to play back the file:

```
Enter number of half-second intervals to wait: 001
```

You can enter a value from 001 to 999. If you want **Playback** to wait one minute, for example, you would enter 120. If you want a 20-second wait, enter 40. The default timed wait is one half-second interval. The **Record** operation will resume after you enter the amount of time to wait.

When **Playback** finds a timed wait in a file, it will pause for the specified amount of time. (You can press both **Shift** keys while **Playback** is waiting to bypass the timed wait and continue playing back the file immediately.)

Select **Stop** to end **Record** and save the file. The file is now ready for use with the **Playback** command.

Selecting **Quit** is equivalent to selecting **Quit** from the Main Menu. When you select this option, both **Record** and MC5250PC will end. Your keystroke file will be saved and ready for use with the **Playback** command. When **Playback** finds a **Quit** command in a recorded file, it will end emulation.

Your keystrokes are recorded as PC scan codes. This means they are recorded as characters other than the characters you see on your keyboard or screen, so you will not be able to look at the file with the DOS TYPE command. If you wish to view and/or edit your files, you should use the Keystroke Compiler described later in this chapter instead of the **Record** command.

Note that **Record** stores all keystrokes that you enter after you select the command. This is different from the **Copy** command, which stores information that was displayed on the screen **before** you selected the command.

5.4.4
Lock

You can use this option as a security feature to lock your keyboard so that no one can use your display station or printer while you are away from your desk. When your keyboard is locked, nothing happens when any keys are pressed and all data disappears from the screen.

When you select **Lock** you will see the following menu:

```
1. Roll 1st Digit
2. Roll 2nd Digit
3. Roll 3rd Digit
4. Roll 4th Digit
L.    <0000>
```

You can use this menu to set any four-digit combination, in a manner similar to spinning the dial on an actual combination lock.

Highlight the first line of the menu and press the **Enter** key or the **1** key repeatedly until the desired number rolls up on the last line of the menu. Then repeat this process for the 2nd, 3rd and 4th digits. Finally, highlight the combination at the bottom of the window and press **Enter** or simply press the L key. You will go back to emulation and your keyboard will be locked. The words KEYBOARD LOCKED will appear on the status line.

To unlock your keyboard, press both **Shift** keys. You will see the lock window again. Enter the same combination you entered to lock it by following the procedure described in the above paragraph. After you highlight the combination and press **Enter** or press the **L** key, you will go back to emulation and your keyboard will be unlocked.

You can also have your keyboard locked at startup by specifying a combination for **Keyboard Lock** in the configuration. This would prevent someone from unlocking your keyboard by turning your PC off, turning it back on and restarting the Emulator. Unlock your keyboard as described above.

5.4.5
Quit

Use the **Quit** option to end operation of the Emulator. Before you **Quit**, make sure you end your host applications and sign off with all LU's. If you used the hot-key, make sure you end any programs that you started while the Emulator was resident.

When you select **Quit**, you will be asked to confirm your selection:

```
Yes
No
```

This prevents you from unintentionally terminating MC5250PC if you accidentally select the **Quit** option. Select **Yes** if you want to stop emulation and return to DOS. Select **No** if you want to continue emulation.

5.4.5.1
Background Process Protection

Background process protection is a safety feature that prevents you from unintentionally ending a resident program and causing other undesirable results when you quit the Emulator.

In some cases, quitting the Emulator while another program is resident can terminate both the Emulator and the resident program while also causing more severe consequences. DOS may stop functioning properly, for example, or your system may lock and have to be rebooted.

If quitting has the potential to cause undesired and unpredictable results, you will see the following warning message when you select **Quit** from the Main Menu:

```
BACKGROUND PROGRAM MAY CRASH SYSTEM
```

Press **Esc** or **Enter** to remove the warning message from your screen. You will then see the **Yes/No** menu asking you to confirm your selection of **Quit**. Select **No** if you want to continue emulation until you end the other program. Or you can select **Yes** to quit the Emulator now, risking the consequences that quitting might cause.

The printer LU screen for 5224, 5225 and 5256 printers looks like this:

```
┌──────────────────────────── 52xx ────────────────────────────┐
│                                                               │
│  ╔══════════════╗  ┌──────────── Page Format ──────────────┐  │
│  ║ Host Printer ║  │                                        │  │
│  ║ Front Panel  ║  │    nnn Lines Per Page                  │  │
│  ║ DOS Printer  ║  │                                        │  │
│  ╚══════════════╝  │    nnn Characters per Line             │  │
│                    │                                        │  │
│                    │     nn Lines per Inch (LPI)            │  │
│                    │                                        │  │
│                    │     nn Characters Per Inch (CPI)       │  │
│                    │                                        │  │
│                    └────────────────────────────────────────┘  │
│                                                               │
│                    ┌──────────── Page Format ──────────────┐  │
│                    │    nn Pending Buffers                  │  │
│                    │                                        │  │
│                    │  nnnn Bytes Available                  │  │
│                    │                                        │  │
│                    └────────────────────────────────────────┘  │
│                                                               │
└───────────────────────────────────────────────────────────────┘
```
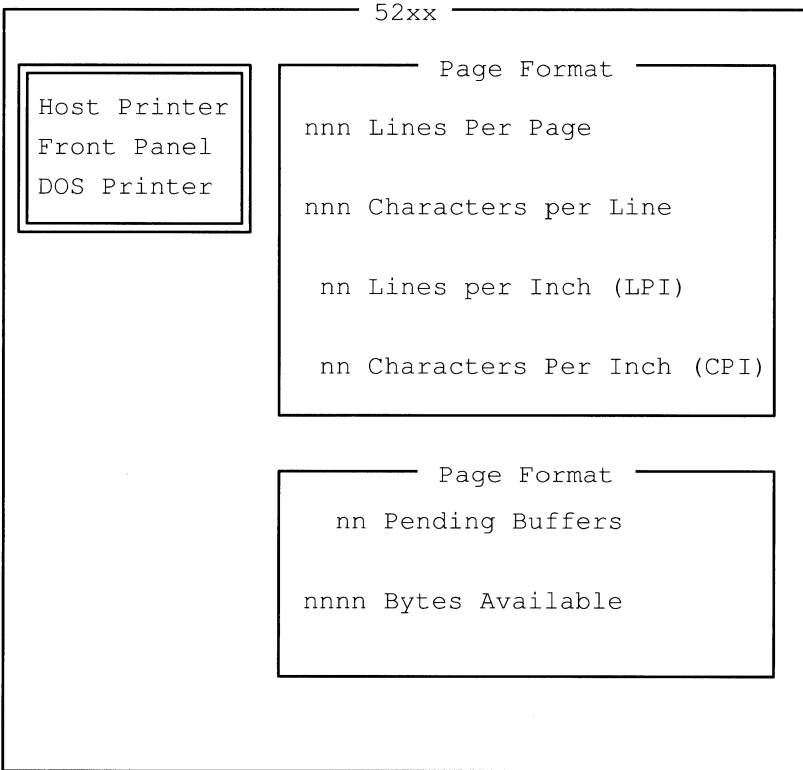
The Page Format window shows you how the printer is currently set to print. The default settings at Emulator startup are 1 line per page, 132 characters per line, 6 lines per inch and 10 characters per inch. Lines per inch and characters per inch can be changed by choosing the **Setup** option from the **Front Panel** printer control menu (described in a following topic), and they can also be set by the host system. Characters per line and lines per page are set by the host. All these items are reset to their original values if you **Reset** the printer.

The Print Buffers window is of interest mainly to technical people. It shows how busy the printer is and how near to capacity its workload is. There will be 00 pending buffers and approximately 2000 bytes available if no data is waiting to be printed. If the pending buffers count is 01 or 02, the host is sending data faster than it can be printed. A faster PC printer would help you keep up with the host.

The printer LU screen for a 3812/5219 printer will also have a Setup window displayed between the Page Format window and the menu window:

```
┌──────── Setup ────────┐
│                       │
│   nnnn Font ID        │
│   nnnn Paper Feed     │
│                       │
└───────────────────────┘
```

This window shows you the latest type font and paper feed information that the host is sending to your emulated 3812/5219 printer. The paper feed value will be one of the following:

0001 Manual feed

0002 Tractor feed

0003 Auto Cut-Sheet feed

5-14

The status line on printer LU's may show any or all of the following indicators:

```
LU  #n  DVC=HOST  HEX  SA  Sn  HH:MM
```

LU #n   The number of the LU (1 through 7) which the PC printer currently represents.

DVC   The DOS printer device used by this LU
LPT1, LPT2, LPT3, COM1 or COM2).

HOST   HOST indicates that the emulated printer is online to the host system and being shared by DOS and the host. DOS indicates a printer that is unavailable to the host. USER means the **Front Panel** printer control menu is in use.

HEX   The printer is in hex output mode and will print control codes received from the host.

SA   System Available. Indicates that the 5250 controller is operating and ready. (If the Emulator is attached directly to a host without a controller, the host is operating and ready.)

Sn   The station address (0 through 6) the host uses to identify this LU.

HH:MM   Shows the current time in hours and minutes. This clock is set from the DOS time at Emulator startup.

The menu window is on the left side of the printer LU screen:

```
Host Printer
Front Panel
DOS Printer
```
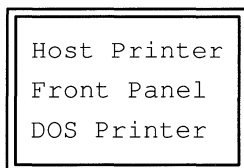
5.7.1
Host Printer and DOS Printer

The **Host Printer** and **DOS Printer** options on the printer LU menu determine whether the PC printer is shared by the host system and DOS or reserved for DOS use only.

Select **Host Printer** to let the host and DOS share the printer. A HOST indicator will appear on the status line to indicate that the printer is available to the host system. The Emulator will allocate printer usage dynamically, according to timeout settings in the configuration file. See Chapter 8 for details on configuring appropriate **DOS Time-out** and **Host Time-out** values to avoid conflicts between the host applications and DOS applications that share your printer.

Selecting **DOS Printer** prevents the host from using this LU to print. A DOS indicator will appear on the status line to indicate that the printer is unavailable to the host system. You would select **DOS Printer** if you want to reserve your PC printer for something other than host printing for this LU, such as an emulated 5250 printer for another LU, output from the **Copy** command or a PC application when you hot-key. Select **Host Printer** when you want to make the printer available to the host system again.

If you select **DOS Printer** while the host is printing, the host print job will be suspended until you select **Host Printer** again.

5.7.2
Front Panel

Selecting **Front Panel** from the printer LU menu stops the printer and displays this printer control menu:

```
┌─────────────────┐
│ Line Feed       │
│ Form Feed       │
│ Top of Form     │
│ Print 1 Line    │
│ Cancel          │
│ Setup           │
│ Reset           │
│ Debug           │
└─────────────────┘
```

The options on this menu correspond to the control panel on a real 5250 printer and let you control the PC printer that is emulating a 5250 printer. These options are described individually in following topics.

5.7.2.1
Line Feed

Line Feed advances the paper in the PC printer one line.

5.7.2.2
Form Feed

Form Feed advances the paper in the PC printer to the top of the next page.

5.7.2.3
Top of Form

This option lets you verify the physical top of forms to ensure that printing will begin in the appropriate spot on each page. When you select **Top of Form**, the Emulator prints the letter H in a row at the current top of form position. If that top of form position is incorrect, adjust the printer and select **Top of Form** again. Repeat until your printer has the correct top of form setting for the forms you are using.

5.7.2.4
Print 1 Line

The printer will print one line of text from the Emulator print buffers every time you select **Print 1 Line**. You would use this option to print data that has been received from the host but not printed yet if you stopped the printer in the middle of a host print job.

5.7.2.5
Cancel

This option cancels the host print job currently in progress by sending a cancel print request to the host.

5.7.2.6
Setup

When you select **Setup** you will see the following menu:

```
A.  6 LPI/10 CPI
B.  6 LPI/15 CPI
C.  7 LPI/10 CPI
D.  8 LPI/15 CPI
```

You use this menu to change the lines per inch (LPI) and characters per inch (CPI) print spacing on your PC printer and on the 5250 printer it is emulating.

The options shown on this menu represent the four possible densities that can be set by switches on a real 5250 printer. The host can set the printer to other CPI and LPI densities besides those on this menu.

When you select an option, the spacing is changed on your PC printer and the host is notified of this change.

Technical note: The Emulator changes density by sending the control codes from the **Density Commands** menus to the PC printer. You specify these control codes during configuration, either by selecting a printer file for **Type of PC Printer** or by entering the hex values on the **Density Commands** menus. See Chapter 8 for details.

5.7.2.7
Reset

Reset resets the PC printer and tells the host that the printer has been reset. You should **Reset** the printer if you need to go back to the original print settings or after you fix a printer problem.

Technical note: Reset sends the control codes from the **Initialization Command** window to the PC printer. You specify these control codes during configuration, either by selecting a printer file for **Type of PC Printer** or by entering the hex values for the **Initialization Command**. See Chapter 8 for details.

5.7.2.8
Debug

When you select **Debug**, you will see the following menu:

```
Hex output
```
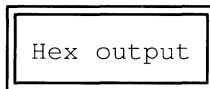
Selecting **Hex output** tells the printer LU to print control codes the host sends to the emulated 5250 printer. A HEX indicator will appear on the status line to tell you that the printer is in hex output mode.

Hex printer output is useful when diagnosing host printer problems. Use the **Debug** option if a Multi-Tech Tech Support Technician instructs you to do so.

5.7.3
Using the Main Menu from a Printer LU

Pressing **Shift-Shift** from a printer LU brings up the Main Menu. This allows you to get help, lock your keyboard and quit the Emulator without switching to a display LU.

Note that you cannot use the **Copy** or **Keys** option while you are in a printer LU. If you select either of those options from the Main Menu, you will see the following message:

```
NOT ALLOWED IN PRINTER LU
```

Press **Esc** to remove the Main Menu from your printer LU screen.

See the Menus and Options for Displays topic earlier in this chapter for information on the Main Menu options.

5.8
3180 Wide Screen Mode

If you have configured an LU as a 3180 display, MC5250PC lets you use wide screen mode. This feature displays more than the standard 24 lines of 80 characters each on your emulated 3180 screen. Wide screen mode is used during some applications such as DisplayWrite/36 and OfficeVision/400.

If your PC has an adapter that supports fewer than 132 columns or fewer than 28 rows, you will not see all the characters on your emulated 3180 screen at once. You can, however, use the following keystroke sequences to scroll the information on your screen:

Keystroke Sequence	Function
Alt-numeric keypad up arrow	Scroll up 1 line
Alt-Shift-numeric keypad up arrow	Display bottom section
Alt-numeric keypad down arrow	Scroll down 1 line
Alt-Shift-numeric keypad down arrow	Display top section
Alt-numeric keypad right arrow	Scroll right 1 column
Alt-Shift-numeric keypad right arrow	Display left section
Alt-numeric keypad left arrow	Scroll left 1 column
Alt-Shift-numeric keypad left arrow	Display right section

The keystroke sequences for scrolling are always the same, regardless of the type of keyboard or keyboard layout you are using.

If your PC has an adapter that supports 132 columns, the Emulator can condense all the characters onto your emulated 3180 screen at once. Note that you must configure the Emulator with certain settings your adapter needs for 3180 wide screen emulation. See the Monitor topic in Chapter 8 for details on these configuration settings and for the standard settings for some adapters. Information on other adapters may be available in a README.DOC file on your master diskette.

A real 3180 display in wide screen mode usually displays error messages from the host on line 28. The Emulator uses line 24 on your emulated 3180 screen to display these error messages. Any data being displayed on line 24 will be covered by the message until the error is reset.

The host may display a shadow cursor on any line of your screen. The Emulator will display the shadow cursor as a reverse video block.

See your host system documentation or online help screens for more information on using 3180 wide screen mode.

5.9
Application Program Interface (API)

The API allows you to run PC applications that communicate with the host through the Emulator.

The MC5250PC API is compatible with the IBM API according to IBM's 5250 API specifications as documented in Appendix C of this manual. PC applications which follow these specifications may be used with MC5250PC.

Applications are available from IBM and third-party vendors. If you want to write your own applications, refer to Appendix C for the API description and specifications.

To use these applications, start MC5250PC and communicate with the host system as described in Chapter 4. Then hot-key out to DOS. The Emulator will continue operating in background mode and the API will be available. Now run the applications as described in their documentation.

5.10
Quit and Restart Options

During the course of a day, you may want to **Quit** the Emulator and then restart it later. You have the option of letting the 5250 twinax card in your PC remain active while the Emulator is not running or deactivating the card when you **Quit**. Your choice will also determine whether your emulated 5250 devices remain active or are deactivated when the Emulator is not running.

You control all of this by simply specifying **Yes** or **No** for two configuration items. See the **Quit with Power Off** and **Reset with Power On** options in Chapter 8.

You would keep the card active to:

Keep the communications link active.

Preserve the information on your 5250 screen so you can continue from where you left off.

Communicate in background mode without using any PC memory.

You would deactivate or reset the card to:

Clear out all old data or conditions and start fresh the next time you use the Emulator.

Notify the host or controller that your 5250 devices have been turned off.

Make 5250 station addresses available for other users.

5.11
Virtual Disk

IBM has various software support packages for PC's that run on midrange computers. There are two categories of support packages: base level file transfer packages such as the File Support Utility (FSU) and higher level transfer utilities such as PC Support/3x.

The base level packages such as FSU use a facility called a virtual disk or VDISK that allows software on the host to interact with the Emulator directly without additional code running on the PC. Use of this facility allows you to transfer files between the PC and specially formatted directories on the host.

The higher level transfer utilities such as PC Support/3x require cooperating software packages running at both ends, on the host and on the PC. PC Support/3x uses another form of virtual disk involving higher level protocols which are more tightly integrated into applications. This virtual disk support does not use the base level virtual support and is not discussed here; see the appropriate IBM PC Support/3x manuals for information about usage.

When PC Support/3x is used, the VDISK facility is usually used only once, to download the PC programs from the host.

The VDISK facility within the Emulator intercepts commands sent to the physical PC floppy disk driver software. The facility intercepts floppy disk commands only when instructed to do so by software running on the host. Configuring a virtual disk does not interfere with the normal operation of the Emulator since it must be enabled by the host during file transfers.

5.11.1
File Support Utility

To transfer files to the PC using FSU, sign on to the host and enter the following command:

```
PCFSU
```

A screen will appear giving instructions on how to continue. At the end of this screen you will be requested to hot-key to DOS. This operation will activate the VDISK facility built into the Emulator. Any files you see on this drive using the DIR command can be accessed as though they were really on the floppy drive (A or B, depending on the configuration). If you have the proper access privileges on the host, you can also copy DOS files from any other PC drive to the virtual drive.

5.11.2
PC Support/3x

The VDISK facility is used only to download the initial PC support programs; thereafter the higher level protocols of PC Support/3x will be used to manage information transfer between the PC and the host. The downloading procedure will vary depending on the host.

The current release of IBM's PC Support/36 includes an installation disk which eliminates the need to download.

To initiate the download from most System/38 hosts, sign on to the host and enter the following command:

```
CALL QIWDOWNL.QIWS
```

A screen will be displayed giving instructions on how to continue. At this point you will be asked to hot-key to DOS. After logging on to the virtual disk you selected, you will be asked to execute a batch file to perform the actual copy operation. All the files necessary to run PC Support/38 will be downloaded to the disk of your choice. Once these files exist on the physical disk connected to your PC you no longer need to use the VDISK facility of the Emulator. After the download you should hot-key back to the 5250 screen and terminate the program by following the directions on the screen. This is usually done by pressing the CMD 1 key sequence.

Follow the directions in the IBM PC Support/3x manual for installing and using PC Support/3x.

Note that you also must make sure the Emulator has certain settings configured for each LU with which you want to use PC Support/3x. For your convenience, the following table shows you these configuration options and which setting you must select for each one:

Option	Setting
Save Graphics RAM	Yes
IBM API Compatibility	Yes

See Chapter 8 for complete information on using the Configuration Editor to set up the options shown above.

5.12
Command Line Options

The line of text that you type at the DOS prompt to start the Emulator is called a command line. A command line contains a command to tell DOS to do something (in this case start the MC5250PC emulation program) and can contain additional information as well. Following is a description of some options you can enter on the MC5250 command line.

The full format of the MC5250 command line showing all the options described here is:

```
MC5250 filename -Pfilename -Cfilename -G -R -H
```

You may include as many of these options as you need. The options may be entered in any order, separated by one or more spaces. A sample command line might be:

```
MC5250 MARYSFIL -R
```

All command line options apply only for the current emulation session. Using them does not make any permanent changes to the configuration file or the default settings.

5.12.1
filename Configuration File

Each time you start the Emulator, it reads configuration information from a disk file. The MC5250PC software package includes the configuration file MC5250.CNF. You can create your own configuration files with the Configuration Editor, as described in Chapter 8.

You tell the Emulator which file to use by typing the filename on the command line. You may specify any file that was created by the **Create** option of the Configuration Editor. All these files will have the filename extension .CNF, but you should not type the .CNF extension here.

If you do not enter a filename, the Emulator uses the file MC5250.CNF as a default.

5.12.2
-Pfilename Playback Keystroke File

This option causes the Emulator to go directly into emulation and automatically playback keystrokes from a file at startup. The **Playback** feature is described earlier in this chapter.

The -P option is a convenient way to sign on to the host, by playing back a file containing the keystrokes needed for signing on.

Most midrange computers are set up to send a sign on request or some type of message to a 5250 display as soon as a communications connection is established. So the Emulator waits for the host to update the display screen before starting automatic playback. If the host does not update the screen or if for some reason the Emulator does not detect the update, you will have to start the playback manually. Press **Shift-Shift**. You will see the following menu:

```
Resume
Pause
Stop
```
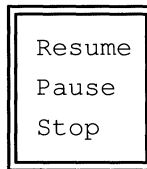
If you select **Resume**, the Emulator will begin playback. **Pause** and **Stop** function as described under the **Playback** option earlier in this chapter.

5.12.3
-Cfilename or -Cdevice Copy

This option defines a device or filename to be used for the Emulator's **Copy** feature. During emulation, you can copy the 5250 screen data to the specified device or file by just pressing **Alt-PrtSc (Alt-*** on an enhanced keyboard) instead of going through the menus. The **Copy** feature is described earlier in this chapter.

5.12.4
-G Graphics RAM Toggle

Specifying -G sets the **Save Graphics RAM** option to the opposite of how it was set in the configuration file. See Chapter 8 for information about **Save Graphics RAM**.

You should configure this option for the setting (**Yes** or **No**) you normally use. If there is a situation where the opposite setting is required, using the command line option is more convenient than changing the configuration.

5.12.5
-R Resident Toggle

Specifying -R sets the **Automatic Hot-Key** (go resident at startup) option to the opposite of how it was set in the configuration file. See Chapter 8 for information about **Automatic Hot-Key**.

You should configure this option for the setting (**Yes** or **No**) you normally use. If there is a situation where the opposite setting is required, using the command line option is more convenient than changing the configuration.

5.12.6
-H Hex Printer Output

Specifying -H tells each printer LU to print control codes the host sends to the emulated 5250 printer. A HEX indicator will appear on each printer LU's status line to tell you that the printer is in hex output mode. Hex printer output is useful when diagnosing host printer problems.

The -H command line option is equivalent to the **Debug** option on the printer LU **Front Panel** menu (described earlier in this chapter). Use the -H option if a Multi-Tech Tech Support Technician instructs you to do so.

5.13
Keystroke Compiler

The **Playback** command described under Menus and Options for
Displays provides automatic keyboard input. This feature allows you to
prepare files of keystrokes ahead of time and then send them to the host
during emulation. The files can be created by the **Record** command
during emulation or by the Keystroke Compiler program MC5250K.

MC5250K translates or compiles ASCII text files into a form that can be
used by the Emulator. These files can include data characters, 5250
keystrokes and special Emulator operation keys. You will not be able to
use the DOS TYPE command to look at the keystroke files produced by
MC5250K.

The Keystroke Compiler can be used to compile text files produced by
other programs. It is also useful for creating long keystroke files that may
need to be edited to correct any errors made during data entry. For
creating short files, the **Record** command is generally more convenient
than MC5250K.

Technical note: The output files produced by MC5250K consist of IBM
PC keyboard scan codes.

5.13.1
Running MC5250K

The MC5250K command line has the form:

```
MC5250K -E -P inputfile outputfile
```

The -E option tells MC5250K that your PC has an enhanced keyboard.
This makes sure that all of your keystrokes will be compiled correctly.

The -P option specifies that MC5250K is to create a file for use with PC
keyboard layout. If -P is omitted, then MC5250K creates a file for use
with 5250 keyboard layout. Create a file that matches your **Keyboard
Layout** configuration.

The inputfile specifies the name of the ASCII text file which MC5250K is
to take as input.

The outputfile specifies the name of the keystroke file which MC5250K is to produce for use by the Emulator **Playback** command. If you do not specify an outputfilename, the outputfilename will be the same as the inputfilename with a .PLY extension.

To start MC5250K, enter the command line with the desired options. You will see this message:

```
5250 KEYSTROKE COMPILER vnn.nn.nn
Copyright (C) 19nn Multi-Tech Systems
```

When the compilation has been successfully completed you will see one of the following messages depending on whether you used the -E option or the -P option:

```
PLAYBACK outputfile IN 5251 KEYBOARD MODE

PLAYBACK outputfile IN PC KEYBOARD MODE

PLAYBACK outputfile IN ENHANCED 5251 KEYBOARD MODE

PLAYBACK outputfile IN ENHANCED PC KEYBOARD MODE
```

If you just type MC5250K without specifying any options on the command line, you will see the following message to remind you what to enter:

```
USAGE: MC5250K [-EP] INPUTFILE [OUTPUTFILE]
```

If a problem occurs you will see one of the following messages instead:

```
UNABLE TO OPEN INPUT FILE
```

If you get this message, check to see that you spelled the filename correctly and that the file exists in the directory.

```
UNABLE TO CREATE OUTPUT FILE
```

If you get this message, your disk or directory may be full, your disk may be damaged or the outputfilename you specified may not be a valid filename.

5.13.2
Creating an Input File

You can create your input file by using a text editor or word processing program (Brief, EDLIN, Word, WordStar, etc.). Make sure you create a true ASCII file. Your text editor or word processing program will allow you to specify this form (create a non-document file in WordStar, save a file unformatted in Word, etc.).

Enter ASCII data characters by typing the desired characters on your keyboard. Upper and lower case characters are allowed and the proper case is preserved.

Enter non-ASCII 5250 data characters such as cent sign by pressing the PC key indicated on the keyboard template, just as you would during emulation.

To enter the special keystrokes, use a code consisting of three ASCII characters enclosed in square brackets, as shown in the following table. The letters in the brackets may be entered as either upper or lower case.

Key Code	Description	Key Code	Description
[SYS]	SYS REQ	[ENT]	ENTER
[BSC]	Backspace	[FLX]	FIELD EXIT
[ERS]	ERASE INPT	[HOM]	HOME
[FL+]	FIELD +	[INS]	INS
[FL-]	FIELD -	[DEL]	DEL
[TAB]	FIELD ADVANCE	[BKT]	FIELD BACKSPACE
[RST]	ERROR RESET	[CRL]	Cursor left
[HLP]	HELP	[CRR]	Cursor right
[DUP]	DUP	[CRU]	Cursor up
[NLN]	NEW LINE	[CRD]	Cursor down
[RLU]	ROLL UP	[RLD]	ROLL DOWN
[ATN]	ATT	[C01]	CMD 1
[C02]	CMD 2	[C03]	CMD 3
[C04]	CMD 4	[C05]	CMD 5
[C06]	CMD 6	[C07]	CMD 7
[C08]	CMD 8	[C09]	CMD 9
[C10]	CMD 10	[C11]	CMD 11
[C12]	CMD 12	[C13]	CMD 13

Key Code	Description	Key Code	Description
[C14]	CMD 14	[C15]	CMD 15
[C16]	CMD 16	[C17]	CMD 17
[C18]	CMD 18	[C19]	CMD 19
[C20]	CMD 20	[C21]	CMD 21
[C22]	CMD 22	[C23]	CMD 23
[C24]	CMD 24	[LU1]	Select LU #1
[LU2]	Select LU #2	[LU3]	Select LU #3
[LU4]	Select LU #4	[LU5]	Select LU #5
[LU6]	Select LU #6	[LU7]	Select LU #7
[PAU]	Insert operator pause	[PRN]	PRINT
[QUI]	Quit	[WAI]	Insert timed wait

To make your text file easier to read, you can insert carriage returns (start typing on the next line) in your file wherever you want. Carriage returns are ignored by MC5250K and will not be included in the output file.

During **Playback**, if a "switch LU" keystroke is encountered for an LU that is configured as **No Device** this keystroke is ignored.

The Pause keystroke [PAU] is equivalent to selecting the **Pause** option from the Emulator menus during keystroke **Playback**. It temporarily suspends taking keystrokes from the file so that you can enter keystrokes manually. PAUSE is displayed on the status line. Press **Shift-Shift** to continue **Playback**.

The Wait keystroke [WAI] is equivalent to selecting the **Wait** option from the Emulator menus during keystroke **Record**. It specifies an amount of time for **Playback** to pause. WAIT is displayed on the status line. Press **Shift-Shift** to bypass the timed wait.

Use a string with the following format to specify a timed wait:

```
[WAI]nnn
```

In this string, nnn represents one to three digits in the range 1 to 999 specifying how many half-second intervals **Playback** should pause. If you do not specify a time value after [WAI], **Playback** will use the half-second default. Following are sample strings:

[WAI]   Wait ½ second

[WAI]120   20 Wait 1 minute

Non-numeric characters in the [WAI] string will display on your screen after the specified wait time. Following are sample strings:

[WAI]120aaa   Wait 1 minute and display 3 a's

[WAI]ABC   Wait ½ second and display ABC

[WAI]6A   Wait 3 seconds and display an A

Numeric characters following the third digit of the time value in the [WAI] string will display on your screen after the specified wait time. Following are sample strings:

[WAI]120555   Wait 1 minute and display three 5's

[WAI]002123   Wait 1 second and display 123

[WAI]2123   Wait 1 minute, 46 seconds (212 half seconds) and display a 3

As the last two examples show, you **must** supply all three digits of the time value before any numeric characters you want to display.

The Quit keystroke [QUI] is equivalent to selecting the Quit option from the Emulator's Main Menu. When a **Quit** keystroke is encountered during **Playback**, emulation will end and control will return to DOS.

Example:

Suppose you want to use the **Playback** command to sign on to a particular host application. First, start emulation and go through the sign on procedure manually to determine exactly what you have to do. Write down the exact keystrokes required to do this.

Suppose the first host sign on screen and your actions are as follows:

```
Welcome to Friendsville Timesharing System.

Please sign on.

        Operator ID: _____
```

Type JOHN and press the FIELD EXIT key.

```
Password: _____
```

Type XYZ123 and press the FIELD EXIT key.

```
Library name: _____
```

Type SUPPLIES and press the ENTER key.

Now suppose this is followed by another screen:

```
Please enter procedure name: _____
```

Type RECEIVE and press the ENTER key.

After you sign off and go back to DOS, use your editor or word processor to create a file called SIGNON.KEY containing:

```
        JOHN[FLX]
        XYZ123[FLX]
        SUPPLIES[ENT]
        RECEIVE[ENT]
```

Save your file and return to DOS. Then enter:

```
        MC5250K SIGNON.KEY
```

When MC5250K is finished you will see:

```
    PLAYBACK signon.ply IN 5251 KEYBOARD MODE
```

To use your file during emulation, select **Keys** and **Playback** from the Emulator menus. You will see the window:

```
Playback Enter device or filename

------------------------------
```

Type `SIGNON.PLY` and press **Enter**. The Emulator will **Playback** the keystrokes and automatically sign you on to the host application.

If you do not want to include your password in the file, create a file containing:

```
JOHN[FLX]
[PAU][FLX]
SUPPLIES[ENT]
RECEIVE[ENT]
```

Playback this file as above. When the [PAU] keystroke is reached in the file, your screen will show:

```
Welcome to Friendsville Timesharing System.

Please sign on.

        Operator ID: JOHN_____

        Password: _____

        Library name: _____
```

The **Playback** operation will pause and the word `PAUSE` will be displayed on the status line. Type `XYZ123` and press **Shift-Shift** to continue **Playback**. The Emulator will automatically fill in the library name, take you to the next screen and fill in the procedure name.

Note that instead of manually writing down all the keystrokes you will need to put into your file, you can use the **Copy** command to copy host screens to the printer or disk files. Then you can work from the screen printouts when you create your keystroke files.

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Requirements
and Specs

6.1
PC Requirements

To run MC5250PC, you must have an IBM PC, XT, AT, Personal System/2™* Model 25, 30, 50, 60, 70 or 80, or another personal computer that is compatible with one of these models. It must have the following features:

- At least one disk drive.

- At least 93K of user memory. If you configure more than one LU or use hot-key, MC5250PC may require up to 105K of memory.

- The MS-DOS or PC-DOS operating system, release 2.0 or later, or a compatible operating system.

- A 5250 twinax hardware adapter card purchased from Multi-Tech Systems.

6.2
Communications Link Requirements

If you need to communicate only within your office, you can connect the twinaxial cable directly to the host and use no controller.

You can use a controller to communicate to a host at a remote location or locally. If you need to communicate with a host at a remote location, you can use either a switched or direct telephone line with a synchronous modem at each end. If you need to communicate within your office, you can use a switched telephone line, a direct telephone line, or a hard-wired connection with either a short-haul synchronous modem at each end or one modem eliminator. Your modem must be compatible with the host's modem.

MC5250PC can transfer data at a rate of up to one million baud, depending on the communications link (controller, modem, transmission lines, etc.) used.

---

*Personal System/2 is a trademark of IBM Corporation.

6.3
Host Requirements

Your host must be able to communicate with any of the following IBM devices:

>   5251, 5291, 5292 color, 5292 graphics, 3180 or 3196 display stations

>   3812, 5219, 5224, 5225 or 5256 printers

The Emulator appears to the host as a real device. Therefore, your host should be configured to communicate with real devices rather than emulation devices.

MC5250PC can use any protocol that the host uses to communicate with the above devices.

Compatible host systems include IBM System/34, System/36, System/38 and AS/400 midrange computers.

6.4
Features Not Supported

The Emulator supports all the functions and features of a real 5250 with the following exceptions:

*   Light pen.

*   Certain special characters in the 5250 display character set that are not found in the PC character set. (The Emulator supports all 5250 characters for input to the host, but makes some substitutions when displaying the special characters on your PC screen.)

*   Column separators located between characters. (The Emulator simulates column separators by displaying a character of your choice in blank positions of fields.)

Your master diskette contains the following files:

- Emulation Program — MC5250.EXE

- Configuration Editor — CFG5250.EXE

- Default Configuration File — MC5250.CNF

- Batch File to Start Configuration Editor Using MC5250PC Options — MC5250C.BAT

- Microcode for MC5250 Card — MC5250.MIC

- Microcode for MC5250 Card — MC5250.SMC

- Graphics Program — GRAF5292.EXE

- Keystroke Compiler — MC5250K.EXE

- Startup Overlay Files — all files with the extension .OVL

- Help Files — MC5250.HLP and CFG5250.HLP

- Printer Files — all files with the extension .PRT

- Language Files — all files with the extension .LNG

- Standard 122-Key Keyboard Files — all files with the extension .KBS

- Enhanced 122-Key Keyboard Files — all files with the extension .KBE

- Keyboard Layout Files — all files with the extension .KBD

- Keyboard Scan Code Data Files — all files with the extension .DAT

NOTE: If your master diskette contains a file named README.DOC, it is an ASCII text file containing valuable information that did not go into the current edition of this manual. Be sure to read the contents of this file.

Hardware Installation

7.1
Hardware Requirements

Your PC must have a 5250 twinax card installed in order to use MC5250PC to communicate with a host system.

Connect your PC to the controller or host computer with a standard twinaxial cable. This cable must have appropriate connectors on both ends. You can use IBM parts or equivalents. Male connectors are IBM part #7362229; female connectors are IBM part #7362230.

7.2
Installation Procedure

This section presents generic procedures for installing a 5250 twinax card. Read all of these steps before you begin. Also read the instructions or precautions in the documentation that came with your PC and the installation instructions for your particular 5250 twinax card.

Warning: Always unplug your PC anytime you install hardware in it. It is important to unplug the machine, rather than just turn it off, because some components have voltages present even when the power is off. Another good precaution to prevent static damage is to ground yourself by touching a metal part of your PC system before you handle the card. Also, be careful not to drop or otherwise damage the card, as accidents can result in improper operation or no operation at all.

1. The 5250 twinax card has groups of switches or jumpers that establish certain electrical connections depending on their settings. They are preset to addresses that will probably fit your needs. See the card's instructions for information on reading and changing the settings.

2. Check to make sure the new card does not use the same addresses as another card already installed in your PC. MC5250PC can use an I/O port address within the range 300 to 3FF hexadecimal and memory address C000, C800, D000, D800, E000 or E800 hexadecimal.

3. Record the card's addresses on the Configuration Worksheet in Chapter 8.

4. Make any additional modifications called for in the card's instructions.

5. Turn off your PC and unplug it. Carefully open it according to the instructions in your PC manual. Avoid touching the power supply while working inside.

6. Most PC's have several empty slots located toward the rear of the system unit. You can usually install a card in any empty slot that is the right size. Make sure the slot is free from obstructions and that the metal contacts in the slot and along the edge of the card are clean. Avoid touching these contacts, as you might leave harmful deposits on them.

7. Hold the card by its corners and slide it into the slot as far as it will go, making sure it is straight and securely in place. Some force may be necessary. In many PC's, you must also insert a screw to hold the card in place. Once the card is properly installed, avoid unnecessary removal and reinsertion.

8. Close your PC.

9. Plug one end of the twinaxial cable into the 15-pin socket on the back of the 5250 twinax card. Tighten the two screws on the plug to prevent the cable from falling off. A T-connector probably already is attached to the other end of the cable. If not, attach it. Finally, connect the twinaxial cable from the controller or the host computer to the T- connector. If you are not the last station on the line, remember to reconnect the cable leading to the next station.

10. Plug your PC back in and turn it on. It should function normally.

If your PC or software does not operate properly after hardware installation, this may be due to conflict between cards. Remove all non-essential cards from your PC and reinsert them one at a time until you identify the conflicting card. See the card's instructions to change conflicting addresses.

Configuration Editor

8

Your software must be set up to suit your host system's requirements, your PC and hardware requirements and your user preferences. This setting up is called configuration. It is very important that software be set up correctly, because incorrect configuration can result in incorrect operation or no operation at all.

This chapter describes in detail all the configuration menus and their options. You should have no problem making the correct choices from the menus after you obtain the necessary information. You can read about all the menus or refer only to those that apply to your system. The items which must be configured are listed on the Configuration Worksheet. Feel free to skip the optional menus for now.

If this is your first configuration session, you can practice using the menu control keys and acquaint yourself with all the menus before making any permanent changes. See Chapter 3 to review the PC menu usage keys.

Use the Configuration Editor to store specifications in a configuration file for the Emulator to read at startup and use during emulation. If you communicate regularly with more than one host system, it is convenient to make and save separate configuration files for each host. Chapter 5 tells you how to specify which configuration file you want the Emulator to read at startup.

You already have one configuration file, MC5250.CNF, supplied as part of your software package. These settings, known as defaults, are the first ones you will see when you set up your first file. Many of these settings will fit your needs, but you will probably need to make a few changes.

The default settings are shown on the sample menus in this chapter. For items where you toggle between options, both options are shown, with the default first. For example, **Yes/No** means you can choose either **Yes** or **No** and the default is **Yes**. You will see only one of these options at a time on your screen.

In this manual, when you see two key names separated by a dash this notation means you should hold down the first key while you press the second key. For example, **Alt-Esc** means you should hold down the **Alt** key while you press the **Esc** key.

Some messages have been built in to the software to help you with configuration. Press **F1** when a message appears or refer to the end of this chapter to find out what each message means.

You can also press **F1** for help on any of the menus and options in the Configuration Editor. Press **Esc** to get out of a help window.

After you configure your software correctly, configuration needs to be done again only if your requirements or preferences change. Therefore, you will not need to reconfigure your software every time you use it.

8.2
Configuration Worksheet

Use the Configuration Worksheet to collect the information needed for configuration. Fill out a separate Worksheet for each configuration file you create or edit. For your convenience, we have included several copies.

You do not need to change all the configuration items to communicate. Only a few are essential and they are found on the Worksheet. For the non-essential options, the default settings will be satisfactory until you decide to change them.

The Worksheet information comes from two sources. First, talk to a systems programmer or network coordinator at your host system. (Your host contact may also ask you for information the host needs to generate a communications line definition for your device.) Next, see whoever installed your hardware for other information.

It may be easiest to remove a copy of the Worksheet from the binder now and refer to it while reading this chapter. With each menu option, there is an explanation of what it means or an indication of where to find the information you need. After you fill in the Worksheet, you will be ready to use the Configuration Editor. When you finish configuration, move the Worksheet to the back of this manual.

Configuration Worksheet

You must configure all the items on the front and back of this Worksheet before you can communicate with the host. Any items not listed here are optional.

Host-Dependent Items

National Language _____

What types of 5250 devices do you want to emulate?

LU #	Device	Primary Station Address	Alternate Addresses
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____

NOTE: Use of printer LU's is optional, but if you do use any then you must also properly configure the items described under Configuring a Printer later in this chapter.

Hardware-Dependent Information

Monitor   Monochrome _____ Color _____

            Mono with Color Card _____

            Special _____ Special (Mono) _____

IBM Color Handling   No _____   Yes _____

Type of Keyboard   PC/XT/AT _____

                     Enhanced-101 _____

                     Enhanced-102 _____

                     122-Key _____

                     Enhanced-122 _____

I/O Port Address   _____

Memory Address   _____

Configuration Worksheet

You must configure all the items on the front and back of this Worksheet before you can communicate with the host. Any items not listed here are optional.

Host-Dependent Items

National Language _____

What types of 5250 devices do you want to emulate?

LU #	Device	Primary Station Address	Alternate Addresses
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____

NOTE: Use of printer LU's is optional, but if you do use any then you must also properly configure the items described under Configuring a Printer later in this chapter.

Hardware-Dependent Information

Monitor   Monochrome _____ Color _____

           Mono with Color Card _____

           Special _____ Special (Mono) _____

IBM Color Handling   No _____   Yes _____

Type of Keyboard   PC/XT/AT _____

           Enhanced-101 _____

           Enhanced-102 _____

           122-Key _____

           Enhanced-122 _____

I/O Port Address   _____

Memory Address   _____

Configuration Worksheet

You must configure all the items on the front and back of this Worksheet before you can communicate with the host. Any items not listed here are optional.

Host-Dependent Items

National Language _____

What types of 5250 devices do you want to emulate?

LU #	Device	Primary Station Address	Alternate Addresses
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____

NOTE: Use of printer LU's is optional, but if you do use any then you must also properly configure the items described under Configuring a Printer later in this chapter.

Hardware-Dependent Information

Monitor   Monochrome _____ Color _____

              Mono with Color Card _____

              Special _____ Special (Mono) _____

IBM Color Handling   No _____   Yes _____

Type of Keyboard   PC/XT/AT _____

                      Enhanced-101 _____

                      Enhanced-102 _____

                      122-Key _____

                      Enhanced-122 _____

I/O Port Address   _____

Memory Address   _____

Configuration Worksheet

You must configure all the items on the front and back of this Worksheet before you can communicate with the host. Any items not listed here are optional.

Host-Dependent Items

National Language _____

What types of 5250 devices do you want to emulate?

LU #	Device	Primary Station Address	Alternate Addresses
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____

NOTE: Use of printer LU's is optional, but if you do use any then you must also properly configure the items described under Configuring a Printer later in this chapter.

Hardware-Dependent Information

Monitor   Monochrome ____ Color ____

               Mono with Color Card ____

               Special _____ Special (Mono) _____

IBM Color Handling   No ____   Yes ____

Type of Keyboard   PC/XT/AT ____

                        Enhanced-101 ____

                        Enhanced-102 ____

                        122-Key ____

                        Enhanced-122 ____

I/O Port Address   _____

Memory Address   _____

8.3
Starting Configuration

Turn on your PC and start DOS. Be sure you are working from a back-up copy of your master diskette, you are working from the proper disk drive and directory and your cursor is at the DOS prompt. Type the following command and press **Enter** to start the Configuration Editor:

```
MC5250C
```

This command invokes the batch file MC5250C.BAT, which starts the Configuration Editor CFG5250.EXE using the configuration options for MC5250PC. You will then see the Configuration Editor startup screen.

NOTE: The Configuration Editor is set up so the screens will display properly on most PC's. If your PC has a monochrome monitor with a color adapter card, your screen may be difficult to read. If so, type Q to return to DOS, then start the Configuration Editor over again by entering the following command:

```
MC5250C -M
```

If you want fast screen updating while running the Configuration Editor, specify -F when you start the Configuration Editor:

```
MC5250C -F
```

8.4
Main Menu

The menu you see in the upper left corner of the startup screen is called the Main Menu.

```
Edit
Create
Delete
Quit
```

Read the following descriptions of these four options before you choose one.

8.4.1
Edit

Edit makes changes to an existing configuration file. If you select **Edit**, the first menu you will see is a list of all existing files from which you select the one you want to **Edit**. The default configuration **MC5250** will be the only file listed until you **Create** other files. For your first configuration session, you can **Edit** the default file or create a new file and save the supplied file unchanged.

The program has a feature to prevent you from accidentally losing changes to an edited file. Before you can end configuration, you will see the following menu:

```
Save Configuration
Abandon Configuration
```

If you have doublechecked your changes, select **Save Configuration** to make them permanent. Remember that you will lose the file in its original form when you make permanent changes. If you do not want to make permanent changes to the file, select **Abandon Configuration** to keep it as it was before you began editing.

8.4.2
Create

Create makes a whole new configuration file. You will be asked to name your new file:

```
Enter configuration name: _ _ _ _ _ _ _
```

Enter a valid filename that will help you identify the file easily. Use a different filename for each file you create. The program will automatically assign the extension .CNF to label your new file as a configuration file. Do not enter an extension when you enter the filename.

After you name your new file, the menus used to **Create** it are the same as those used to **Edit** an existing file. They are described in a following section.

When you finish creating a new file, select **Save Configuration** to finalize its creation and add it to the list of existing files. Select **Abandon Configuration** to cancel the creation of a new file.

When you **Create** a new file, default settings will be assigned for all options. This means you don't have to fill in all the options on all the menus; you just have to change the ones that you want to be different from the defaults.

You can choose the defaults from the original MC5250.CNF defaults or from any existing configuration file. You can pick defaults that require the least amount of reconfiguration.

When you first start the Configuration Editor, the defaults are the same as the settings found in the file MC5250.CNF. After that, the defaults will be the same as the settings in the last file that you worked on in **Create** or **Edit**. If you **Quit** and start the Configuration Editor over again, the defaults for **Create** will go back to the MC5250.CNF settings.

If the file MC5250.CNF does not exist in the current directory when you start the Configuration Editor and try to **Create** a file, the Configuration Editor will use the same settings that were in the original unedited version of MC5250.CNF. Note that this provides a safety feature, so that even if you lose all of your configuration files you can still create new ones.

If you want to **Create** a new file from an existing file and still keep the existing file unchanged, proceed as follows. First select **Edit** and select the existing file. Then select **Abandon Configuration** to keep that file unchanged. Now select **Create** and enter the new filename. Make any changes you want on the menus and then select **Save Configuration** for the new file.

8.4.3
Delete

Delete erases an entire configuration file. You should never **Delete** a file unless you are absolutely sure you will not need it again. When the listing of all existing files appears, select the file you want to **Delete**. The following menu will then appear:

```
Yes
No
```

This feature prevents you from deleting a file accidentally. Select **Yes** to delete the file or **No** to save it.

8.4.4
Quit

Quit ends configuration and returns you to DOS. You will always have a chance to save your work before you **Quit**.

8.5
Menus for Edit and Create

Edit and **Create** both use the same menus. The difference is that **Edit** makes changes to an existing file and **Create** makes a whole new file.

The first menu lists three major areas of configuration:

```
PC/User Interface
Card Addresses
Logical Units
```

PC/User Interface refers to your PC equipment and user-preference
items. Card Addresses refers to the 5250 twinax card installed inside
your PC. Logical Units sets up emulated display stations and printers.

8.6
PC/User Interface

PC/User Interface lets you describe certain features of your PC to the
Emulator and select options for your personal convenience.

The following menu will appear when you select this option:

```
A. Monitor .............. Monochrome
B. IBM Color Handling ... No/Yes
C. Cursor .............. Underline/Block
D. Type of Keyboard ..... PC/XT/AT
E. National Language .... USENGLSH
F. Multinational ........ No
G. Provide Key Click .... No/Yes
H. Buffer Keystrokes .... No/Yes
I. 5250 Column Separator  B3
J. Hot-Key Scan Code .... 01
K. Save Graphics RAM .... No/Yes
L. Automatic Hot-Key .... No/Yes
M. Keyboard Lock ........ Unlocked
```

8.6.1
Monitor

When you select this option you will see the following menu:

```
A. Color Monitor with Color Adapter
B. Monochrome Monitor with Monochrome Adapter
C. Monochrome Monitor with Color Adapter
D. Special Monitor and Adapter
E. Special Monitor and Adapter (Monochrome)
```

The adapter card may be built in to your PC or may have been installed as an add-on option. You should be able to find out what kind of adapter you have from your PC hardware documentation or the person who installed your PC.

You must select the option that matches your PC hardware. If this option is not set correctly, you will get the message WRONG MONITOR TYPE IN CONFIGURATION when you try to run the Emulator.

The option "color monitor with monochrome adapter" is not offered because a PC usually will not work at all with this combination of hardware installed. If your PC has this combination, select **Monochrome Monitor with Monochrome Adapter**.

If your PC has a monochrome monitor with a color adapter, you still must type MC5250C -M each time you start the Configuration Editor even if you select **Monochrome Monitor with Color Adapter** on this menu.

NOTE: You must set the **Monitor** type before configuring any attribute options under **Logical Units**, since changing it resets attributes. If you will be using graphics support with the Emulator, you must have a color monitor with a color graphics adapter (CGA), an enhanced graphics adapter (EGA) or a video graphics array (VGA).

Select **Special Monitor and Adapter** from the **Monitor** menu if you have a color monitor and an EGA or a VGA that supports more than 80 columns. Select **Special Monitor and Adapter (Monochrome)** if you

are using a monochrome monitor with an EGA or VGA that supports
more than 80 columns.

When you select either **Special Monitor** option, you will see another
menu:

```
A. Hex Code for Special EGA Mode .......    03
B. Maximum Number of Columns on Screen .  080
C. Maximum Number of Rows on Screen ....   25
D. BIOS Function Number ................   00
E. REGEN Buffer Address ................ B000
F. Optional Parameter (BX Value) ....... 0000
```

Each of these options is described individually in a following topic. The
defaults for these options are the most common settings. You must
configure these options if your adapter uses settings different from the
defaults.

Following is a list of some adapters and the configuration settings they
use with color monitors:

Adapter: Everex Viewpoint VGA

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
70	132	25	00	B800	000A
70	132	43	00	B800	000B

Adapter: Expert Top SEGA

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
60	132	25	00	B800	0000
63	132	43	00	B800	0000

Adapter: Genoa Super EGA

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
61	132	28	00	B800	0000

Adapter: Paradise VGA Plus16

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
55	132	25	00	B800	0000
54	132	43	00	B800	0000

Adapter: Tecmar VGA*

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
17	132	25	00	B800	0000

Adapter: Tseng Labs VGA/16*

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
24	132	28	00	B800	0000

Adapter: Video7 FastWrite VGA

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
05	132	28	6F	B800	0045

---

*The Tecmar VGA and Tseng Labs VGA/16 adapters each support both EGA and VGA monitors on the same card.

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Adapter: Video7 Vega VGA

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
05	132	25	6F	B800	0041
05	132	43	6F	B800	0042

Following is a list of some adapters and the configuration settings they use with **monochrome** monitors:

Adapter: Everex Viewpoint VGA

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
70	132	25	00	B800	000E
70	132	43	00	B800	000F

Adapter: Everex LVGA 800

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
1A	132	28	00	B000	0000

Adapter: Expert Top SEGA

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
46	132	25	00	B000	0000
49	132	43	00	B000	0000

Adapter: Genoa Super EGA

Mode	Columns	Rows	BIOS Function Number	REGEN Buffer Address	BX Value
47	132	28	00	B000	0000

Information on other adapters may be available in a README.DOC file on your master diskette.

8.6.1.1
Hex Code for Special EGA Mode

This option lets you specify the hex code your adapter uses to enter wide screen mode. When you select **Hex Code for Special EGA Mode** you will see the following window:

```
Enter new value in hex:
```

This setting must match the hex code your adapter uses for displaying more than 80 columns. You should be able to find this code in the documentation that came with your adapter.

8.6.1.2
Maximum Number of Columns on Screen

This option specifies your screen width. When you select **Maximum Number of Columns on Screen** you will see the following window:

```
Enter new value in decimal:
```

Enter the number of columns your adapter supports.

3.6.1.3
Maximum Number of Rows on Screen

This option specifies your screen height. When you select **Maximum Number of Rows on Screen** you will see the following window:

```
┌──────────────────────────────────────┐
│  Enter new value in decimal:          │
└──────────────────────────────────────┘
```

Enter the number of rows your adapter supports.

8.6.1.4
BIOS Function Number

The Emulator initializes wide screen mode on your adapter using a video BIOS function number. Most adapters use function number 00 hex, which is the default setting for this option. Some adapters, however, require a non-00 setting.

When you select **BIOS Function Number** you will see the following window:

```
┌──────────────────────────────────────┐
│    Enter new value in hex:            │
└──────────────────────────────────────┘
```

Change the default setting if you are instructed to do so by the technical documentation that came with your adapter or by a Multi-Tech Tech Support Technician.

8.6.1.5
REGEN Buffer Address

This address tells the Emulator the location of the video memory. The default address for color monitors is B800 hex, and the default address for monochrome monitors is B000 hex.

When you select **REGEN Buffer Address** you will see the following window:

```
Enter new value in hex:
```

Change the default setting if you are instructed to do so by the technical documentation that came with your adapter or by a Multi-Tech Tech Support Technician.

8.6.1.6
Optional Parameter (BX Value)

Most adapters ignore this optional parameter. Certain adapters, however, require the Emulator to set the BX value on the processor chip to a predetermined hex value.

When you select **Optional Parameter (BX Value)** you will see the following window:

```
Enter new value in hex:
```

Change the 0000 default setting if you are instructed to do so by the technical documentation that came with your adapter or by a Multi-Tech Tech Support Technician.

8.6.2
IBM Color Handling

If your PC has an IBM color graphics adapter (CGA) and you get unacceptable amounts of static, or "snow," on your screen, try selecting **Yes** to eliminate it.

This option is a solution to a known hardware problem of IBM's CGA. With **IBM Color Handling,** the software waits for retrace before updating the screen. Selecting **Yes** will eliminate the snow if your PC provides the ability to wait for screen retrace.

Select **No** for faster screen updating if your PC has a different type of color adapter, no color adapter or a monochrome monitor.

8.6.3
Cursor

Use this option to change the shape of your cursor. Select **Underline** if you prefer an underline cursor or **Block** if you prefer a block cursor.

8.6.4
Type of Keyboard

This item has to do with the type of keyboard on your PC. Your selection affects how your keys will work in emulation and determines what you will see on the **Hot-Key Scan Code** and **Keyboard Layout** menus described elsewhere in this chapter. If you don't know what kind of keyboard you have, compare the keyboard on your PC to the keyboard templates included in the MC5250PC package.

When you select this option you will see the following menu:

```
A.  PC/XT/AT Keyboard
B.  Enhanced-101 Keyboard
C.  Enhanced-102 Keyboard
D.  122-Key Keyboard
E.  Enhanced-122 Keyboard
```

Select the type of keyboard you are using.

Be sure to select the correct **Type of Keyboard** before configuring your **Keyboard Layout** under **Logical Units**.

If you select **122-Key Keyboard**, you will see a list of existing standard 122-key keyboard files. These are files with a .KBS filename extension, but the extension is not shown on the menu. A file is provided for each standard 122-key keyboard currently supported. Select the file that matches the standard 122-key keyboard you will be using with the Emulator. Select **DEFAULT** if you want to use the default standard 122-key keyboard file.

Likewise, if you select **Enhanced-122 Keyboard**, you will see a list of existing enhanced 122-key keyboard files. These are files with a .KBE filename extension, but the extension is not shown on the menu. A file is provided for each enhanced 122-key keyboard currently supported. Select the file that matches the enhanced 122-key keyboard you will be using with the Emulator. Select **DEFAULT** if you want to use the default enhanced 122-key keyboard file.

8.6.5
National Language

When you select **National Language** you will see a list of the existing language files. These are files with a filename extension of .LNG, but the extension is not displayed on the menu. Files are supplied for several common national languages.

Indicate the national language character set used by your host system. The Emulator will then load the appropriate language file and remap your keyboard for the language you select.

NOTE: You must select the appropriate **National Language** before configuring your **Keyboard Layout** under **Logical Units** since changing it resets key definitions.

8.6.6
Multinational

This option is for national languages, such as Canadian French, which uses the multinational character set for displays. The multinational character set has characters not included in the language's standard character set. The default setting for Multinational is No. Ask your host system administrator if you should toggle it to Yes.

8.6.7
Provide Key Click

If you select **Yes**, your PC will click or beep every time you press a key. The actual sound will be different on different PC's. Select **No** if you prefer no sound.

8.6.8
Buffer Keystrokes

Keystroke buffering allows the Emulator to accept keystrokes without sending them to the host immediately. You can continue entering keystrokes even when the host is temporarily not accepting data (when the Input Inhibited indicator is showing on the status line). The Emulator stores your keystrokes (up to 128 bytes) in a buffer and processes them when the host resumes accepting data.

Select **Yes** for **Buffer Keystrokes** if you want to use keystroke buffering. Select **No** if you do not want the Emulator to buffer your keystrokes.

8.6.9
5250 Column Separator

Some fields on real 5250 display station screens may contain column separators. These are vertical bars which appear between character positions to improve readability. Because of hardware limitations, separators cannot be displayed between columns on a PC screen. However, the Emulator gives you a similar effect by displaying separators in character positions rather than **between** them. This makes the fields look like they do on a real 5250 and shows you how many character positions are contained in a field.

The default separator character displayed by the Emulator is the vertical bar. Use this option if you want a different character.

When you select this option you will see the following menu:

```
        SELECT ASCII CHARACTER      [B3]

        0 1 2 3 4 5 6 7 8 9 A B C D E F

0    ►   0 @ P ` p Ç É á ▓ L ╨ α ≡
1    ☻ ◄ ! 1 A Q a q ü æ í ┴ ╤ β ±
2    ☻ ↕ " 2 B R b r é Æ ó ┬ ┐ Γ ≥
3    ♥ ‼ # 3 C S c s â ö ú ├ ╙ π ≤
4    ♦ ¶ $ 4 D T d t ä ö ñ ─ ─ Σ ⌠
5    ♣ § % 5 E U e u à ò Ñ ┼ ┴ σ ⌡
6    ♠ ▬ & 6 F V f v å û ª ╣ ┌ μ ÷
7    • ↨ ' 7 G W g w ç ù º ╗ ┤ τ ≈
8    ◘ ↑ ( 8 H X h x ê ÿ ¿ ╝ ╬ Φ °
9    ○ ↓ ) 9 I Y i y ë Ö ⌐ ╜ ╛ θ •
A    ◙ → * : J Z j z è Ü ¬ ╜ └ Ω ·
B    ♂ ← + ; K [ k { ï ¢ ½ ╗ ╦ δ √
C    ♀ └ , < L \ l | î £ ¼ ╩ ╠ ∞ ⁿ
D    ♪ ↔ - = M ] m } ì ¥ ¡ ╚ = ø ²
E    ♫ ▲ . > N ^ n ~ Ä ₧ « ╣ ╬ ε ■
F    ☼ ▼ / ? O _ o á Å ƒ » ┐ ═ ∩
```

You can select the column separator you prefer in one of several ways:

- Use your arrow keys to select the character you want from the menu. Then press **Enter**.

- If the character you want to use is on your keyboard, simply type that character and press **Enter**.

- Hold down the **Alt** key while you type the decimal value (0-255) of the character on the numeric keypad. When you release the **Alt** key, the arrow on the table will move to the character you selected. Then press **Enter**.

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If you do not want to see column separators, select a blank or press the
space bar. Then press **Enter**.

8.6.10
Hot-Key Scan Code

The hot-key lets you switch back and forth between emulation and other
PC programs. This feature is described fully in Chapter 5.

When you select this option a menu resembling your keyboard will
appear, similar to the following:

```
                      Select Hot-Key Scan Code


  3B 3C   01 02 03 04 05 06 07 08 09 0A 0B 0C 0D   0E     45     46

  3D 3E   0F  10 11 12 13 14 15 16 17 18 19 1A 1B  1C 47 48 49 4A

  3F 40   1D  1E 1F 20 21 22 23 24 25 26 27 28 29     4B 4C 4D

  41 42   2A 2B 2C 2D 2E 2F 30 31 32 33 34 35  36   37 4F 50 51 4E

  43 44   38              39               3A   52   53


   KEY Select ALT+KEY For Hot-Key      ALT Leave Hot-Key Unchanged
```

You will see the menu that matches your selection for the **Type of
Keyboard** option (described earlier).

If the menu you see does not match your keyboard, go back and make
the correct selection for the **Type of Keyboard** option before attempting
to configure the **Hot-Key Scan Code**.

The default keystroke for hot-key is **Alt-Esc**. This menu lets you redefine
hot-key as **Alt** in combination with another key.

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The position of the currently assigned key will be highlighted. The
numbers in the boxes on the menu are scan codes instead of the
characters that actually appear on your keyboard. Scan codes are
numbers that are used internally by the PC. They are displayed on the
menu for technical reference purposes and you do not have to be
concerned with them while you are making your choice.

Press the new PC key that you want to use with **Alt** for hot-key. Press
only the other key; do not press **Alt** along with it.

Note that you cannot press **F1** for help with this menu. Pressing that key
will configure your hot-key to be **Alt-F1**.

To leave this menu without changing the hot-key assignment, press the
Alt key.

8.6.11
Save Graphics RAM

This item is important if you plan to use the Emulator's hot-key feature to
run other PC programs while you are running the Emulator. The Emulator
uses a part of PC memory known as graphics RAM, and graphics RAM
may be needed by the other programs as well.

You must select **Yes** if another program will use graphics RAM while you
are running the Emulator. Otherwise, information on your screen will not
be displayed properly when you use the hot-key.

Select **No** if no other programs will use graphics RAM while you are
running the Emulator.

The documentation that came with your other programs should tell you
whether or not they use graphics RAM. However, if you cannot find this
information, set this option to **No** for now. Then perform the following test
before you connect to the host computer. Run the Emulator, use the
hot-key and start another application. Hot-key back and forth between
the Emulator and the other program and see if the screens display
properly. If so, leave the option set to **No**. If not, change the option to
Yes.

We recommend that you do not specify **Yes** unless necessary, because **Yes** causes the Emulator to use more memory, leaving less available for other applications.

If any of your logical units are configured as 3180 displays, this option will automatically be set to **Yes** because 3180 emulation requires extra memory. If you try to change the setting to **No**, you will see the following message:

```
SAVE GRAPHICS RAM REQUIRED FOR 3180 EMULATION
```

Note to PC Support/38 Users: You must select **Yes** for **Save Graphics RAM**. Failure to do so will produce undesired and unpredictable results.

8.6.12
Automatic Hot-Key

Choose **Yes** if you want the Emulator to automatically go resident at startup. This is the same as starting the Emulator and immediately pressing the hot-key. When you start the Emulator, you will see the DOS screen and the following message:

```
EMULATOR IS RESIDENT
```

Choose **No** if you do not want the Emulator to automatically go resident at startup. When you start the Emulator, you will see the normal startup screen.

Automatic Hot-Key is useful with DOS batch or AUTOEXEC files. It allows you to start the Emulator from a batch file and then automatically return control to DOS to execute the next command in the batch file.

More details on going resident are found in the Hot-Key topic in Chapter 5.

8.6.13
Keyboard Lock

Keyboard Lock lets you automatically lock your keyboard at startup to prevent someone from tampering with your display station or printer while you are away from your desk. If your keyboard is locked, nothing will happen when the keys are pressed and all data will disappear from the

screen. Your keyboard will remain locked until you enter the correct numeric combination to unlock it.

```
U. Unlock Keyboard
1. Roll 1st Digit
2. Roll 2nd Digit
3. Roll 3rd Digit
4. Roll 4th Digit
L. Lock <0000>
```

Select **Unlock Keyboard** or the combination 0000 from this menu if you do not want your keyboard locked at startup.

To lock your keyboard at startup, set any combination except 0000. To set the first digit, select **Roll 1st Digit** and press the **Enter** key or the **1** key repeatedly until you reach the digit you want. You can see the digits changing in the bottom line of the menu. Repeat the same procedure for the 2nd, 3rd and 4th digits.

When you finish setting the combination, select **Lock** to accept your combination. You will need to enter the combination set on this menu when you start the Emulator, so be sure you can remember it.

If you decide later that you do not want your keyboard locked at startup anymore, return to this menu and change your selection to **Unlock Keyboard**. Your keyboard will then be unlocked at startup.

Chapter 5 explains how to lock and unlock your keyboard during emulation.

8.7
Card Addresses

When you select this option you will see the following menu:

```
Restart with Power On ........ Yes/No
Quit with Power Off .......... No/Yes
I/O Port Address (300H-3FFH) .. 368
Memory Address (C000H-FC00H) .. D000
```

8.7.1
Restart with Power On and Quit with Power Off

These two options are used together to control what happens when you stop the Emulator and restart it without turning off your PC in the meantime.

To take advantage of these options, you need to know a little bit about the Emulator's internal workings. The Emulator consists of two parts. One part is the PC code which runs on your PC just like any other application program. The other part is the microcode which runs on the 5250 twinax card. You can think of the 5250 twinax card as another small computer inside your PC.

The microcode handles all communications with the host or 5250 controller. The PC code loads the microcode onto the 5250 twinax card for you and has the ability to stop the microcode. The PC code and microcode pass information back and forth, but otherwise they operate independently.

Once the microcode has been activated, it keeps running until the PC code stops it or until you turn off your PC. Note that rebooting DOS does not stop the microcode.

If you specify **Yes** for **Quit with Power Off**, the 5250 twinax card will be deactivated when you **Quit** the Emulator. Your emulated devices will be "turned off." Communications with the host will end and all data will be erased from your emulated display screens. The station addresses used by your devices will be available for other users.

If you specify **No** for **Quit with Power Off**, the 5250 twinax card will
remain active after you **Quit** the Emulator. Your emulated devices will
remain "turned on." All LU's will continue communicating with the host, in
background mode. Any data that was on your emulated display screens
will be preserved. The host will not be able to write data to your emulated
printers, however, because the PC printer is not available.

If you specify **Yes** for **Restart with Power On**, the 5250 twinax card will
be reset when you start the Emulator. This is like turning a real 5250 off
and back on. Your emulated devices will be reset and all screen data will
be erased.

If you specify **No** for **Restart with Power On**, the 5250 twinax card will
not be reset if it is already active. Your emulated devices will remain
"turned on" and any data on the emulated display screens will be
preserved.

To keep your 5250 twinax card and emulated devices "as is" when you
Quit and restart, you must specify **No** for both options. You can then
continue from where you left off before you **Quit**. Data that was
previously on your emulated display screens will still be there, or you will
see new data if the host has updated the screens since you **Quit**. This
combination is often used when the PC is attached directly to the host or
when the controller is attached to a direct line to the host. With a dial-up
line, if you did not sign off you must maintain your phone connection with
the host after you **Quit**. Otherwise you may be unable to establish a
connection or sign on again, and you will need to have someone at the
host reset the line.

If you specify **Yes** for either option, your 5250 twinax card will be reset,
all your devices will be reset and all screen data will be erased during a
Quit and restart.

Since the 5250 twinax card is always turned off if you **Quit with Power
Off**, it doesn't matter in this case whether you specify **Yes** or **No** for
Restart with Power On.

The combination of **No** for **Quit with Power Off** and **Yes** for **Restart
with Power On** is not normally used.

Note that to use the API with standard applications, you must hot-key
instead of specifying **No** for **Quit with Power Off**.

Hot-key is usually more convenient than quitting and restarting. Also, with hot-key you can continue to print on LU printers and you can use standard applications with the API. The **Power Off** and **Power On** options are provided for circumstances where the hot-key cannot be used or for other special situations. For example, you may want to start applications while the Emulator is running and then keep the applications running after you terminate the Emulator, but if you used hot-key the applications would be terminated when you **Quit** the Emulator. Or there may not be enough memory available for you to run your other applications with the Emulator resident.

No matter what choices you make for these options, all PC memory used by the Emulator is freed when you **Quit**.

8.7.2
I/O Port Address

When you select this option you will see the following window:

```
Enter new value in hex:
```

This setting must match the I/O port address used by the 5250 twinax card in your PC. If your card has just been installed for use with MC5250PC, the I/O port address it uses should match the default setting.

8.7.3
Memory Address

When you select this option you will see the following window:

```
Enter new value in hex:
```

This setting must match the memory address used by the 5250 twinax card in your PC. Valid memory addresses are C000, C800, D000, D800, E000 and E800. If your card has just been installed for use with MC5250PC, the memory address it uses should match the default setting.

MC5250PC can emulate up to a total of seven IBM displays and printers at once. These emulated devices are called logical units or LU's. The host computer does not know that the LU's are not real devices. It simply identifies each one by a number called a station address.

The **Logical Units** menu lets you set up the LU's that you want to use and the 5250 devices you want to emulate. You must discuss this setup with someone at the host system. To be able to communicate, the way your LU's are set up and the way the host is set up must match. If you have not yet obtained the host-dependent information listed on the Worksheet, please do so before continuing.

```
┌─────────────────────────────────────────────────────────┐
│  ┌─ LU #1 ─┐                                             │
│  │          │      Select Logical Unit                   │
│  │  5251    │                                            │
│  │   S0     │      Configuration: YOURFILE               │
│  │  IBMAPI  │                                            │
│  └──────────┘                                            │
│                                                          │
│  ┌─ LU #2 ─┐    ┌─ LU #3 ─┐    ┌─ LU #4 ─┐               │
│  │          │    │          │    │          │             │
│  │          │    │          │    │          │             │
│  │          │    │          │    │          │             │
│  └──────────┘    └──────────┘    └──────────┘             │
│                                                          │
│  ┌─ LU #5 ─┐    ┌─ LU #6 ─┐    ┌─ LU #7 ─┐               │
│  │          │    │          │    │          │             │
│  │          │    │          │    │          │             │
│  │          │    │          │    │          │             │
│  └──────────┘    └──────────┘    └──────────┘             │
└─────────────────────────────────────────────────────────┘
```

In this menu you see seven LU boxes. Each box contains some information about how that LU is currently configured. An unconfigured LU will be blank. Select the LU you want to configure by using the arrow keys or by typing the LU number (1-7). You do not have to use all seven LU's, but they are available if you need them. The double border indicates the LU you are currently configuring.

8.8.1
Device Selection

You must specify the type of 5250 device that each of your LU's is going to emulate. When you select one of the LU's on the **Logical Units** menu, you will see the following list of display and printer models:

```
A. 5251 Display
B. 5291 Display
C. 5292 Color
D. 5292 Graphics
E. 3180 Display
F. 3196 Display
G. 3812/5219 Printer
H. 5224 Printer
I. 5225 Printer
J. 5256 Printer
K. No Device
```

If you select a display model, you will then see the menus needed to configure a display. If you select a printer, you will see the menus needed to configure a printer.

If you select **No Device**, you will go back to the **Logical Units** menu. Select **No Device** for the LU's which you aren't going to use. Note that if you are configuring LU #1, the **No Device** option is not displayed on the menu.

Due to the extra memory required for 3180 and 5292 graphics emulation, selecting **3180 Display** or **5292 Graphics** from the device selection menu will take up two LU positions instead of one. There will always be one blank LU box (starting from LU #7 backward) for each **3180 Display** and **5292 Graphics** display you configure.

You can never configure LU #7 as a **3180 Display** or as a **5292 Graphics** display. Also, you can never configure more than three 3180 devices at one time. If you try to do so, you will see the following message:

```
UNABLE TO DEFINE 3180 OR 5292 GRAPHICS DISPLAY
```

Finally, you can never configure more than one 5292 graphics device at one time. If you try to do so, you will see the following message:

```
UNABLE TO DEFINE MORE THAN ONE
     5292 GRAPHICS DISPLAY
```

8.9
Configuring a Display

These items affect the display station you will be emulating. The display model is noted at the top of the menu.

```
┌─ 52xx Display ═══════════╗
│                          ║
│ Status Line Attribute    ║
│ Logical Unit Address     ║
│ Display Options          ║
│ Field Attributes         ║
│ EBCDIC to ASCII          ║
│ Keyboard Layout          ║
└──────────────────────────╝
```

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8.9.1
Status Line Attribute

You use this option to choose the way you want the status line at the
bottom of each LU screen to look. You can select the appearance which
you find most pleasing.

When you select this option you will see the PC Attributes Table:

```
┌────────────────────────────────────────────────────────────────────┐
│                    Select  PC  Attribute                           │
│                                                                     │
│          01    02    03    04    05    06    07                    │
│    10    11    12    13    14    15    16    17                    │
│    20    21    22    23    24    25    26    27                    │
│    30    31    32    33    34    35    36    37                    │
│    40    41    42    43    44    45    46    47                    │
│    50    51    52    53    54    55    56    57                    │
│    60    61    62    63    64    65    66    67                    │
│ → 70 ← 71    72    73    74    75    76    77                      │
│                                                                     │
│        F2  70        F4  F0        F6  78        F8  F8            │
└────────────────────────────────────────────────────────────────────┘
```

You should make your choices based on the appearance of the various
blocks on this menu. You can ignore the numbers on this menu when you
are choosing the appearance. (These numbers are the hexadecimal
representations of the attribute characters that produce the visual
appearance of each block.)

This menu lets you select various combinations of high intensity or low
intensity, reverse video or normal video and blinking or non-blinking. On
a color monitor you can also select various background and foreground
colors. Use your arrow keys to select the block that most closely
resembles the way you want your status line to look.

Note the four blocks at the bottom of the menu change in appearance as you move the indicator arrows around in the table. Each of these blocks is some variation of the block pointed to by the indicator arrows. To select the variation you want and exit from this menu, press the corresponding function key:

F2	Normal
F4	Blinking
F6	Bold
F8	Blinking Bold

8.9.2
Logical Unit Address

When you select this option you will see the following menu:

```
Primary Station Address . 0
Alternate Addresses ..... None
```

The host or controller identifies each device on a twinaxial cable by a station address in the range 0 through 6. Each real or emulated device on the same cable must use a unique station address. Therefore no more than seven devices can operate at the same time on one cable, even though more than seven devices may be present. Your host contact will assign station addresses for the devices you are going to emulate.

Be sure not to confuse station addresses with LU numbers. The host or controller identifies devices according to station addresses. LU numbers, on the other hand, are for your reference and the Emulator's use. LU numbers have no meaning to the host or controller.

The LU numbers and the station addresses assigned to your emulated devices do not have to match. This means you can run the Emulator with LU #1 configured to use any available station address, not just station address 1.

Likewise, several PCs on the same twinaxial cable can run the Emulator from the same LU number as long as each one uses a different station address. One user can configure LU #1 to use station address 0, another user can configure LU #1 to use station address 1, and a third user can configure LU #1 to use station address 2. All three can run the Emulator successfully, using LU #1 with unique station addresses.

8.9.2.1
Primary Station Address

When you select this option you will see the following table:

```
┌─────────────────────────────────┐
│ ┌─────────────────────────────┐ │
│ │  Select Station Address     │ │
│ │                             │ │
│ │  →0←1   2   3   4   5   6    │ │
│ └─────────────────────────────┘ │
└─────────────────────────────────┘
```

Select the station address to be used by this LU.

Your host contact will assign station addresses to your 5250 devices instead of your LU's. Be sure to match up your device types and station addresses. For example, suppose you are emulating three devices, one of which is a 5256 printer. If your host contact says your 5256 printer has station address 3, then you must configure station address **3** for whichever LU you configure to be the 5256 printer. Also see the description of alternate station addresses below.

Note that you must configure a different primary station address for each of your LU's. If you configure more than one LU to use the same primary station address, you will see this message when you try to leave the **Logical Units** menu:

```
MULTIPLE DEVICES ARE USING THE SAME ADDRESS
```

You must specify a **Primary Station Address**. **Alternate Addresses** are optional.

8.9.2.2
Alternate Addresses

When you select this option you will see the following menu:

```
Select Alternate Addresses

      P . . . . . .

   0-6 Alternate ON/OFF
```
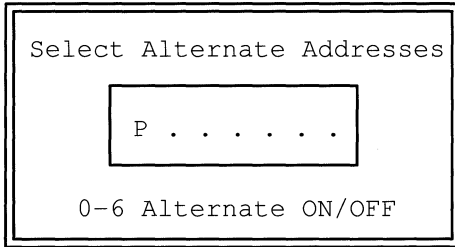
You use this menu to provide alternate station addresses for the
Emulator to use if the primary station address is already being used by
another device (real or emulated).

The primary station address is marked by a P on this menu. Pressing the
number keys **0** through **6** will toggle the corresponding alternate
addresses on and off.

At startup, the Emulator will first try to assign the primary station address.
If the primary address is already in use, the Emulator will check each of
the specified alternates and assign the first available address it finds. The
assigned station address appears on the status line of each LU during
emulation.

If neither the primary address nor any of the specified alternates is
available at startup, you will see the message *** ATTENTION *** LU
#n: UNAVAILABLE. During emulation, operation is the same as if that
LU had been configured as **No Device**.

Be sure the alternate addresses you specify have been configured on the
host system for the device type you are emulating.

8.9.3
Display Options

When you select this option you will see another menu:

```
IBM API Compatibility .. Yes/No
Virtual Disk ........... No/A/B
```

8.9.3.1
IBM API Compatibility

MC5250PC supports an Application Program Interface (API) according to IBM's 5250 specifications as documented in Appendix C of this manual. This feature allows you to run PC application programs which communicate to the host through the Emulator.

Select **Yes** if you want to use the API with this LU. Select **No** if you don't.

Note that LU #1 automatically defaults to **Yes** for this option. The remaining LU's use **No** as their default setting.

Note to PC Support Users: You **must** select Yes for **IBM API Compatibility**.

See Chapter 5 and Appendix C for more information on the API.

8.9.3.2
Virtual Disk

This option toggles among three choices: **A**, **B** or **No**.

IBM's midrange system software includes a virtual disk feature which lets you use host disk space as though it were a disk on your PC. Chapter 5 explains how to use virtual disk.

To be able to use virtual disk, you must first select either drive **A** or drive **B** as the virtual drive. If your PC has only one floppy drive and no hard disk, select **B**.* If your PC has one floppy drive and a hard disk, select **A**. If your PC has two or more floppy drives (with or without a hard disk), you may choose either **A** or **B** according to your preference.

If you will not be using virtual disk, specify **No**.

---

*NOTE: In this case you must also set your PC to support drive B. Usually this is done by setting switches inside the PC. Refer to your PC hardware manual for specific instructions. After you make this change to your PC, you will not be able to perform floppy-to-floppy copy operations on your PC.

8.9.4
Field Attributes

The 5250 to PC Attribute Translation Table lets you change the appearance of your emulated 5250 display screen.

```
5251 [20]     5251 to PC Attribute Translation Table     PC [07]

→ Normal      ← Blink         Normal/CSEP      Blink/CSEP

  Reverse       Reverse         Reverse          Reverse

  Intensity     Intensity       Intensity        Intensity

  INT/Reverse   INT/Reverse     INT/Reverse      INT/Reverse

  Underscore    Underscore      Underscore       Underscore

  UNDS/Reverse  UNDS/Reverse    UNDS/Reverse     UNDS/Reverse

  UNDS/Intens   UNDS/Intens     UNDS/Intens      UNDS/Intens
```

The **words** inside each box describe the fields on a real 5250 display. The **appearance** of each box shows how these fields are currently configured to appear on your PC when you emulate a 5250. In the default configuration, the appearance is set to match the description. For example, fields labeled as Blink do in fact blink. (In other words, fields on your emulated display station will look the same as fields on a real

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display station. For example, fields that would blink if you were using a real display station will also blink on your PC.) See Appendix A for a complete description of 5250 attributes. Note that the bottom line of the table corresponds to nondisplay fields on a 5250.

There are two forms of the **Field Attributes** menu. The form you see depends on the option you selected for **Monitor**. If you specified **Monochrome Monitor with Monochrome Adapter**, **Monochrome Monitor with Color Adapter** or **Special Monitor and Adapter (Monochrome)**, you will see the monochrome form. The field descriptions will correspond to a 5250 monochrome display and the appearances will use monochrome PC attributes. If you specified **Color Monitor with Color Adapter** or **Special Monitor and Adapter**, the descriptions will be for a 5250 seven-color display and the appearances will use color PC attributes.

To change the appearance of a particular kind of field, use the arrow keys to select the **description** of the field you want and press the **Enter** key. Then select the **appearance** you want from the PC Attributes Table. The PC Attributes Table is explained under **Status Line Attribute** earlier in this chapter.

After you come back from the PC Attributes Table, the box you selected on the 5250 to PC Attribute Translation Table will retain its old label but have the new appearance you selected. For example, a box labeled Blink may now be non-blinking or a box labeled Red may actually be blue, and these fields on your emulated 5250 screen will appear as non-blinking and blue.

8.9.5
EBCDIC to ASCII

IBM midrange computers and 5250 devices use the EBCDIC character set. This means that hexadecimal numbers in a host are assigned to represent characters according to the rules of EBCDIC. PC's, however, use the ASCII character set. Therefore, the same hexadecimal numbers may represent different characters on a PC. EBCDIC data received from the host by your emulated devices is translated to ASCII so it can be displayed on your PC screen or printer.

This option allows you to change the translation of any character. Any changes you make here will affect all of your LU's and not just the LU you are currently configuring. The default translation table supplied with the Emulator will work for most situations and should be changed only for special circumstances.

You might want to change the translation if:

• You are using special graphics characters.

• You want to substitute displayable characters for 5250 control characters.

• Your PC printer does not support some of the characters in the IBM extended character set and you want the screen to show the same characters that will be printed.

• You are creating a translation table for a language which is not listed on the **National Language** menu.

Note that EBCDIC values 20 through 3F are the 5250 field attributes. The Configuration Editor will not let you change their translation.

All characters with a translation of FF are displayed as spaces by the Emulator.

When you select this option the following translation table will appear:

```
        EBCDIC to ASCII Translation Table      [00]

      0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F

 0   ←  ▶           &  ─  Ø  Ø  '  μ  ¢  {  }  \  ()
 1   ☺  ◀           é  /  E  a  j  ~  £  A  J     1
 2   ☻  ↕        ä  ê  å  ê  b  k  s  ≠  B  K  S  2
 3   ♥  ‼        ä  ë  Ä  ë  c  l  t  R  C  L  T  3
 4   ♦  ¶        à  è  à  è  d  m  u  f  D  M  U  4
 5   ♣  §        å  í  å  í  e  n  v  s  E  N  V  5
 6   ♠  ─        æ  î  æ  î  f  o  w  ¶  F  O  W  6
 7   •  ↕        å  ï  Å  ï  g  p  x  ¼  G  P  X  7
 8   ◘  ↑        ç  ì  ç  ì  h  q  y  ½  H  Q  Y  8
 9   ○  ↓        ñ  β  ñ  `  i  r  z     I  R  Z  9
 A   ◙  →        ¢  !  ¦  :  «  a  ¡  ¬  ─  ˜  ²  ³
 B   ♂  ←        .  ¤  ,  #  »  o  ¿  |  ö  û  ö  û
 C   ♀  *        <  *  %  @  δ  æ  Ð  ~  ö  ü  Ö  ü
 D   ♪  ↔        (  )  _  '  ≤  J  †  ß  ò  ù  ò  ù
 E   ♫  _        +  ;  >  =  ¥  Æ  ¥  '  ó  ú  ó  ú
 F   ☼  ■        |  ¬  ?  "  ±  ¤  @  _  ○  ÿ  O

   F2 ASCII/HEX    F4 Enter Hex    ◄┘ Select Character
```

The hex digits along the top and left side of the table refer to the EBCDIC characters. The characters in the table represent the current ASCII translations.

Each position in the table corresponds to an EBCDIC character. One position is marked with an arrow, and the hex value of the EBCDIC character is shown in the upper right corner of the menu. The character shown in the position marked with the arrow is the ASCII translation.

The **F2** key lets you look at this table in either of two formats. **F2** toggles between a table of characters and a table of hex values. The first format shows you what the ASCII characters will look like on your screen. The second format shows you their hex representations.

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```
                EBCDIC to ASCII Translation Table        [00]

        0   1   2   3   4   5   6   7   8   9   A   B   C   D   E   F

0      FF  10  FF  FF  20  26  2D  ED  ED  F8  E6  9B  7B  7D  5C  30
1      01  11  FF  FF  FF  82  2F  90  61  6A  7E  9C  41  4A  FF  31
2      02  12  FF  FF  83  88  83  88  62  6B  73  9D  42  4B  53  32
3      03  13  FF  FF  84  89  8E  89  63  6C  74  9E  43  4C  54  33
4      04  14  FF  FF  85  8A  85  8A  64  6D  75  9F  44  4D  55  34
5      05  15  FF  FF  A0  A1  A0  A1  65  6E  76  15  45  4E  56  35
6      06  16  FF  FF  61  8C  61  8C  66  6F  77  14  46  4F  57  36
7      07  17  FF  FF  86  8B  8F  8B  67  70  78  AC  47  50  58  37
8      08  18  FF  FF  87  8D  80  8D  68  71  79  AB  48  51  59  38
9      09  19  FF  FF  A4  E1  A5  60  69  72  7A  FF  49  52  5A  39
A      0A  1A  FF  FF  9B  21  7C  3A  AE  A6  AD  AA  2D  F2  FD  33
B      0B  1B  FF  FF  2E  24  2C  23  AF  A7  A8  B3  93  96  93  96
C      0C  1C  FF  FF  3C  2A  25  40  EB  91  44  F7  94  81  99  9A
D      0D  1D  FF  FF  28  29  5F  27  F3  F5  18  EC  95  97  95  97
E      0E  1E  FF  FF  2B  3B  3E  3D  E8  92  E8  27  A2  A3  A2  A3
F      0F  1F  FF  FF  B3  AA  3F  22  F1  0F  01  5F  6F  98  4F  FF

       F2 ASCII/HEX     F4 Enter Hex     ↵ Select Character
```

In the character table, an arrow points to the currently selected position. In the hex table, the value in the currently selected position is highlighted. With either form, use your arrow keys to select the position corresponding to the EBCDIC character whose translation you want to change.

Then either:

Press **F4**, type the new ASCII hex value over the current value and press **Enter**.

or:

Press **Enter** to see the following table of ASCII characters. Select the
character you want as described under **5250 Column Separator**
earlier in this chapter. (Use your arrow keys, type the character on
your keyboard or hold down **Alt** and type the decimal value on the
numeric keypad.) Then press **Enter** again.

Select ASCII Character [FF]

8.9.6
Keyboard Layout

This option lets you reconfigure which PC keys emulate which 5250 keys. **The key definitions you set here apply to all of your LU's, not just the LU under which you configure them**. See Chapter 4 for a list of 5250 keys and their standard functions.

NOTE: Changing your **Type of Keyboard** or **National Language** selection under **PC/User Interface** resets key definitions. Be sure to choose the appropriate keyboard type and language file before setting up any key definitions in this section.

When you select **Keyboard Layout**, the first menu you see asks which layout, 5250 or PC, you want to configure.

```
A.  User Configured 5250

B.  User Configured PC

C.  Default 5250

D.  Default PC
```

A 5250 keyboard has some keys not on a PC keyboard. The Emulator allows you to use keys that are on your PC to perform the same functions as the real 5250 keys. Select the way you want your keyboard to work when you are actually emulating a 5250 display. Your selection does not apply when you are working with menus.

If you are familiar with the 5250 keyboard and you are accustomed to touch typing, you may prefer 5250 keyboard layout. With this layout, each key on your PC keyboard, regardless of its label, functions the same as the key in the same position on a 5250 keyboard.

If you are not familiar with the 5250 keyboard, you will probably find PC keyboard layout more convenient. With PC layout:

- Keys common to both the PC and the 5250 function as labeled on the PC (**A, B, 1, 2, Shift**, etc.).

- Other PC keys are assigned to represent those 5250 keys not present on the PC keyboard (FIELD +, ERROR RESET, etc.).

Select one of the **Default** layouts if you want to use the default key definitions that are already set for your use in the Emulator. You will return to the previous menu with no need for further keyboard layout configuration.

Select one of the **User Configured** layouts if you want to change one or more of the default key definitions. You will then see this menu:

```
Edit
Create
Select
Delete
```

This menu works much the same as the menu you saw when you started the Configuration Editor, but it affects keyboard layout files rather than configuration files.

8.9.6.1
Edit

Edit makes changes to an existing keyboard layout file. The first menu you will see is a list of all existing keyboard layout files for the type of keyboard and layout you selected. Select the file you want to edit.

8.9.6.2
Create

Create makes a whole new keyboard layout file. You will be asked to name your new file:

```
Enter keyboard file name: _____
```

Enter a valid filename that will help you identify the file easily. Use a different filename for each file you create. The program will automatically assign the extension .KBD to label your new file as a keyboard layout file. Do not enter an extension when you enter the filename.

8.9.6.3
Select

Select chooses an existing user-configured keyboard layout file for use unchanged. The first menu you will see is a list of all existing keyboard layout files for the type of keyboard and layout you selected. Select the file you want to use. You will return to the previous menu with no need for further keyboard layout configuration.

8.9.6.4
Delete

Delete erases an entire keyboard layout file. You should never delete a file unless you are absolutely sure you will not need it again. You cannot delete the default keyboard layout files PC.KBD and 5250.KBD.

When the listing of all existing files appears, select the file you want to delete. The following menu will then appear:

```
Yes
No
```

This feature prevents you from deleting a file accidentally. Select **Yes** to delete the file or **No** to save it.

8.9.6.5
Editing/Creating a Keyboard Layout File

After you select a keyboard layout file to edit or create, a menu resembling your keyboard will appear, similar to the one shown below. This menu lets you redefine the PC keys that emulate the keys found on real 5250 devices.

```
                    5250 Keyboard Scan Codes

  ┌──────┬──────────────────────────────────────────────────────────┐
  │7C 6F │ 3E 31 32 33 34 35 36 37 38 39 3A 3B 3C   3D    4B    4C   │
  │6C 6D │ 20  21 22 23 24 25 26 27 28 29 2A 2B 2C  2D 47 48 49 4E   │
  │6E 7D │ 54  11 12 13 14 15 16 17 18 19 1A 1B 1C     44 45 46      │
  │71 70 │ 57  0E 01 02 03 04 05 06 07 08 09 0A  56  0C 41 42 43 4D  │
  │72 73 │ 7E           0F                 68   40   4A              │
  └──────┴──────────────────────────────────────────────────────────┘

    KEY Enter 5250 Scan Code          ESC Press Twice to Leave Menu
```

This menu shows the scan code which is currently generated by each PC key during emulation.

Press **Esc** twice when you want to leave this menu.

Note that in many cases the sequence **Ctrl-Alt-Del** restarts the PC operating system. Therefore, you should never try to define this keystroke sequence as a 5250 key.

Press a PC key you want to redefine and you will see another menu to let you select the 5250 key(s) that you want this PC key to represent.

```
                    5250 Key Scan Codes

       Key                                            Scan
    Combination              Description              Code
   ================================================================

    Unshifted             |                             nnn

    Shifted               |                             nnn

    W Alt                 |                             nnn

    W Alt Graphic         |                             nnn

   ================================================================

     ESC - Exit   ENTER - Choose Scan Code To Change
```

This menu shows the current definitions for the PC key you pressed. The
left column shows PC key combinations; the middle column describes
5250 characters and functions produced by the PC keys; the right column
shows the scan codes generated to produce those 5250 characters and
functions.

NOTE: Alt Graphic in the left column always refers to the right **Alt** key on
an enhanced-101 keyboard. Use the **Ctrl** key for Alt Graphic on a
non-enhanced keyboard in PC layout. Use **Alt-Ctrl** for Alt Graphic on a
non-enhanced keyboard in 5250 layout.

Use your arrow keys to move the highlight to the definition that you want
to redefine. Then press **Enter**.

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You will see a menu similar to the one shown below. (The specific content of this menu varies according to your **National Language** selection.)

```
                    Scan Codes

                                    Scan
            Description              Code
= = = = = = = = = = = = = = = = = = = = = = = = = =
Edit Scan Code                       FFF
Unassigned                           000
z                                    001
x                                    002
c                                    003
v                                    004
b                                    005
n                                    006
m                                    007
, Comma                              008
. Period                             009
/ Slash                              00A
New Line                             00C
< Less Than                          00E
= = = = = = = = = = = = = = = = = = = = = MORE ↓
     ESC - Exit   ENTER - Choose
```

The left column in this menu shows 5250 key characters and functions. The right column shows the scan code that is generated for each character or function.

If you know the scan code for the 5250 key you want to define, select **Edit Scan Code** from the top of this menu. You will then see the following window:

```
┌─────────────────────────────────────┐
│                                      │
│    Enter new value in hex:           │
│                                      │
└─────────────────────────────────────┘
```

Enter the scan code you want to use. You will then return to the previous menu, with the edited description and scan code shown.

If you want to remove an existing key definition, select **Unassigned** from this menu. You will then return to the previous menu, with the key definition unassigned.

If you don't know the scan code for the 5250 key you want to define, use the arrow keys to scroll through the list. Information for 14 scan codes is shown in this window at once, and you can use **PgUp** and **PgDn** to see other scan codes. Press **Home** to move to the beginning of the list. Press **End** to move to the end of the list. Move the highlight to the 5250 key you want to define and press **Enter** to select it. You will then return to the previous menu, with the description and scan code you selected shown.

Be sure that you have a definition assigned for every 5250 key. Otherwise, you will not be able to use all of the 5250 keys during emulation.

8.10
Configuring a Printer

You must give the Emulator the information it needs to make your PC printer emulate a 5250 printer. The printer model you are configuring is noted at the top of the first menu.

```
┌─ 52xx Printer ════════════╗
│ ┌────────────────────────┐ ║
│ │ Status Line Attribute  │ ║
│ │ Logical Unit Address   │ ║
│ │ DOS Printer Device     │ ║
│ │ Type of PC Printer     │ ║
│ │ Printer Options        │ ║
│ │ Configure PC Printer   │ ║
│ └────────────────────────┘ ║
└───────────────────────────╝
```

8.10.1
Status Line Attribute

This option works the same as **Status Line Attribute** for configuring a display.

8.10.2
Logical Unit Address

This option works the same as **Logical Unit Address** for configuring a display.

8.10.3
DOS Printer Device

This option displays a list of device names:

```
┌──────────┐
│ A. LPT1  │
│ B. LPT2  │
│ C. LPT3  │
│ D. COM1  │
│ E. COM2  │
└──────────┘
```

Select the device name that was assigned to your printer when it was installed on your PC system.

LPT1 is the common assignment for a standard IBM PC parallel printer on a standard PC. Some printers require different assignments depending on how the printer is connected, which PC port the printer is plugged into or the way other hardware or software is set up in your PC system. See your printer manual, PC manual and DOS manual for more information.

Note that if you want to print with more than one printer LU at the same time, you must select a different **DOS Printer Device** for each one. You can assign the same device for more than one LU only if you do not actually print on more than one of those LU's at a time.

If you select **COM1** or **COM2** as the device name assigned to your printer, you will see another menu with the device you selected noted at the top:

```
┌─ COMn ════════════════════╗
║                           ║
║  Initialize  ... No/Yes   ║
║                           ║
║  Baud Rate   .... 4800    ║
║                           ║
║  Parity  ....... Odd      ║
║                           ║
║  Stop Bits  .... 1/2      ║
║                           ║
║  Word Length  .. 7/8 bits ║
╚═══════════════════════════╝
```

The items on this menu affect serial printers specifically.

8.10.3.1
Initialize

If you use your serial printer with an application other than the Emulator (a word processing program, for example), your serial port may be set up through commands in your AUTOEXEC startup batch file. In that case, the Emulator can use the serial port as is without further configuration. The **Initialize** option lets you tell the Emulator whether or not to set up your serial port.

Select **Yes** if your serial printer is not already set up for another application. The Emulator will then use your settings for the other options on this menu to configure your serial port.

Select **No** if your serial printer is already set up for another application. Your settings for the other options on this menu then are not used.

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8.10.3.2
Baud Rate

When you select **Baud Rate** you will see this menu:

```
A.  110
B.  150
C.  300
D.  600
E.  1200
F.  2400
G.  4800
H.  9600
```

Select the baud rate (speed) of the communications between your PC
and this printer device. The baud rate you select must be that used by
your PC and printer. See your printer manual for help in determining the
baud rate used.

8.10.3.3
Parity

The protocol your serial printer uses may involve internal parity checks
on data being transferred. The Emulator needs to know if your printer
performs parity checks. If so, the Emulator needs to know if it checks for
odd or even parity.

When you select **Parity** you will see the following menu:

```
Odd
None
Even
```

Select **Odd** if your printer checks odd parity, or **Even** if your printer checks even parity. Select **None** if your printer does not check parity. See your printer manual for help in determining the correct setting.

8.10.3.4
Stop Bits

A stop bit is a signal that an entire byte of data has been transmitted. Your printer expects either 1 or 2 as a stop bit, and the Emulator needs to know which so it can transmit the correct one.

Select either **1** or **2** for **Stop Bits**. See your printer manual for help in determining which stop bit your printer expects.

8.10.3.5
Word Length

A word is a unit of data measurement. Your serial printer expects words to be transmitted in streams of 7 or 8 bits, and the Emulator needs to know which so it can use the correct length.

Select either **7** or **8** bits for **Word Length**. See your printer manual for help in determining which word length your printer expects.

8.10.4
Type of PC Printer

Many different types of printers can be used with PC's. You must describe the PC printer you are using to the Emulator.

You can do this either by using the **Type of PC Printer** option to read the information from an existing file or by using the **Configure PC Printer** option to enter this information into configuration menus.

When you select **Type of PC Printer** you will see a list of the existing printer files. These are files with a filename extension of .PRT, but the extension is not displayed on the menu. Files are supplied for several common types of printers. If there is an existing file for the printer you have, select the filename that corresponds to it by highlighting that name and pressing **Enter**. If there is no existing file for the printer you have, enter the required information on the following menus.

An **Other** option also will be at the end of the printer files list. If **Other** is
highlighted, it probably means that you have not yet made a selection for
Type of PC Printer. **Other** also can mean that a printer file was
previously selected, but now is not available on the current drive. The
configuration file still contains the printer commands from that file.

8.10.5
Printer Options

When you select this option you will see another menu:

```
A. IBM API Compatibility  .......  No/Yes
B. Translate Transparent Data  ..  Yes/No
C. Online After Initialization  .  Yes/No
D. Busy Time-out (seconds)  .....  10
E. Characters per Time Slice  ...  20
F. Form Feed - Enable  .........  No/Yes
G. Select Signal - Disable  .....  No/Yes
H. Paper Out Signal - Disable  ..  No/Yes
I. Error Signal - Disable  ......  No/Yes
J. DOS Time-out (seconds)  ......  None
K. Host Time-out (seconds)  .....  None
L. DOS Busy Option  ............  Error/Hold
```

8.10.5.1
IBM API Compatibility

This option works the same as **IBM API Compatibility** for configuring a
display.

8.10.5.2
Translate Transparent Data

Transparent data consists of control code sequences from the host, which the Emulator normally translates as they are received. The **Translate Transparent Data** option lets you disable that translation so a host application can send control codes directly to your PC printer. This lets the Emulator ignore your normal printer configuration settings and give direct control of the current print job to the host.

Select **No** for this option if you want host control sequences to go directly to your PC printer without translation. Otherwise, select **Yes**.

8.10.5.3
Online After Initialization

This option determines the status of this printer LU when you start the Emulator. If you select **Yes** for **Online After Initialization**, this printer LU will be online to the host system at startup. If you select **No**, this printer LU will be unavailable to the host at startup.

8.10.5.4
Busy Time-out

While the host is printing data on the PC printer, the Emulator polls the printer to determine its status. The **Busy Time-out** option specifies how long the Emulator will wait for a response from the PC printer before notifying the host that a timeout error has occurred on the emulated 5250 printer.

Press **Enter** repeatedly to scroll through the timeout values available: **5** seconds, **10** seconds, **15** seconds, **20** seconds, **60** seconds (1 minute), **90** seconds (1.5 minutes), **120** seconds (2 minutes), **180** seconds (3 minutes), **240** seconds (4 minutes), and **None**. The default setting is **10** seconds.

The time you select will be the number of seconds the Emulator waits before notifying the host that the emulated 5250 printer is busy.

You should specify a time which allows normal printing and error recovery without degrading the printer speed. You may need to experiment to find the value which gives optimum performance for your system.

8.10.5.5
Characters per Time Slice

This option is useful for fine tuning your system's performance while you are using the Emulator to print in background mode.

When you select **Characters per Time Slice** you will see the following window:

```
┌────────────────────────────────────────────────┐
│┌──────────────────────────────────────────────┐│
││   Enter new value in decimal:                ││
│└──────────────────────────────────────────────┘│
└────────────────────────────────────────────────┘
```

You can enter any decimal value up to 255. This will be the number of characters the Emulator sends to your printer during each time period allocated to the Emulator while it is running in the background.

Configuring a large number of characters per time slice will slow the foreground program while enhancing the background printing speed. A lower number will slow the background printing while the foreground program runs at more or less normal speed.

8.10.5.6
Form Feed - Enable

Form Feed - Enable resolves a problem with certain applications that do not start printing at the appropriate location at the top of each form. If you experience this problem, select **Yes** for this option. Doing so should ensure that your forms line up correctly.

8.10.5.7
Select Signal - Disable

If your parallel or serial printer sends unexpected select signals to the Emulator, you may see irrelevant printer ATTENTION messages for DEVICE errors. Disabling the select signal on your printer should

eliminate those messages. Select **Yes** to disable this signal if a Support Technician instructs you to do so.

8.10.5.8
Paper Out Signal - Disable

If your parallel printer sends unexpected paper out signals to the Emulator, you may see irrelevant printer ATTENTION messages for FORMS errors. Disabling the paper out signal on your printer should eliminate those messages. Select **Yes** to disable this signal if a Support Technician instructs you to do so.

8.10.5.9
Error Signal - Disable

If your parallel printer sends unexpected I/O error signals to the Emulator, you may see irrelevant printer ATTENTION messages for FORMS errors. Disabling the I/O error signal on your printer should eliminate those messages. Select **Yes** to disable this signal if a Support Technician instructs you to do so.

8.10.5.10
DOS Time-out

Host applications and DOS applications may share your PC printer. If so, you can set timeout values to avoid conflicts between host print jobs and DOS print jobs.

The **DOS Time-out** option specifies how long the host will wait for a DOS application to use the PC printer before assuming that DOS isn't currently printing.

Press **Enter** repeatedly to scroll through the timeout values available: **5** seconds, **10** seconds, **15** seconds, **20** seconds, **60** seconds (1 minute), **90** seconds (1.5 minutes), **120** seconds (2 minutes), **180** seconds (3 minutes), **240** seconds (4 minutes) and **None**.

The time you select will be the number of seconds the host waits for DOS before using the emulated 5250 printer. Suppose you select **15** seconds. When the host wants to print it will first wait 15 seconds for DOS to print. If DOS doesn't print within 15 seconds, the host will start printing.

The default setting is **None**, which means the host will start printing immediately without waiting for DOS. This setting is satisfactory when the host is not sharing the PC printer with DOS applications.

Some DOS applications require longer timeouts than others. If you have problems with the host printing in the middle of DOS print jobs, select a longer **DOS Time-out** value. You may need to experiment to find the value which gives optimum performance for your applications.

Also see the following explanation of the **Host Time-out** option.

8.10.5.11
Host Time-out

DOS applications and host applications may share your PC printer. If so, you can set timeout values to avoid conflicts between DOS print jobs and host print jobs.

The **Host Time-out** option specifies how long DOS will wait for a host application to use the emulated 5250 printer before assuming that the host isn't currently printing.

Press **Enter** repeatedly to scroll through the timeout values available: **5** seconds, **10** seconds, **15** seconds, **20** seconds, 60 seconds (1 minute), **90** seconds (1.5 minutes), **120** seconds (2 minutes), **180** seconds (3 minutes), **240** seconds (4 minutes) and **None**.

The time you select will be the number of seconds DOS waits for the host before using the PC printer. Suppose you select **15** seconds. When DOS wants to print it will first wait 15 seconds for the host to print. If the host doesn't print within 15 seconds, DOS will start printing.

The default setting is **None**, which means DOS will start printing immediately without waiting for the host.

If you have problems with DOS printing in the middle of host print jobs, select a longer **Host Time-out** value. You may need to experiment to find the value which gives optimum performance for your applications.

Also see the preceding explanation of the **DOS Time-out** option and the following explanation of the **DOS Busy Option**.

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8.10.5.12
DOS Busy Option

The **DOS Busy Option** determines what DOS does if the host is already printing when a DOS application wants to print.

Select **Hold** if you want DOS to hold (queue) the DOS print job until the host finishes printing. This setting is most useful with DOS batch applications.

Select **Error** if you want DOS to cancel the DOS print job and send a printer error to the DOS application. This setting is most useful with DOS interactive applications.

8.10.6
Configure PC Printer

This menu lets you define the PC printer control information. It also lets you write this information to a printer file so that later you can read it into other configuration files by using the **Type of PC Printer** option described above.

```
Initialization Command
Transparent Command
Character Density Commands
Line Density Commands
Advanced Printer Commands
PC Printer Character Set
EBCDIC to ASCII
Natinal Variations
Save PC Printer File
```

See your printer manual for technical information about the control codes used by your printer. These codes may also be referred to as escape sequences.

8.10.6.1
Initialization Command

The purpose of the initialization command is to let your printer start over with certain specific operational settings. For example, on sophisticated printers you can select a particular ribbon or type font. You can also include the control codes for any additional initial settings you want.

The Emulator will send the initialization command to your PC printer at startup, when you reset your printer and when the host sends a printer reset command.

At these three times, the Emulator will automatically set your emulated printer to the values that a midrange system expects after reset. These are 6 lines per inch, 1 line per page, 10 characters per inch and 132 characters per line. To accomplish this printer reset, the Emulator performs three steps: first the initialization command is sent, and then the Emulator will send the control codes which you configure for 6 LPI and 10 CPI on the **Density Commands** menus.

When you select **Initialization Command** you will see the following window:

```
┌──────────────────────────────────────────┐
│  Enter printer initialization command in hex: │
│                                            │
│  _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ │
└──────────────────────────────────────────┘
```

Enter a new command or edit the existing one.

There is no need to include control codes in the initialization command to set character or line density. The Emulator handles lines per page and characters per page settings automatically, by performing line feeds. For the Emulator to control forms length by using line feeds, automatic form feed at end of page must be disabled on your PC printer. If this is done by means of a control sequence instead of a switch on your PC printer you must include the appropriate control codes in the initialization command.

8.10.6.2
Transparent Command

Some PC printers can print characters that usually function as control codes, expanding the printer character set by 32 characters. The Emulator sends the transparent command to tell the PC printer that the following character is not a control code and should be printed.

When you select **Transparent Command** you will see the following window:

```
┌─────────────────────────────────────────────┐
│  Enter printer initialization command in hex: │
│                                               │
│ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ │
└─────────────────────────────────────────────┘
```

Enter a new command or edit the existing one.

8.10.6.3
Character Density Commands

Your host may vary its character density commands, depending on the application or print job you are running.

The Emulator can automatically change the horizontal spacing (characters per inch) on your PC printer when it receives a command from the host, but first you must tell it what control codes to send to your printer to accomplish this. You do not have to be concerned with the codes used by the host or by a real 5250 printer. You need to know only the codes your printer uses. Refer to your printer manual for this information.

When you select this option you will see the following menu:

```
                   Character Density Table

  → A.  05 CPI ←
    B.  10 CPI
    C.  12 CPI
    D.  13 CPI
    E.  15 CPI
    F.  17 CPI
    G.  18 CPI
    H.  20 CPI
    I.  22 CPI
    J.  27 CPI

                 Select Density Command
```

First choose a characters-per-inch (CPI) setting with your arrow keys and
Enter or by typing the letter of the setting. The input field to the right of
your selection will be highlighted. Enter a new command or edit the
existing one.

If desired, you can set your PC printer to something different from what
the host requests. For example, you can set your printer to 12 CPI when
the host requests 15 CPI by entering the control codes for 12 CPI in the
15 CPI field of the table.

If the Emulator receives a command from the host for a character density
which is not configured, it will use the next higher density which is
configured. If there is no higher density configured, the Emulator will use
the highest one available.

8.10.6.4
Line Density Commands

This option displays a Line Density Table which works the same as the Character Density Table described in the previous topic except that it applies to vertical spacing (lines per inch) instead of horizontal spacing.

```
                    Line Density Table

  →A.  01 LPI ←
    B.  02 LPI
    C.  04 LPI
    D.  05 LI
    E.  06 LPI
    F.  08 LPI
    G.  09 LPI
    H.  10 LPI
    I.  12 LPI
    J.  18 LPI
    K.  24 LPI
    L.  36 LPI
    M.  48 LPI
    N.  72 LPI

             Select Density Command
```

8.10.6.5
Advanced Printer Commands

This option allows you to configure the advanced commands used only during 3812/5219 printer emulation. You do not need to configure these commands unless you are configuring a 3812/5219 printer.

When you select **Advanced Printer Commands** the following menu will appear:

```
                    Advanced Printer Commands

→A.  Begin Underscore ←                        _ _ _ _ _
  B.  End Underscore                           _ _ _ _ _
  C.  Begin Overstrike                         _ _ _ _ _
  D.  End Overstrike                           _ _ _ _ _
  E.  Begin Superscript                        _ _ _ _ _
  F.  End Superscript                          _ _ _ _ _
  G.  Begin Subscript                          _ _ _ _ _
  H.  End Subscript                            _ _ _ _ _
  I.  Letter Quality                           _ _ _ _ _
  J.  Draft Quality                            _ _ _ _ _
  K.  Set Left Margin                          _ _ _ _ _
  L.  Set Right Margin
  M.  Vert. Motion Index
  N.  Hori. Motion Index
  O.  Begin Emphasis
  P.  End Emphasis
  Q.  Set Form Length

                    Select Advanced Command
```

The supplied printer files listed under **Type of PC Printer** include default commands for some common types of printers. If you are editing one of the supplied printer files or if you are creating a new file for a different type of printer, you should refer to your printer technical reference manual to determine the command strings that you should use for proper 3812/5219 emulation.

The first column of this menu lists the advanced printer commands that you can configure. The middle column is for you to enter hex command strings that will tell your emulated 3812/5219 printer to perform the indicated function. The third column applies only to the last seven printer commands and allows you to define parameters within the command strings in the middle column.

The first ten advanced printer commands use only the first two columns on the menu. First select a command with your arrow keys and **Enter** or by typing the letter of the command. The input field to the right of your selection will be highlighted. Type a new command string (up to 8 bytes) or edit the existing one. Then press **Enter** and you will be ready to configure another advanced printer command.

The last seven advanced printer commands are more complex than the first ten because they require parameters which can only be determined during printer emulation. First select a command with your arrow keys and **Enter** or by typing the letter of the command. The input field to the right of your selection will be highlighted. Type a new command string (up to 8 bytes) or edit the existing one. While typing the command string, use a null (00) for a parameter.

After you type a command string in the middle column and press **Enter**, the input field in the third column will be highlighted. Enter a new hex string (4 bytes) or edit the existing one.

Parameter information must be entered as follows:

Byte 1   Specifies the number of parameters within the command string and their position(s).

Byte 2   Shows any offset value to be added to the parameter. If no offset is used, this byte should be 00.

Byte 3   Used only for **Vert. Motion Index** and **Hori. Motion Index** to specify the parts-per-inch value associated with these strings. If you are configuring another command, this byte will be ignored and can be 00.

Byte 4   Indicates whether or not the parameter needs to be converted to decimal form (number or string) before it is sent to the printer. This byte must be 00 if conversion is not needed and 01 if conversion is needed.

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Troubleshooting

9

9.1
Introduction

MC5250PC is designed for trouble-free operation. If you do have any difficulties, refer to this chapter for possible causes and solutions to some common problems and for information on contacting Tech Support. You may also need assistance from the person who installed your hardware or configured your software.

Before you try any of the solutions given here, be sure you have carefully followed the directions in this manual for the operation you are attempting. If a message appeared on your screen, first look up the explanation of that message to help you solve your problem.

NOTE: If your master diskette contains a file named README.DOC, check it for information that may help you with your problem. It is an ASCII text file which contains valuable information that did not go into the current edition of this manual.

9.2
If Your PC Will Not Work . . .

1. Are your system unit and monitor both plugged into the wall outlet and turned on? If not, plug them in and turn them on. If so, go to Step 2.

2. Are your system unit, monitor and keyboard properly connected to one another? If not, connect them and turn them on. If so, see your PC manual for possible reasons why your PC will not work.

9.3
If DOS Will Not Load . . .

1. Does your PC have a hard disk? If so, go to Step 2. If not, go to Step 3.

2. Is DOS installed on your hard disk? If not, either install DOS on your hard disk or load it from a DOS system diskette. If so, go to Step 4.

3. Is the correct DOS system diskette in the active floppy drive? If not, insert the correct diskette. If so, go to Step 4.

4. The 5250 twinax card installed in your PC may be in conflict with another card. Remove all non-essential cards from your PC and reinsert them one at a time until you identify the conflicting card. Change the switch settings on either of the cards to resolve the conflict. If there is not a card conflict, see your DOS manual for possible reasons why DOS will not load.

9.4
If MC5250PC Will Not Load . . .

1. Is the required hardware properly installed in your PC? If not, install a 5250 twinax adapter card as directed in Chapter 7. If so, go to Step 2.

2. Make sure the disk or directory you are working from contains the MC5250PC files. If not, either change to the disk or directory that contains the files or copy the files you need to the disk or directory you are using. If the files already exist but will not load, copy them from the master diskette again.

9.5
If Nothing Happens When You Press the Keys . . .

1. Does your PC have a keyboard lock feature? If so, turn this feature off. If not, go to Step 2.

2. Is your keyboard configured to be locked at startup? If so, enter the correct numeric combination. (If you do not know the combination, you must turn off your PC, reboot and reconfigure your keyboard to be unlocked at startup.) If not, go to Step 3.

3. Did you or someone else manually lock your keyboard during emulation? If so, enter the correct numeric combination. (If you do not know the combination, you must turn off your PC and reboot, which will result in the loss of your communications and the data files with which you are working.) If not, go to Step 4.

4. Is the Input Inhibited (II) indicator displayed on your status line? If so, either your display is waiting for a response from the host or you have an error condition that must be corrected before you can unlock your keyboard. If not, go to Step 5.

5. Is the System Available (SA) indicator displayed on your status line? If so, call Tech Support. If not, go to Step 6.

6. Is the twinaxial cable properly connected to your PC, to a host or 5250 controller and to the T-connectors for all other stations in between? If so, go to Step 7. If not, connect it properly.

7. Find out if the controller or host to which the twinaxial cable is connected is operational and functioning normally. If not, correct the problem as necessary. If so, call Tech Support.

9.6
If Your PC Screen Does Not Display Properly . . .

1. Did your screen begin to display incorrectly after you used hot-key? If so, reconfigure the **Save Graphics RAM** option to **Yes**. If not, go to Step 2.

2. Is there snow on your screen? If so, reconfigure the **IBM Color Handling** option to **Yes**. If not, go to Step 3.

3. Make sure your screen attributes are configured correctly. If they are not, reconfigure them. If your screen attributes are already configured correctly, go to Step 4.

4. Make sure the termination settings are correct for all devices on the twinaxial cable. See the instructions that came with the 5250 twinax card for information about setting termination on the card. The last device on the cable must be terminated, either by a setting on the card or by a cable terminator. No device except the last one should be terminated. If all the termination settings are correct, go to Step 5.

5. Consult a technician to see if you have a hardware problem. If you determine that the problem is not in your hardware, call Tech Support.

9.7
If You Cannot Establish Communications with the Host . . .

1. Find out if your controller is functioning properly. If your controller has any diagnostic or test capabilities, perform the tests as instructed in the controller manual. If your controller seems to be functioning normally, if it does not have any test capabilities or if you are not using a controller, go to Step 2.

2. Find out if the communications line, the host computer system and the host's modem are operational and functioning normally. If they are not, do not try to establish communications until the host resets the line or corrects the problem. If the host is operational and functioning properly, the problem is in the connection between modems or in your system. Go to Step 3.

3. Did you load the correct configuration file for the host with which you are trying to communicate? If so, go to Step 4. If not, load the correct file.

4. Are the logical units configured correctly? If not, configure them correctly. If so, go to Step 5.

5. Are you using a modem (or modem eliminator)? If not, go to Step 11. If so, go to Step 6.

6. Is your modem cable a straight RS-232? If so, go to Step 7. If not, correct the cable or use another cable.

7. Is your modem or modem eliminator turned on? If so, go to Step 8. If not, turn it on.

8. Is your modem cable properly connected to your modem or modem eliminator? If so, go to Step 9. If not, connect the cable.

9. Do all the wires in your modem cable pass a continuity test? If so, go to Step 10. If not, use another cable or replace the defective wire(s).

10. Is your modem's baud rate compatible with the host's? If so, go to Step 11. If not, use a modem that is compatible with the host's.

11. Is the twinaxial cable properly connected to your PC, to a host or controller and to the T-connectors for all other stations in between? If so, go to Step 12. If not, connect it properly.

12. Do all the wires in your cable pass a continuity test? If so, go to Step 13. If not, use another cable.

13. Is more than one card in your PC set to use the same I/O port address or memory address? If not, go to Step 14. If so, remove all non-essential cards from your PC and reinsert them one at a time until you isolate the conflicting cards. Change the switch settings on either of them and reconfigure the software if necessary.

14. Do your software and 5250 twinax card I/O port addresses match? If so, go to Step 15. If not, set the proper I/O port address on the card and/or reconfigure the software to match.

15. Do your software and 5250 twinax card memory addresses match? If not, set the proper memory address on the card and/or reconfigure the software to match. If so, call Tech Support.

9.8
Calling Tech Support

Call Tech Support for help if you have tried all the possible solutions and still cannot get MC5250PC to function as it should. Please have the following information written down in front of you when you call:

• The serial number and version number of your master diskette, both of which should have been recorded and moved to the back of this manual when the software package was opened. These numbers are also on the startup screen.

• A description of your PC, including the manufacturer, model number and types of hardware installed.

• Information about the controller you are using (if any), such as the manufacturer and model number.

• Information about the modem or modem eliminator you are using (if any), such as the manufacturer, model number and baud rate.

• The name and version number of your PC disk operating system (DOS) and any enhancements or utilities you are using with DOS.

• A description of the host system with which you are trying to communicate.

• A description of the problem you are having and the circumstances that lead up to it.

Please be at your PC when you call. If possible, have MC5250PC running and at the point where you encountered trouble. Also have this manual with you so you can refer to it if necessary.

Refer to Chapter 10 for service information.

10

Service, Warranty and Tech Support

10.1
Software User License Agreement

MC5250 software is licensed by Multi-Tech Systems, Inc. to the original end-user purchaser of the product, hereafter referred to as"licensee". The License includes the distribution diskette, other accompanying programs, and the documentation.

The MC5250, hereafter referred to as "software", consists of the computer program files included on the original distribution diskette.

Licensee agrees that by purchase and/or use of the Software, he hereby accepts and agrees to the terms of this License Agreement.

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10.2
Service

In the event service is required, equipment may be sent, freight prepaid, to our factory. Return shipping charges will be paid by Multi-Tech Systems. Include a description of the problem, a return shipping address, and a check or purchase order for out-of-warranty repairs. The standard repair charge for an 5250 card is $95. Multi-Tech pays the return freight. Send equipment to this address:

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MULTI-TECH SYSTEMS, INC.
2205 Woodale Drive
Mounds View, Minnesota 55112
Attn: Service

You should also check with the people that supplied you with your equipment on the availability of local service and/or loaner units, in your part of the country. You may call us 1-800-328-9717, or if in Minnesota, at 612-785-3500.

10.3
Limited Warranty

Multi-Tech Systems, Inc. ("MTS") warrants that its products will be free from defects in material or workmanship for a period of two years from the date of purchase, or if proof of purchase is not provided, two years from date of shipment. MTS MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

This warranty does not apply to any products which have been damaged by lightning storms, water or power surges or which have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by the customer or any party without MTS's written authorization, or used in any manner inconsistent with MTS's instructions.

MTS's entire obligation under this warranty shall be limited (at MTS's option) to repair or replacement of any products which prove to be defective within the warranty period, or, at MTS's option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS's factory transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PURCHASE PRICE FOR DEFECTIVE PRODUCTS.

10.4
Tech Support and BBS

Multi-Tech has an excellent staff of tech-support personnel available to help you get the most out of your Multi-Tech product. If you have any questions about the operation of this unit, please call Tech-Support at 1-800-328-9717.

Multi-Tech Systems also maintains a Bulletin Board Service (BBS) for its customers. The information available via the BBS includes: new product information, product upgrade data, problem solving tips and a message service for you to leave questions for which you would like additional information. The phone number for the Multi-Tech BBS is (612) 785-9875

The BBS can be accessed by any asynchronous modems at 9600, 4800, 2400, 1200 or 300 bps.

Appendices

Appendix A
Technical Reference

This appendix provides technical information about the Emulator and the emulated devices.

5250 Scan Codes

When a key on a 5250 keyboard is pressed, it sends a hexadecimal number to the host or controller. These numbers are called scan codes. The scan code depends only on the key position, not on the keyboard type or nationality. A key in a given position generates the same scan code on all 5250 keyboards, even though it may represent different characters on different keyboards. The host or controller detects what type of keyboard is present and interprets the scan codes accordingly.

The diagram on the following page shows the key arrangement, key numbers and scan codes for 5250 keyboards.

The hexadecimal number on the front of each key is the scan code. The decimal number on the top of each key is the IBM key number. The key numbers are for reference purposes only. The scan code, not the key number, is generated when the key is pressed.

Note that two scan codes are shown on keys 45, 62 and 74. The first scan code is generated when the key is pressed; the second is generated when the key is released. These are called the make and break codes respectively.

5250 Attributes

The following table shows how fields with each of the 5250 screen
attributes are displayed on the real 5250 devices. The **Field Attributes**
menu described in Chapter 8 lets you reconfigure the field appearance
for your emulated display stations.

Atr	5250 Mono Display	5250 Normal Color Display	5250 7-Color Display
20	Normal	Green	Green
21	Reverse	Reverse green	Reverse green
22	Hi	White	White
23	Reverse hi	Reverse white	Reverse white
24	Us	Green, us	Green, us
25	Reverse, us	Reverse green, white us	Reverse green, us
26	Hi, us	White, us	White, us
27	Nondisplay	Nondisplay	Nondisplay
28	Blink	Blink green	Red
29	Blink reverse	Blink reverse green	Reverse red
2A	Blink hi	Blink white	Blink red
2B	Blink reverse hi	Blink reverse white	Blink reverse red
2C	Blink, us	Blink green,	Red, us us
2D	Blink reverse, us	Blink green, white us	Reverse red, us
2E	Blink, us, hi	Blink white, blue us	Blink red, us
2F	Nondisplay	Nondisplay	Nondisplay
30	Normal, cs	Green, blue cs	Turquoise, cs
31	Reverse, cs	Reverse green, blue cs	Reverse turquoise, cs
32	Hi, cs	White, blue cs	Yellow, cs
33	Reverse hi, cs	Reverse white, blue cs	Reverse yellow, cs
34	Us, cs	Green, us, cs	Turquoise, us, cs
35	Reverse, us, cs	Reverse green, us, cs	Reverse turquoise us, cs
36	Hi, us, cs	White, us, cs	Yellow, us, cs
37	Nondisplay	Nondisplay	Nondisplay
38	Blink, cs	Blink green, blue cs	Pink
39	Blink reverse, cs	Blink reverse green, blue cs	Reverse pink

cs = column separators
hi = high intensity
us = underscore

A-3

Atr	5250 Mono Display	5250 Normal Color Display	5250 7-Color Display
3A	Blink hi, cs	Blink white, cs	Blue
3B	Blink reverse hi, cs	Blink reverse white, cs	Reverse blue
3C	Blink, us, cs	Blink green, us, cs	Pink, us
3D	Blink reverse, us, cs	Blink reverse green, white us & cs	Reverse pink, us
3E	Blink, us, hi, cs	Blink white, us, cs	Blue, us
3F	Nondisplay	Nondisplay	Nondisplay

cs = column separators
hi = high intensity
us = underscore

MC5250PC Microcode

The Emulator software consists of two parts - the PC code which runs on the PC CPU and the microcode which runs on a Z80 microprocessor on the 5250 twinax card. The microcode is contained in the file MC5250.MIC (MC5250.SMC for the MC5250 card).

The 5250 twinax hardware appears to the PC as one I/O port and a block of memory. Switches on the 5250 twinax card determine the port address and the starting address of the memory.

The microcode handles all communications with the host or 5250 controller. The PC code handles all I/O on the PC. The PC code loads and activates the microcode and has the ability to stop the microcode. The PC code and microcode pass information back and forth through the shared PC memory. Other than this, the PC code and microcode operate independently.

The microcode is not directly programmable by the end user. All interface with the 5250 twinax card is through the Emulator or the API.

To load the microcode onto the 5250 twinax card and activate the card you must run the emulation program MC5250.EXE.

The first time you start the Emulator after turning on your PC, it loads the microcode and activates the 5250 twinax card. Once the 5250 twinax card has been activated it remains active until you **Quit with Power Off**, **Restart with Power On** or physically turn off or reset your PC. The 5250 twinax card is not affected if you reboot DOS.

Quit with Power Off stops the processor on the 5250 twinax card and zeroes out the microcode. **Restart with Power On** reloads the microcode and resets the 5250 twinax card.

To use applications which access the API, you must hot-key instead of **Quit**. Standard applications expect address 0034 to point to the beginning of the API. When you **Quit**, the interrupt vectors are restored and the applications will no longer find the proper address at 0034.

Appendix B
Reference Publications

For additional information, refer to the following IBM publications:

	5250 Information Display System to System/34 System Unit Product Attachment Information
	5250 Information Display System to System/36 System Unit Product Attachment Information
	5250 Information Display System to System/38 System Unit Product Attachment Information
G580-0696	S/38 Personal Services/38
GA21-9246	IBM 5250 Information Display System Introduction
GA21-9248	IBM 5251 Display Station Models 1 and 11 and IBM 5252 Dual Display Station Operator's Guide
GA21-9260	IBM 5256 Printer Operator's Guide
GA21-9323	Display Station Models 2 and 12 Operator's Guide
GA21-9337	IBM 5250 Information Display System Planning and Site Preparation Guide
GA21-9370	IBM 5294 Control Unit Operator's Guide and Operating Procedures
GA21-9409	IBM 5291 Display Station Operator's Guide
GA21-9416	IBM 5292 Color Display Station Operator's Guide
GA21-9466	IBM 3180 Model 2 Display Station Introduction and Preinstallation Planning Manual.
GA21-9469	IBM 3180 Model 2 Display Station User's Guide
GC21-7775	IBM System/38 Guide to Program Product Installation and Device Configuration
SA21-9247	5250 Information Display System Functions Reference Manual
SC21-7689	IBM System/34 Installation and Modification Reference Manual
SC21-9020	IBM System/36 Systems Reference Manual

SC21-9052   IBM System/36 Changing Your System Configuration

SC21-9059   S/38 File Support Utility User/Program Guide

SC21-9088   PC Support/36 User's Guide

SC21-9097   PC Support/36 Technical Reference

IBM Personal Computer Disk Operating System

IBM Personal Computer Guide to Operations

IBM Personal Computer Technical Reference

For a list of further reference publications refer to the following:

GC21-9015   IBM System/36 Guide to Publications

GC21-9678   AS/400 Information Directory

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Appendix C
Application Program Interface (API)

This appendix describes the entry points of the MC5250PC API. It provides information to allow you to write your own application programs which communicate through the MC5250PC interface to a host system.

In this appendix, "applications" always refers to application programs running on the PC concurrently with the Emulator.

The MC5250PC API is compatible with IBM's API according to IBM's 5250 specifications as documented below.

There is a separate data segment for each LU for which API support has been configured. The word at 0000:0036-0037H points to the data segment for the first LU. Offset 0198-0199H in each LU data area points to the data segment of the next LU.

The addresses given below are offsets from each LU data segment. When referring to bits in a byte, bit 7 is high order and bit 0 is low order.

Data Areas for Display LU's

Following are the data areas used with display LU's. Printer LU's use somewhat different data areas, and they are described later in this appendix.

0000-013DH Reserved

013EH INDICST (Indicators Set)

This byte indicates whether certain status line indicators have been set to ON.

The bits in INDICST are defined as follows:

Bit 7	MW (Message Waiting)
Bit 6	Reserved
Bit 5	KS (Keyboard Shift)
Bit 4	Reserved
Bit 3	IM (Insert Mode)
Bit 2	Reserved
Bit 1	II (Input Inhibited)
Bit 0	Reserved

If a bit is 1, then the corresponding indicator has been turned ON. Note, however, that the indicator may not currently be ON. For example, when a 5250 ENTER scan code is processed by the host, the II indicator is turned on and then turned off.

INDICST is used in conjunction with INDICRS (offset 013FH) and INDIC (offset 015AH). INDICRS indicates whether an indicator has been turned OFF, and INDIC shows the current status of each indicator.

Applications should set INDICST to 00H before sending scan codes that may affect the status indicators.

013FH INDICRS (Indicators Reset)

This byte indicates whether certain status line indicators have been reset to OFF. If a bit is 0, then the corresponding indicator has been turned OFF.

Applications should set INDICRS to FFH before sending scan codes that affect these indicators.

See also the explanation of INDICST (offset 013EH).

0140-0141H XXLCHR (Character Translate Table)

This word is a pointer to the EBCDIC to ASCII translation table. The table is loaded from the configuration file at Emulator startup.

The 256 bytes in this table are the defined ASCII translations for EBCDIC characters 00-FFH. The table can be indexed by the EBCDIC values.

Applications may read or modify this table.

0142-0143H XXLATT (Attribute Translate Table)

This word is a pointer to the 5250 to PC attribute translation table. This table is loaded from the configuration file at Emulator startup.

The 32 bytes in this table are the values of the PC attribute characters which have been assigned to correspond to 5250 attributes 20-3FH. The table can be indexed by the 5250 attribute value minus 20H.

Applications may read or modify this table.

0144-0145H XXLKEY (Keyboard Translate Table)

This word is a pointer to the translation table of PC scan codes to 5250 scan codes. The table is loaded from the configuration file at Emulator startup.

The table consists of 1 byte for keyboard ID, followed by a byte for each PC scan code. It can be indexed by PC scan code.

Applications can read 5250 scan codes from this table and place them in KEY0 (offset 0151H) to be sent to the host.

0146-0147H XREGEN (Screen Regeneration)

This word is a pointer to the 5250 screen buffer. The buffer consists of 1920 bytes, containing the EBCDIC values of the characters on the emulated 5250 screen. The first byte corresponds to row 1, column 1; the last byte corresponds to row 24, column 80.

0148-0149H XEC (Engineering Change Level)

This word is a pointer to the engineering change level field. This 8-byte field contains the IBM API version number supported by MC5250PC. The first 3 characters are always space, E, C. For example, for the version 02.10 API the ASCII characters " EC02.10" are contained in this field.

014A-014BH XIO@ (I/O Address)

This word is a pointer to the I/O port address the Emulator uses to access the 5250 twinax adapter card. This value must match the address set on the adapter.

014C-014DH XILVL@ (Interrupt Level)

This word is a pointer to the interrupt vector address used by the 5250 twinax adapter card.

> 0034H IRQ 5

014EH LKTIMSK (Interrupt Mask)

This byte is an interrupt mask for the 8259 chip and corresponds to the operating interrupt level.

> 20H IRQ 5

014FH NOTMSK (Inverted Interrupt Mask)

This byte is the bit inverted value of the LKTIMSK (offset 014EH) interrupt mask.

> DFH IRQ 5

0150H KEYI (PC Keystroke)

Applications can give instructions to the Emulator by writing PC scan
codes to this byte. This byte will contain the last scan code placed there,
since the Emulator does not clear it after reading the scan code. Writing
to KEYI does not affect emulation.

0151H KEY0 (5250 Keystroke)

Applications can send 5250 keystrokes to the host by writing the 5250
scan codes to this byte. When a non-zero value is found here, it is sent to
the host and this byte is reset to 00H.

0152-0155H DSKDxx (Virtual Disk Drive)

In the IBM API, these bytes are defined as follows:

0152H DSKDI	First virtual drive
0153H DSKDI0	Second virtual drive
0154H DSKD11	Third virtual drive
0155H DSKD12	Fourth virtual drive

In the MC5250PC API, the usage is as follows:

0152H	00H	Virtual drive A
	01H	Virtual drive B
	02H	No virtual drive
0153-0155H	Not used	

0156-0159H Reserved

015AH INDIC (Indicators' Current Status)

This byte represents the current settings of certain status line indicators.
An indicator is ON if the corresponding bit is on.

The bits in INDIC are defined as follows:

Bit 7	MW (Message Waiting)
Bit 6	Reserved
Bit 5	KS (Keyboard Shift)
Bit 4	Reserved
Bit 3	IM (Insert Mode)
Bit 2	Reserved
Bit 1	II (Input Inhibited)
Bit 0	Reserved

See also the explanations of INDICST (offset 013EH) and INDICRS
(offset 013FH).

015BH SYSAV (System Available)

This byte gives the current status of the System Available (SA) indicator. This byte is 00H if SA is OFF. A non-zero value indicates that SA is ON.

015CH BYPS (Bypass Normal Operation)

Applications may set the bits in this byte to modify normal keyboard operation.

The bits in BYPS are defined as follows:

> Bit 7   Reserved
> Bit 6   Turning this bit on disables hot-key from the application into emulation.
> Bit 5   Turning this bit on disables hot-key out of the LU session.
> Bit 4   If this bit is on, all translated keystrokes are sent to the host.
> Bit 3   If this bit is on, PC keystrokes are translated to 5250 scan codes which are stored in LASTKEY (offset 016DH) but not sent to the host.
> Bit 2   Reserved
> Bit 1   If this bit is on, the keyboard is locked for the LU during emulation and the status line says EXTERNAL DISPLAY.
> Bit 0   Reserved

015D-015EH CURSOR (Cursor Address)

Byte 015DH contains the current column (00-4FH). Byte 015EH contains the current row (00-17H). Note that changing these values does not alter the position of the cursor on the screen.

015F-0160H Reserved

0161-0162H CRT_SAV (Screen-Save Buffer Address)

This word is a pointer to the buffer in which the application program's screen is saved when the user hot-keys to emulation. The buffer size is 12K if the Emulator is configured to use a color adapter card and to save graphics RAM; 4K if configured for a mono card or not to save graphics RAM.

0163H PRTBC (Printer Boundary Check)

The Emulator prints characters with ASCII codes greater than this value as blanks. PRTBC defaults to FFH. Applications may modify this byte to inhibit the printing of certain characters.

0164H SURX (External Screen Update Register)

A non-zero value in this byte indicates that the 5250 screen buffer has been updated. After reading this byte, applications should reset it to zero. Changing this byte does not affect emulation.

0165-0166H Reserved

0167H DVC_TYP (Device Type)

This byte specifies the device emulated by the LU:

>   2DH   5219 printer (or 3812 printer, not supported by IBM) 60H
>   5256 printer (or 5224 or 5225 printer, not supported
>   by IBM)
>   C2H   Display station, model determined by MODEL_ID
>   (offset 0168H)

0168H MODEL_ID (Display Model)

This byte indicates the model of display station emulated by the LU if the value of DVC_TYP (offset 0167H) is C2H:

>   00H   5251
>   10H   3196 (not supported by IBM)
>   20H   3180 (not supported by IBM)
>   40H   5292-1
>   41H   5292-2 (not supported by IBM)
>   80H   5291

0169-016CH Reserved

016DH LASTKEY (Last Key Sent to Host)

In this byte, the Emulator stores the last 5250 scan code sent to the host. Applications may write to this byte without affecting emulation.

The Emulator does not use LASTKEY for keystrokes sent through KEY0 (offset 0151H).

Applications should use caution when testing for a particular scan code in LASTKEY, since this byte can change quickly if a series of scan codes is being sent.

016E-0175H Reserved

0176-0177H PCREGN@ (PC Screen Regeneration)

This word is a pointer to the PC video display buffer. Applications may modify this address to redirect video output. If PCREGN@ is non-zero, the Emulator uses the specified address.

0178H FLAGS (Hot-Key Flags)

Applications can set bits in this byte to control hot-key to or from emulation.

To hot-key out of emulation to DOS, applications should set bit 1 to 1 and execute an INT 09.

To hot-key into emulation from DOS, applications should set bit 0 to 1 and execute an INT 09.

Bits 2 and 4 are reserved and must not be modified.

0179-017AH Reserved

017BH HKCOL (Hot-Key Column)

This byte can be used in conjunction with HKROW (offset 017CH) and HKCHAR (offset 017DH) to allow the host to initiate a hot-key out of emulation.

When the EBCDIC character designated by HKCHAR is present on the 5250 screen in the row and column designated by HKROW and HKCOL, the Emulator automatically hot-keys out to DOS or to an application.

017CH HKROW (Hot-Key Row)

See 017BH, HKCOL.

017DH HKCHAR (Hot-Key Character)

See 017BH, HKCOL.

017E-0181H Reserved

0182-0183H CODESEG (Code Segment Address)

This word contains the segment address of the API data area for the LU. In IBM's API, the data area is in the program code segment. In the MC5250PC API, the program code is in another segment. Applications can use this address as a pointer to the API data area.

0184H SESSNO (Session Number)

This byte contains the LU number.

0185-0192H Reserved

0193H STN@ (Station Address)

This byte contains the station address of the LU.

0194-0197H Reserved

0198-0199H NSDS (Next Session Data Segment)

This word is a pointer to the API data area of the next configured LU. The
last LU points back to the data area for the first LU. The application
program may use this address to allow itself or another application to
access other LU's.

Data Areas for Printer LU's

Following are the data areas used with printer LU's. They are similar but
not identical to the data areas used with display LU's.

0000-013FH Reserved

0140-0141H XXLCHR (Character Translate Table)

This word is a pointer to the EBCDIC to ASCII translation table. The table
is loaded from the configuration file at Emulator startup.

The 256 bytes in this table are the defined ASCII translations for EBCDIC
characters 00-FFH. The table can be indexed by the EBCDIC values.

Applications may read or modify this table.

0142-0143H XXLATT (Attribute Translate Table)

This word is a pointer to the 5250 to PC attribute translation table. This
table is loaded from the configuration file at Emulator startup.

The 32 bytes in this table are the values of the PC attribute characters
which have been assigned to correspond to 5250 attributes 20-3FH. The
table can be indexed by the 5250 attribute value minus 20H.

Applications may read or modify this table.

0144-0147H Reserved

0148-0149H XEC (Engineering Change Level)

This word is a pointer to the engineering change level field. This 8-byte field contains the IBM API version number supported by MC5250PC. The first 3 characters are always space, E, C. For example, for the version 02.10 API the ASCII characters " EC02.10" are contained in this field.

014A-015BH Reserved

015CH BYPS (Bypass Normal Operation)

The bits in this byte are defined as follows:

> Bit 7   Reserved
> Bit 6   Turning this bit on disables hot-key from the
>   application into emulation.
> Bit 5   Reserved
> Bit 4   Reserved
> Bit 3   Reserved
> Bit 2   Reserved
> Bit 1   Reserved
> Bit 0   Reserved

015D-0160H Reserved

0161-0162H INITSTRNG@ (Initialization String)

This word is a pointer to the printer initialization string. The string is loaded from the configuration file at Emulator startup. The 32 bytes in this string are ASCII characters and control codes that the Emulator sends to the PC printer at startup and after a reset.

0163H Reserved

0164H SURX (External Screen Update Register)

A non-zero value in this byte indicates that the printer LU screen needs updating. Changing this byte does not affect emulation.

0165H Reserved

0166H ATTDEVID (Attached Device ID)

This byte identifies the PC printer used by the LU.

The bits in ATTDEVID are defined as follows:

Bit 7   Table-driven printer
Bit 6   IBM Quietwriter
Bit 5   IBM color printer
Bit 4   IBM Wheelprinter
Bit 3   IBM Proprinter
Bit 2   NEC Spinwriter
Bit 1   IBM graphics printer
Bit 0   IBM matrix printer

0167H DVC_TYP (Device Type)

This byte specifies the printer device emulated by the LU:

2DH   5219 printer (or 3812 printer, not supported by IBM) 60H
5256 printer (or 5224 or 5225 printer, not supported
        by IBM)

See also the explanation of MODEL_ID (offset 0168H).

0168H MODEL_ID (Printer Model)

This byte is used with DVC_TYP (offset 0167H) to further specify the
model of printer emulated by the LU.

0169-0181H Reserved

0182-0183H CODESEG (Code Segment Address)

This word contains the segment address of the API data area for the LU.
In IBM's API, the data area is in the program code segment. In the
MC5250PC API, the program code is in another segment. Applications
can use this address as a pointer to the API data area.

0184H SESSNO (Session Number)

This byte contains the LU number.

0185-0192H Reserved

0193H STN@ (Station Address)

This byte contains the station address of the LU.

0194-0197H Reserved

0198-0199H NSDS (Next Session Data Segment)

This word is a pointer to the API data area of the next configured LU. The last LU points back to the data area for the first LU. The application program may use this address to allow itself or another application to access other LU's.

01A0-01C4H Reserved

01C5-01C6H RCBUF1@ (Receive Buffer 1)

This word is a pointer to the start of the first 256-byte receive buffer.

01C7-01C8H RCBUF2@ (Receive Buffer 2)

This word is a pointer to the start of the second 256-byte receive buffer.

01C9-01CAH BUFXFULL@ (Receive Buffer Full)

This word is a pointer to the receive buffer flags.

The bits in BUFXFULL@ are defined as follows:

    Bit 7   Reserved
    Bit 6   Reserved
    Bit 5   Reserved
    Bit 4   Reserved
    Bit 3   Reserved
    Bit 2   Reserved]
    Bit 1   The first receive buffer contains data to be
             printed.
    Bit 0   The second receive buffer contains data to
             be printed.

01CB-01CCH RCBUF1CT@ (Receive Buffer 1 Byte Count)

This value specifies the byte count in the first receive buffer. It is reset when that buffer receives new data.

01CD-01CEH RCBUF2CT@ (Receive Buffer 2 Byte Count)

This value specifies the byte count in the second receive buffer. It is reset when that buffer receives new data.

01CF-01D0H Reserved

01D1H PTRDEVNAM (Printer Device Name)

This byte identifies the DOS printer device name assigned to the PC printer the LU is using. The high order nibble indicates whether the port type is parallel or serial. The low order nibble indicates the specific port of the type indicated by the high order nibble.

00H	LPT1
01H	LPT2
02H	LPT3
03H	LPT4
10H	COM1
11H	COM2
12H	COM3
13H	COM4

01D2H SERPARM (Serial Parameters)

This byte contains parameters used for communications with a serial printer.

The bits in SERPARM are defined as follows:

Bits 7, 6, 5	000	110 baud
	001	150 baud
	010	300 baud
	011	600 baud
	100	1200 baud
	101	2400 baud
	110	4800 baud
	111	9600 baud
Bits 4, 3	X0	No parity checking
	01	Odd parity checking
	11	Even parity checking
Bit 2	0	1 stop bit
	1	2 stop bits
Bits 1, 0	10	7-bit word length
	11	8-bit word length

If a serial printer is not used, SERPARM is set to zero.

01D3H Reserved

01D4-01D5H INDICAT@ (Indicators' Current Status)

This byte represents the current status of certain indicators on the printer LU status line. An indicator is ON if the corresponding bit is on.

The bits in INDICAT@ are defined as follows if the LU is emulating a 5256 printer:

Bit 7   Ready
Bit 6   Attention
Bit 5   Forms
Bit 4   Graphics
Bit 3   Data Cleared
Bit 2   SA (System Available)
Bit 1   Reserved
Bit 0   Reserved

The bits in INDICAT@ are defined as follows if the LU is emulating a 5219 printer:

Bit 7   Ready
Bit 6   Exception
Bit 5   Forms
Bit 4   Change Setup
Bit 3   Change Font
Bit 2   SA (System Available)
Bit 1   Reserved
Bit 0   Reserved

01D6-01D7H MESSAG@ (Message Flags)

This byte represents the current state of certain messages in a printer LU. A message is displayed if the corresponding bit is on.

The bits in MESSAG@ are defined as follows:

Bit 7   Reserved
Bit 6   Reserved
Bit 5   Reserved
Bit 4   Reserved
Bit 3   Date Loss May Have Occurred
Bit 2   Suspended
Bit 1   Offline
Bit 0   Invalid Option

Appendix D
System Error Checks

One of the following four-digit error codes will appear on your screen if the normal operation of your emulated display station is interrupted. This section lists the error codes in numeric order and tells you what causes them to appear. In many cases, all you have to do is press ERROR RESET to unlock your keyboard, clear the error code from your screen and return to normal operation. In other cases, you must take the additional action described below.

0000	Either the host does not provide a help message for the current condition or you pressed HELP when there was not an error code on your screen.
0001	You entered information faster than it could be processed.
0002	The host or controller received an invalid scan code and cannot recognize the key you pressed. If the error cannot be reset or occurs repeatedly, contact Tech Support.
0003	The key you pressed after CMD is not a command function key.
0004	The current input field does not accept information entered from the keyboard.
0005	You cannot enter information at the current cursor position.
0006	The key you pressed after SYS REQ is an invalid key.
0007	You did not enter information into all fields requiring entry.
0008	The current field accepts only alphabetic characters (A through Z, space, comma, period, hyphen, apostrophe) and you pressed an invalid key.
0009	The current field accepts only numeric characters (0 through 9, space, comma, period, plus, minus) and you pressed an invalid key.
0010	The current field accepts only the characters 0 through 9 and you pressed an invalid key.
0011	You cannot enter information into the last position of the current field. Use FIELD + or FIELD - to leave the field.

0012	Either the cursor is in the last position of the current field or there is not room in the field to insert more information.
0013	The key you pressed is not allowed while your display screen is in insert mode.
0014	You cannot leave the current field unless it is blank or completely filled.
0015	The number and self-check digit you entered are different. Make sure you entered them correctly and that the number is valid for a self-check field. If the error persists, contact Tech Support.
0016	FIELD - is not allowed in the current field.
0017	You cannot leave the current field unless it is blank or completely filled.
0018	You cannot use a data key to leave the current field.
0019	DUP is not allowed in the current field.
0020	The key you pressed is not allowed in right-adjusted or signed numeric fields.
0021	You cannot leave the current field without entering the required information.
0022	A host error occurred, possibly when you inserted or deleted information. Correct the field if necessary.
0023	Either the current field accepts only hex characters (A through F, 0 through 9) and you pressed an invalid key or you entered a hex code into a field that does not accept hex entry.
0024	The current field accepts only the characters 0 through 9 and you pressed an invalid key.
0026	You cannot use FIELD - to leave the current field unless the last position of the field is a character 0 through 9. Correct the last position or use FIELD + or FIELD EXIT to leave the field.
0027	The key you pressed does not have an assigned function.

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0029	You entered an invalid combination of a diacritical (accent) mark and another character.
0040	Your modem is not ready to send or receive information. Make sure it is turned on and connected properly.
0042	The receive clock signal failed while the Emulator was receiving information from the host. Make sure your modem is functioning properly.
0043	Your modem should be switched to non-data mode.
0044	The controller is not receiving any information from the host. You might not have a data path. Make sure your modem is turned on and connected properly. See Chapter 9 if you need help with establishing a data path.
0050	You cannot transmit information unless the "clear to send" and "request to send" lines on your modem are both turned on.
0051	The transmit clock signal failed while the Emulator was sending information to the host. Make sure your modem is functioning properly.
0052	The controller found an internal error.
0054	The controller received an invalid command from the host.
0060	The controller received a test frame with an error.
0062	Transmitter underrun. The controller tried to send information faster than it was being processed.
0063	Receiver overrun. The controller received information faster than it could be processed.
0064	The DCD (data carrier detect) signal was lost while the controller was receiving information.
0065	The "clear to send" line on your modem went down momentarily while the controller was sending information to the host. Make sure your modem is functioning properly.
0066	Your modem stopped working momentarily while the controller was sending or receiving information. Make sure your modem is functioning properly.

0067	The controller received frames out of sequence.
0068	The controller had to send frames again because the host did not receive them successfully on the first transmission.
0069	The controller received an incorrect cyclic redundancy check (CRC) calculation.
006A	The controller sent a termination signal.
006B	The controller received a termination signal.
006C	A transmitter error occurred.
006D	The controller received a short I-frame (information frame).
0070	Either the current line does not have a left or right margin defined or you tried to insert too many characters.
0071	You cannot start a new task until the host finishes the task currently in progress.
0072	The cursor is in an area that does not accept information entered from the keyboard.
0073	You cannot delete or replace an instruction or format change character unless the host has displayed a prompt message on your screen.
0074	The arrow keys and NEW LINE are not allowed with the prompt message that is currently on your screen.
0075	The character you specified was not found in the current text.
0076	You cannot insert information until the host finishes processing the information currently on your screen.
0077	The key you pressed does not have an assigned function.
0078	The host did not define the required scale line for your display. There is an error in the host application program.
0097	The host cannot support online verification tests.

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0099

The host is not responding to your signal. The exact meaning of this error code depends on when it appeared.

If the error code appeared before sign on, you pressed an invalid key.

If the error code appeared during sign on, the host may not be functioning normally or the controller may not be communicating with the host. Try to sign on again. If the error code appears again, find out if the host and the controller are functioning normally.

If the error code appeared after sign on, either the host did not recognize the key you pressed or the controller is not communicating with the host. Try to perform a different task. If the error code appears again, find out if the host and the controller are functioning normally. If it does not appear again, the problem is in the previous task and may be a keying error or a programming problem at the host.

Appendix E
5292 Graphics Support

Introduction

Graphics support allows you to display graphics from the host system on your PC screen. The Emulator supports host graphics programs by using the graphics handler GRAF5292. The information in this appendix explains how to use 5292 graphics support with the Emulator.

Graphics Support Requirements

A CGA (color graphics adapter), EGA (enhanced graphics adapter) or VGA (video graphics array) is required for 5292 graphics support. GRAF5292 will detect your specific adapter at startup.

In addition, the Emulator requires certain configuration settings for 5292 graphics support. Your **Monitor** type must be configured as either **Color Monitor with Color Adapter** or **Special Monitor and Adapter**. Also, one LU must be configured as a **5292 Graphics** display station. See Chapter 8 for details on these configuration options.

Starting GRAF5292

To run GRAF5292, you must first start the Emulator and communicate with the host as described in Chapter 4. Hot-key out of the Emulator to DOS. The Emulator will continue operating in background mode.

Type the following command line and press **Enter** to start GRAF5292:

```
GRAF5292
```

GRAF5292 will automatically go resident and hot-key back into the Emulator.

The Emulator must be running when you start GRAF5292. If you try to start GRAF5292 when the Emulator is not resident, you will see the following message:

```
UNABLE TO INSTALL 5292 GRAPHICS SUPPORT
```

Note that commands for starting the Emulator and GRAF5292 can be included in an AUTOEXEC or other batch file, eliminating the need for operator intervention.

GRAF5292 Command Line Options

Following is a description of some options you can add to the command line used to start 5292 graphics support. Command line options may be entered in any order, separated by one or more spaces.

-R Resident Graphics Support

Graphics support usually quits automatically when you hot-key out of the Emulator. Specifying -R on the GRAF5292 command line, however, allows GRAF5292 to remain resident even when you use the hot-key.

When you hot-key out of the Emulator after using the -R option, GRAF5292 will continue running and you will see the following message:

```
5292 GRAPHICS SUPPORT IS RESIDENT
```

NOTE: After you use the -R option to make 5292 graphics support resident, you must use the -D option described later to quit GRAF5292.

-L EMS Reserved

GRAF5292 uses expanded memory (EMS) when it finds EMS available. Specify -L on the GRAF5292 command line if you want to reserve EMS for use by another application instead.

-0 CGA Mode

The -0 option forces GRAF5292 to run in CGA 4-color 320 by 200 resolution mode, regardless of the hardware it detects on your PC. Using this option may improve the appearance of graphics displayed on your particular setup.

-1 EGA Mode

The -1 option forces GRAF5292 to run in EGA 16-color 640 by 200 resolution mode, regardless of the hardware it detects on your PC. Using this option may improve the appearance of graphics displayed on your particular setup.

-2 EGA High Resolution Mode

The -2 option forces GRAF5292 to run in EGA 16-color 640 by 350 resolution mode, regardless of the hardware it detects on your PC. Using this option may improve the appearance of graphics displayed on your particular setup.

-3 Monochrome Mode

The -3 option forces GRAF5292 to run in monochrome 640 by 200 resolution mode, regardless of the hardware it detects on your PC. Using this option may improve the appearance of graphics displayed on your particular setup.

Graphics Mode

Once GRAF5292 is running, the Emulator can handle and display graphics commands from the host just like a real 5292 Model 2 display station. The host takes care of switching the 5292 graphics LU in and out of graphics mode.

You will see a GM indicator on the status line when the host switches the 5292 graphics LU to graphics mode. Otherwise, the status line will display CM to indicate that the LU is in character mode.

Note that pressing **Shift-Shift** will **not** bring up the Main Menu in graphics mode. The Emulator menus are unavailable from a 5292 graphics LU until the host returns the LU to character mode. The menus are, however, still available from other LU's.

If the host tries to switch a 5292 graphics LU to graphics mode when GRAF5292 is not running, you will see an error message. You then have the following options:

- Hot-key out of the Emulator to DOS and start GRAF5292. This lets the host switch the LU to graphics mode and function normally.

- Cancel the host graphics job. This returns the 5292 graphics LU to character mode.

- Switch to another LU. This disables the 5292 graphics LU in both graphics and character mode, but lets you continue host communications.

Quitting GRAF5292

You should always quit GRAF5292 before quitting the Emulator. There are two different ways to quit GRAF5292.

Unless you used the -R command line option discussed earlier, GRAF5292 will quit automatically when you hot-key out of the Emulator. If you want to continue using 5292 graphics support, you must restart GRAF5292 before returning to the Emulator.

If you used the -R command line option to keep 5292 graphics support resident when you hot-key, GRAF5292 cannot quit automatically. In that case, you must quit GRAF5292 using the -D command line option, which removes resident graphics support.

Simply hot-key out of the Emulator and enter the following command line:

```
GRAF5292 -D
```

Resident graphics support will be uninstalled. The Emulator will remain resident, and you can use the hot-key to continue emulation without 5292 graphics support.

When you quit GRAF5292, you will always see the following message:

```
5292 GRAPHICS SUPPORT UNINSTALLED
```

This message simply verifies that 5292 graphics support is no longer running.

Glossary

Glossary

Address   Hexadecimal number used to identify location of card, device or logical unit. See also Card, Device and Logical unit.

API   See Application Program Interface.

Application   Job, such as payroll, which a computer program is designed to do.

Application program interface   Program that allows running PC applications that communicate with the host through the Emulator. Also called API.

ASCII   American Standard Code for Information Interchange. Set of characters used by PC's to represent data. See also EBCDIC.

Attribute   Invisible character that defines the use and appearance of a field.

Baud   Number of bits per second (bps) at which data is transmitted.

Bit   Binary digit. Smallest unit of information stored or transmitted by a computer.

Byte   Unit of information represented by 8 bits stored or transmitted by a computer. See also Bit.

Card   Panel with electrical components installed in a computer. Also called a printed circuit board, circuit board, or board.

Column separator   Vertical bar between character positions on 5250 display screens to improve readability.

Command   Instruction to tell computer to begin, continue or end a specific operation. See also Command line.

Command line   Instructions typed at DOS prompt to tell DOS to do something, such as start the Emulator.

Communications link   Physical connection through which data is transferred between computers. See also Direct line and Switched line.

Configuration   Setting up software to suit host requirements, PC and hardware requirements and user preferences.

Configuration file   Collection of configuration settings for a program to read at startup and use during operation. See also Configuration.

Control unit   See Controller.

Controller   Device that directs communications between a host computer and a group of 5250 display stations and printers. Also called control unit.

Cursor   Marker to show where next character typed will display on screen. Usually highlighted or flashing, may be block or underline.

Data   Information (facts, instructions, etc.) stored, generated or processed by computers.

Data communications   Process of transferring information between locations within a communications system.

Default   Preconfigured setting supplied as part of software package.

Delete   To remove.

Density   Refers to lines per inch (LPI) and characters per inch (CPI) printer settings.

Device   Any piece of equipment, such as a printer or display station, that is part of a computer system.

Direct line   Permanent communications link between host and remote device. Opposite of switched line. Also called nonswitched, dedicated, private or leased. See also Communications link.

Directory   Group of files.

Disk   Device with magnetic surfaces on which information can be recorded. Can be flexible plastic (floppy) or hard.

Display station   Device capable of transferring information over a communications link. Allows keyboard entry and provides visual display. Also called workstation or terminal.

DOS   Disk Operating System. Controls PC operations.

DOS prompt   > symbol displayed after disk drive letter. Cursor must be at prompt when entering DOS commands. See also DOS.

EBCDIC   Extended Binary Coded Decimal Interchange Code. Set of characters used by host computers and IBM display stations to represent data. See also ASCII.

Edit   To add, change or remove information.

Emulation   Ability of a computer to imitate, or emulate, another device.

Glossary-2

Emulator   Program that lets one computer imitate, or emulate, another device.

Execute   To carry out a command or run a program on a computer.

Extension   A period and up to 3 other characters at the end of a filename assigned to help identify the file. See also Filename.

Field   Any designated portion of screen which displays information received from host or allows information to be entered.

File   Collection of related records.

Filename   Label assigned to identify a file. Can consist of up to 8 characters plus an extension. See also Extension.

Full-duplex   Allows both host and remote device to send and receive data at the same time. See also Half-duplex.

Graphics RAM   Part of PC memory used by the Emulator and possibly by other programs as well.

Half-duplex   Allows both host and remote device to send and receive data, but not at the same time. See also Full-duplex.

Hardware   Electronic and mechanical data processing equipment.

Hexadecimal   Base 16 numbering system using the digits 0 through 9 and A through F.

Host   Computer that allows attached devices to use its resources.

Hot-key   Feature that allows switching back and forth between 5250 emulation and PC applications by pressing two designated keys. See also Resident.

Initialization command   Group of control codes to let printer start over with specific operational settings.

Input   Information entered into a computer. See also Output.

Input field   Area of screen into which information can be entered.

Insert   To position new characters to the left of existing characters.

Key click   Causes PC to click or beep every time a key is pressed.

Keyboard lock   Prevents unauthorized tampering with display station by locking keyboard so nothing happens when keys are pressed. Keyboard remains locked until correct numeric combination is entered.

Keystroke compiler MC5250K program that compiles ASCII text files containing data characters, 5250 keystrokes and Emulator operation keys into a form that can be used by the Emulator.

Logical unit Emulated display or printer device. Also called LU.

LPT1 Common device name assignment for a standard IBM PC printer on a standard PC.

LU See Logical unit.

Menu List from which options can be chosen or into which information can be entered. Eliminates need for typing complex commands.

Modem MOdulator/DEModulator. Device that converts data back and forth between a format understood by computers and a format that can be transmitted over telephone lines.

Offline Equipment not under the control of the computer to which it is connected. Opposite of online.

Online Equipment under the control of the computer to which it is connected. Opposite of offline.

Operating system Controls the operations of a computer. See also DOS.

Output Information produced by a computer. See also Input.

Overwrite To replace existing information with new information.

Path Course followed by a computer through directories and subdirectories to reach specific files.

Printer Device capable of producing printouts of output information from the computer to which it is connected.

Program Series of computer instructions designed to achieve predetermined results.

Protocol Communications rules used by computers.

Resident Refers to program that resides in PC memory and continues to operate in the background. See also Hot-key.

Root directory Group of files for operating system and subdirectories.

Scan code Hexadecimal number generated when a key is pressed.

Signing on   Process of entering an account name, user ID or password to identify the Emulator before starting communications with the host.

Software   Computer programs and files.

Status line   Row of numbers and abbreviations across the bottom of a PC screen containing information about the current condition of the system.

Switched line   Communications link which requires dialing a telephone number to establish a connection to the host every time the line is used. Opposite of direct line. Also called dial-up. See also Communications link.

Toggle   To switch back and forth.

VDISK   See Virtual disk.

Virtual disk   Allows Emulator to use host disk space as if it were a disk on the PC. Allows file transfer between a PC and specially formatted directories on the host. Also called VDISK.

Wide screen mode   Allows an extended number of characters to be displayed on an emulated 3180 screen.

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System Indicators: **SA**=System Available **MW**=Message Waiting **KS**=Keyboard Shift **IM**=Insert Mode **II**=Input Inhibited

PC Keyboard Layout
for PC/XT Keyboard

= Shift Mode **ALT (1-N)**=Switch to Logical Unit (1-N) **SHIFT SHIFT**=Invoke Menus **ALT ESC**=Hot Key

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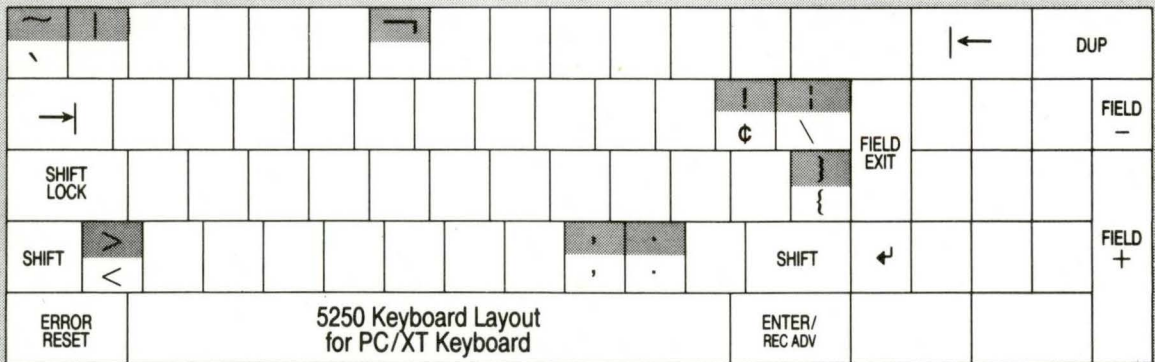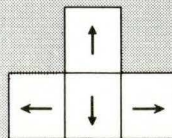
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CMD13 CMD14 CMD15 CMD16   CMD17 CMD18 CMD19 CMD20   CMD21 CMD22 CMD23 CMD24   SYS REQ
CMD1 CMD2 CMD3 CMD4   CMD5 CMD6 CMD7 CMD8   CMD9 CMD10 CMD11 CMD12   ATTN PRINT

INS ERASE INPT / HOME ROLL ↑   ↵   DUP FIELD −
DEL HELP ROLL ↓   FIELD +

¢ | { | }

CAPS LOCK   ENTER/ REC ADV
SHIFT   SHIFT   ↑   ENTER/ REC ADV
ERROR RESET **PC Keyboard Layout for Enhanced Keyboard** ERROR RESET   ← ↓ →

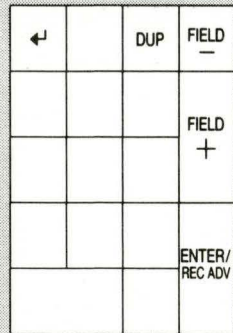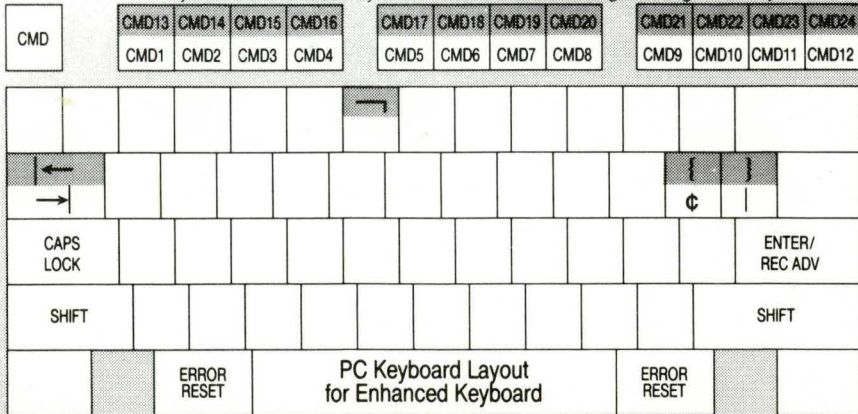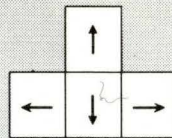■=Shift Mode   **ALT (1-N)**=Switch to Logical Unit (1-N)   **SHIFT SHIFT**=Invoke Menus   **ALT ESC**=Hot Key

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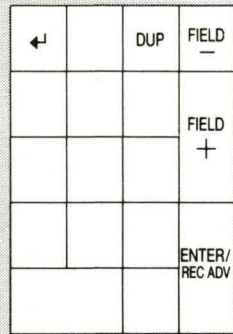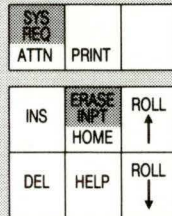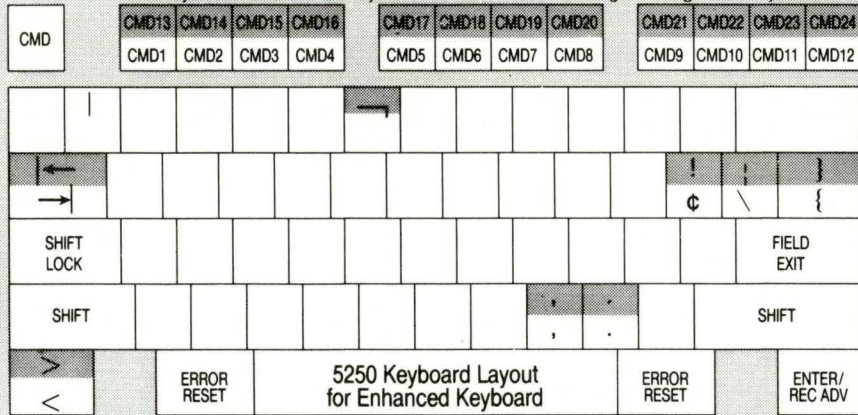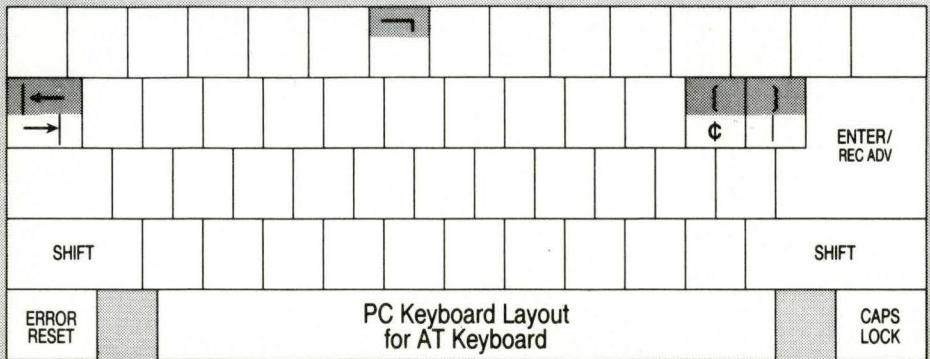
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| SYS REQ / ATTN | CMD | | | | | ⌐ | | | | | | FIELD EXIT | | DUP | |

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| PRINT | HELP | | | | | | | ← | | → | FIELD − |

| ROLL ↑ | ROLL ↓ | SHIFT | | | | | SHIFT | | ↓ | ROLL ↓ | FIELD + |

| ← | → | ERROR RESET | **PC Keyboard Layout for AT Keyboard** | CAPS LOCK | INS | DEL |

■=Shift Mode   **ALT (1-N)**=Switch to Logical Unit (1-N)   **SHIFT SHIFT**=Invoke Menus   **ALT ESC**=Hot Key

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| ← | → | ERROR RESET | **5250 Keyboard Layout for AT Keyboard** | ENTER/ REC ADV |

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