
Chapter 4. Operating and Configuring Your System Unit

The operation of your IBM 7587 Industrial Computer depends on the Single Board Computer, system configuration, operating system, and application programs in your particular system unit. This chapter begins with general operator information about the features of the 7587 Industrial Computer. Later in the chapter, it explains how to use the different screens of the Configuration/Setup Utility.

Operator Information

Your system unit contains the following features:

On/Off power switch

The On/Off power switch is located on the front panel.

Light-emitting diodes (LEDs)

The 7587 Industrial Computer has four light-emitting diodes (LEDs) located on the front panel.

- The left-most LED (green) indicates power is on.
- The next LED (yellow) indicates a hard drive is reading or writing data.
- The next LED (yellow) is the speaker LED. It is connected to the speaker and blinks each time the speaker beeps. It provides a visual indication to the user who might not be able to hear the speaker.
- The right-most LED (yellow) is not connected and can be used with any device where visual signals to the user are required. The connector is behind the LED.

Power supply

The power supply on the 7587 Industrial Computer is auto ranging. It will work properly if:

- The voltage range in your country is between 90 and 137 volts.
- The voltage range in your country is between 180 and 265 volts.

Attention

If the voltage is not in the correct range, you could damage your system unit when you turn it on.

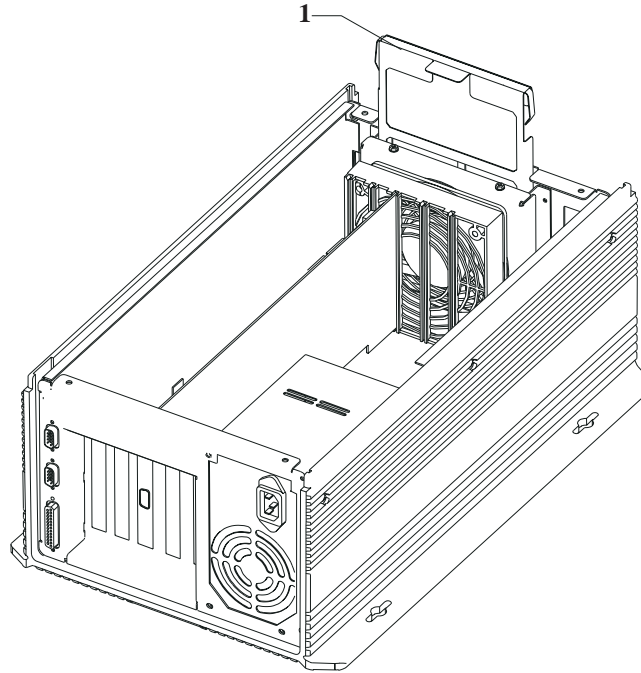
Functions

Specific functions and features referred to in this chapter and Chapter 5, "Solving Problems" may be limited by the installed SBC. See Table 6-1 on page 6-1 for a list of the features of the SBC.

Cleaning Air Filters

The 7587 Industrial Computer contains a single foam-type air filter that must be cleaned or replaced periodically. To remove the filter, do the following.

1. Loosen the four top-cover screws and remove the top cover.
2. Locate the filter assembly and lift it out of the unit.



3. Remove the element from the frame and replace it with a new element.
4. Reinstall the filter assembly and the top cover.

Starting Up Your System

Before turning on your computer, make sure all of the following conditions are met:

- All internal and external options have been installed properly.
 - The power supply switch is set correctly.
 - All signal cables are properly connected.
 - All power cables are plugged into grounded electrical outlets.
 - The cover and all mounting hardware are properly installed.
1. Turn on your display and adjust the brightness and contrast controls to the approximate midpoint.
 2. Turn on the system unit.

The power-on indicator light comes on.
 3. Watch the display screen and listen for a single beep.
 4. If you have not installed the operating system, go to the instructions that came with your operating system.

Installing Application Programs

For your system unit to be able to perform the tasks that meet your needs, you must install application programs. For information about installing and using your application programs, refer to the manuals that came with the application programs.

Note: Before installing any application program, make sure that your computer has enough storage available for that program.

Security Features

Security involves protecting your system unit components and preserving the data stored in your system unit. There are several security features available to help protect your system unit, the hardware inside, and the information stored on your hard disk.

Diskette Drive and Hard Drive Access: Access to drives can be disabled to prevent unauthorized reading or writing to the IDE hard drives and the diskette drive. The hard-drive option affects all IDE hard drives (they cannot be set independently).

The option is selected in the Configuration/Setup Utility program. See “System Security Option” on page 4-14.

Serial and Parallel Port I/O Control: This feature can disable input and output functions of the serial and parallel ports and their attached devices. The control of this feature is set by accessing the **Devices and I/O Ports** option in the Configuration/Setup Utility program.

USB Port Access: The USB ports can be disabled by accessing the **USB Setup** option under the **Advanced Setup** option of the Configuration/Setup Utility program.

Ethernet Access: The onboard Ethernet can be disabled by accessing the **Ethernet Setup** option under the **Advanced Setup** option of the Configuration/Setup Utility program.

Passwords: Password security is implemented by a power-on password, a System Administrator password, and a keyboard password. The Configuration/Setup Utility program gives directions for setting, changing, and disabling the passwords. The **System Security** option on the Configuration/Setup Utility main screen (see Figure 4-12 on page 4-14) contains the fields for setting, changing, or disabling power-on or administrator passwords.

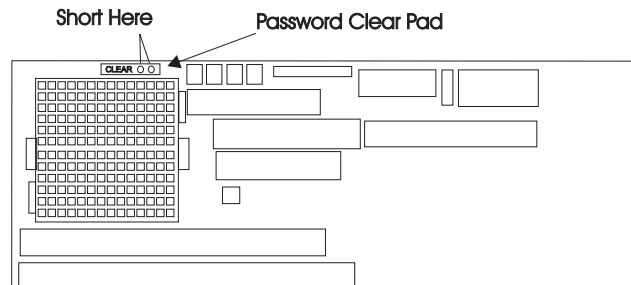
If it should become necessary to remove either a power-on password or System Administrator password because it is forgotten or for servicing, follow the procedure given in “Removing a Power-on or System Administrator Password” on page 4-4.

Power-on Password: A power-on password denies access to the system unit by an unauthorized user when the system unit is powered on. When a power-on password is active, the password prompt appears on the screen each time the system unit is powered on. The system unit starts only after the correct password is entered.

System Administrator Password: The system-administrator password restricts access to the Configuration/Setup Utility, which controls the security features. After the system-administrator password is set, the password prompt appears each time someone attempts use the Configuration/Setup Utility program.

Removing a Power-on or System Administrator Password: If you need to remove either the power-on or system-administrator password:

1. Turn off the computer and remove the cover.
2. Use a screwdriver or other conductive device to short the two pads on the password clear pad for 10 seconds (refer to the following illustration). An alternative method is to remove the battery for 10 minutes.



3. Reinstall the cover.
4. Turn on the computer and run the Configuration/Setup Utility program.
5. If a password is required, you must enter a new one.

Keyboard Password: A keyboard password allows locking the keyboard while the computer is running. Setting the keyboard password depends on the operating system. The OS/2 operating system provides keyboard-password protection as a standard feature; other operating systems might not offer this feature. Refer to your operating system documentation for more information.

Startup-Sequence Control

The system unit has a default startup sequence that checks diskette drives first, then any available hard drive, then any other startup device that might be installed. You can change the startup sequence by arranging the startup devices in any order that meets your needs. For example, you can make your hard drive your primary startup device, thereby preventing a person from starting the system unit from a diskette drive. You can *customize* the startup sequence by changing the order in which the system unit checks the devices by accessing the Configuration/Setup Utility program.

Keyboardless Operation Mode

The **Start Options** option on the Configuration/Setup Utility program main screen lets you select to start the system unit without a keyboard attached. This mode of operation commonly is used when the system unit has been set up as a network server.

Configuration Information

Your system unit has a special type of memory that maintains an inventory of its features and their associated settings. This inventory is the *configuration information*. A memory-retention battery on the SBC keeps the memory active so it does not lose the configuration information when you turn off the system unit. The battery-backed memory contains information about the following:

- Cache memory
- Date and time settings
- Diskette drives and hard disk drives
- Keyboard and mouse information (if attached)
- Memory map
- Power management
- Processor information
- Security features and passwords
- Selectable features
- Serial and parallel ports
- Video information.

Many built-in features, such as the serial and parallel ports, have programmable settings. Each time you turn on the system unit, the settings are copied from memory to the various features to get them ready for operation. You can change these settings using the Configuration/Setup Utility program.

You also use the Configuration/Setup Utility program to update the configuration information whenever you install an optional feature.

Each device in your system unit configuration must have a unique setting. The microprocessor uses the configuration settings to communicate with each device in your system unit. If two devices have the same setting, the conflict prevents the microprocessor from sending specific instructions to either device.

ISA-bus (AT-bus) compatible, 16-bit adapters have either fixed settings or settings that you control through jumpers or switches. Refer to the documentation that comes with the adapter for information about jumper settings. You cannot control these settings by using the Configuration/Setup Utility program. However, you can use the Configuration/Setup Utility program to change the setting of a built-in feature to one that does not conflict with an adapter. For example, a conflict occurs if you install a serial adapter set as Serial 1 (primary), because your built-in Serial A port already has that setting. Use the Configuration/Setup Utility program to change the built-in Serial 1 port assignment to another setting, if possible, or to disable it.

Each time you power on the system unit, the power-on self-test (POST) compares the stored configuration information with the installed hardware. If there is a mismatch, POST displays a configuration error. A configuration error can occur under any of the following conditions:

- You added or removed memory or a drive.
- You did not turn on an external device.
- A device is not working correctly and POST cannot detect its presence.
- A configuration conflict exists (two devices have the same settings).

If a configuration error occurs, the first and then the second of the following messages appears on the screen, or just the second message appears.

POST error(s) detected. Press any key to exit POST error log.

The following error(s) were detected when the system was started.

162 Configuration change has occurred

Press Enter to run the Configuration/Setup Utility or Esc to continue.

When the error message appears, the pop-up screen gives you a choice: you either can press Enter to run the Configuration/Setup Utility program, or press Esc to bypass the error and continue with the operating system startup.

If you just added or removed an option, running the Configuration/Setup Utility program automatically updates the configuration information for the option you just added or removed, without affecting the settings of any other features.

Using the Configuration/Setup Utility Program

The Configuration/Setup Utility program is a tool you can use for viewing and changing the configuration of your system unit. This utility program performs a number of tasks automatically, but there are other tasks that require input from you. You have access to such tasks as working with the configuration, setting a power-on or administrator password, and changing the date and time.

The memory-retention battery keeps the configuration memory active, even when you turn off your system unit. If the battery fails, the memory loses the settings and the Configuration/Setup Utility program automatically restores your system to the default (factory) settings.

Note

Pressing F5 while in the Configuration/Setup Utility program restores your system configuration to the default (factory) settings. Use care with this restore function; it attempts to preserve diskette drive types and avoids setting a configuration that has conflicts.

The Configuration/Setup Utility program gives you the opportunity to view, and in some cases, change information about your system unit. This utility program automatically notes changes that occur in your system unit hardware.


When you look at the Configuration/Setup Utility program screens, you notice that some *fields* (data areas) have square brackets, while other fields contain text only. The square brackets indicate a field you can change; the Configuration/Setup Utility program fills in all other fields. If you see an arrow head pointing to any of the fields on the screen, the Configuration/Setup Utility program is noting configuration changes that have occurred since the last time you used the program.

Getting Help

Pressing F1 for a highlighted field on any screen will display Help information for that field.

Accessing the Configuration/Setup Utility Program: If a configuration error occurs during POST, the Configuration/Setup Utility program displays a message that describes the errors found by POST and gives you the option to access the utility program. You also can access the Configuration/Setup Utility program any time you want to check your settings.

To access the Configuration/Setup Utility program, do the following.

1. Remove all media (diskettes, CDs, and tapes) from all drives.
2. Turn on the system unit. If it is already on, you must turn off the system unit for a few seconds, then turn it back on.
3. While the POST memory test is counting, the Configuration/Setup Utility program symbol  appears in the upper-right corner of the display screen. Press F1 while the memory is still counting to access the Configuration/Setup Utility program and skip the memory testing. The Configuration/Setup Utility program main screen appears.

Note: If you have set an Administrator Password, a password prompt appears. You must type the correct Administrator Password before you can use the Configuration/Setup Utility program.

You can get help information about any item on the screen by moving the cursor to the field and pressing F1. The active keys are shown at the bottom of each screen in the Configuration/Setup Utility program.

Moving Around the Configuration/Setup Utility Screens: Use the up arrow and down arrow keys to move from one field to the next. Each field is highlighted as you move from one option to another. Use the left arrow and right arrow keys to change the setting within fields that have square brackets. Press the Page Down and Page Up keys to move from page to page. When you are ready to exit from the Configuration/Setup Utility program, press Esc and follow the instructions on the screen.

The Configuration/Setup Utility program main screen contains the following options.

```
Configuration/Setup Utility
-----
                        Select Option:

System Summary
Product Data
PCI Bus 0 Master Data
Devices and I/O Ports
Date and Time
System Security
Start Options
Advanced Setup
ISA Legacy Resources
Advanced Power Management

Save Settings
Restore Settings
Load Default Settings

Exit Setup

-----
<F1>  Help                      <↑><↓>  Move
<Esc> Exit                      <Enter> Select
```

Figure 4-1. Configuration/Setup Utility Main Screen

Use the up and down arrow keys to highlight the option you want; then press Enter to select that option.

System Summary Option: When you select the **System Summary** option on the main Configuration/Setup Utility screen, the current system configuration is displayed, as illustrated in Figure 4-2. You cannot make any changes on this screen. The Configuration/Setup Utility program changes the information on this screen automatically after you add or remove options.

| System Summary | |
|-------------------|---------------------------|
| Processor | Pentium MMX |
| Processor Speed | 233 MHz |
| Math Coprocessor | Internal |
| System Memory | 640 KB |
| Extended Memory | 15360 KB |
| Video Controller | S3 Incorporated, Trio64V+ |
| Cache Size | 512 KB |
| Cache State | Enabled |
| Shadow RAM: | 384 KB |
| Diskette Drive A: | [1.44 MB 3.5"] |
| Diskette Drive B: | [1.2 MB 5.25"] |
| Hard Disk Drive 0 | 3221 MB |
| Hard Disk Drive 1 | Not installed |
| Hard Disk Drive 2 | Not installed |
| Hard Disk Drive 3 | Not installed |
| Ethernet | Enabled |
| Mouse | [Installed] |
| <hr/> | |
| <F1> | General Help |
| <Esc> | Exit |

Figure 4-2. Example System Summary Screen

Product Data Option: When you select the **Product Data** option on the main Configuration/Setup Utility screen, the product information is displayed, as illustrated in Figure 4-3.

Note: *System Board* refers to the SBC.

| Product Data | |
|-----------------------------|-------------|
| Machine Type/Model | 7500MMM |
| Flash EEPROM Revision Level | LX96000US |
| System Board Identifier | IP501000063 |
| System Serial Number | 9660000 |
| BIOS Date | 08/29/99 |

Figure 4-3. Example Product Data Pop-Up

PCI Bus 0 Master Data Option: When you select the **PCI Bus 0 Master Data** option on the main Configuration/Setup Utility screen, the device status information for the PCI bus 0 is displayed, as illustrated in Figure 4-4. The status information shows the devices on PCI bus 0 that are bus-master enabled. The following example shows the information for a computer with two PCI slots, onboard Ethernet, and a PMC video card.

| PCI Bus 0 Master Data | |
|-----------------------|----------|
| PMC | Enabled |
| USB | Enabled |
| Ethernet | Enabled |
| PCI to PCI Bridge | Disabled |
| Slot 1 | Enabled |
| Slot 2 | Enabled |
| Slot 3 | Disabled |
| Slot 4 | Disabled |

Figure 4-4. Example PCI Bus 0 Master Data Pop-Up

Devices and I/O Ports Option: When you select the **Devices and I/O Ports** option on the main Configuration/Setup Utility screen, the current configuration is displayed in a pop-up menu, as illustrated in Figure 4-5. You can modify the configuration information on this screen.

| Devices and I/O Ports | |
|------------------------|------------------|
| Mouse | [Installed] |
| Diskette Drive A: | [1.44 MB 3.5"] |
| Diskette Drive B: | [Not installed] |
| Serial Port Setup... | |
| Parallel Port Setup... | |
| Video Setup... | |
| IDE Drives Setup... | |

Figure 4-5. Example Devices and I/O Ports Screen

Mouse

Indicates that a mouse is attached. The Configuration/Setup Utility program automatically detects the absence or presence of a mouse when the system unit starts up.

Diskette Drive A/B

Displays the diskette drive configurations that you have selected. Use the left and right arrow keys to select the correct drive.

- 1.44 MB 3.5 inch
- 2.88 MB 3.5 inch

Serial Port Setup

Displays the Serial Port Setup pop-up, as illustrated in Figure 4-6.

| Serial Port Setup... | |
|-----------------------|----------|
| Serial Port A Address | [3F8h] |
| Serial Port A IRQ | [IRQ 4] |
| Serial Port B Address | [2F8h] |
| Serial Port B IRQ | [IRQ 3] |

Figure 4-6. Example Serial Port Setup Screen

Serial Port A Address/IRQ

Serial Port B Address/IRQ

Shows the current port address and interrupt level. The interrupt level of each device helps the microprocessor prioritize tasks and manage those tasks that have a greater need. Use the right and left arrow keys to change the *interrupt request* (IRQ) settings so that each device has a unique setting. The DOS/Windows® and OS/2 serial port labels (such as COM1 and COM2) are displayed for each port. These settings rarely need to be changed from the default settings. To disable a serial port, select **Disable** in the address field. For more information about the serial ports, see page 4-25.

Parallel Port Setup

Displays the Parallel Port Setup pop-up, as illustrated in Figure 4-7.

| Serial Port Setup... | |
|---------------------------------|------------------|
| Parallel Port | [3BCh] |
| Parallel Port Mode | [Standard] |
| Parallel Port Extended Mode | [Bidirectional] |
| Parallel Port Extended Mode DMA | [No DMA] |
| Parallel Port IRQ | [IRQ 7] |

Figure 4-7. Example Parallel Port Setup Screen

Parallel Port

Displays the current port address. Use the right and left arrow keys to change the setting so the device has a unique address. For more information about the parallel port, see page 4-26.

Parallel Port Mode

Indicates the present mode of operation of the parallel port attached to the SBC. You can select either Extended or Standard mode. In standard mode, the port is limited to output only. In extended mode, you are offered three other modes that allow the parallel port both read and write function (see “Changing the Parallel-Port Mode” on page 4-27).

Parallel Port Extended Mode

You can change this field only if the address is not 3BCh and Extended is selected in the **Parallel Port Mode** field. In bidirectional mode, data can be written to or received from the attached device. This mode is compatible with the IBM Personal System/2® computer. The ECP (extended capabilities port) and EPP (enhanced parallel port) modes are industry-standard, high-performance, bidirectional modes. To use either ECP or EPP modes, make sure the attached device supports the extended mode.

Parallel Port Extended Mode DMA

Controls the parallel port to use DMA. The device attached to the parallel port must support the ECP mode.

Parallel Port IRQ

Displays the current interrupt level. Use the right and left arrow keys to change the setting so each device has a unique IRQ setting. For more information about the parallel port, see page 4-26.

Video Setup

Lets you customize video parameters, as illustrated in Figure 4-8.

| Video Setup... | |
|------------------------------|---------------------------|
| Video Controller | S3 Incorporated, Trio64V+ |
| Video Memory | 2048 KB |
| DDC Monitor Checking | [Disabled] |
| Video Feature Connector | [Disabled] |
| Video Display Type | [IBM7573] |
| Monitor Horizontal Frequency | [Not Supported] |
| Refresh Rate for (640x480) | [85 Hz] |
| Refresh Rate for (800x600) | [75 Hz] |
| Refresh Rate for (1024x768) | [75 Hz] |
| Refresh Rate for (1280x1024) | [60 Hz] |
| Refresh Rate for (1600x1200) | [Not supported] |

Figure 4-8. Example Video Setup Pop-Up

Video Controller

Identifies the video controller chip, or chip set, present on the SBC.

Video Memory

Displays the amount of video memory, in kilobytes, installed in the system unit. The video controller uses this memory to process images.

DDC Monitor Checking

Select Enabled to allow POST and setup to automatically detect monitors that support Display Data Channel 1 (DDC) specifications. If you are not using one of these monitors, select Disabled to reduce delays during power-on.

Video Feature Connector

Is always **Disabled**.

Video Display Type

Displays a field you can use to name the type of display you have attached to your system unit. The type of display you select from the list determines the video resolutions and refresh rates. If your display is not listed, you can select Custom or User Defined display types.

Monitor Horizontal Frequency

Displays the current horizontal frequency (*horizontal sweep rate*) for User Defined display types only. This field does not appear unless you select User Defined in the **Video Display Type** field. Refer to the documentation that came with your display to determine the highest horizontal frequency your display can support. If you change this option, your system unit automatically restarts when you exit the Configuration/Setup Utility program.

Refresh Rate for...

Lets you change the refresh rates for each resolution listed if you select Custom in the **Video Display Type** field. Refer to the documentation that came with your display for the proper settings. If you change this option, your system unit automatically restarts when you exit the Configuration/Setup Utility program.

IDE Drives Setup...

Displays information about the hard disk drives installed in the system unit. On the 586 and 586E SBCs, the primary IDE controller supports the 2.5-inch drive form-factor of the laptop computers. Therefore, the first 3.5-inch drive attached to the 586 or 586E SBC is Hard Disk Drive 2. If a 2.5-inch drive is installed, it is Hard Disk Drive 0.

| IDE Drives Setup... | |
|----------------------|-----------|
| Hard Disk Drive 0 | |
| Hard Disk Drive 1 | |
| Hard Disk Drive 2 | |
| Hard Disk Drive 3 | |
| Drive 0 & 1 Prefetch | [Disable] |
| Drive 2 & 3 Prefetch | [Enable] |

Figure 4-9. IDE Drives Setup Pop-Up

Hard Disk Drive x

Select one of these options to display a pop-up showing the size and IDE performance of the selected hard drive. For example, if you selected **Hard Disk Drive 0** from the IDE Drives Setup... screen, a pop-up similar to Figure 4-10 would indicate the disk drive 0 size, and let you set the disk to utilize performance-enhancement features. (The Configuration/Setup Utility program changes the information in these fields automatically after you add or remove hard disk drives.)

| Hard Disk Drive 0 | |
|-------------------|--------------------|
| Size | 4211 MB |
| IDE Performance | [High Performance] |

Figure 4-10. Example Hard Disk Drive 0 Pop-Up

Size

Displays the disk storage size.

IDE Performance

Displays the current mode selection, either High Performance or Compatible for the two IDE hard disk controllers on the SBC. The default selection is High Performance, and this mode makes use of all available functions. If you have an IDE device that is not capable of running in the high-performance mode, select Compatible mode to use the device in your system unit.

Note: When you select Compatible mode for a controller, any device attached to it is affected by the reduction in function. For example, if you select Compatible mode to accommodate a slower drive attached to the same controller, a high-performance hard disk does not operate as efficiently as it would in High Performance mode.

Drive x & x Prefetch

Lets you enable Read prefetching, which can improve your system performance. However, CD-ROM drives will not work and some operating systems will not work properly with Read prefetch enabled.

Date and Time Option: You can set the date and time for your system unit in two ways:

- Through the operating system (see your operating-system documentation for details)
- Through the Configuration/Setup Utility program

When you select the **Date and Time** option on the main Configuration/Setup Utility screen, date and time information is displayed as illustrated in Figure 4-11.

| Date and Time | |
|---------------|--------------|
| Time | [10:53:35] |
| Date | [09/14/1995] |

Figure 4-11. Example Date and Time Pop-Up

Time

Displays the current time. Type in the correct time in *hh:mm:ss* format.

Date

Displays the current date. Type in the correct date in the format of day, month, and year appropriate for your country.

The memory-retention battery keeps the internal clock active when you switch off your system unit.

System Security Option: When you select the **System Security** option on the main Configuration/Setup Utility screen, you can control access to diskette drive and (if applicable) hard disk drive read/write operations, set a power-on password to protect the information stored in your system unit, and set an administrator password to deny access to the Configuration/Setup Utility program. The following pop-up is displayed.

| System Security |
|---|
| Secure Hard Disk Drives and Diskette Drives |
| Power-on Password |
| Administrator Password |

Figure 4-12. System Security Pop-Up

Secure Hard Disk Drives and Diskette Drives

Lets you secure your disks and diskettes. Figure 4-13 illustrates the current access status.

| Secure Hard Disk Drives and Diskette Drives Pop-Up | |
|--|------------|
| Hard Disk Access | [Enabled] |
| Diskette Drive Access | [Enabled] |

Figure 4-13. Example Secure Hard Disk Drives and Diskette Drives Pop-Up

Hard Disk Access

Displays the status of the hard disks (if applicable) attached to the IDE controller on the SBC. The Disabled setting prevents hard disks from reading or writing data, and all IDE disks will be shown as Not Installed on the System Summary screen. If you change this field, your system unit automatically restarts when you exit the Configuration/Setup Utility program.

Diskette Drive Access

Indicates internal diskette drives are Enabled (ready for read/write operations) or Disabled (not accessible for read/write operations). If you change this field, your system unit automatically restarts when you exit the Configuration/Setup Utility program.

Power-on Password

Lets you set, change, or delete your power-on password using the following pop-up.

| Power-on Password | |
|---|-----------|
| Enter your new power-on password twice. | |
| Enter Power-on Password | [] |
| Enter Power-on Password Again | [] |
| Set or Change Power-on Password | |
| Delete Power-on Password | |
| Password Prompt | [On] |

Figure 4-14. Power-on Password Pop-Up

Administrator Password

Lets you set, change, or delete this password to limit access to the Configuration/Setup Utility program using the following pop-up.

| Administrator Password | |
|--|-----------|
| Enter your new administrator password twice. | |
| Enter Administrator Password | [] |
| Enter Administrator Password Again | [] |
| Set or Change Administrator Password | |
| Delete Administrator Password | |
| Power-on password changeable by user | [No] |

Figure 4-15. Administrator Password Pop-Up

Start Options: When you select the **Start Options** option on the main Configuration/Setup Utility screen, you can change the startup options as illustrated in Figure 4-16. The startup devices options ignore devices that are not installed. The first installed diskette drive found will be Diskette Drive 0; the first hard disk drive found will be Hard Disk 0.

| Start Options | |
|-----------------------------|--------------------|
| Keyboard NumLock State | [On] |
| Keyboard Speed | [Fast] |
| Disketteless Operation | [Disabled] |
| Monitorless Operation | [Enabled] |
| Keyboardless Operation Mode | [Enabled] |
| First Startup Device | [Diskette Drive 0] |
| Second Startup Device | [Hard Disk 0] |
| Third Startup Device | [Disabled] |
| Fourth Startup Device | [Disabled] |
| Power On Self Test | [Enhanced] |
| Power On Logos | [Enabled] |
| Power On F1/Esc Options | [Enabled] |
| Virus Detection | [Disabled] |

Figure 4-16. Example Start Options Pop-Up

Keyboard NumLock State

Allows selection of the state of the NumLock key when you start the system unit, if a keyboard is attached. Use the left and right arrow keys to choose On (sets the numeric keypad keys for use as numeric keys) or Off (sets the numeric keypad keys for use as cursor keys).

Keyboard Speed

Allows selection of the typematic rate (the speed at which the keyboard responds when you hold down a key), if a keyboard is attached. Use the left and right arrow keys to choose either Normal or Fast.

Disketteless Operation

Allows the system unit to run without a diskette drive.

Monitorless Operation

Allows the system unit to run without a display.

Keyboardless Operation Mode

Allows the system unit to function without a keyboard. This mode of operation is used commonly when the system unit has been set up as a network server. Select **Enabled** (sets the system unit to work without a keyboard) or **Disabled** (sets the system unit to work with a keyboard).

First/Second/Third/Fourth Startup Device

Shows the current device for each step in the startup process. This function defines the order in which the system unit looks for an operating system when it is started. You can have up to four devices in the startup sequence, if you have that many devices installed in your system unit. Use the right and left arrow keys to choose from a list similar to the following:

- Diskette Drive 0
- Hard Disk 0
- Hard Disk 1
- Network
- Disabled

The startup devices are listed based on their function. The first hard disk drive will be Hard Disk Drive 0, no matter which physical disk drive it is in the system unit. If the disk drives are attached only to the secondary IDE controller, the first physical disk drive is 2, but it is listed as Hard Disk 0 in the startup sequence.

Note: If you install a hard disk drive, make sure it is included in the startup options list; otherwise, you will not be able to boot your computer from that hard disk drive.

Power On Self Test

Allows the selection of system testing that will be performed when the system unit is turned on. Select **Quick** or **Enhanced**.

Power On Logos

Lets you select the main power-on logos that are displayed. If disabled, only the copyright text is displayed.

Power On F1/Esc Options

Lets you enable or disable displaying of the message instructing the user to press F1 for setup or Esc for fast boot (the keys still function the same either way).

Virus Detection

Lets you enable or disable the built-in virus-detection program to run at boot time.

Advanced Setup Option: When you select the **Advanced Setup** option on the main Configuration/Setup Utility screen, the following pop-up is displayed.

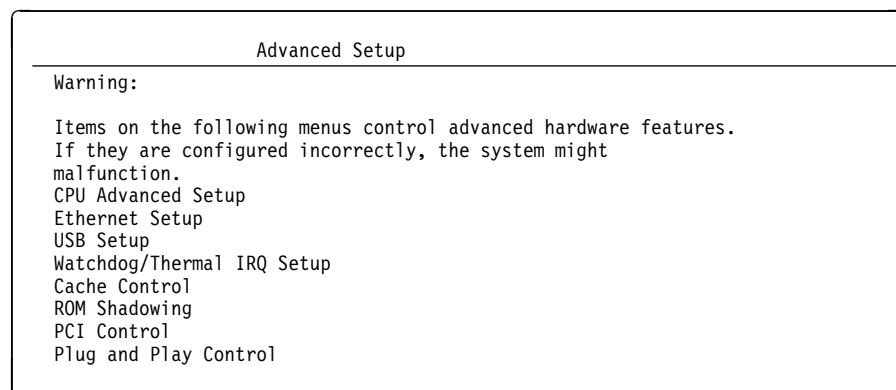


Figure 4-17. Advanced Setup Pop-Up

CPU Advanced Setup

Controls the burst mode of the microprocessor. It should always be **Disabled**.

Ethernet Setup

Lets you enable or disable the onboard Ethernet port. For configurations that do not have an onboard Ethernet port, it is always Disabled.

USB Setup

Lets you enable or disable the onboard USB ports. The ports cannot be controlled individually. For more information, see "Universal Serial Bus" on page 4-28.

Watchdog/Thermal IRQ Setup

Lets you enable or disable the watchdog timer and thermal monitoring. For more information, see "Watchdog Timer and Thermal Monitor" on page 4-29.

Cache Control

Lets you enable or disable the use of the memory cache.

| Cache Control | |
|---------------|------------|
| Cache State | [Enabled] |
| Cache Size | 256 KB |

Figure 4-18. Cache Control Pop-Up

ROM Shadowing

Lets you specify whether the information in ROM will be copied to system RAM (which will improve system performance), as illustrated in Figure 4-19. If the address range is used for an adapter card buffer, do not enable shadowing.

| ROM Shadowing | |
|---------------------------------------|------------|
| F0000h - FFFFFh (System BIOS) | Enabled |
| E8000h - EFFFFh: | [Enabled] |
| E0000h - E7FFFh: | [Enabled] |
| D8000h - DFFFFh: | [Disabled] |
| D0000h - D7FFFh: | [Disabled] |
| C8000h - CFFFFh: | [Disabled] |
| C0000h - C7FFFh (Adapter Video BIOS): | [Enabled] |

Figure 4-19. Example ROM Shadowing Pop-Up

PCI Control

Controls the burst mode on the PCI bus. Some PCI cards will not function properly unless burst mode is **Disabled**.

Plug and Play Control

Lets you enable and disable the plug-and-play adapters' ability to alter the hardware configuration directly.

ISA Legacy Resources Option: When you select the **ISA Legacy Resources** option on the main Configuration/Setup Utility screen, the following pop-up is displayed.

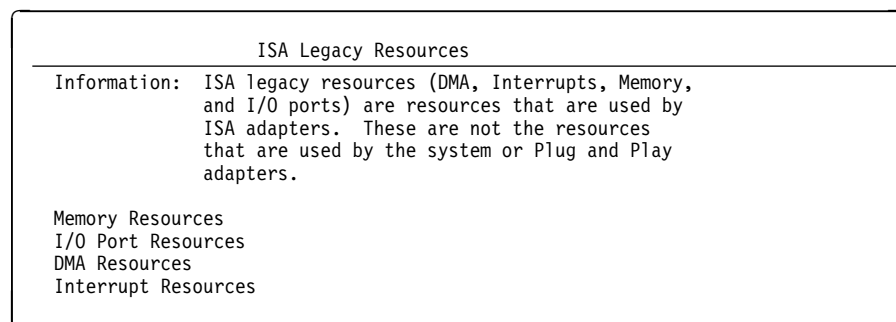


Figure 4-20. ISA Legacy Resources Pop-Up

This pop-up lets you allocate system resources to ISA Legacy adapters. There are three selections for each of the options on this pop-up:

- **System Resource** for a resource the system is using. This resource cannot be changed without disabling the resource that is using it. For example, Serial Port A uses IRQ 4, which is shown as a System Resource. If Serial Port A is disabled, IRQ 4 can be set to **Not Available**.
- **Not Available** to allow an ISA adapter to use the resource. It is not available to the PCI bus.
- **Available** to allow the PCI bus to use the resource. It is not available to the ISA adapter.

Memory Resources

Lets you allocate memory to an ISA Legacy adapter by selecting Not Available for that memory space. Figure 4-21 illustrates possible memory spaces.

| Memory Resources | | |
|------------------|-------------------|---|
| A0000h - A3FFFh: | [System Resource] | |
| A4000h - A7FFFh: | [System Resource] | |
| A8000h - ABFFFh: | [System Resource] | |
| AC000h - AFFFFh: | [System Resource] | |
| B0000h - B3FFFh: | [System Resource] | |
| B4000h - B7FFFh: | [System Resource] | |
| B8000h - BBFFFh: | [System Resource] | |
| BC000h - BFFFFh: | [System Resource] | |
| C0000h - C1FFFh: | [System Resource] | |
| C2000h - C3FFFh: | [System Resource] | |
| C4000h - C5FFFh: | [System Resource] | |
| C6000h - C7FFFh: | [System Resource] | |
| C8000h - C9FFFh: | [Available |] |
| CA000h - CBFFFh: | [Available |] |
| CC000h - CDFFFh: | [Not Available |] |
| CE000h - CFFFFh: | [Available |] |
| D0000h - D1FFFh: | [Available |] |

Figure 4-21. Example Memory Resources Pop-Up

I/O Port Resources

Lets you allocate I/O ports for an ISA Legacy adapter by selecting Not Available for those ports. Figure 4-22 illustrates available I/O ports.

| I/O Port Resources | | |
|--------------------|-------------------|---|
| 100h - 103h: | [System Resource] | |
| 104h - 107h: | [System Resource] | |
| 108h - 10Bh: | [Available |] |
| 10Ch - 10Fh: | [Available |] |
| 110h - 113h: | [Available |] |
| 114h - 117h: | [Available |] |
| 118h - 11Bh: | [Available |] |
| 11Ch - 11Fh: | [Available |] |
| 120h - 123h: | [Not Available |] |
| 124h - 127h: | [Available |] |
| 128h - 12Bh: | [Available |] |
| 12Ch - 12Fh: | [Available |] |
| 130h - 133h: | [Available |] |
| 134h - 137h: | [Available |] |
| 138h - 13Bh: | [Available |] |
| 13Ch - 13Fh: | [Available |] |
| 140h - 143h: | [Available |] |

Figure 4-22. Example I/O Port Resources Pop-Up

DMA Resources

Lets you allocate DMA channels to an ISA Legacy adapter by selecting Not Available for that channel. Figure 4-23 illustrates available channels.

| DMA Resources | | |
|---------------|-------------------|---|
| Channel 0 | [Available |] |
| Channel 1 | [Available |] |
| Channel 2 | [System Resource] | |
| Channel 3 | [Available |] |
| Channel 4 | [Available |] |
| Channel 5 | [Not Available |] |
| Channel 6 | [Available |] |
| Channel 7 | [Available |] |

Figure 4-23. Example DMA Resources Pop-Up

Interrupt Resources

Lets you allocate an interrupt to an ISA Legacy adapter by selecting Not Available for that interrupt. Figure 4-24 illustrates the interrupt levels.

| Interrupt Resources | |
|---------------------|-------------------|
| 0: | [System Resource] |
| 1: | [System Resource] |
| 2: | [System Resource] |
| 3: | [System Resource] |
| 4: | [System Resource] |
| 5: | [Available] |
| 6: | [System Resource] |
| 7: | [System Resource] |
| 8: | [System Resource] |
| 9: | [Available] |
| 10: | [Not Available] |
| 11: | [Available] |
| 12: | [System Resource] |
| 13: | [System Resource] |
| 14: | [System Resource] |
| 15: | [System Resource] |

Figure 4-24. Example Interrupt Resources Pop-Up

Advanced Power Management Option: When you select the **Advanced Power Management** option on the main Configuration/Setup Utility screen, the following pop-up is displayed.

| Advanced Power Management | |
|-------------------------------------|------------|
| APM BIOS Mode | [Enabled] |
| Automatic Hardware Power Management | |
| Activity Monitor | |

Figure 4-25. Advanced Power Management

Advanced Power Management (APM) lets you have your system unit enter one of three power-saving modes after a specified period of inactivity. When that period of time has elapsed, the BIOS can set the system unit to the specified power-saving mode. APM must be installed and configured in the operating system before power management will function.

APM BIOS Mode

Lets you enable or disable BIOS support for power management. When disabled, all power management is disabled.

Automatic Hardware Power Management

Lets you set the APM timer for each power-saving mode's inactivity period.

| Automatic Hardware Power Management | |
|-------------------------------------|------------|
| Automatic Hardware Power Management | [Enabled] |
| Time to Level 1 Power Management | [5 min] |
| Processor Speed | [25%] |
| Display | [Standby] |
| Time to Level 2 Power Management | [10 min] |
| Processor Speed | [01%] |
| Display | [Suspend] |
| Time to Level 3 Power Management | [15 min] |
| Processor Speed | [01%] |
| Display | [OFF] |
| Hard File | [Enabled] |

Figure 4-26. Automatic Hardware Power Management

Activity Monitor

Lets you configure which system resources the system will monitor for power management. If a resource is enabled, any activity on that resource resets the APM timer.

| Activity Monitor | |
|------------------|------------|
| Hard Files | [Enabled] |
| IRQ1 | [Enabled] |
| IRQ3 | [Enabled] |
| IRQ4 | [Enabled] |
| IRQ5 | [Enabled] |
| IRQ6 | [Enabled] |
| IRQ7 | [Enabled] |
| IRQ9 | [Disabled] |
| IRQ10 | [Disabled] |
| IRQ11 | [Disabled] |
| IRQ12 | [Enabled] |
| IRQ13 | [Enabled] |
| IRQ14 | [Disabled] |
| IRQ15 | [Disabled] |

Figure 4-27. Activity Monitor

Device Drivers

Device drivers are programs that support a specific type of hardware device, such as a printer. They provide instructions that allow the system unit to interact with the device or take advantage of the special features of the device. The drivers might be included with your operating system or application programs. Hardware options also might include a diskette that contains the device drivers you need to make the options work.

Device drivers fall into two general categories:

- Device specific
- Application specific

Device-specific drivers load into memory each time you turn on the system unit. The CONFIG.SYS file contains the statements that control them. Some drivers check for the presence of a device each time you turn on the system unit. If the device it supports is not attached or not turned on, the driver does not load and might generate an error message. Once loaded, device-specific drivers stay in memory.

Application programs load application-specific drivers into memory. These drivers stay in memory while the application is running, and they generally clear from memory when you exit from the application. For more information about the CONFIG.SYS file, refer to your operating-system documentation and the documentation that comes with your hardware or device drivers.

Interrupt and DMA Assignments

Table 4-1 and Table 4-2 on page 4-24 outline the interrupt request assignments and direct memory access (DMA) channel assignments for your system unit. If you install industry-standard architecture (ISA) bus adapters in your system unit, be sure that no interrupts or DMA channels conflict with existing resources. For example, do not set an ISA adapter to use interrupt (IRQ) 14 because IRQ14 is used by the IDE hard disk drive.

Interrupt Request Assignments: The following table outlines the interrupt request assignments.

| Table 4-1. Interrupt Request Assignments | |
|--|--|
| Interrupt Request | System Resource |
| NMI | Parity error or channel check |
| 0 | Reserved (interval timer) |
| 1 | Reserved (keyboard buffer full) |
| 2 | Reserved (cascade interrupt from slave PIC) |
| 3 | Serial port 2 |
| 4 | Serial port 1 |
| 5 | Available (parallel port 2, or can be used by either AT- or PCI-bus adapters – see note) |
| 6 | Diskette drive |
| 7 | Parallel port 1 |
| 8 | Real-time clock |
| 9 | Available (can be used by either AT- or PCI-bus adapters – see note) |
| 10 | Available (can be used by either AT- or PCI-bus adapters – see note) |
| 11 | Onboard Ethernet (optional) |
| 12 | Mouse port, if enabled; otherwise, it is available |
| 13 | Reserved (math coprocessor) |
| 14 | IDE hard disk drives |
| 15 | Alternate IDE hard disk drives |

Note: NMI is the abbreviation for *non-maskable interrupt*. PIC is the abbreviation for *programmable interrupt controller*.

For interrupts 5, 9, 10, and 11, at least one must be available for PCI adapters if any PCI adapters are installed. Interrupt 9 can be used as the vertical retrace interrupt by some software, so it might not always be available.

DMA Channel Assignments: The following table outlines the DMA channel assignments.

| Table 4-2. DMA Channel Assignments | | |
|------------------------------------|------------|--|
| DMA Channel | Data Width | System Resource |
| 0 | 8 bits | Available |
| 1 | 8 bits | Available |
| 2 | 8 bits | Reserved (diskette drive) |
| 3 | 8 bits | Available (used by parallel port when in extended capabilities, ECP, mode) |
| 4 | | Reserved (cascade channel) |
| 5 | 16 bits | Available |
| 6 | 16 bits | Available |
| 7 | 16 bits | Available |

Jumpers and Switches

Jumpers are located on the SBC and can help you customize the way your system unit operates. See page 6-16 for jumper location and descriptions.

Memory-Retention Battery

The system unit has a special type of memory that maintains the date, time, and settings for built-in features. The memory-retention battery, located on the SBC, keeps this information active when the system unit is powered off. This battery requires no charging or maintenance throughout its life, but it might need to be replaced at some point in time.

If the memory-retention battery fails or you replace the SBC, a message similar to the following appears on the display screen when the system unit is powered on (after you bypass the "POST error(s) detected" message).

The following error(s) were detected when the system was started.

161 Bad CMOS Battery

Press Enter to run the Configuration/Setup Utility Program or Esc to continue.

You might see other error codes displayed after the 161 error.

Serial Port

You can use the serial ports to add external devices, such as a plotter, scanner, external modem, or serial printer. The serial ports provide an effective way of communicating with a variety of serial devices. You also can use it to set up communications between two system units using a null modem or over telephone lines using a modem.

The serial port sends and receives data 1 bit at a time, as opposed to the parallel port, which sends and receives data 8 bits at a time. The serial port can transmit data at speeds ranging from 300 to 19.6K bits per second.

Your computer has two 9-pin serial ports: A and B. Both serial port A and serial port B are 16550A-compatible connections.

You can add another serial port by installing a serial adapter in one of the available expansion slots.

Serial-Port Assignments: Software distinguishes Serial Port A from Serial Port B by the serial-port I/O address assignment. No two serial ports can be set the same. Most adapters that provide serial communications use jumpers or switches to set the serial-port I/O address assignment.

You can change the assignment of the built-in serial ports by using the Configuration/Setup Utility program. You can set each serial port to one of the following settings:

- 3F8h using IRQ 4
- 2F8h using IRQ 3
- 3E8h using IRQ 4
- 2E8h using IRQ 3
- Disabled

The factory sets the serial ports to 3F8h and 2F8h.

Many operating systems and application programs have setup programs that define the location and speed (baud rate) of a modem, or the location and type of serial printer. These programs use "COM" (short for "Communications") to refer to the serial ports. For example, COM1 is assigned to I/O address 3F8h. If you are not sure of your serial-port assignment, use the Configuration/Setup Utility program to view it.

Viewing/Changing the Serial-Port Assignments: To view/change the serial-port assignment, do the following.

1. Access the Configuration/Setup Utility program main screen. (See the procedure on page 4-7 if you need assistance.)
2. Select the **Devices and I/O Ports** option.
3. Use the up arrow and down arrow keys to highlight one of the two serial port settings.
4. Use the left arrow and right arrow keys to change the setting in this field. The utility program will not allow you set both ports to the same setting.
5. Press Esc to exit from the Configuration/Setup Utility program and save your changes.

You also can disable each serial port if you want to prevent unauthorized transmission of data to any attached serial device, such as an external modem or serial printer.

Use the left arrow and right arrow keys to select the Disabled setting in each serial port field.

Installing an External Serial Device: Adding an external device to your system unit requires the use of a serial cable (purchased separately). Use Serial Port A for high-speed modem and printer connections, or for devices such as a mouse or other pointing device. To complete the installation, do the following.

1. Plug one end of the serial cable into the connector for Serial Port A or B.
2. Plug the other end of the serial cable into the external device. (If the serial cable does not fit, you need to purchase a cable adapter.)
3. Make any adjustments or add any features needed to operate the device. For example, your external device might require additional software or special settings. For detailed requirements, read the installation instructions that came with the external device.

Parallel Port

The parallel port is most often used to communicate with a parallel printer; however, parallel communication is an effective method of communicating with a variety of parallel devices.

The parallel port can send and receive data 8 bits at a time, as opposed to the serial port, which sends and receives data 1 bit at a time. Although the parallel port has 25 pins, only 8 of them are used to transfer data; the rest are used for control or status functions, and grounding.

Your system unit has one parallel port as a standard, built-in feature. You can increase the number of parallel ports by installing a parallel adapter in one of the system unit expansion slots.

Parallel-Port Assignments: Software distinguishes one parallel port from another by the parallel-port assignment. Most adapters that provide parallel communication use jumpers or switches to set the parallel-port I/O address assignment. No two parallel ports can be set the same. You can change the assignment of the built-in parallel port by using the Configuration/Setup Utility program.

You can set the built-in parallel port to any of the following settings:

- 3BCh using IRQ 7
- 378h using IRQ 5
- 278h using IRQ 5
- Disabled

The factory sets the parallel port to 3BCh.

Many operating systems and application programs have a setup program that defines the location of the printer and the type of printer attached. Many use “LPT” (for line printer) to refer to the parallel ports.

Viewing/Changing the Parallel-Port Assignment: To view/change the parallel-port assignment, do the following.

1. Access the Configuration/Setup Utility program main screen. (See the procedure on page 4-7 if you need assistance.)
2. Select the **Devices and I/O Ports** option.
3. Use the up arrow and down arrow keys to highlight the parallel port field setting.
4. Use the left arrow and right arrow keys to change the setting in this field.
5. Press Esc to exit from the Configuration/Setup Utility program and save your changes.

You also can disable the parallel port if you want to prevent unauthorized transmission of data to any attached parallel device, such as a printer or external tape drive. Use the left arrow and right arrow keys to select the Disabled setting in the parallel port field.

Installing an External Parallel Device: Adding an external device to your system unit requires the use of a parallel cable (purchased separately). To complete the installation, do the following.

1. Plug one end of the parallel cable into the connector for the parallel port.
2. Plug the other end of the parallel cable into the external device. (If the parallel cable does not fit, you need to purchase a cable adapter.)
3. Make any adjustments or add any features needed to operate the device. For example, your external device might require additional software or special settings. For detailed requirements, read the installation instructions that came with the external device.

Changing the Parallel-Port Mode: The parallel port can operate in the standard mode (the default) or in either of three extended modes:

- Standard allows the port to be used for output only.
- Extended modes allow the port to be used for input and output.
 - **Bidirectional** allows data transfers with other system units and supported parallel port devices.
 - **ECP** (extended capabilities mode) is a bidirectional protocol enhancement for high-performance printers. New printers that take advantage of this mode indicate ECP support in their documentation. Address setting 3BCh does not support ECP mode.
 - **EPP** (enhanced parallel port) is an industry-standard, high-performance, bidirectional mode. It provides higher performance than the bidirectional mode and allows the attachment of

communication devices (modem and LAN adapters) in addition to printers. Address setting 3BCh does not support ECP mode.

You can set these different modes of operation for the parallel port, as well as disabling the port, using the Configuration/Setup Utility program. Use the following steps to change the parallel-port assignment.

1. Access the Configuration/Setup Utility program main screen. (See the procedure on page 4-7 if you need assistance.)
2. Select the **Devices and I/O Ports** option.
3. Use the up arrow and down arrow keys to highlight the **Parallel Port Mode** field.
4. Use the left arrow and right arrow keys to change the setting in this field to Extended or Standard.
5. If you select Extended mode, use the down arrow key to highlight the **Parallel Port Extended Mode** field, and use the left and right arrow keys to select the desired mode.
6. Press Esc to exit from the Configuration/Setup Utility program and save your changes.

If you change this option, your system unit automatically restarts when you exit the Configuration/Setup Utility program.

Universal Serial Bus

The 586U and 586EU SBCs provide two universal serial bus (USB) ports. The USB is a serial interface standard for attaching telephony and multimedia devices to a computer. Through this single interface, the USB port supports several types of devices that previously required different interfaces for each device and unique connectors for each interface (for example serial ports for communications devices, parallel ports for printers, and game ports).

Although the USB port is a serial interface, it does not accept standard serial devices.

The USB port uses plug-and-play concepts to distinguish which device is attached to the connector. Each USB device on the bus is accessed by a unique USB address.

A *hub* converts a single USB port to an attachment point for multiple USB devices. Each hub provides seven ports for attaching peripheral devices. A maximum of 127 devices (each hub counts as one device) can be attached to a USB port. All devices must be within the maximum distance of 5 meters (16.4 feet). The maximum throughput of the USB port is 12 000 000 bps.

The two USB ports are completely independent. If more than two USB devices are to be attached to the computer, one of the devices must be a hub.

Note: The USB port requires device drivers to operate. Therefore, boot devices cannot be used with the USB port, and a keyboard or mouse should not be used (it will not operate until the operating system has been loaded).

Watchdog Timer and Thermal Monitor

These two functions provide monitors that detect certain processing conditions (watchdog interrupt) and over-temperature conditions (thermal interrupt). They are available only on the 586U and 586EU SBCs.

To use these functions, you need to install the device drivers and other support programs, which can be downloaded from the Web site (see “Downloading System Support Programs and BIOS Updates” on page 8-2 for more information). The downloaded files include sample programs.

Watchdog Timer: The watchdog timer allows software to recover from fatal errors and log status information about the error conditions. During operation, the watchdog timer is reset at specified intervals. If the timer is not reset before the timer reaches the end of the interrupt period, the timer generates a watchdog interrupt. When the support program is loaded, the system can be programmed to perform one of the following when a watchdog interrupt occurs:

- Generate a hardware reset (similar to turning off the computer)
- Generate a nonmaskable interrupt (NMI)
- Generate a hardware interrupt (PCI INT C)

Thermal Monitor: The thermal monitor is used to detect an internal over-temperature condition. It monitors the temperature of the microprocessor and the temperature inside of the computer. With the monitor program loaded and running, the monitor can be programmed to generate a hardware interrupt if either temperature exceeds its programmed value.

SVGA Video

Your system unit supports both SVGA (super video graphics array) and VGA (video graphics array) levels of resolution. SVGA is a video standard that displays high-resolution, 1024 x 768 graphic images. With 2 MB of video memory standard, you can view the following SVGA modes:

- Up to 256 colors simultaneously at 1280 x 1024 resolution
- Up to 65536 colors simultaneously at 1024 x 768, 800 x 600, or 640 x 480 resolution
- Up to 16,777,216 colors at 800 x 600 and 640 x 480 resolution

The SVGA video also is fully compatible with all standard VGA modes.

Advantages of Using SVGA: The SVGA video controller provides easy-to-read text and graphics at new levels of performance. With the new fast-refresh non-interlaced displays, you will find flicker and jitter a thing of the past.

The SVGA controller provides excellent on-screen performance, and uses its local bus capabilities to process tasks. This provides better overall system performance.

Software Compatibility with SVGA: The SVGA video controller can display application programs written for any of the following video standards.

| Standard | Resolution | Colors |
|-----------------------------------|-------------|----------|
| MGA (Monochrome Graphics Adapter) | 720 x 350 | ---- |
| CGA (Color Graphics Adapter) | 320 x 200 | 4 |
| EGA (Enhanced Graphics Adapter) | 640 x 350 | 16 |
| MCGA (Multicolor Graphics Array) | 320 x 200 | 256 |
| | 640 x 480 | 2 |
| VGA (Video Graphics Array) | 640 x 480 | 256 |
| SVGA (Super Video Graphics Array) | 640 x 480 | 16777216 |
| | 800 x 600 | 65536 |
| | 1024 x 768 | 65536 |
| | 1280 x 1024 | 256 |

Some application programs require video device drivers to use the super-graphics modes. The device-driver package shipped with your system unit provides device drivers for some application programs and operating systems that do not have SVGA support built in. Refer to the device-driver package for installation instructions and additional information about the individual drivers.

Some application programs provide their own video device drivers to take advantage of SVGA modes. These device drivers are installed through a setup program built into the application program. Setting up these applications to operate in the super video modes can be confusing, because terminology for these modes has not been standardized throughout the industry. The following lists some terms commonly used in application programs to describe the SVGA modes:

- High resolution
- Super VGA or SVGA
- Extended VGA or EVGA
- 1024 x 768

Terms like *high resolution*, *super VGA*, and *extended VGA* do not have the same meaning as *1024 x 768*. If you find these terms used by your application program, refer to the documentation that came with the program for additional information.

Display Support: The SVGA controller provides support for a wide variety of displays. The following list describes the categories of supported displays.

- 640 x 480 (60-, 72-, 75-Hz non-interlaced displays)
- 1024 x 768 (60-, 70-, 72-, 75-Hz non-interlaced displays and 43-Hz interlaced displays)
- 1280 x 1024 (60-, 73-, 75-Hz non-interlaced displays and 43-Hz interlaced displays).

Video Configuration: You can view the current settings for your video features by selecting the **Video Setup** on the Devices and I/O Ports screen of the Configuration/Setup Utility program. The information identifies your current video controller and the amount of usable video memory you have available.

Special Characters and Languages: The SVGA video controller can display a variety of characters and languages. The language that is supported depends on the *code page* loaded by your operating system. Following is a list of supported code pages.

| Language | Code Page |
|-----------------|-----------|
| Multilingual | 437 |
| Multilingual | 850 |
| Portuguese | 860 |
| Canadian French | 863 |
| Nordic | 865 |
| Russian | 982 |

You can find additional information about code pages in your operating-system documentation.

System Programs

The system programs contain the power-on self-test (POST) routines and the Basic Input/Output System (BIOS) instructions. These programs are contained in *Flash EEPROM* modules on the SBC.

Updating the Flash EEPROMs: As part of the continuing work to improve quality, IBM might make changes and enhancements to the POST routines and BIOS instructions that are on the SBC. You can use the revision level to determine if a later version is available. If updates are required for the Flash EEPROM, updated versions of the system programs will be made available on the Web. See “Downloading System Support Programs and BIOS Updates” on page 8-2 and “Flash (BIOS/VPD) Update Procedure” on page 8-2 for more information.

You can verify the Flash EEPROM update by selecting the **Product Data** option on the Configuration/Setup Utility program main screen. For information about the Configuration/Setup Utility program, see “Using the Configuration/Setup Utility Program” on page 4-6.

