

Many built-in features, such as the serial and parallel ports, have programmable (changeable) 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 unit to the default (factory) settings.

Note

Pressing F5 while in the Configuration/Setup Utility program will restore your system unit's configuration to the default (factory) settings. The restore function will, however, attempt to preserve diskette drive types and avoid 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 ► 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, tapes, and so forth) 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.

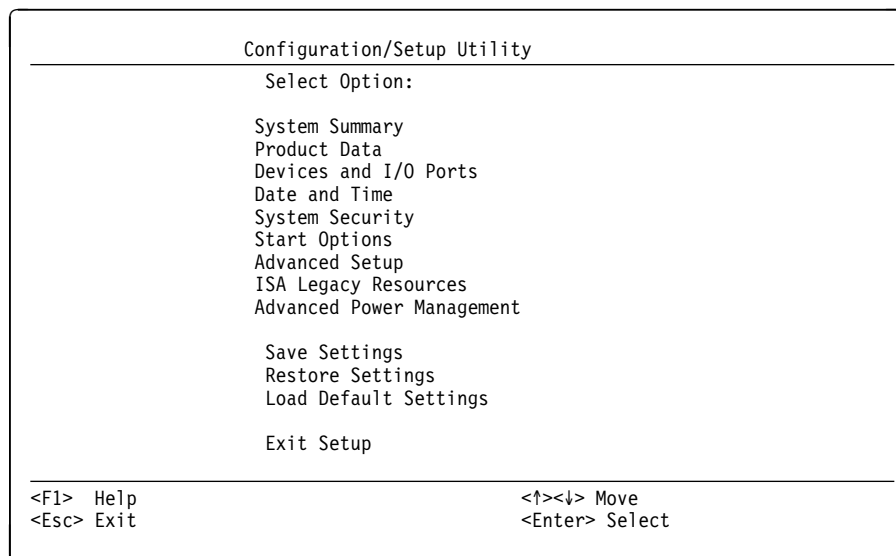
Note: If you have set an Administrator Password, a password prompt appears. You must type the correct Administrator Password before you can use the Configuration/Setup Utility program.

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 (↑ and ↓) 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 (← and →) 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
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 arrows (↑ ↓) 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 unit 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
Processor Speed	166 MHz
Math Coprocessor	Internal
System Memory	640 KB
Extended Memory	7168 KB
Video Controller	S3 Incorporated, Trio64V+
Cache Size	256 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	Not installed
Hard Disk Drive 1	Not installed
Hard Disk Drive 2	345 MB
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.

Product Data	
Machine Type/Model	7500MMM
Flash EEPROM Revision Level	LX96000US
System Board Identifier	IP501000063
System Serial Number	96G0000
BIOS Date	08/29/99

Figure 4-3. Example Product Data Pop-Up

Note: *System Board* refers to the IBM SBC.

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

Mouse

Indicates if an external 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.

- 1.44MB 3.5"
- 2.88MB 3.5"

Serial Port Setup

Displays the Serial Port Setup pop-up, as illustrated in Figure 4-5.

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 4-5. 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 to make a priority list for tasks that can be *interrupted* to process an instruction with a higher priority. 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 4-23.

Parallel Port Setup

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

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 4-6. Example Parallel Port Setup Screen

Parallel Port

Displays the current port address. Use the right and left arrow keys to change the setting so each device has a unique address. For more information about the parallel port, see page 4-24.

Parallel Port Mode

Indicates the present mode of operation of the parallel port attached to the IBM SBC. You can select either Extended or Standard mode. In standard mode, you are limited to a write-only mode. In extended mode, you are offered four other modes that allow the parallel port both read and write function (see “Changing the Parallel-Port Mode” on page 4-25).

Parallel Port Extended Mode

You can change this field only if 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 (PS/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’s ability to use DMA. The device attached to the parallel port must be able to support DMA.

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 4-24.

Video Setup

Lets you customize video parameters, as illustrated in Figure 4-7.

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 4-7. Example Video Setup Pop-Up

Video Controller

Identifies the video controller chip, or chip set, present on the IBM 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**. 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 7587 Industrial Computer, the first 3.5-inch drive is shown as Hard Disk Drive 2. If a 2.5-inch drive is installed, it is shown as 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	[Disabled]
Drive 2 & 3 Prefetch	[Enabled]

Figure 4-8. 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 4-9 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	541 MB
IDE Performance	[High Performance]

Figure 4-9. 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 IBM 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's 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 4-10.

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

Figure 4-10. 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 4-11. System Security Pop-Up

Secure Hard Disk Drives and Diskette Drives

Lets you secure your disks and diskettes. Figure 4-12 illustrates the current access status.

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

Figure 4-12. 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 IBM 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 4-13. Power-on Password Pop-Up

Administrator Password Option

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 4-14. 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 4-15. 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 4-15. 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. In the 7587 Industrial Computer, the first physical disk drive is 2, but it is listed as Hard Disk Drive 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 system unit from your 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 enable or disable the display of the main power-on logos. 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.

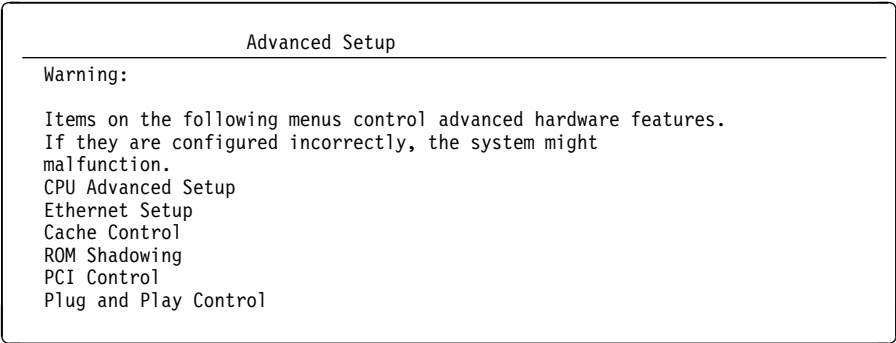


Figure 4-16. Advanced Setup Pop-Up

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**.

Cache Control

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

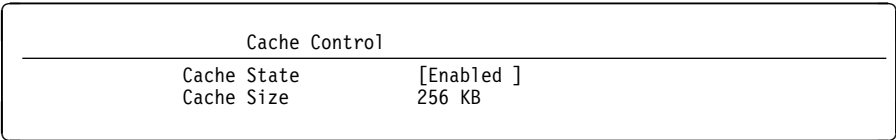


Figure 4-17. Cache Control Pop-Up

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 4-18. If the address range is used for an adapter card buffer, do not enable shadowing.

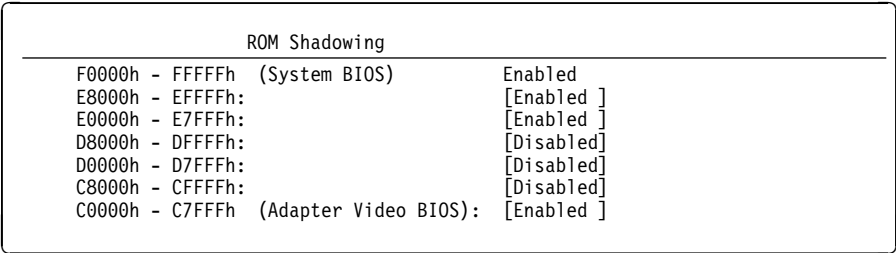


Figure 4-18. Example ROM Shadowing Pop-Up

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.

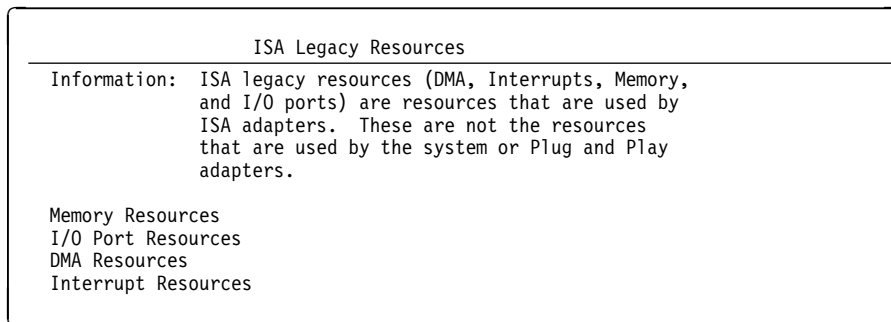


Figure 4-19. ISA Legacy Resources Pop-Up

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 A uses IRQ 4, which is shown as a System Resource. If Serial 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 4-20 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 4-20. 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 4-21 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 4-21. 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 4-22 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 4-22. 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 4-23 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 4-23. 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 4-24. 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 4-25. 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 4-26. 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 4-22 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	8 bits	Reserved (cascade channel)
5	16 bits	Available
6	16 bits	Available
7	16 bits	Available

IBM SBC Jumpers and Switches

Jumpers are located on the IBM SBC and can help you customize the way your system unit operates. See Appendix D, “Jumpers, Switches, and Pin Assignments” for jumper locations, descriptions, and instructions on how to change jumpers.

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 IBM 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 IBM 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 8 bits at a time. The serial port can transmit data at speeds ranging from 300 to 19.6K bits per second. The bits-per-second measurement is commonly referred to as the *baud rate*.

Your system unit 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 the serial ports to any of the following settings:

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

The serial ports are set to 3F8h – IRQ 4 and 2F8h – IRQ 3 at the time of shipment.

Many operating systems and application programs have a setup program that defines the location and speed (baud rate) of a modem, or the location and type of serial printer. Many use “COM” (short for “Communications”) to refer to the serial ports. For example, COM1 might be assigned to I/O address 3F8h – IRQ 4. 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 (↑ and ↓) to highlight one of the two serial port settings.
4. Use the left arrow and right arrow keys (← and →) 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 (← and →) 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 Serial Port A or B, shown as **3** and **4** in Figure 1-3 on page 1-3.
2. Plug the other end of the serial cable into the external device. (If the serial cable does not fit, you may need to purchase a cable adapter.)
3. Make any adjustments or add any features needed to operate the device. For example, your external device may 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 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 – IRQ 7
- 378h – IRQ 5
- 278h – IRQ 5
- Disabled

It is set as 3BCh – IRQ 7 at the time of shipment.

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.