Notebook Computer Expansion Station User's Manual
Part No. 2607753-0002
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Changes may be made periodically to the information in this publication. Such changes will be incorporated in new editions of this manual.

This product, as well as the programs created to use with it, are tools that can help people better manage the information used in their business; but tools-including this product-cannot replace sound judgment nor make the manager's business decisions.

Consequently, the manufacturer cannot warrant that its products are suitable for any specific customer application. The manager must rely on judgment of what is best for his or her business.

Notice

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

> Reorient or relocate the receiving antenna
> increase the separation between the equipment and receiver
> Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
> Consult the dealer or an experienced radio/television technician for help

Notice: Shielded Cables

All connections to other computing devices must be made using shielded cables to maintain compliance with FCC regulations.

Notice: Peripheral Devices

Only peripherals (input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this equipment. Operation with
non-certified peripherals is likely to result in interference to radio and TV reception.

Caution

Changes or modifications not expressly approved by the manufacturer could void the user's authority, which is granted by the Federal Communications Commission, to operate this equipment.

Use Conditions

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

Notice: Canadian Users

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.
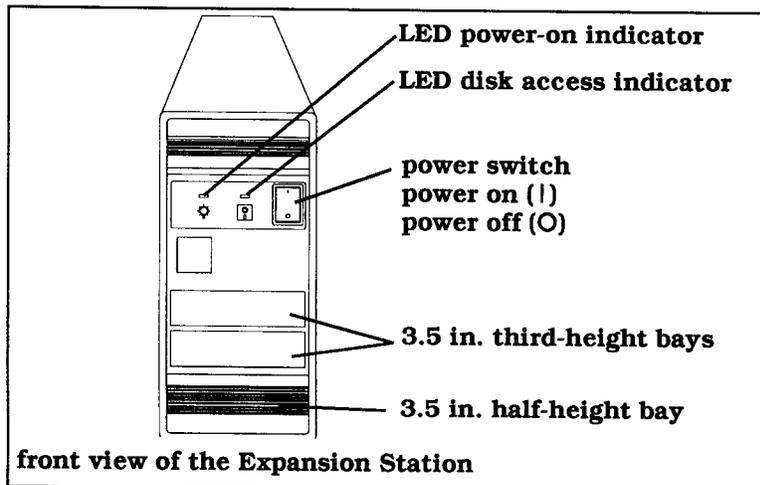
Expansion Station Description

The Notebook Computer Expansion Station is designed for easy operation and requires no internal settings. It has three full-size expansion slots that can be used to add PC XT -and AT -compatible cards to your portable computer, such as a hard-disk drive controller, a memory board, a terminal emulation adapter, or a network board.

Note: For easier setup and operation with compatible cards, the CPU and bus clock must be set to Auto Mode.

In addition, one 3.5-inch half-height bay and two 3.5-inch third-height bays are provided for hard-disk drives and/or another mass storage device. Most brands of PC-compatible drives can be used.

A modular, 3-foot interface cable is provided so that the Station can be placed away from the computer. The Station interface adaptor has a keyboard interface that can be used to attach a full-sized external keyboard.

LED power-on indicator

LED disk access indicator

power switch
power on (I)
power off (O)

3.5 in. third-height bays

3.5 in. half-height bay

front view of the Expansion Station

The power switch is located on the front panel. Two indicators are located next to the power switch: a green power-on indicator and a yellow drive access indicator.

Symbols used in This Manual

Note that several international symbols are used throughout this manual to advise you of important information.

This symbol indicates a Note concerning operating procedures or information you should know to help you operate your Expansion Station.

This symbol alerts you to a Warning or Caution which can prevent you from causing a hazard to your self or your Expansion Station.

This symbol tells you that more information about the same subject is continued on the next page.

Contents of This Manual

Setting Up the System explains how to install and operate the Station.

Installing Internal Options provides instructions for installing optional equipment, such as a special-function card and a hard disk drive.

Troubleshooting provides information to aid you in identifying and solving problems with the Station.

Unpacking

To remove the Station from its shipping carton, place the car-ton on the floor either braced between your feet or with a second person holding it. Lift the Station upwards along with its foam packing. After the unit is clear of the carton, set it on a clean, flat surface, and remove the foam packing.

Included in the shipping container with the Expansion Station is a separate carton containing the following items.

•   Interface cable

•   Interface module

•   AC power cord

•   Small bag with drive-mounting fasteners

•   This user's manual

If any of these components are missing, or if you detect any damage, contact your dealer immediately.

Connecting to Your Computer

The Station is connected to your computer with an interface module and an interface cable (included in the accessory package). Place the Station on a desk or workstation close enough to your computer so that the interface cable can be easily connected. The front panel should face you so that the indicator lights are clearly visible.
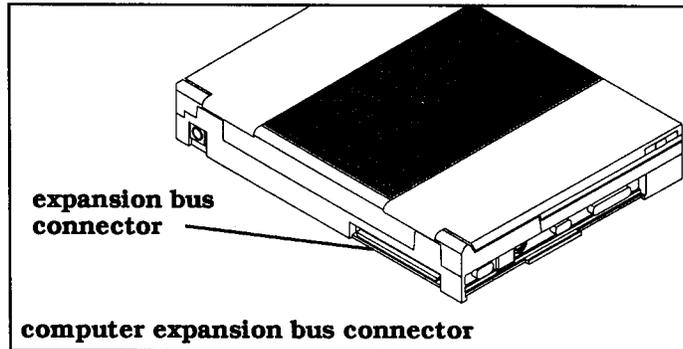
Note: Turn off power to both the computer and the Station before connecting or disconnecting the interface module or cable.

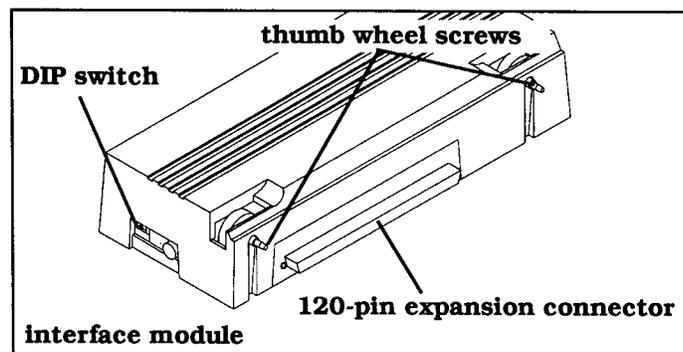Do the following to connect the interface module and interface cable:

Setting Up the System

1. Turn off both the Station and the computer.

2. Connect the interface module to the computer's expansion bus connector.

**3.** Secure the interface module to the computer by turning the two thumbwheel screws clockwise.

4. Connect one end of the interface cable to the interface module and the other end to the interface connector on the back of the Station as shown in the following figures. The interface cable connector ends are interchangeable, and either end can be connected to either device.

100-pin interface cable connector

external keyboard connector

interface module connectors
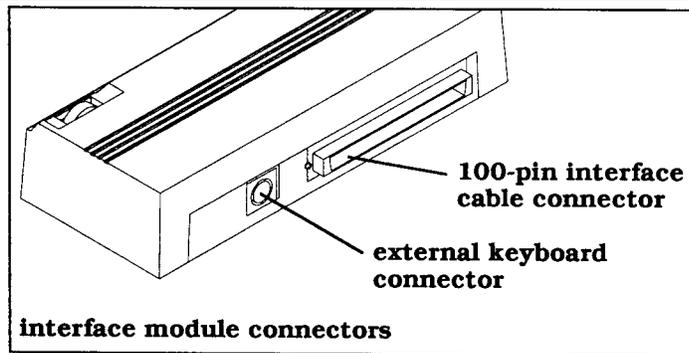
5.   Secure the interface cable's connectors by screwing in the two finger screws on either side of the connectors.

The Station can be detached from the computer by turning off power and then disconnecting either the interface module or just the interface cable. Remove the interface module by turning the thumbscrews counterclockwise. Remove the interface cable by unscrewing the finger screws.

Note: The interface cable has been designed for frequent connection and disconnection. However, be careful not to apply unnecessary stress to the connectors or to the cable.


factory-installed interface adapter card

interface connector

AC receptacle
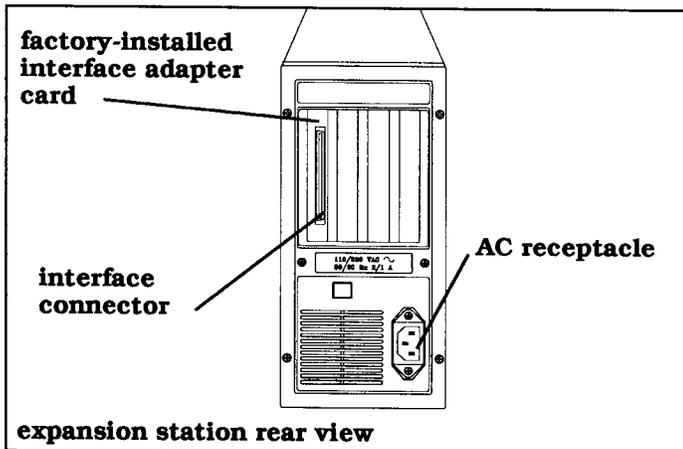
expansion station rear view

Setting the Interface Module DIP Switches

The DIP switch located on the interface module enables you to select the type of keyboard and computer you are using with the Expansion Station. The DIP switches can be positioned up or down.

It is important to set the DIP switches to the correct posion for your system setup, or your computer and Station may not operate.
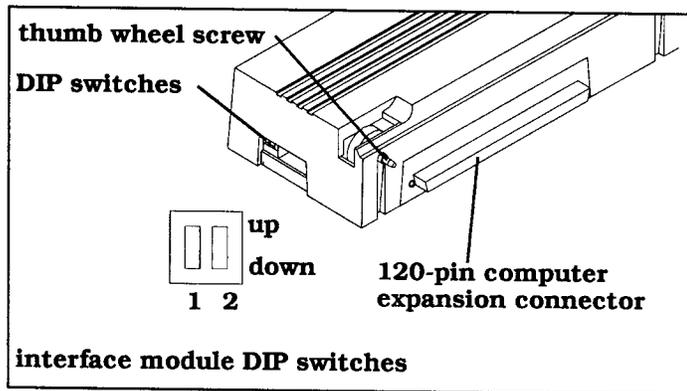
Keyboard Setting

DIP switch I is used to select either an external keyboard or the internal keyboard on your computer according to the following table.

Computer Setting

DIP switch 2 is used to select the type of processor used by your computer, either 386 or 486. This switch must be set correctly for the Station to operate with your computer.

Note: DIP switch 2 must be set in the Down position for operating the Expansion Station with 386 or 486 processors. The 286 processor is no longer supported by the expansion station.
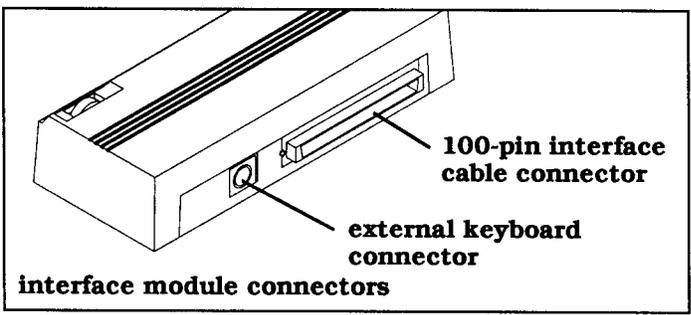
DIP Switch Settings

Function	SW1	SW2
External Keyboard Enabled	Down	-
Internal Keyboard Enabled	Up	-
386SX Processor	-	Down
486SX and 486DX Processors	-	Down

Caution: **Turn off both the computer and the Station before setting the DIP switches.**

Connecting an External Keyboard

You can connect an external keyboard to your computer via the Expansion Station. A PS/2-compatible keyboard can be connected directly to the 6-pin mini DIN, PS/2 compatible connector on the interface module.

100-pin interface cable connector

external keyboard connector

interface module connectors

Note: A keyboard adapter, available at most computer stores, is required to connect an AT-compatible keyboard with a standard 5-pin maxi DIN connector to the interface module

Setting Up the System

The interface module DIP switch must be set for external keyboard operation before you can use an external keyboard. DIP switch 1 must be in the Down position to select the external keyboard. (Refer to the previous section, "Setting the Interface Module DIP Switches.") Remember to set switch I to the Up position when using the computer's keyboard.

⚠

> **Caution:**   **Always turn off the computer and the Station before attaching the external keyboard and setting the DIP switch.**

Connecting the Power Cord

Do the following to connect the AC power cord (included in the accessory package) to the Station:

1.   Make sure the power switch on the front of the Station is set to the 0 (off) position.

2.   Plug the power cord into the AC receptacle on the back of the Station.
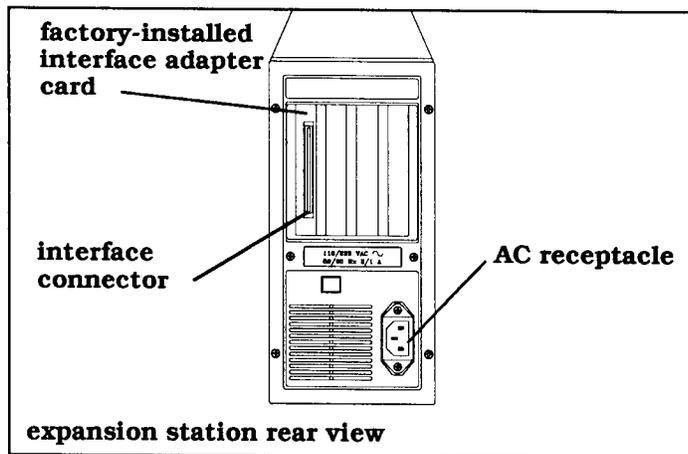
3.   **Plug the other end of the power cord into an AC power outlet of the correct voltage.**

Note: The Station's power supply automatically adapts to an input voltage of either I 10 Vac or 220 Vac, as required. An appropriate 220 Vac power cord must be supplied by the user.

Turning Power On

The power switch for the Station is located on the front panel. The green indicator light will illuminate when power is on.

Note: Always turn on the Expansion Station before turning on your computer. If the computer is turned on first, the system can lock up and not respond to commands. If this happens, reboot the computer, or turn it off and turn it back on again after 5 seconds.

Installing Internal Options

Preparing to Install Options

Before installing a card or drive, you will need to remove the chassis cover from the Station. Instructions for this are provided below.

Read the documentation for the drive or card carefully before installing it. If you require assistance, contact your dealer.

Removing the Chassis Cover

Take the following steps to remove the chassis cover from the Expansion Station:

1.   Turn off power to the Station and the computer and unplug the power cords.

   Caution: To avoid shock, always make sure power is off to the Station and the computer and unplug all power cords.

2.   Disconnect the interface cable from the Station.

3.   Remove six screws from the back of the Station using a No. 2 Phillips screwdriver. Save the screws for later reassembly.
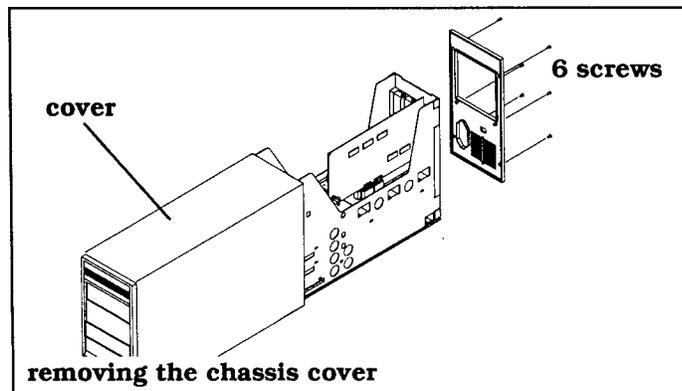
4.   Carefully slide the cover forward until it is free of the chassis.

Installing Special-Function Cards

Special-function cards include memory expansion cards, network cards, video adapter cards, modem cards, and disk drive controller cards. For a list of special- function cards tested and found to be compatible with the Station and your computer, see Appendix A. A special-function card can be installed in one of the three available expansion slots in the Station.

Notes: 1. The Station is not designed to support special function cards that require the use of the master control line. These cards are sometimes referred to as "bus master" cards. Some bus master cards are capable of running in a non-bus master mode and may be compatible with the Station. Refer to the card's documentation or contact your dealer for more information.
2.   Since the manufacturers may change their product at any time, compatibility with the station cannot be guaranteed.

Special-function cards typically require switch or jumper settings, physically and/or through software routines, of any or all of the following parameters: hardware interrupts, DMA channel assignments, 1/0 port addresses, and memory addresses. Some cards may also require other settings such as memory access times or wait state selections.

Before installing a card, read the card's documentation to determine if switch or jumper settings must be changed to configure the card for operation with your computer or the Station. It is important that one card's settings not interfere with other cards' settings, and that it is compatible with the parameters set in your computer. Refer to your computer's documentation for more information.

Installing Internal Options

When assigning communication ports (Com1, COW, remember that no two ports within the system should be given the same port assignment. COM2 is generally asigned to a modem, if installed. Before setting the port assignments, review the documentation for the software you plan to use with the special-function card. Some software products will work only with a specific port.

⚠ **Caution:** **Prevent possible component damage caused by electrostatic discharge (ESD). Use a high-impedance, grounded-conductive floor mat or wrist strap to prevent ESD. Before touching the integrated circuit devices, discharge static electricity from your hands, tools, and containers by touching them to a grounded surface.**

Install a special-function card in the Station as follows:

1. Remove Station chassis cover as described previously.

2. **Remove the slot cover from a vacant expansion slot on the back of the Station and save the screw.**

3. **Position the special-function card so that it is properly aligned with the edge connectors along the bottom of the Station chassis.**

installing a special-function card
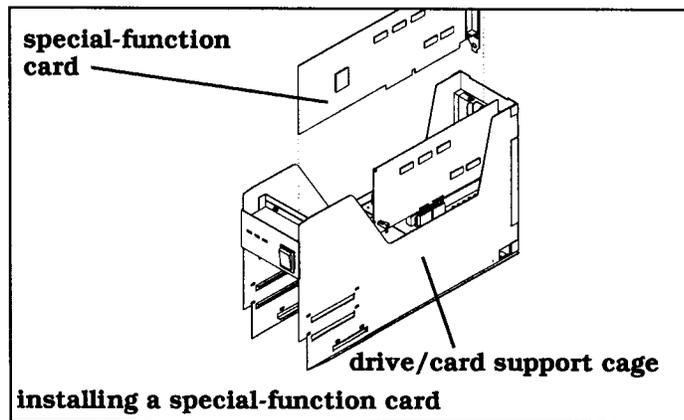
4.   Holding the card by its edges, carefully press it into the edge connectors. When installing a full-size card, make sure that the edge of the card opposite the back panel slot is inserted into the guide provided. if the card is fully seated into the connector and properly aligned, the slot cover on the card will be aligned with the opening in the back panel.

5.   Align the slot cover on the card with the screw hole in the back panel and insert the screw saved in step 2.

Note: To keep dust out of the Station, keep a blank slot cover over the opening of any slots that are not used.

6.   Slide the chassis cover back into position and refasten the six screws on the back of the chassis.

Installing a Hard-Disk Drive

You can install from one to three 3.5-inch hard-disk drives in the Station. A PC-compatible hard-disk drive controller capable of operating as a secondary controller is required. Refer to Appendix A for a list of cards tested and found to be compatible with the Station. A hard-disk drive installed in the Station should be given the next logical drive designation after any that are already assigned, usually D.

Do the following to install a hard-disk drive in the Station.

1.   Remove all packing material from the disk drive.

2.   Remove the Station chassis cover as described previously.

3.   Slide the disk drive into a bay at the front of the Station chassis, aligning it with the screw holes on the sides of the chassis.

4. Secure the disk drive to the chassis with screws through both sides of the chassis as shown in the following figure.

> **Note:** If no mounting screws are furnished with the disk drive, use the screws furnished with the Station.

installing a hard disk drive
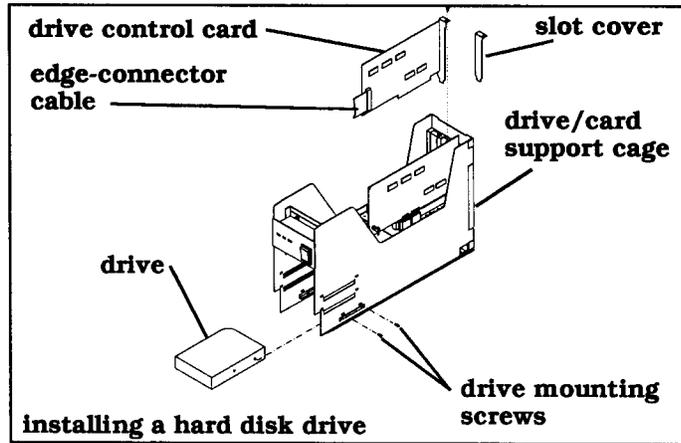
5. Locate the four-pin power cable connected to the Station's power supply, and connect the free end to the power connector on the back of the hard-disk drive.

6. Locate the two-pin disk access indicator cable inside the Station. Connect the free end to the hard-disk drive. (The location of the connector on the disk drive may vary.)

If there is no two-pin connector on the disk drive, connect the two-pin drive access indicator cable to the secondary controller board.

Installation of the secondary controller board is described in the following section.

Note: If the disk access indicator light on the front panel does not work after installing the drive, try reversing the two-pin cable to switch the pin connections.

Installing a Hard-Disk Drive Controller Card

Follow the steps below to install the hard-disk drive controller card in the Station. Read the documentation for the controller card. The installation procedures for your controller card may vary slightly. If you are installing a card for the first time, read the section, "Installing Special-Function Cards" earlier in this manual.

1.   Before installing, verify that all jumper and/or switch settings on the controller card are configured for operation with your computer. Refer to the controller card's documentation for these settings. If you need assistance, contact your dealer.

2.   If you have not already done so, remove the Station chassis cover as described previously.

3.   Remove the slot cover from a vacant expansion slot on the back of the Station and save the screw.

4.   Insert the controller card into the connector that runs along the bottom of the Station.

Caution: Prevent possible component damage caused by electrostatic discharge (ESD). Use a high-impedance, grounded-conductive floor mat or wrist strap to prevent ESD. Before touching the integrated circuit devices, discharge static electricity from your hands, tools, and containers by touching them to a grounded surface.

5.   Use the slot cover screw removed in step 3 to fasten the card's slot cover to the back panel.

6. **Depending on the type of controller card, attach either one or two edge-connector cables to the** controller card and to the hard-disk drive. Attach the cable(s) to the controller card first and then to the disk drive. Orient the cable(s) so that pin 1 on each connector is matched. A colored edge on a cable usually indicates pin 1, or you can look for the number I on the connector itself. Twist the cable, if necessary, to make it fit neatly inside the Station.

Note: If you twisted the ribbon cable in step 6, make a fold or crease in the cable at the point of the twist, and gently press the surfaces together. If a twisted cable is not folded, it could be damaged or interfere with reattaching the cover.

7. Slide the chassis cover back into position and refasten the six screws on the back of the chassis.

Formatting a Hard Disk

A new hard disk must be formatted before use. For information on partitioning and formatting a new hard disk, refer to your disk drive's documentation, to your operating system manual, or consult your dealer.

General Troubleshooting

Begin the troubleshooting process by determining the most likely cause of the problem. Problems often occur after installing new equipment or after some change is made. Refer to your computer's user manual for information on problems with your computer. Also consult the documentation for any installed devices or cards.

For problems not covered in this section or if a hardware defect is suspected, contact your dealer for technical assistance.

New Installations

Most problems with newly installed equipment are caused by incorrect cabling or improperly set switches and jumpers on the card or device. Verify that all cables are properly attached, fully seated, and secured by screws or clips (where applicable), and that all switches and jumpers are set according to the instructions supplied with the product. Also verify that the software you are using is correctly installed and configured to your system.

After Extended Use

Determine what conditions might have changed since the last time the Station operated properly. Was a new device added? Was a cable disconnected? Verify that the Station was turned on before turning on the computer.

Note: Some devices are not compatible with the Expansion Station. Before purchasing a special-function card or disk drive, refer to Appendix A for examples of compatible devices, or contact your dealer.

Troubleshooting

If you encounter any of the following problems, try the suggested solution. If a problem persists, is not covered in this chapter, or if a hardware defect is suspected, contact your dealer.

If there is the fan

Nothing happens when you turn on the power no response when you turn on the Station (the power indicator light should be on and blowing), verify the following:

> - Is the power cord securely connected to the AC receptacle on the back panel of the Station?
>
> - Is the power cord connected to a live AC receptacle? If necessary, verify that the receptacle is live by plugging in another device or using approved testing equipment.
>
> - Is the computer turned on, and is it plugged into a live AC receptacle?

If the following:

The computer will not access the station Station or devices connected to it do not respond to the computer, verify the

> - Is the interface module securely attached to the computer's interface connector? If not, turn off both units before attaching it.
>
> - Is the interface cable securely attached to the interface module? If not, turn off both units before attaching it.

Was the Station turned on at the same time or before the computer? If not, make sure the Station is powered on, then reset the computer, or turn it off and turn it back on.

- Is the problem with the Station or the portable computer? Remove the interface module or cable from the computer and verify that you can power up the computer when it is detached from the Station.

- Is there a conflict between a special-function card and the computer? Remove one card at a time from the Station. After each card is removed, repeat the steps outlined in "Setting Up the System" to establish communications between the computer and the Station.

- If you find that a card is creating a conflict, try changing the configuration settings for the card. Refer to the card's user manual for more information. If this does not solve the problem, the card may not be compatible with the computer or with the Station.

If you have **The hard-disk drive cannot be accessed** just installed a hard-disk drive but cannot access it, verify the following:

- Was a controller card installed?

- Were the power cable (four-pin) and controller cables connected to both the hard-disk drive arid the controller card?

- Were all switches and jumpers on the controller card set for your configuration? Refer to the controller card documentation for these settings.

- Has the new hard disk been fomatted? Refer to the hard-disk drive documentation, your DOS manual, or consult your dealer.

Dimensions

Width: 4.75 in. (12.1 cm)

Depth: 16.4 in. (41.7 cm)

Height: 10 in. (25.4 cm)

Weight: 19.5 lbs. shipping with accessories 15.0 lbs (Station only)

Ambient Temperature

Operation: 400 to 120' F (50 to 500 C)

Storage: 320 to 1400 F (0' to 60' C)

Humidity

Operation: 20 to 80 percent, noncondensing

Storage: 10 to 90 percent, noncondensing

Vibration

Operation: 17-150 Hz, 0.55 G

Storage: 17-200 Hz, 1 G

Power Supply

Continuous output: 55 watts

Peak output: 65 watts

Efficiency (full load):   75% _ 5%

Specifications

Input
Automatic AC input   90 Vac to 132 Vac
range selection: (175 Vac to 264 Vac)

AC input frequency: 47 Hz to 63 Hz

Inrush current (cold):   15A at 115 Vac

Output
Load:

voltage	Power supply	Available Current	Line Regulation	Load Regulation
+5 Vdc	6.0 A	5.4 A	0.2%	2%
-5 Vdc	0.50 A	0.50 A	0.5%	2%
+12 Vdc	3A/4A peak	2.85/3.85 peak	0.2%	2%
-12 Vdc	0.50 A	0.50 A	0.5%	2%

+5 Vdc is adjustable from 4.75 V to 5.50 V, factory set to +I% nominal. AR other voltages are fixed with fully regulated output.

To calculate the available current for special-function cards and drives, subtract 0.6A on the +5 Vdc and 0. 15A on the + 12 Vdc used by the Expansion Station.

The + 12 Vdc current is shown as nominal/peak, where nominal current is continuous and peak is available momentarily during drive spin-up.

Overload protection is through fold back.

Minimum rise time to 90% of rated voltage is 5 ms.

Overload protection:	Fully protected against output overload and short circuit; automatic recovery upon removal of overload condition
Overvoltage protection:	Provided onthe main +5 V output set at 6.2 V + 0.6 V
Input protection:	AC input live fuse provided internally
Output noise and ripple:	0.3% RMS, 1% peak to peak maximum on main +5 V output
Power-up initialization period:	Typical 0.3 second turn-on delay assures orderly ramp-up and stabilization of all output voltages
Inrush current:	Internally limited by thermistor

Configuration

Bus configuration:	AT bus (8 MHz)
Expansion slots:	Three AT expansion slots
"B" bay configuration:	One 3.5-inch, half-height drive bay Dual 3.5-inch third-height drive bays

Indicators

Power:	Indicates that the Station is powered on
Disk:	Indicates that the disk drive (if installed) is being addressed

Specifications

Connections

AC input connection: Male connector connects to
110 Vac (220 Vac) power
supply via 3-prong cable

PS/2 Keyboard: Female connector for external
PS/2-style compatible keyboard;
+5 Vdc at 150 mA max available
current

Interface cable: Interfaces between Expansion
Station and Interface Module

Hardware Interrupts

The Expansion Station allows special-function cards to use the following available interrupts. Refer to each added device's documentation for proper configuration parameters.

Request	Function
IRQ2	Available
IRQ3	Serial port 2 (available)*
IRQ4	Serial port 1 (available)*
IRQ5	Available
IRQ7	Parallel port I (available)*
IRQ9	Software redirected to IRQ2 (available)*
IRQ10	Available
IRQ11	Available
IRQ 12	Available

*A conflict may arise if the Station card shares IRQ with the notebook computer.

Direct Memory Access Controllers

Two direct memory access (DMA) controllers in your computer provide the Station with the following available DMA channel assignments:

DMA Controller 1	DMA Controller 2
-	Channel 5
Channel 1	Channel 6
Channel 3	Channel 7

The following IBM and compatible cards and peripherals have been tested and found to perform acceptably with the Expansion Station. Cards and peripherals not listed may also perform acceptably but were not tested at the time of printing. If you have a question about a specific product not listed, contact your dealer or the manufacturer of the product.

Note: Since the manufacturers may change their products at any time, compatability with the Station cannot be guaranteed.

Product Tested and Company	Category	Version	Card Size	Data Path
SCSI Host Adapter Seagate	disk drive controller	use with ESDI drive	1/2	8-bit
Worn Etherlink Plus 3C505 3Com Corporation	network	Assy 2012	Full	16-bit
Token 16/4 IBM Corporation	network	N/A	1/2	8-bit
Everex Evercom 24 EV-940 BD Everex	modem	Rev. E.	1/2	8-bit
Above Board/PC Intel	memory	N/A	full	16-bit
Mini-EMS/768 Franklin Data Corn	memory	B	1/2	8-bit
Logitech Hires Bus Mouse Logitech U.S.A.	mouse	SW V3.42	1/2	8-bit
IBM 3270 Terminal Emulation Adapter IBM Corporation	terminal emulation	N/A	1/2	8-bit