9440

Industrial PC/AT^{TM}
Rack Mount Computer

P/N 106501-001B

Revision	Description	Date
A	Manual Released	6/96
B	Manual Updated (incorporates PCN 210)	7/97

United States FCC Part 15, Subpart B, Class A EMI Compliance Statement

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

For Canadian Users

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numérique n' émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques des Class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

For European Users - WARNING

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

WARNING for Electromagnetic Compatibility

The connection of non-shielded equipment interface cables to this equipment will invalidate FCC EMI and European Union EMC compliance and may result in interference and/or susceptibility levels which are in violation of regulations which apply to the legal operation of this device. It is the responsibility of the system integrator and/or user to apply the following directions which relate to installation and configuration:

1. All interface cables must include braid/foil type shields. Communication cable connectors must be metal, ideally zinc die-cast backshell types, and provide 360 degree protection about the interface wires. The cable shield braid must be terminated directly to the metal connector shell; ground drain wires alone are not adequate.

2. EMC compliance is, in part, a function of PCB design. Third party add-on PCB assemblies installed within this apparatus may void EMC compliance. FCC/CE compliant PCB assemblies should always be used where possible. Xycom can accept no responsibility for the EMC performance of this system after system integrator/user installation of PCB assemblies not manufactured and/or expressly tested and approved for compliance by Xycom. It is the responsibility of the system integrator/user to ensure that installation and operation of such devices does not void EMC compliance.

Table of Contents

Appendix A – Specifications

Appendix B – Pinouts

Chapter 1 – Introduction

Product Overview

The 9440 Industrial PC/AT Rack Mount Computer puts the power and versatility of an IBM PC/AT-compatible computer in a industry standard package that is ideal for the factory floor and other industrial applications. The Xycom 9440 Industrial PC/AT Rack Mount Computer features a design that meets the requirements of a wide variety of applications where both a powerful PC and a durable industrial enclosure are required. The system integrates the computer card cage, mass storage, and power supply in a truly industrial standard 19" EIA form factor.

The 9440 system includes a passive backplane, and hard and floppy disk drive facilities. The open-architecture design accepts IBM PC-, XT-, AT-compatible, or PCI cards, and a variety of single-board computers.

The 9440's design allows easy access to the boards, switches, power supply, and disk drives.

About This Manual

This manual describes 9440 Industrial PC/AT computer system. As the 9440 supports a variety of processor and peripheral options, refer to the documentation that accompanied the particular processor board or peripheral for information specific to that component.

Standard Features

The 9440 incorporates the following features:

- A passive backplane featuring

  - Ten ISA slots

    or

  - Seven ISA and two PCI slots.

- IDE hard disk drive

- 3.5-inch, 1.44 Mbyte floppy drive

- MS-DOS installed on the hard disk

- 200-watt power supply

- IBM PC/AT/XT compatibility

- Parallel printer port

- Two RS-232C serial ports, initially configured as COM1 and COM2

- A variety of processor board options, featuring integrated video support

- Power and hard drive activity LEDs

Optional Features

Optional items available for use with the 9440 include:

- Larger-capacity hard drives
- Solid state drive options
- CD-ROM capability
- 9440-RMS rack-mounting slide rail kit

Unpacking The System

After removing the 9440 from its box, verify that you have the parts listed below. Save the box and inner wrapping in case you need to reship the unit.

If you ordered the system with a CD-ROM installed, you will receive a CD-ROM driver disk.

- 9440 unit
- Documentation kit, which includes:
  - Power cable
  - Test software diskette
  - Two front door lock keys
  - 9440 user manual
  - CPU Manual
  - Business reply card

System Components

This section describes the external components of the 9440.

Front Panel Components

The 9440 features a lockable hinged front door that protects the drive bays, power switch and fans when closed. Figures 1-1 and 1-2 depict the 9440's front panel features.
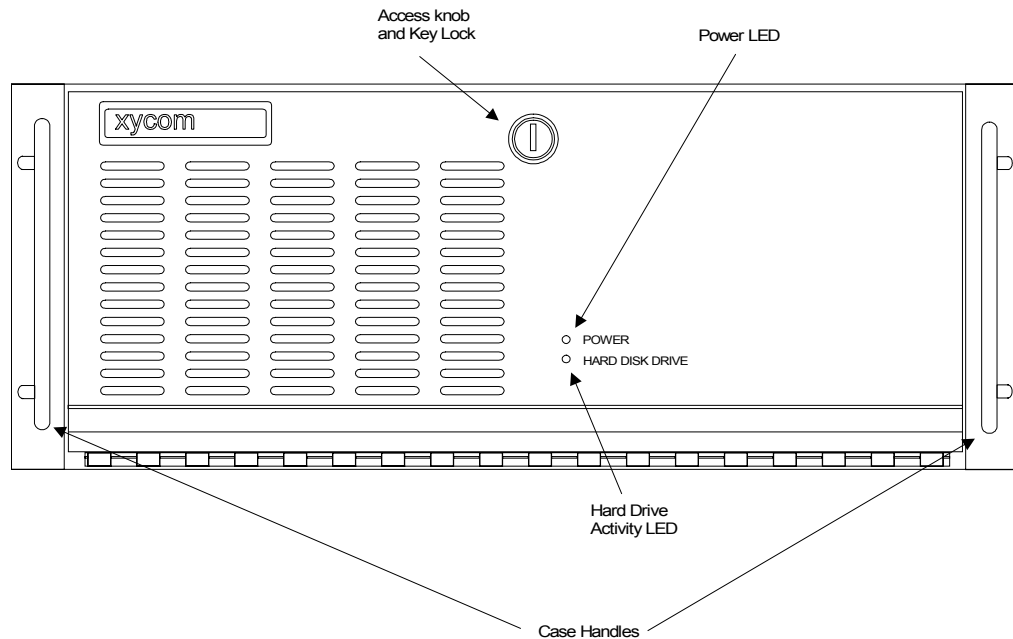
Figure 1-1. Front Door Components

Access Knob/Key Lock	Latches and locks front panel door.
Power LED	This LED glows green when power is applied to the 9440.
Hard Drive Activity LED	When properly connected to the hard drive controller, this LED glows green when the hard drive is being accessed.
Case Handles	These may be used to carry the 9440 and to maneuver it into position when mounting.

To open the front door, twist the Access Knob clockwise and pull the door forward and down. The inside front panel of the 9440 is exposed, as shown below.

Figure 1-2. Inside Front Panel Components

ON/OFF Switch   This switch should be positioned to OFF (O) until the system is properly configured and connected to a 115 VAC or 230 VAC power source.

Keyboard Connector   The optional keyboard interfaces with the system via this six-pin PS/2-compatible mini-DIN connector, located at the bottom center of the front panel.

WARNING

Do not connect a keyboard to this connector if a keyboard is plugged into the keyboard connector on the rear panel. Doing so may cause the keyboards to operate improperly.
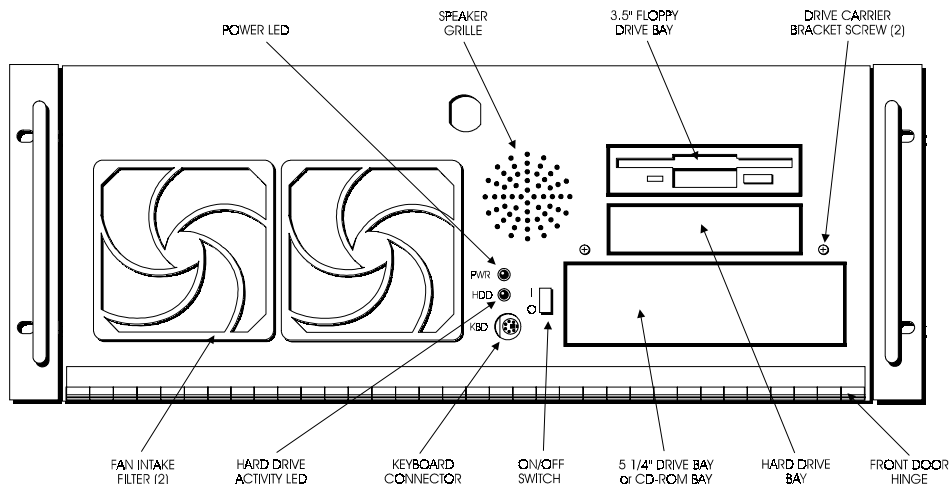

Power LED   This LED glows green when power is applied to the 9440.

Hard Drive Activity LED   When properly connected to the hard drive controller, this LED glows when the hard drive is being accessed.

Speaker Grille   The speaker is located behind this grille.

3.5" Drive Bays   These bays may hold up to two externally-accessible 3.5" mass storage devices. As shipped, the upper bay contains a floppy disk drive, and the lower a hard drive.

5.25" Drive Bay or CD-ROM Bay   This bay may hold a single 5.25" externally-accessible mass storage device or CD-ROM drive.

Fan Intake Filters   These replaceable filters separate particulate contaminants from the cooling air drawn into the 9440. Refer to the spare parts list in Chapter 5 for the part number for replacement filters.

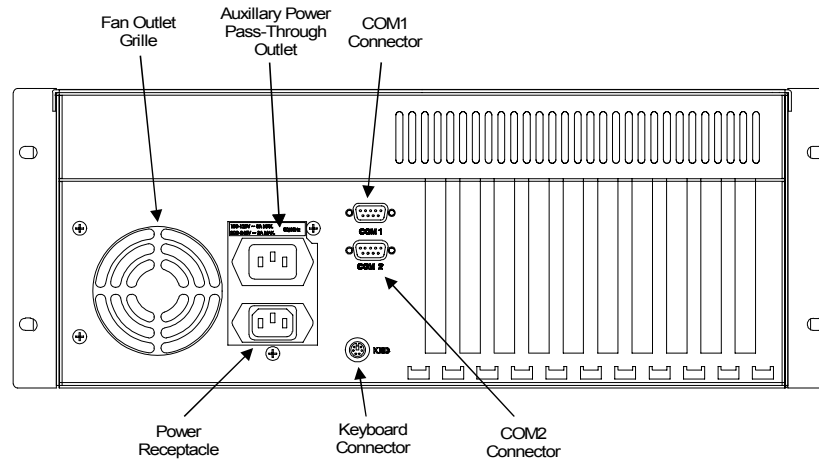# Rear Panel Components

Figure 1-3 depicts the rear panel components.

Figure 1-3. 9440 Rear Panel Components

Power Receptacle	The plug and cord must be securely positioned before turning power ON. The 9440's power supply automatically adjusts itself for 115 or 230 volt AC operation.
Auxiliary Power Pass-Through Outlet	This switched outlet may only be used to power a monitor or other device that draws less than 3.0 A peak current.
COM1 Connector	This serial port connector is a male DB-9 located above the keyboard connector.
COM2 Connector	The serial port connector is a male DB-9 located above the keyboard connector.
Keyboard Connector	The optional keyboard interfaces with the system via this six-pin PS/2-compatible mini-DIN connector, located at the bottom input/output panel, just to the left of center.

WARNING

Do not connect a keyboard to this connector if a keyboard is plugged into the keyboard connector on the front panel. Doing so may cause the keyboards to operate improperly.

Fan Outlet Grille	Unobstructed airflow is essential to proper ventilation and cooling of the 9440. Do not obstruct this outlet.

> ### NOTE
>
> The pinouts for connectors and ports are shown in Appendix B.

Quick Start-Up

> ### NOTE
>
> At minimum, you should read this section and the appendices. This section gets your system running without explaining options or capabilities of the system. The appendices provide pinouts, error messages, setup information, specifications, etc.

To prepare the system for use, perform the steps listed below:

> ### WARNING
>
> Turn the power to the unit off and unplug the power cord while making any adjustments to the inside or outside of the unit.

1. Connect the video cable from a VGA video monitor to the CRT video connector on the CPU/video card.

2. Attach optional keyboard and/or mouse.

   - Connect an external full-stroke keyboard to the keyboard connector on <u>either</u> the front or the rear panel.

> ### WARNING
>
> Do not connect more than one keyboard to the unit at a time.

   - A serial mouse may be connected to one of the serial ports on the rear of the unit.

3. Attach other optional equipment.

4. Attach the power cord from the power receptacle to a properly grounded 115 or 230 VAC outlet.

5. Turn on power to the unit. The system will boot up to the C:> prompt.

6. Install application software from the A: floppy disk drive.

7. Perform the test procedure described in Chapter 2 <u>before</u> rack-mounting or otherwise installing the 9440.

Regulatory Compliance

The Xycom 9440 Industrial PC/AT Computer is UL and CUL listed and has also been investigated for compliance with the following standards:

Agency Approvals

- UL   UL 1950 (Information Technology Equipment)
  EN 60950 (Information Technology Equipment)
- CUL   CSA 22.2, #950 (Information Technology Equipment)

Regulatory Compliance

- EU "CE Marking"   EMI   EN 55022, Class A
                        Immunity   EN 50082-2
                        Safety   EN 60950
- FCC   47 CFR, Part 15, Class A
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Chapter 2   - Testing the 9440

Diagnostic Tests

Diagnostic tests are provided as a tool to verify the operation of the 9440 system hardware functions. If any of these tests fail, either you do not have the correct default setting or there is a failure. Check the default settings and run the tests again. If the failure occurs again, contact Xycom's Product Repair & Customization Department, as described in *Product Repair*, in Chapter 5 of this manual.

NOTE

Unexpected failures may occur if Xycom diagnostics are run with device drivers or memory resident programs installed on the system. Remove these before running any diagnostic tests.

Make sure the Setup Menu is configured properly (factory set configuration). If your 9440 is configured with an AT4+ processor card, to enter the Setup Menu, press [Ctrl+Alt+S] simultaneously after the POST RAM test has completed. Make the necessary changes by following directions on the screen. Press [F10] to save the Setup and [Esc] to exit. Refer to your CPU manual for more information on the Setup Menu.

If your 9440 is configured with an AT5+ processor card, to enter the Setup Menu, press [F2] after the POST RAM test has completed. Make the necessary changes by following directions on the screen. Press [F10] to save the Setup and [Esc] to exit. Refer to your CPU manual for more information on the Setup Menu.

To test your system, you need the following equipment:

- Xycom System Test Disk—3.5-inch, DS/DD disk (bootable), part number 99290-001
- IBM PC/AT-compatible keyboard (Xycom part number 91971-001 or equivalent)
- Centronics-compatible printer cable
- Parallel printer (Centronics-style interface)
- Two serial loopback test connectors (refer to Figure 2-1 for pinouts)
- Scratch disk—formatted 3.5-inch, DS/HD (1.44 Mbyte)

Preparing For The Tests

Perform the following steps before beginning the system tests:

1. Place the CPU board jumpers and switches to the factory-set positions. Refer to your CPU manual for these settings.

2. Plug the female end of the AC power cable into the rear of the unit and the male end into a properly grounded outlet.

3. Connect the serial loopback connector(s) and the printer cable to the appropriate connectors and connect a PC/AT keyboard to a keyboard connector. Figure 2-1, below, illustrates the wiring necessary for the loopback connection.
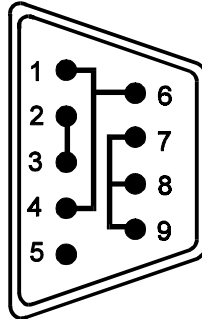
Figure 2-1. Serial Loopback Connections

Running The Tests

To run the test, insert the diagnostics diskette into drive A. Turn on the computer (the diagnostics program will boot up). Figure 2-2, on the following page, shows the Main Menu as it is displayed on the screen.

```
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Diagnostic Tests Sequence/Selection Menu (Rel. xx)

0)    WILL pause on an error      4)    Auto-select tests
1)    SINGLE PASS test mode       5)    Deselect all tests
2)    Save setup to file          6)    Quit and exit to DOS
3)    Extract setup from a file   7)    Return to Previous screen


A)    RAM Test                K)    Video Interface Test
B)    Video RAM Test          L)    Speaker Port Test
C)    Extended RAM Test       M)    LPT1: Printer Port Test
D)    Real Time Clock Test    N)    LPT2: Printer Port Test
E)    COM1 Serial Port Test   O)    C: Hard Drive Interface Test
F)    COM2 Serial Port Test   P)    D: Hard Drive Interface Test
G)    COM3 Serial Port Test   Q)    A: Floppy Drive Interface Test
H)    COM4 Serial Port Test   R)    B: Floppy Drive Interface Test
I)    Math Coprocessor Test   S)    Keyboard, Keypad Tests
J)    Video Adjustments Test        = Test Selected

[ENTER] = START TESTING
Use the letters to move the cursor and select/deselect, or use
the arrow keys to move, then use the [SPACE] key to
select/deselect a test or function:
```

Figure 2-2. Diagnostics Main Menu

You can select tests individually. However, we recommend you use Auto-select (4), which selects all tests appropriate to your configuration.

NOTE

Please read the DIAG.TXT and CMOS.TXT files on the diagnostics disk for detailed information. Refer to the CMOS.TXT file for BIOS setup information.

NOTE

If the Solid State (Flash) drive option is used, avoid repeatedly running any hard drive diagnostic utility on it. The Flash drive has a limited number of writes to each logical sector over its life span. Repeated writes caused by a diagnostic utility will prematurely shorten the life of the drive.

Chapter 3 – Installation

Introduction

This chapter describes how to install options into the 9440, and how to mount it into a rack.

General Configuration

The following four figures show components on the front panel, back panel, and inside the unit to help locate features relevant to installation
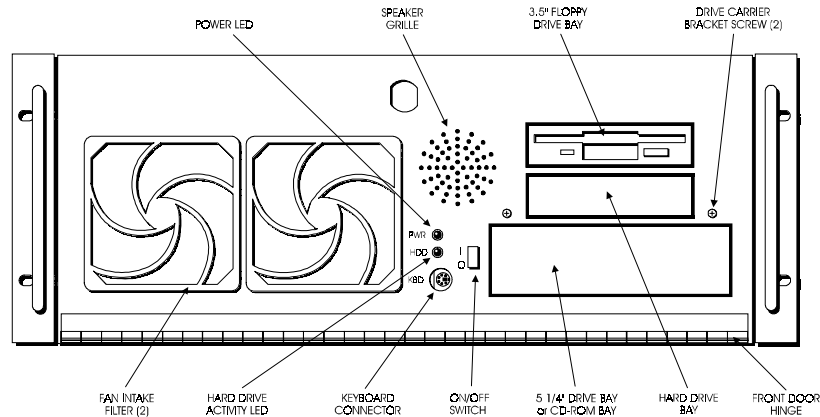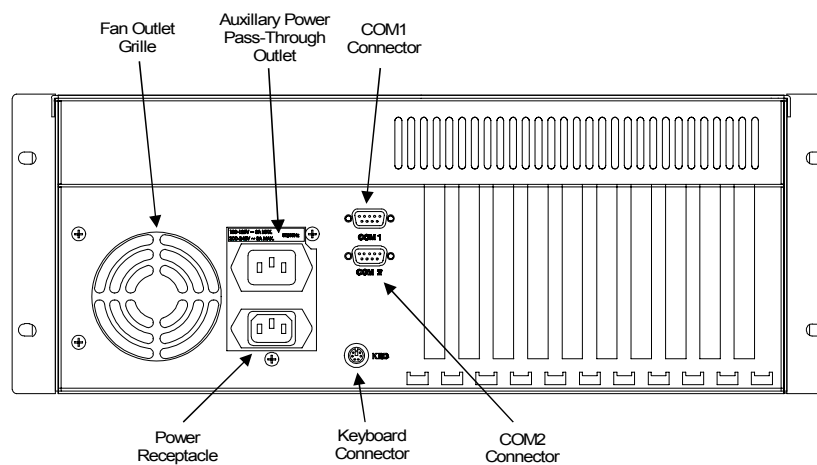

Figure 3- 1. 9440 Front Panel

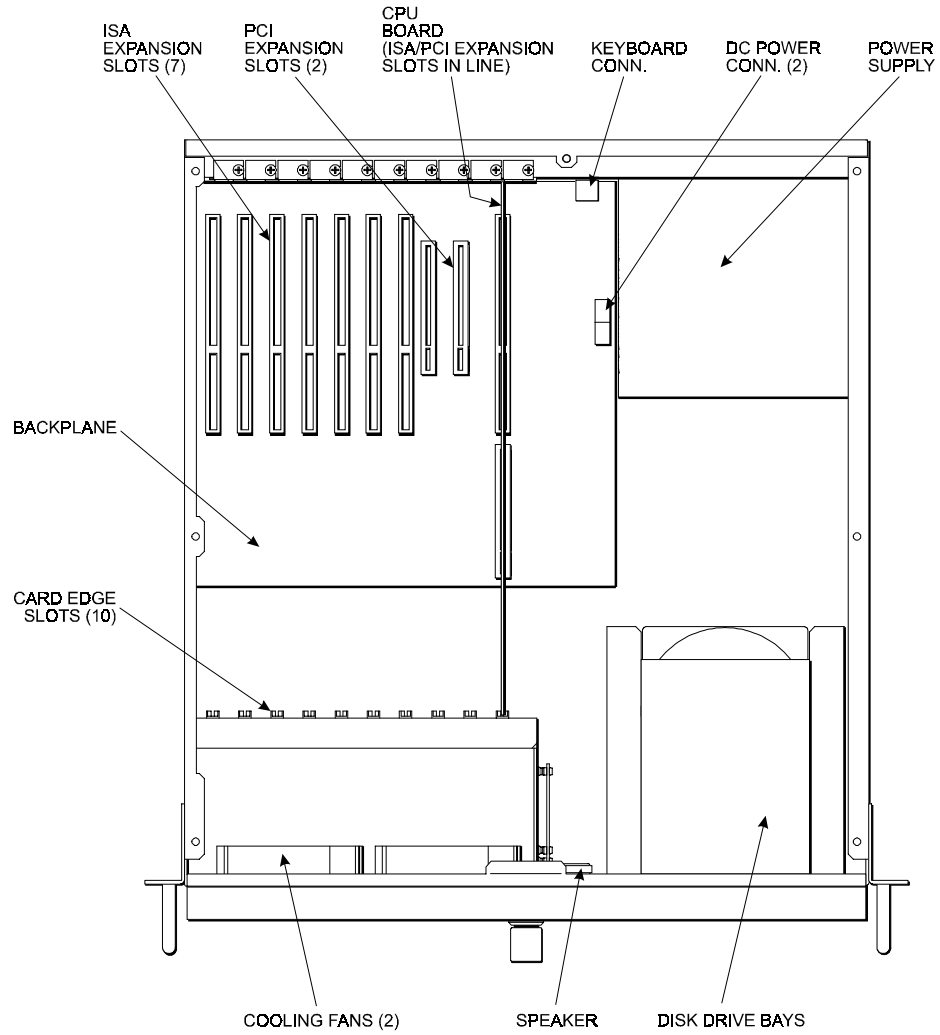

Figure 3- 2. 9440 Back Panel

Figure 3- 3. Internal System Components (ISA/PCI Backplane)
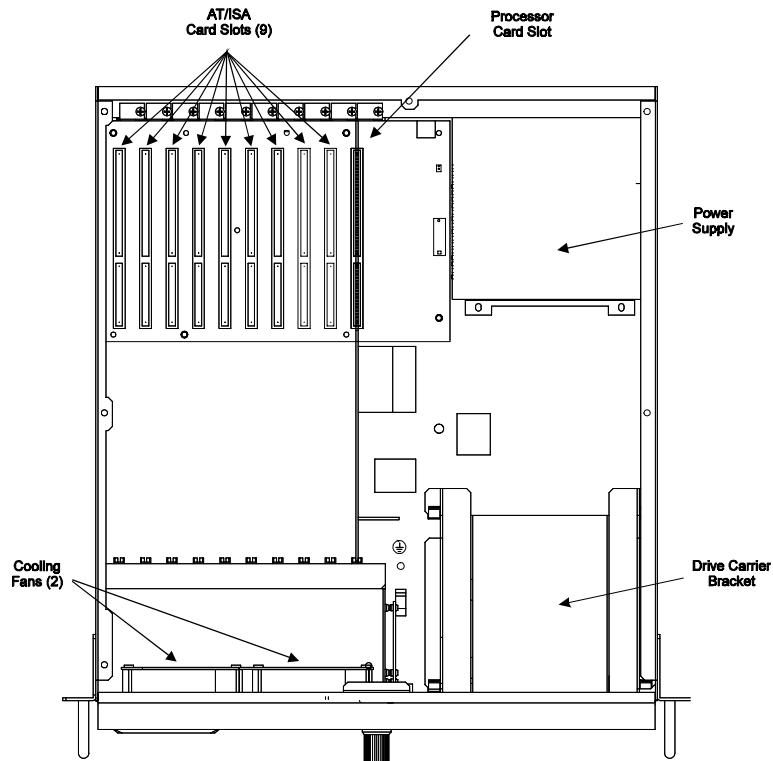
Figure 3- 4. Internal System Components (ISA Backplane)

Installing Cards and Devices

This section describes the procedures for installing cards and devices into the 9440.

Opening the Case

To access the interior of the 9440:

1. Turn off the unit.

2. If the 9440 is mounted on its optional slide rails, slide it forward, out of the rack or cabinet in which it is mounted.

3. Disconnect the power and any other cables connecting the 9440 to external devices.

4. Remove the 9440 from any rack or case in which it has been mounted.

5. Remove the seven Phillips-head screws from the top panel.

6. Slide the top panel toward the rear of the unit, then tilt the back of the panel upward and free of the unit.

Installing a Processor Card

To install a processor card:

1. Open the case, as described above.

2. Remove the blank ORB from the slot nearest the power supply. Save the screw.

3. Connect the ribbon cables from the backplane board to the processor card. Pay special attention to the orientation of the plugs as you connect them to the headers on the processor card. The stripe on the cable corresponds to pin 1 on the header on the processor card.

4. Slide the processor card into the slot. Push down on the card evenly until it firmly seats in the card cage connectors.

NOTE

<u>DO NOT</u> force the board or apply uneven pressure.

---

5. Secure the processor card ORB to the 9440 by replacing and tightening the screw that was removed in Step 2.

6. Slide the top panel into position, then replace and tighten the seven screws.

7. Reconnect the I/O cables you disconnected when opening the unit.

8. Reconnect the power cables you disconnected when opening the unit.

9. If the unit is mounted on its optional slide rails, slide the unit back into the rack or cabinet in which it is mounted.

Installing Other Cards

To install a card into the 9440 unit:

1. Check that the memory, I/O configuration and processor requirements of the board you want to install do not conflict with the CPU and memory maps of boards already installed in your system.

2. Check that the additional power required by the card will not cause the 9440 to exceed its current ratings. See *Derating the Power Supply*, later in this chapter for current ratings and specifications.

3. Open the case, as described above.

4. Remove the ORB cover for the slot that the card will occupy. Save the screw.

Note

When installing cards into system equipped with the combination ISA/PCI backplane, you may install an ISA card in the shared ISA/PCI slot or a PCI card in the PCI slot immediately adjacent to it. Due to physical clearance limitations, you may NOT install an ISA card in the shared ISA/PCI slot and a PCI card in the adjacent PCI slot.

---

5. Slide the card into the slot. Push down on the card evenly until it firmly seats in the card cage connectors.

Note

DO NOT force the board or apply uneven pressure.

---

6. Secure the card's ORB to the 9440 by replacing and tightening the screw that was removed in Step 4

7. Slide the top panel into position, then replace and tighten the seven screws.

8. Reconnect the I/O cables you disconnected when opening the unit.

9. Reconnect the power cables you disconnected when opening the unit.

10. If the unit is mounted on its optional slide rails, slide the unit back into the rack or cabinet in which it is mounted.

Installing Drives

To install hard drives or other mass storage devices into the 9440 unit:

1. Check that the memory, I/O configuration and processor requirements of the drive you want to install do not conflict with the CPU and memory maps of boards already installed in your system. If you must install an additional controller card, verify that its requirements do not conflict, either.

2. Check that the additional power required by the device will not cause the 9440 to exceed its current ratings. See *Derating the Power Supply*, later in this chapter for current ratings and specifications.

3. Open the case, as described above.

4. Open the front door and remove the two Phillips-head drive carrier bracket screws located on either side of the lower 3.5" drive bay, as shown in Figure 3-1, above. Save these screws.

5. Slide the drive carrier bracket toward the rear of the unit. then lift it straight up and out of the case, as far as the cables attached to the drives will permit.
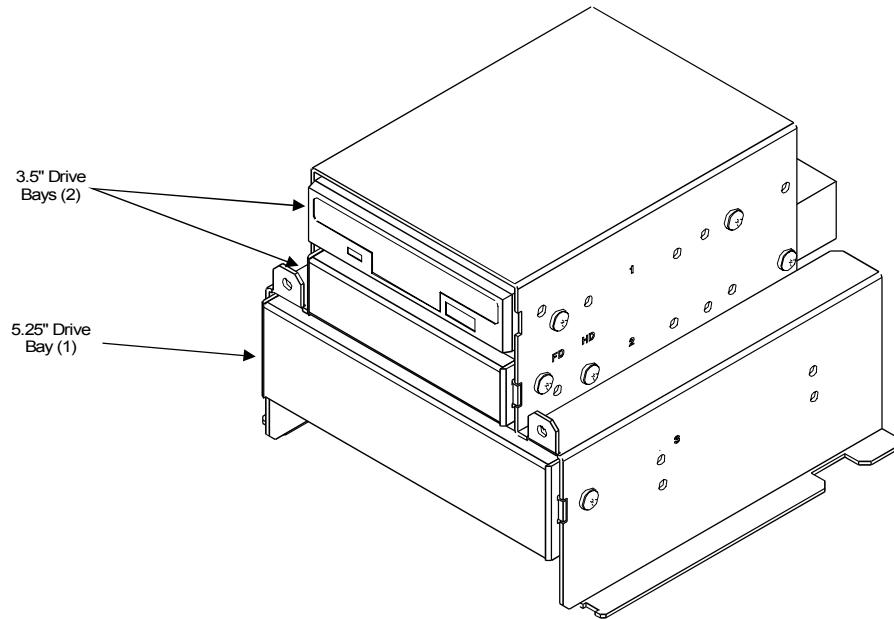
Figure 3- 5. The Drive Carrier Bracket

6. Disconnect the power and ribbon cables connected to any drives already mounted in the drive carrier bracket, then place the drive carrier bracket on a solid, level work surface.

7. If you are installing a removable-media device, remove the two Philips-head screws that hold the blank bezel plate to the bracket, then remove the bezel plate.
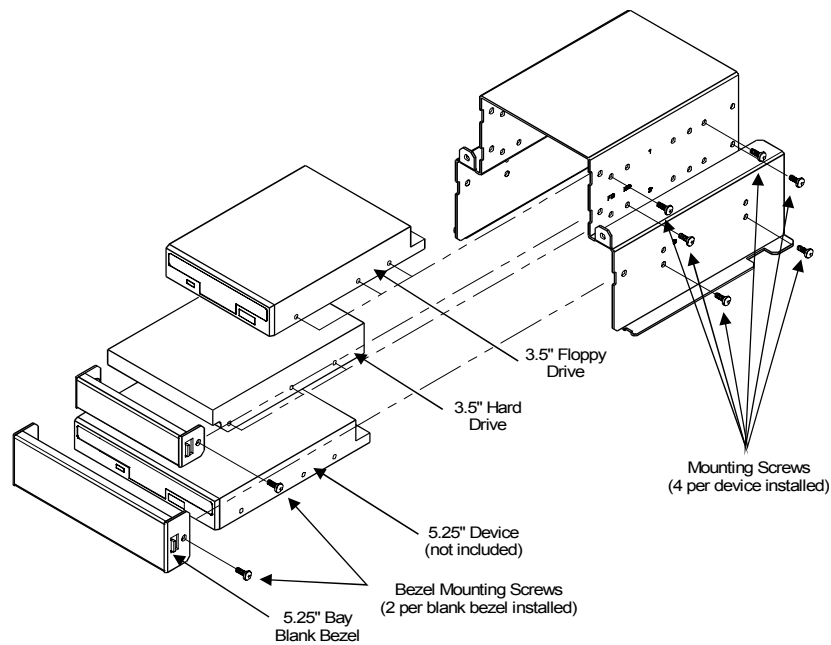

Figure 3- 6. The Drive Carrier Bracket (Exploded View)

8. Slide the device into the bracket, from the rear, until the drive's mounting holes line up with the corresponding holes in the mounting bracket, then install the mounting screws, two on each side. Slide-mounting rails are not used when mounting drives into the drive carrier bracket.

9. Connect the power cable and ribbon cable(s) to the new drive, then reconnect the cables to any devices that were already installed in the drive carrier bracket.

10. Install any controller card required by the new drive, as described above.

11. Set the drive carrier bracket back into the case, then slide it forward in the case, until it rests against the front panel. Make sure that the bracket is properly engaged beneath the tabs on the floor of the case. Re-install the two Philips-head screws you removed in Step 4.

12. Slide the top panel into position, then replace and tighten the seven screws.

13. Reconnect the I/O cables you disconnected when opening the unit.

14. Reconnect the power cables you disconnected when opening the unit.

15. If the unit is mounted on its optional slide rails, slide the unit back into the rack or cabinet in which it is mounted.

Preparing The System For Use

To prepare the system for use, perform the steps listed below. If you have purchased any options, install them according to the instructions in the next sections.

1. Attach the power cord by connecting one end to the power receptacle on the rear of the 9440 (see Figure 3-2) and the other to a properly grounded 115 or 230 VAC outlet.

2. Connect the video cable from the 9440 to the video connector on a compatible monitor.

3. Connect the keyboard cable from your external keyboard to the keyboard connector on either the front or back panel of the 9440.

Installing The System Into A Rack

The 9440's rugged design allows it to be installed in most industrial environments. The unit is intended to be mounted in an enclosure that protects against contaminants such as moisture, dust, and other particulate matter, such as a Type 12 enclosure. Metal enclosures also help minimize the effects of electromagnetic radiation that may be generated by nearby equipment.

Mounting Considerations

Follow these guidelines when installing your 9440:

- Select an enclosure and place the unit to allow easy access to the ports.

- Account for the unit's depth as well as cabling when choosing the depth of the enclosure.

- Mount the unit in an upright position.

- When installing the unit in a rack, take care to install it in such a way as to ensure that it does not cause a hazard from uneven mechanical loading.

- Place the unit at a comfortable working level.

- Consider locations of accessories such as AC power outlets and lighting (interior lighting and windows) for installation and maintenance convenience.

- Condensation should be prevented by installing a thermostat-controlled heater or air conditioner, if needed.

- To allow for maximum cooling, avoid obstructing the air flow.

- Place fans or blowers close to the heat generating devices. If using a fan, make sure that outside air is not brought inside the enclosure unless a fabric or other reliable filter is used. This filtration prevents conductive particles or other harmful contaminants from entering the enclosure.

- Do not select a location near equipment that generates excessive electromagnetic interference (EMI) or radio frequency interference (RFI) (equipment such as high power welding machines, induction heating equipment, and large motor starters).

- Place incoming power line devices (such as isolation or constant voltage transformers, local power disconnects, and surge suppressors) away from the unit. The proper location of incoming line devices keeps power wire runs as short as possible and minimizes electrical noise transmitted to the unit.

- Make sure the location does not exceed the unit's shock, vibration, and temperature specifications.

- The 9440 is rated at 115/230 VAC at 6.3 Amps, maximum. Circuit overloading of the supply circuit must be avoided.

System Power

It is always a good practice is to use isolation transformers on the incoming AC power line to the unit. An isolation transformer is especially desirable in cases in which heavy equipment is likely to introduce noise onto the AC line. The isolation transformer can also serve as a step-down transformer to reduce the incoming line voltage to a desired level. The transformer should have a sufficient power rating (units of volt-amperes) to supply the load adequately.

The following practices should be observed:

- Separate ground wires from power wires at the point of entry to the enclosure. To minimize the ground wire length within the enclosure, locate the ground reference point near the point of entry for the plant power supply.

- The safety ground should be connected to earth ground.

Electrical Noise

Digital technology and low power analog circuits are sensitive to electrical noise. Within the industrial environment electrical noise is commonplace. Some examples of noise generating sources are high frequency mini-arcs between switch contacts at transition time (relays, etc.), transients from highly inductive loads when abruptly shut off (motors, etc.), and RF power (hand-held radio transceivers). Noise can find paths into sensitive circuits via conducted, capacitive, or inductive coupling. When this occurs malfunctions are likely to result which usually appear random in nature.

Xycom products are engineered to maintain a high level of immunity to electrical noise through the use of filters, shielding, and careful grounding techniques. However, several factors regarding system installation must be given careful consideration by system integrators and/or installation personnel. Note the Electromagnetic compatibility warning located at the beginning of this manual.

Capacitive coupling into cables will be minimized with the use of shielded cables. Cables which incorporate both copper braid and foil shields are preferred. Metal I/O cable backshell connectors should be used rather than plain or

conductive plastic. Cable shields should be terminated directly to the metal backshell. The copper braid shield is ideal for this termination. Shield drain wires alone are inferior.

Inductive coupling is best prevented through separation of conductors. I/O and signal cables should not be routed in parallel and within close proximity to AC mains conductors or other high voltage/current wiring.

As noted elsewhere within this manual, proper grounding of this equipment is essential. Noise immunity techniques employed within this design cannot be optimized otherwise. The traditional "ground bus" widely used within industry is being replaced with a "star" grounding technique. In an enclosure or rack, each apparatus which incorporates sensitive electronic technology should have its own low impedance protective earth conductor. These conductors should subsequently be terminated at one common point within the rack/enclosure (hence the term "star"). This single-point ground should then be connected to facility (mains) ground in typical installations. In those cases where noise generating sources are extreme, this single-point ground should be routed to a close earth grounding rod or appropriate section of building structure. Protective earth grounding conductors attached to noise generating devices such as motors should not share the same conductor or point of termination. Points of termination should be at least 10 feet (3 meters) apart.

Be sure to reference all relevant national, state/provincial, and local electric codes with respect to legal wiring practice.

Excessive Line Voltage

The power supply section of the 9440 is built to operate at voltages from 100 to 120 VAC or from 200 to 240 VAC and still allow the system to function within its operating margin. As long as the incoming voltage is adequate, the power supply provides all of the logic voltages necessary to support the processor, memory, and I/O.

In cases in which the installation is subject to unusual AC line variations, a constant voltage transformer can be used to prevent the system from shutting down too often. However, a first step toward the solution of the line variations is to correct any possible feed problem in the distribution system. If this correction does not solve the problem, a constant voltage transformer must be used.

The constant voltage transformer stabilizes the input voltage to the unit by compensating for voltage changes at the primary in order to maintain a steady voltage at the secondary. When using a constant voltage transformer, check that the power rating is sufficient to supply the unit.

Rack-mounting and Installing the 9440

To install the 9440 in a standard EIA 19" rack, follow the steps described in the applicable section below.

Slide Rail Mounting

1. Disconnect all cables and cords from the 9440 unit.

2. Place the 9440 unit on a solid work surface.

3. Attach the slide rails from the 9440-RMS slide rail kit to the 9440 unit, using the #8-32 screws provided with the kit. This is illustrated in Figure 3-7, below.
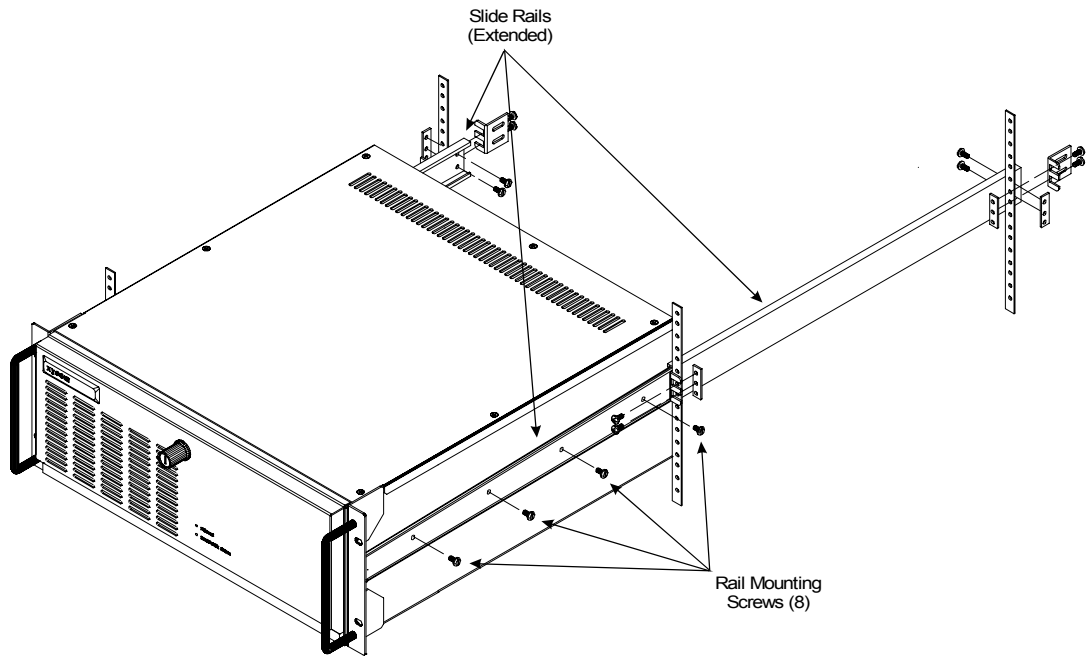
Figure 3- 7. Installing the Optional Slide Rails

4. Install the unit securely in the rack, using standard rack-mounting hardware, so the drive access door faces outward. Torque the rail mounting screws to 35 in/lbs (3.95 Nm).

WARNING

Be certain to install the 9440 in such a manner as not to create an unsafe loading condition when it is mounted in the rack. This may require reconfiguration of other equipment mounted in the rack. Proper installation permits the rack to remain stable and upright while the 9440 is slid fully out of the rack on its rails.

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5. If you should ever need to remove the slide rails, reverse this process.

NOTE

Make sure the 9440 enclosure is grounded to the rack or panel enclosure.

Rack Mounting

1. Attach the 9440 securely to the rack, using the proper mounting hardware for your rack, as illustrated in Figure 3-8, below.
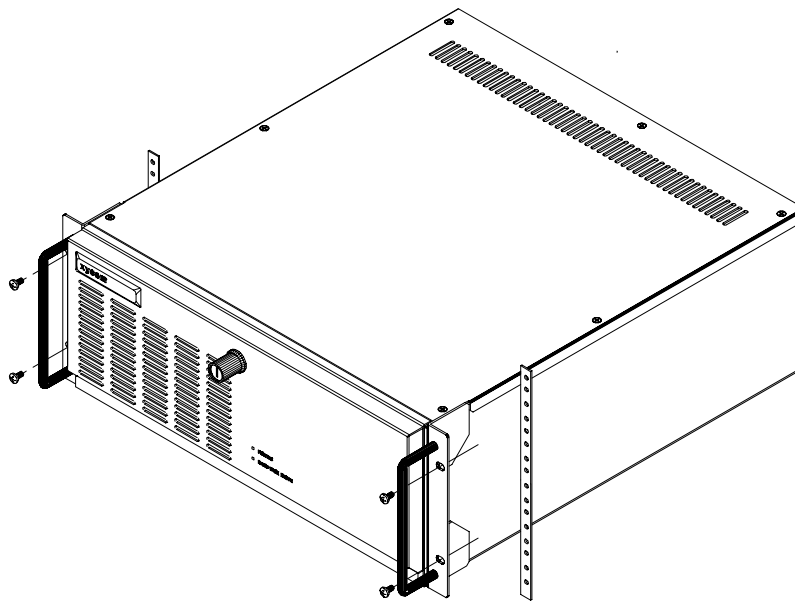
Figure 3- 8. Installing the Mounting Hardware

2. Install the unit in the rack, using standard rack-mounting hardware, so the drive access door faces outward.

WARNING

Be certain to install the 9440 in such a manner as not to create an unsafe loading condition when it is mounted in the rack. This may require reconfiguration of other equipment mounted in the rack.

3. To remove the 9440 from the rack, reverse the process.

NOTE

Make sure the 9440 enclosure is grounded to the rack or panel enclosure.

Connecting External Hardware Options

This section explains how to connect the external hardware options available with the 9440.

Keyboards

The 9440 can be connected to any standard PS/2-compatible keyboard, using either the front keyboard port or the rear. An AT-compatible keyboard may be connected by using an AT-PS/2 adapter plug or adapter cable between the keyboard and the 9440's keyboard port.

WARNING

Do not connect keyboards to both the front and the rear keyboard ports at the same time. Doing so may cause the keyboards to operate improperly.

Serial Mouse

To install Xycom's 4100-MS1 three-button serial mouse, attach the connector on the mouse cable to one of the serial port connectors (COM1 or COM2) on the input/output panel of the 9440. For further instructions, refer to the manual that accompanied the mouse.

Installing Operating Systems

If you want to install a new operating system or re-install a current operating system, refer to the operating system's manual for instructions.

Note

If you had Windows NT preloaded on your system and do not have a CD-ROM drive installed, you may have to purchase and install standard or parallel port CD-ROM drive in order to reinstall Windows NT. This is because Windows NT operating system only ships on CD-ROM.

Caution

Use of controls adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Derating The Power Supply

On the average, the temperature within the 9440 is 7-10° higher than that outside the enclosure. When the ambient (exterior) temperature reaches 42°C, the system's power supply will begin to derate at a rate of 3.25 watts per increase of 1°C. The 9440 is rated to work at temperatures up to 50°C. At 50°C, the power supply should be derated to 125 W of total power available for expansion cards with an AT4+ or AT5+ processor board installed. Refer to Table 3-1 for more information.

Total current available for expansion cards after derating at 50°C ambient outside temperature (not to exceed 125 W):

Table 3- 1. Available Expansion Current

Voltage	Available Current
+5 VDC	16.90 A
+12 VDC	7.00 A
-12 VDC	0.48 A
-5 VDC	0.50 A

Chapter 4 – Maintenance

Preventive Maintenance

The 9440 was designed to withstand the harsh environment of the factory floor. Routine maintenance can help keep your 9440 in good operating condition. Preventive maintenance consists of several basic procedures and checks that will greatly reduce the chances of system malfunction. Preventive maintenance should be scheduled along with the regular equipment maintenance to minimize 9440 down time.

Some preventive measures are listed below.

- Clean or change the fan filters periodically to ensure that the air circulating in the unit is clean. Filter maintenance should not be put off until the scheduled maintenance, but should be performed periodically, depending on the amount of dust in the area.

- Remove dust and dirt from PC components. If dust builds up on heat sinks and circuitry, the resulting reduction in heat dissipation could cause the unit to malfunction. If dust reaches the electronic boards, a short circuit could occur.

- Check the connections to I/O modules, especially in environments where shock could loosen the connections. Check to see that all plugs, sockets, terminal strips, and module connections are solid.

- Do not move noise generating equipment too near the 9440.

- Stock spare parts to minimize down time resulting from part failure. The spare parts stocked should be 10 percent of the number of each unit used. There should be one spare CPU card each, regardless of the number of CPUs used. Each power supply should have a back-up. In certain applications where immediate operation of a failed system is required, an entire spare unit may need to be stocked. See the spare parts list in Table 5-1.

- When replacing a module, make sure it is the correct type. If the new module solves the problem, but the failure reoccurs after a while, check for inductive loads that may be generating voltage and current spikes that may require external suppression.

Care of the 9440 Cabinet

> **CAUTION**
>
> Never clean the 9440 while power is on. Disconnect the monitor power cord before cleaning. Avoid spraying liquids into the ventilation slots.

To clean the exterior of the 9440, dampen a soft cloth with a mild cleaning solution, such as dishwashing detergent. After cleaning, rinse cloth thoroughly, wring dry, then wipe cleaned surfaces to remove any residual detergent.

Changing the Fan Filter

To change the fan filter, remove the grille and filter as illustrated in Figure 4-1. Clean the filter and snap the grille back into position.

CAUTION

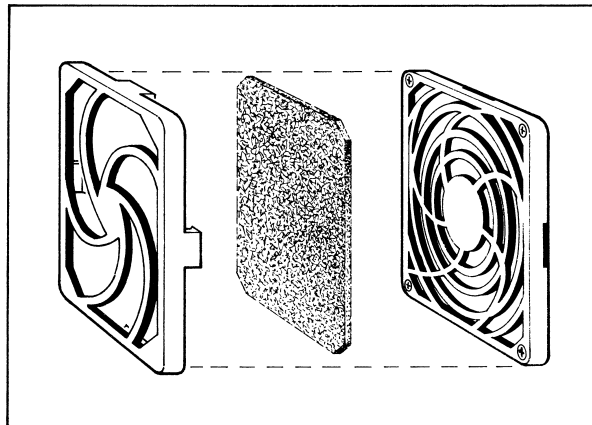Do not operate the 9440 without a fan filter. Dust build-up could cause the unit to malfunction.

Figure 4- 1. Changing the Fan Filter

Chapter 5 – Product Repair

Spare Parts List

Use the part numbers indicated below if you need to order parts for your 9440 unit:

Table 5- 1 . 9440 Spare Parts

Description	Part Number
CPU	
AT4+, 66 MHz, 0 Mbytes	99298-466
AT5+, 100 MHz, 0 Mbytes	101331-100
AT5+, 133 MHz, 0 Mbytes	101331-133
AT5+, 200 MHz, 0 Mbytes	101331-200
Hard Drive	
540 Mbytes	109456-001
850 Mbytes	109456-002
2.1 Gbytes	109456-004
Solid-State (Flash) Drive	
10 Mbytes	109469-004
20 Mbytes	109469-001
40 Mbytes	109469-002
60 Mbytes	109469-003
Floppy Drive, 3.5", 1.44 Mbyte	109443-001
DRAM for AT4+ CPUs	
1 Mbyte $\times$ 9	98012-001
4 Mbytes $\times$ 9	98749-001
EDO DRAM for AT5+ CPUs	
1 Mbyte $\times$ 32 (4 Mbytes)	104273
2 Mbytes $\times$ 32 (8 Mbytes)	104258
4 Mbytes $\times$ 32 (16 Mbytes)	104302
8 Mbytes $\times$ 32 (32 Mbytes)	106054
Cache-On-A-Stick (COAST), 256 Kbytes, for AT5+ CPUs	104330
Power Supply	109402-001
Rack Mount Rails Kit	9440-RMS

Product Repair

Xycom's Product Repair Department performs services to restore equipment to normal operating condition and to implement authorized engineering changes which enhance operating specifications. Products returned to Xycom will be tested using standard Xycom test diagnostics. Contact the Product Repair Department for information on the turnaround time for the particular repair you require.

Preparing the Unit for Shipment

To ensure that the monitor is packed to minimize the chance of damage during shipment, follow the steps described below before shipping.

1. Obtain a RMA number for your unit by calling your local Product Repair Department, or the Xycom Repair Center at *1-800-289-9266*. Before calling, collect the following information:

   - Your company's name, shipping and billing addresses

   - The type of service desired– product repair or product exchange

   - The product model number, part number, serial number, quantity, and warranty status

   - A thorough description of the product failure and the circumstances that led up to it

   - Purchase order or repair order number

   You will be issued a RMA number. This number must appear on the outside of the shipping container, and on the purchase number.

2. To prepare the unit for shipment, make sure that all case panels are secured using all screws.

3. To speed processing of your repair, attach a written description of the failure to the unit.

4. Place the unit securely in its original packaging or an equivalent heavy-duty container.

5. Mark the RMA number on the outside of the shipping box, as well as on your purchase order.

6. Ship the unit to your local Xycom Repair Center.

Appendix A - Specifications

Environmental Specifications

Table A- 1. Environmental Specifications

Temperature	
Operating	0° to 50° C (32° to 122° F)
Non-operating	-40° to 60° C (-40° to 140° F)
Humidity	
Operating	20% to 80% RH, non-condensing
Non-operating	20% to 90% RH, non-condensing
Altitude	
Operating	Sea level to 10,000 ft. (3048 m)
Non-operating	Sea level to 40,000 ft. (12192 m)
Shock*	
Operating	5 g peak acceleration (22 msec duration)
Non-operating	10 g peak acceleration (11 msec duration)
Vibration*	
Operating	5 to 2,000 Hz .006" (.15mm) peak-to-peak displacement 1.0 g (maximum) acceleration
Non-operating	5 to 2,000 Hz .015" (.38mm) peak-to-peak displacement 2.5 g (maximum) acceleration

*Note

The shock and vibration specifications require that the solid state disk drive be installed. Also, CD-ROM and standard hard disk drives should *not* be used in applications where high levels of shock and vibration are present.

If a CD-ROM drive is installed, the shock and vibration specifications of this unit are limited to the shock and vibration specifications of the CD-ROM drive.

Hardware Specifications

Table A- 2. Hardware Specifications

Mechanical
  Height
  Width
  Mounting Depth
  Depth
  Weight
	
	7.0" (177.8 mm)
	19.0" (482.6 mm)
	18.5" (469.9 mm)
	20.75" (527.1 mm)
	32 lbs. (14.5 kg)

Electrical	115/230 VAC, 6.3 A 50/60 Hz, 200 watts

Passive Backplane	10 PC/AT ISA (9 available to user)
	  or
	2 PCI and 7 PC/AT ISA slots (2 PCI, 6 ISA available to user)
	
	125 watts available to backplane and drives
	  +5 VDC @ 16.9 A/+12 VDC @ 7.0 A
	  -5 VDC @ 0.5 A/ -12 VDC @ 0.48 A
	  Not to exceed 125 watts, total

Mounting	EIA standard 19" rack or shelf/cabinet mounting

Appendix B – Pinouts

Keyboard Connectors

The 9440 has two standard PS/2-compatible keyboard connectors, one mounted behind the front cover and one mounted on the rear panel.

WARNING

Do not connect more than one keyboard to the unit at a time.
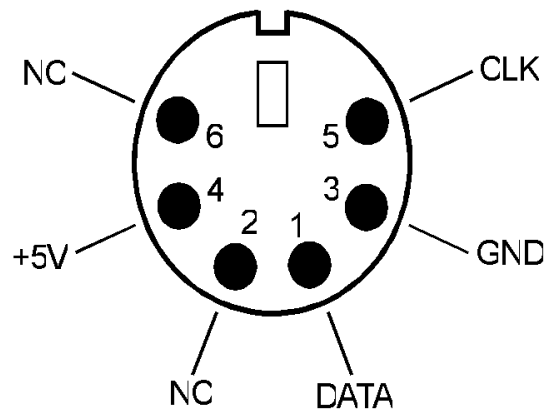
Figure B- 1. Keyboard Pinout Diagram

Table B- 1. Keyboard Connector Pinout

Pin	Signal
1	DATA
2	N/C
3	GND
4	+5 VDC
5	CLK
6	N/C

Serial Ports

The 9440 uses standard 9-pin DB-9M (male) connectors to facilitate interface to RS-232 compatible serial devices. These connectors are mounted on the rear panel of the 9440.
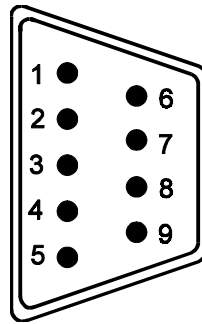
Figure B- 2. Serial Port Pinout Diagram

Table B- 2. RS-232 (Serial Port) Connector Pinout

Pin	Signal	Pin	Signal
1	DCD	6	DST
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	GND		

Index