

**1500**

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Industrial PC/AT™  
Computer System

P/N 124048-001(C)

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NOTE: This equipment has been tested and found to comply with the 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.

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#### **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.

### **INSTALLATION: Electromagnetic Compatibility WARNING**

The connection of non-shielded equipment interface cables to this equipment will invalidate FCC EMI and European Union EMC compliance and may result in electromagnetic 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 shielded cables. Braid/foil type shields are recommended. 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. For systems other than Pentium II logic board (AHIP6+): In those cases where an external mouse is used, the snap-on ferrite bead provided (P/N 116046) must be installed on the mouse cable at the host end in order to comply with relevant EMI regulations.
3. Protective measures for power and interface cables as described within this manual must be applied. Do not leave cables connected to unused interfaces or disconnected at one end. Changes or modifications to this device not expressly approved by the manufacturer could void the user's authority to operate the equipment.
4. EMC compliance is, in part, a function of PCB design. Third party add-on AT/XT peripheral 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 apparatus 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.

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# Chapter 1 - Introduction

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## Product Overview

The 1500 Node Box PC/AT Computer System offers a powerful, compact package for the factory floor and other harsh environments. The 1500 features an open architecture to meet a wide variety of applications that require both a powerful PC and a durable industrial enclosure. The system integrates a computer card cage, mass storage, and power supply in a truly industrial form.

The system's modular design allows easy access to expansion boards, jumpers, power supply, and disk drives.

## Standard Features

The 1500 offers the following standard features:

- 19-inch wall-, shelf-, or rackmountable
- 3.5-inch internal floppy, side access
- Six AT-bus full-length expansion slots
  - Four ISA slots
  - One ISA or PCI slot
  - One PCI (4.8" maximum length with AHIP6+ board)
- Status LEDs
  - Power
  - Hard Disk
  - COM
- Two serial COM ports
  - RS-232
  - RS-232 or RS-485
- Parallel port
- VGA port
- Keyboard port (side access)
- Mouse port
- MS-DOS®
- Autosensing AC power supply
- Power switch
- Flash BIOS

## Optional Features

### With AHIP4+ board

- PCI 64 bit video controller with 1 MB video RAM
- PCI local-bus IDE controller
- AMD<sup>®</sup> 5x86<sup>™</sup> processor
- PCI local-bus IDE controller
- Two 72-pin EDO DRAM SIMMs that support 4, 8, 16, 32, and 64 MB options
- 24 VDC power supply

### With AHIP370 board

- Intel Celeron<sup>®</sup> processors (PPGA package)
- 32 MB-256 MB DRAM DIMMs
- PCI fast IDE controller
- 1.30 – 2.05 VDC power supply

### With AHIP6+ board

- Celeron<sup>®</sup>, Pentium II or Pentium III technologies
- PCI local bus XGA graphics with 2 MB of SDRAM
- PCI fast IDE controller
- Two 168-pin SDRAM DIMMs that support 32, 64, 128, and 256 MB options
- Two USB ports
- 100MHz front side bus with Pentium II processors

### On all units

- Larger IDE hard drives and solid state drives
- High-speed CD-ROM
- Preinstalled PCI 10/100 Base-T Ethernet card
- 9000-EXF external floppy drive (unit must be ordered without internal floppy)
- Preloaded with Microsoft<sup>®</sup> Windows<sup>®</sup> 95 or Windows NT<sup>®</sup> operating systems

## Unpacking the System

When you remove the 1500 from its box, verify that you have the parts listed below. Save the box and inner wrapping in the event you need to reship the unit.

- 1500 unit
- Documentation kit, which includes
  - Diagnostic software disk (units shipped with MS-DOS only)
  - VGA utility disk
  - AC power connector

- Power connector retainer bracket
- Clip-on ferrite for AUX cables
- 1500 manual (CD ROM)
- CPU manual (CD ROM)
- Mounting Hardware
  - Eight 10-32 nuts with lockwasher
  - Eight 10-32 x 5/8 screws
  - Two plastic u-channel grommets (use on front of the 1500 when setting the unit on a shelf)
  - Power cord strain relief p-clamp (if you ordered the DC power supply option)

## Quick Start-up

This section gives you the steps to get the 1500 up and running without explaining the capabilities and options of the system.

### Note

Refer to Chapter 3 for a detailed outline of the 1500's components.

### Warning

Turn off the power to the unit and disconnect the power cord before making any adjustments to the inside or the outside of the computer.

To prepare the system for use, perform the following steps.

1. Attach the optional keyboard to the keyboard port.
2. Attach other optional equipment following the instructions in Chapter 3.
3. Attach a monitor to the VGA connector.
4. Attach the power cord from the power receptacle to a properly grounded 115/230 VAC, 50-60 Hz outlet, or 24 VDC outlet, whichever applies. (See Chapter 3, *Creating a Power Cable*.)
5. Turn on the power to the unit. The system will boot up at the C:\ prompt.

Install application software via the floppy disk drive or network.



## Chapter 2 – Testing

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On units with MS-DOS installed, diagnostic tests are provided as a tool to verify the operation of the system hardware functions. If any of these tests fails, either you do not have the correct default setting or there is a failure. Check the default settings and run the tests again. If another failure occurs, contact Xycom's Product Repair & Customization Department (see Chapter 4).

### Note

Remove any device drivers or memory resident programs (TSRs) installed on the system before running Xycom diagnostic tests. If you do not, unexpected failures may occur.

### Note

You must hook up a monitor before running any tests.

Make sure the BIOS setup menus are configured properly (factory set configuration).

To enter the Setup Menu:

1. Press F2 after the POST RAM test has completed.
2. Make the necessary changes by following directions on the screen.
3. Press ESC.
4. Press ENTER twice to save the Setup and exit.

Refer to your CPU manual for more information on the BOIS setup menus.

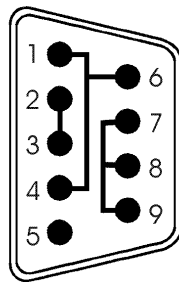
## Preparing for the Tests

To test your system, you need the following equipment:

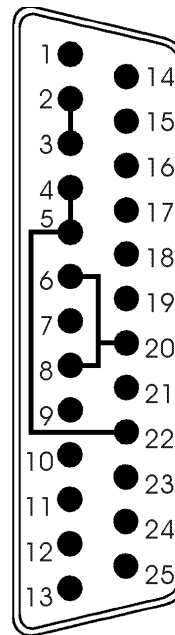
- Floppy disk drive
- IBM PC/AT or PS/2-compatible keyboard (Xycom part number 8000-KBX or equivalent)
- Xycom System Test Disk (3.5 inch, bootable DS/DD disk, Xycom part number 99290)
- Centronics-compatible printer cable
- Parallel printer (Centronics-style interface)
- Two serial loopback test connectors (refer to Figure Chapter 2 -1 for pinouts)
- Formatted 3.5-inch, DS/HD (1.44 MB) disk

Perform the steps below before starting 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 side 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 or PS/2 keyboard. Figure Chapter 2 -1 illustrates the wiring necessary for the loopback connection.
4. Default the CMOS setup to the factory settings.



Com 1 Serial Loopback Connections



Com 2 Serial Loopback Connections

Figure Chapter 2 -1. Serial Loopback Connection

## Running the Tests

To run the test, insert the diagnostics' disk into drive A. Turn on the computer (the diagnostics program will boot-up). The following figure shows the Main Menu.

Copyright 1990-1996, Xycom, Inc. All rights reserved.	
Diagnostic Tests Sequence/Selection Menu (Rel. xx)	
1. WILL pause on error	5. Auto-select tests
2. SINGLE PASS test mode	6. Deselect all tests
3. Save setup to file	7. Quit and exit to DOS
4. Extract setup from a file	8. 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 Chapter 2 -2. Main Menu

### Note

Please read the DIAG.TXT file on the diagnostics disk for detailed information about the tests.

### Note

Avoid repeated running of any hard disk diagnostic utility if you use the Solid State (Flash) drive option. The Flash drive has a limited number of writes to each logical sector. Repeated writes from a diagnostic utility will prematurely shorten the life of the drive.



# Chapter 3 – Installation

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## System Components

This section describes the components on the unit to help you locate features relevant to installation.

### Mounting Plate

The 1500's mounting plate protects the system's interior when the system is properly mounted (refer to the *Mounting Considerations* and *Mounting Instructions* sections later in this chapter).

Figure 3-1 illustrates the front view of the node box.

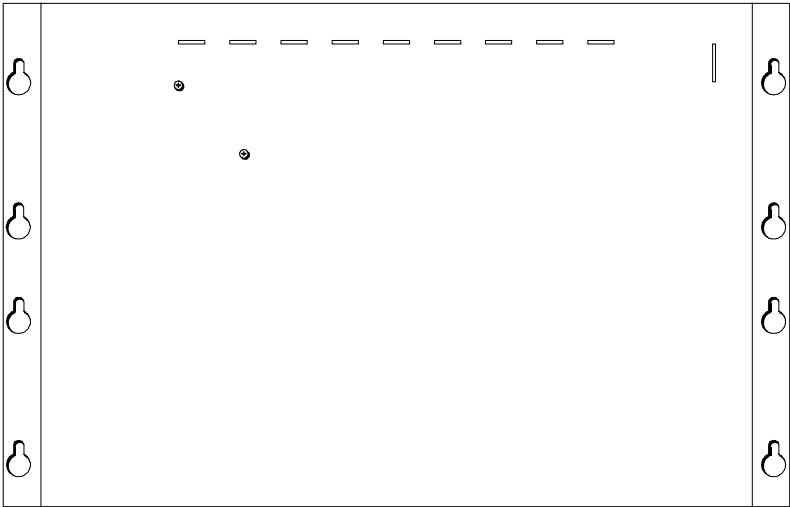


Figure 3-1. 1500 Front View of Node Box

### Back Panel

Figure 3-2 illustrates the back panel.

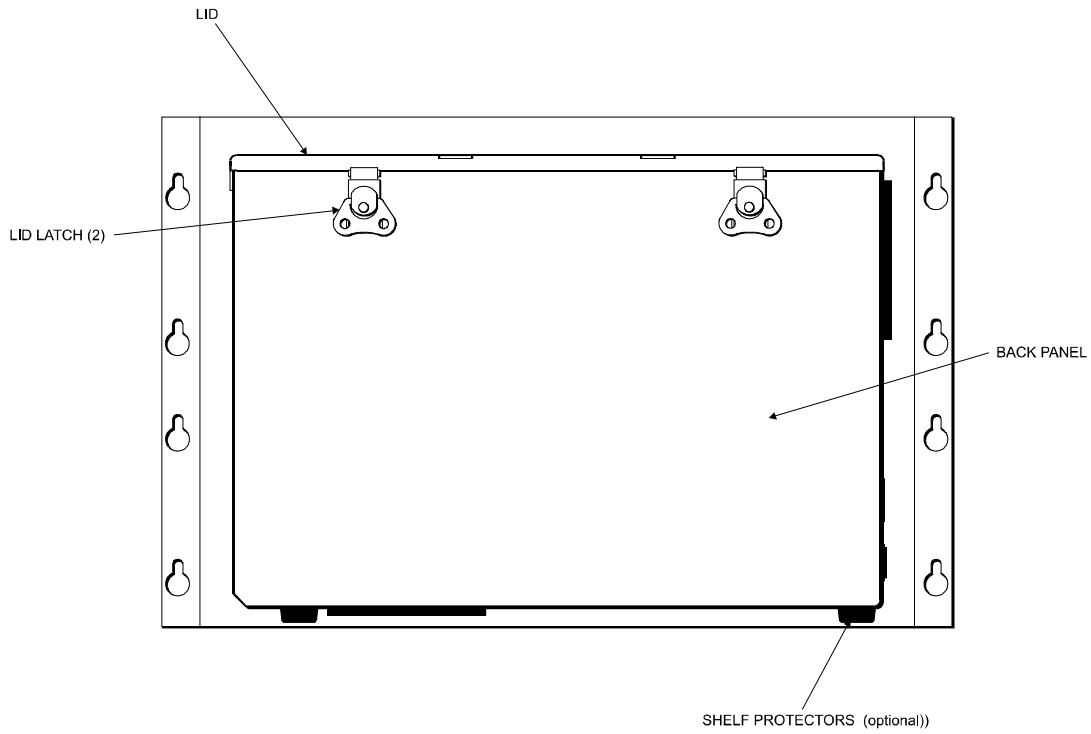


Figure 3-2. 1500 Back Panel

Lift the two lid latches along the top of the back panel to remove the lid.

## I/O Panel

Figure 3-3 illustrates the unit's I/O panel.

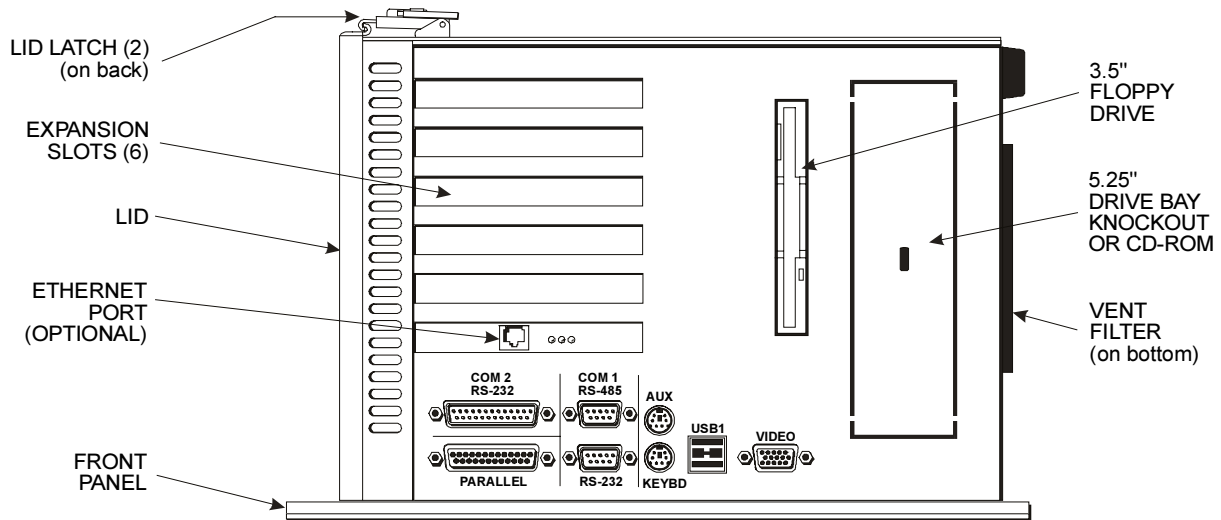


Figure 3-3. 1500 I/O Panel

Feature	Description
Expansion Slots	Six expansion slots are available: four ISA, one PCI, and one ISA/PCI.
COM ports	COM1 consists of two connectors (RS-232 and RS-485) attached to one logical port. Only one connector can be used at a time. COM2 consists of one connector (RS-232). An external push-button reset option is available. Consult the CPU board manual for the jumper which controls this option.
Parallel Port	This port provides a standard PC compatible printer interface.
AUX Port	The AUX port allows you to attach a serial device.
Keyboard Port	The keyboard port easily connects to a PC/AT keyboard.
USB Port (Celeron, Pentium II and Pentium III processors only)	USB (Universal Serial Bus) is a "plug-and-play" interface between a computer and add-on devices (such as audio players, joysticks, keyboards, telephones, scanners, and printers). With USB, a new device can be added to your computer without having to add an adapter card or even having to turn the computer off. USB supports a data speed of 12 megabits per second. This speed will accommodate a wide range of devices, including MPEG-2 video devices, data gloves, and digitizers.
Video Port	This connector supports any standard VGA connection.
Floppy Drive	The 1500 has a side mounted external 3.5-inch floppy drive.
CD Drive (Optional)	There is a 5¼ drive-bay knockout for an optional CD drive. <b>Caution: If you have a CD-ROM installed, use of controls, adjustments, or the performance of procedures other than those specified herein may result in hazardous radiation exposure.</b>
Ethernet Port (optional)	The Ethernet port provides a 10BASE-T/100BASE-TX autosensing Ethernet connection.

### Note

Refer to *Appendix C* pinout information.

## Bottom Panel

The following components are located on the bottom of the unit.

Feature	Description
Product ID Label	The product ID label is located on the bottom panel.
Vent and Filter	The bottom of the 1500 contains a vent and filter that aids in the cooling of internal components.

## Power Supply Panel

Figure 3-4 illustrates the unit's power supply panel when an AC power supply is installed (standard).

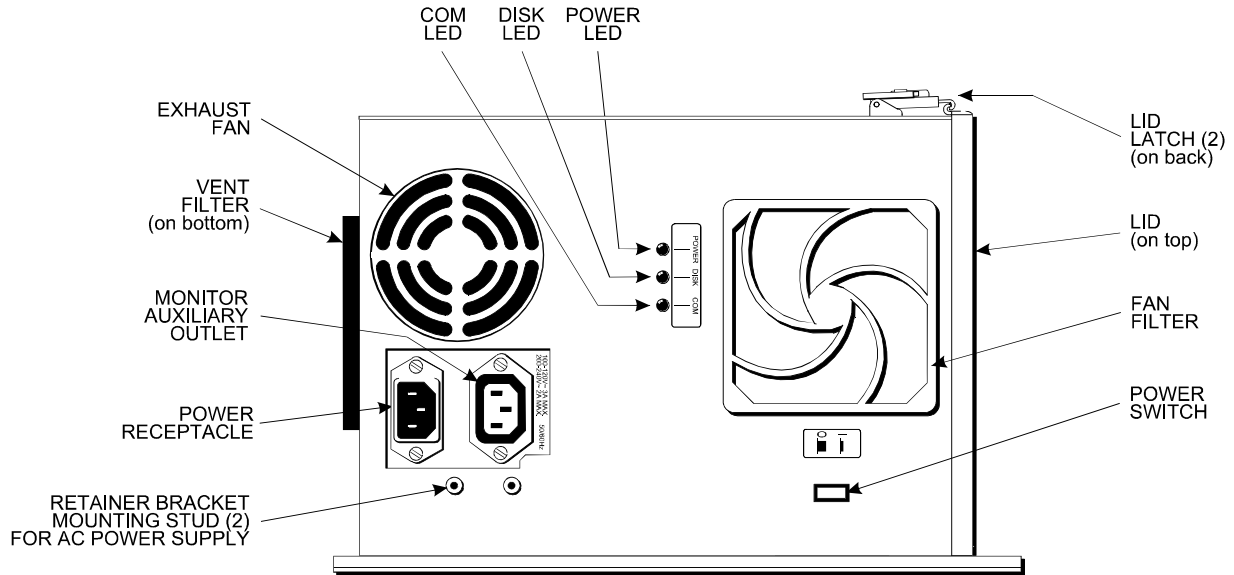


Figure 3-4. 1500 Power Supply Panel with AC Power Supply

Figure 3-5 illustrates the power supply panel when an optional 24 VDC power supply is installed.

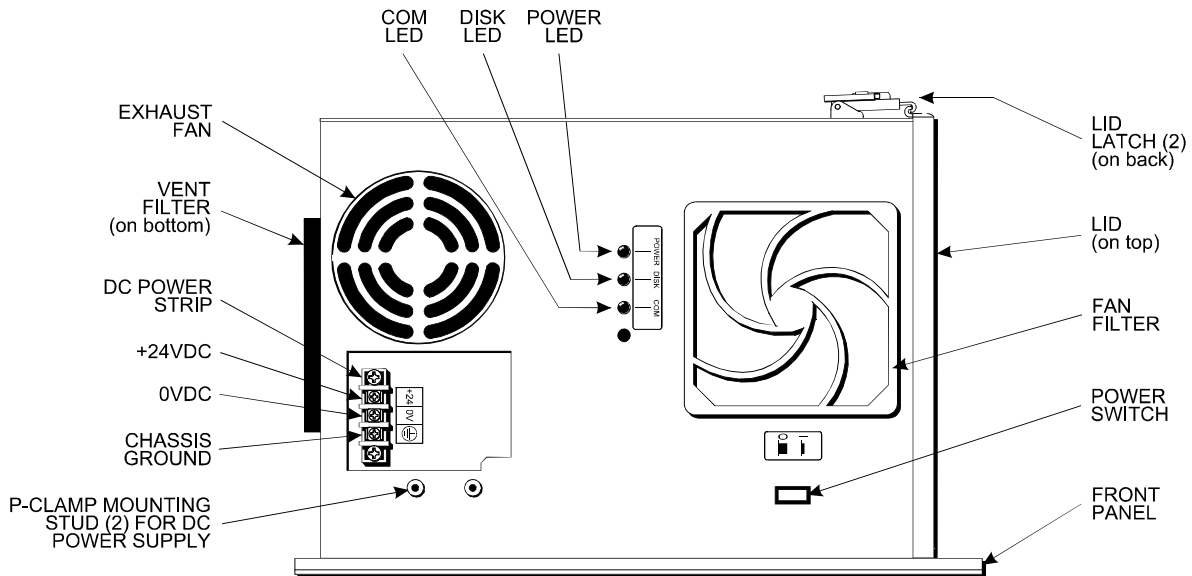


Figure 3-5. 1500 Power Supply Panel with DC Power Supply

Feature	Description
Diagnostic LEDs	<p>Power Lit when there is power to the 1500</p> <p>Disk Lit when the computer module is accessing the disk drive</p> <p>COM Lit when there is communication activity on one of the computer module's serial ports</p> <p>During power-up, firmware on the processor board checks the hardware configuration against the configuration stored in the CMOS memory.</p>

Feature	Description
Exhaust Fan	The exhaust fan cools the power supply.
Monitor Auxiliary Outlet	This outlet can be used to attach an auxiliary monitor. If the optional retainer bracket is used, this outlet will be covered.
Retainer Bracket (AC) or P-Clamp (DC)	With an AC power supply, this bracket can be screwed into the two studs, as shown in Figure 3-13, to retain the power connector and to cover the Monitor Auxiliary outlet. If an optional DC power supply is installed, use the P-Clamp to provide power cord strain relief.
Power Receptacle	The AC power receptacle is the three-pin connector on the left side of the 1500. If an optional DC power supply is installed, this connector will be a terminal block.
Fan and Filter	The filter can be replaced or removed for cleaning (refer to the <i>Fan Filter Replacement</i> section in Chapter 4 for more details).
Power Switch	This switch should be positioned to OFF (O) until the system is properly configured and connected to a 115/230 VAC or 24 VDC outlet, whichever applies.

## Installing Options

### Caution

Turn off the unit before installing internal hardware.

## Internal Hardware Options

This section describes how to install internal hardware options.

### DRAM and Additional DRAM Single In-Line Memory Modules (SIMMs)

You can order your 1500 CPU with many DRAM configurations. To reconfigure the DRAM capacity, change the DRAM SIMMs on your board. For more information, refer to the CPU manual.

### PC/AT or PCI Boards

1. Turn off the unit and disconnect the power.
2. Check that the board's memory and I/O configuration do not conflict with the CPU and I/O memory maps in your CPU board manual.
3. Lift the two lid latches to remove the lid (refer to Figure 3-2).
4. Remove the ORB screw and blank ORB from the desired track.
5. Slide the PC/AT or PCI expansion board into a corresponding rail.
6. Push the board into the backplane connectors.

### Note

*Do not* force the boards or apply uneven pressure.

7. Secure the board by installing the screw through the hole in the board's metal ORB and into the top of the track.
8. Replace and relatch the lid.

### **Caution**

On Pentium II and III equipped units, do *not* block the CPU fan when installing a card in the slot closest to the processor. The processor may overheat.

## **External Hardware Options**

The 1500 supports front access to keyboard and floppy drive connectors with the 9000-FKA kit and front access to an externally mounted floppy drive with the 9000-FFK kit.

### **Externally Mounted Floppy Drive**

The connector for the external floppy is mounted in the location of the internal floppy bay. Since the 1500 supports one floppy drive, you cannot use the external floppy option if the unit has an internal floppy drive.

The floppy drive access door is provided for installations using the filler with cutout, or panel mount installations that provide a cutout for the front mounted floppy drive. See Figure 3-6 for cutout dimensions.

### **Note**

Make sure the floppy drive cable reaches the floppy connector on the unit before making the cutout.

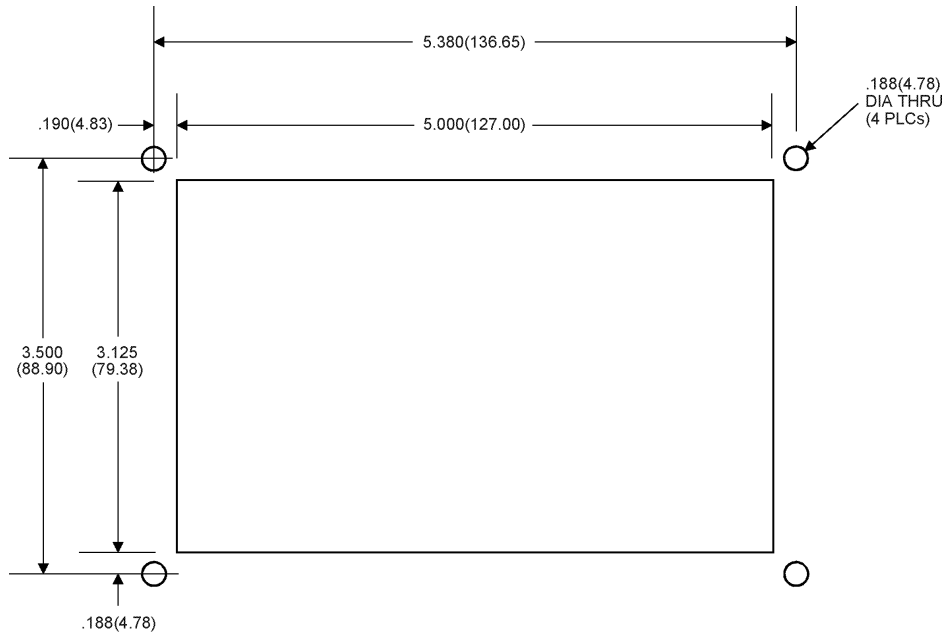


Figure 3-6. Front Mounted Floppy Cutout Dimensions

Mount the floppy drive access door to the filler plate or the panel, using the four mounting nuts as shown in Figure 3-7. Torque the nuts to 35 in/lb. (3.95 Newton Meters).

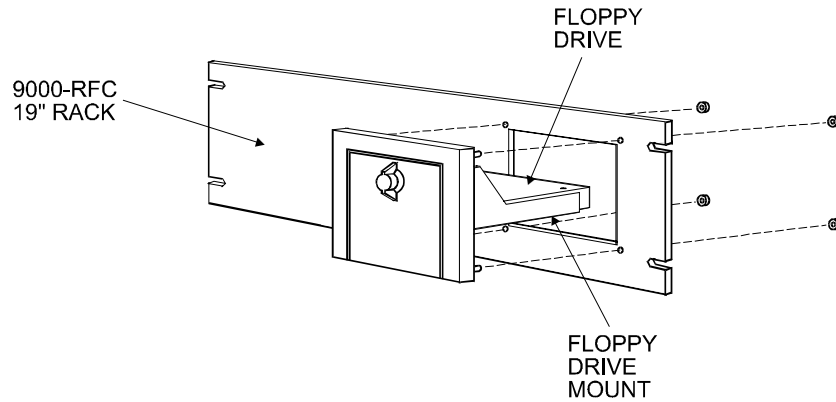


Figure 3-7. Floppy Drive - Front Mounting Option

Figure 3-8 shows an overhead view of the Front Floppy Kit with the floppy drive mounted into the rack.

**Note**

Do not attach the drive with a disk installed to avoid corrupting a disk when using the external floppy drive.

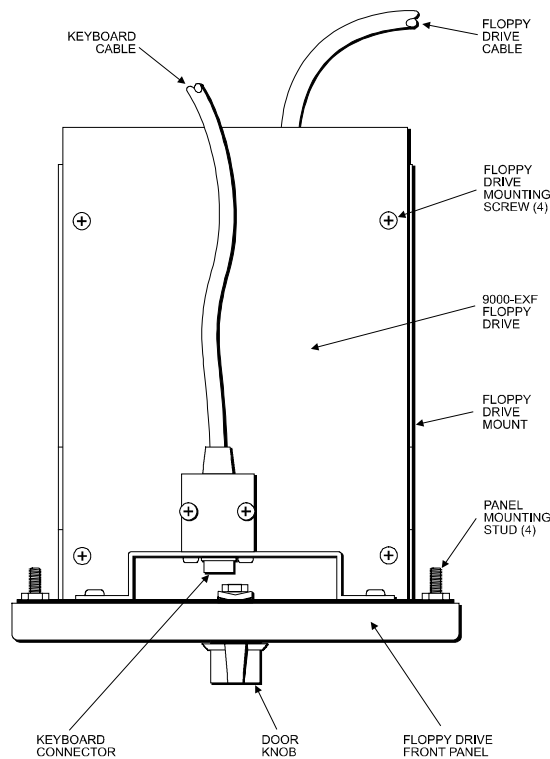


Figure 3-8. Floppy Drive - Front Mounting Option (top view)

### Front Access Keyboard and Floppy Connectors

You can access these keyboard and floppy drive connectors with the 9000-FKA kit in installations that provide a cutout for the front mounted connections, you must install the 9000-FKA kit. The kit's keyboard cable connects to a PS/2 stacked mini-din located on the side of the unit. The floppy drive cable connects to a port mounted in the internal floppy bay. Since the 1500 support one floppy drive, you cannot use the external floppy option if the unit has an internal floppy drive. See Figure 3-9 for cutout dimensions.

#### Note

Make sure the keyboard and floppy drive cables reach the ports on the unit before making the cutout.

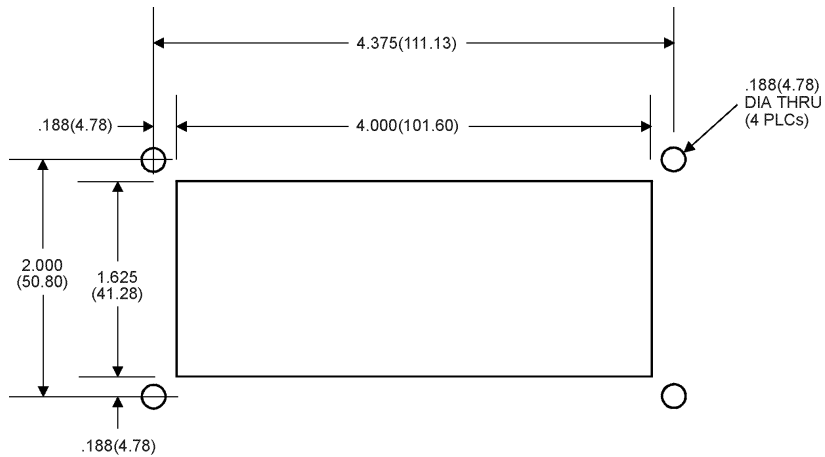


Figure 3-9. Front Mounted Connectors Cutout Dimensions

Mount the front floppy and keyboard access kit to the plate or the panel as shown (Figure 3-10). Torque the nuts to 35 in/lb. (3.95 Newton Meters).

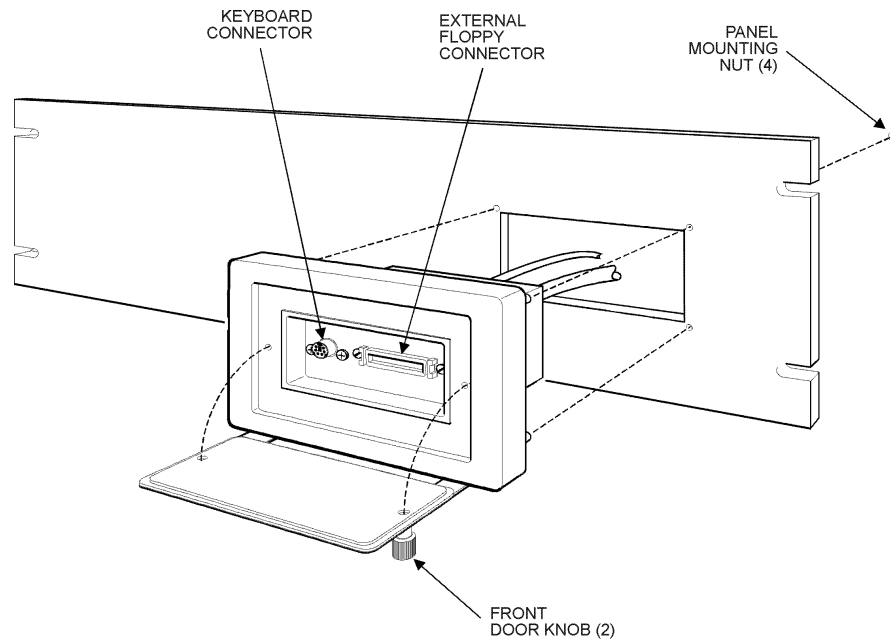


Figure 3-10. Front Floppy and Keyboard Access Option

### Note

The 1500 supports one floppy drive. If you want to use the floppy drive connector, the unit cannot have an internal floppy drive. (The external floppy's connector is mounted in the internal floppy bay.)

## Serial AUX

If the unit uses an auxiliary device, you must install the ferrite included in the documentation kit to maintain CE compliance.

## Installing Operating Systems

The 1500 CPU comes with MS-DOS. Available options are Windows 95 and Windows NT 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 directions.

### Note

If you need to reinstall the Windows NT operating system, you must have an internal CD-ROM drive or an external parallel port CD-ROM drive as Windows NT *only* ships on a CD-ROM disk.

## Installing Drivers

This section describes how to install the drivers associated with the 1500.

### Ethernet Drivers

If Windows 95 or Windows NT 4.0 is pre-installed on your system and you ordered the Ethernet card option, Ethernet drivers are installed on your hard drive in the C:\netdrv directory.

### Note

If you want to use Ethernet capabilities with Windows 95, your system must have BIOS revision level 1.1 or higher.

If MS-DOS is installed on your system, the Ethernet drivers are supplied on your hard drive in the C:\netdrv directory, but they are not installed.

To install the MS-DOS Ethernet drivers,

1. At the C: prompt, type "cd netdrv".
2. Once the C:\netdrv path is specified, type "install".
3. Follow the on-screen instructions to complete installation.

If you install Windows 3.1 on your system, Xycom provides the Ethernet drivers. They can be found on the Ethernet Drivers disk that ships with your system.

### Note

If you install Windows NT 4.0 or Windows 95 on your system, the Ethernet drivers that are provided do not work with the Ethernet controller installed. You must use the drivers provided by Xycom.

These drivers can be found on the Ethernet Drivers disk that ships with your system.

## Video Drivers

Video drivers for each operating system are on the diskettes included with the documentation kit. To install a video driver, refer to the INSTALL.TXT file on the diskette for your operating system.

## CD-ROM Drivers

A CD-ROM driver disk comes with the CD-ROM option, as well as the preinstalled driver for the operating system you have selected. If you change operating systems and need help loading the required CD-ROM driver, contact Xycom technical support at 1-800-289-9266 ext. 450.

## Miscellaneous Drivers

Refer to your operating system and peripheral manuals for information on installing drivers related to these items.

## Mounting Considerations

This section describes issues you must address before placing the 1500 inside an enclosure.

Consider the following points and precautions:

- Select an enclosure and place the unit to allow easy access to the 1500 ports.
- Account for the unit's depth when choosing the depth of the enclosure.
- The unit must be mounted in an approved fire and electrical enclosure.
- Mount the 1500 in an upright position if possible.
- Consider locations of accessories such as AC power outlets for installation and maintenance convenience.
- Prevent condensation by installing a thermostat-controlled heater or air conditioner.
- To allow for maximum cooling, avoid obstructing the air flow.
- Place any fans or blowers close to the heat generating devices. If using a fan, ensure 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 interface (RFI) (equipment such as high power welding machines, induction heating equipment, and large motor starters).
- Installation in a rack shall be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Place incoming power line devices (such as isolation or constant voltage transformers, local power disconnects, and surge suppressers) away from the 1500. The proper location of incoming line devices keeps power wire runs as short as possible and minimizes electrical noise transmitted to the 1500.
- The power cord outlet must be installed near the equipment and shall be easily accessible.
- Avoid overloading the supply circuit.
- Incorporate a readily accessible disconnect device in the fixed wiring for permanently connected systems.
- Make sure the location does not exceed the 1500's shock, vibration, and temperature specifications.

## Enclosures

The 1500 systems are designed for installation within a clean and dry enclosure. The requirements for enclosure fittings, conduit, and wiring vary according to the specific rating of the location and the type of flammable or combustible material involved. Those requirements are beyond the scope of this document and it is the responsibility of the customer to ensure that their installation is compliant with codes and regulations that apply to their specific location. Reference NFPA 70, Article 500 for specific regulations in the United States.

## System Power

On the average, the temperature within the 1500 is 7-10°C 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 1500 is rated to work at temperatures up to 50°C (at 50°C, no more than 100 watts of expansion can be added to the 1500). Refer to the table below for more information.

Voltage	Available Current <sup>a</sup>		
	AHIP4+	AHIP6+	AHIP370
+3.3 VDC	0A	10.6A <sup>b</sup>	*
+5 VDC	17.1A	10.6A <sup>b</sup>	*
+12 VDC	4.94A	4.88A	*
-12 VDC	0.45A	0.76A	*
-5 VDC	0.50A	0.50A	*

<sup>a</sup>Total expansion power not to exceed 100 watts

<sup>b</sup>Combined 3.3V and 5V expansion is 10.6A

\* See Note below

### Note

Power specifications for the AHIP370 board are unique. The CPU power supply provides a voltage range of 1.30 V to 2.05 V in increments of 50mV. The CPU selects its voltage through its four outputs VID3-VID0. The maximum current that the supply can deliver is 19A.

It is always a good idea to use isolation transformers on the incoming AC power line to the 1500. An isolation transformer is especially desirable in cases where 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.

Proper grounding is essential to all safe electrical installations. Refer to the relevant Federal, State, Provincial, and local electric codes which provide data such as the size and types of conductors, color codes and connections necessary for safe grounding of electrical components. The code specifies that a grounding path must be permanent (no solder), continuous, and able to safely conduct the ground-fault current in the system with minimal impedance (minimum wire required is 18 AWG, 1 mm).

Observe the following practices:

- Separate ground wires (P.E. or Protective Earth) 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.
- All electrical racks or chassis and machine elements should be Earth Grounded in installations where high levels of electrical noise are expected. Ground the chassis with a ground rod or attach to a nearby Earth structure such as a steel support beam. Each different apparatus should be connected to a single Earth Ground point in a “star” configuration with low impedance cable. Scrape away paint and other non-conductive material from the area where a chassis makes contact with the enclosure. In addition to the ground connection made through the mounting bolt or stud, use a one-inch metal braid or size #8 AWG wire to connect between each chassis and the enclosure at the mounting bolt or stud.

## Excessive Heat

The 1500 withstands operating temperatures from 0° to 50° C (32° to 122° F). To keep the temperature in range, the cooling air at the base of the system must not exceed 50°C. Allocate proper spacing between internal components installed in the enclosure.

When the air temperature is higher than 50°C in the enclosure, use a fan or air conditioner.

## Electrical Noise

Electrical noise is seldom responsible for damaging components, unless extremely high energy or high voltage levels are present. However, noise can cause temporary malfunctions that can result in hazardous machine operation in certain applications. Noise may

be present only at certain times, may appear at widely-spread intervals, or in some cases may exist continuously.

Noise commonly enters through input, output, and power supply lines and may also be coupled through the capacitance between these lines and noise signal carrier lines. This usually results from the presence of high voltage or long, close-spaced conductors. When control lines are closely spaced with lines carrying large currents, the coupling of magnetic fields can also occur. Use shielded cables to help minimize noise. Potential noise generators include switching components relays, solenoids, motors, and motor starters.

Refer to the relevant Federal, State, Provincial, and local electric codes which provide data such as the size and types of conductors, color codes and connections necessary for safe grounding of electrical components. It is recommended that the high voltage and low voltage cabling be separated and dressed apart. In particular, the AC cables and switch wiring should not be in the same conduit with all communication cables.

## Line Voltage Variation

The unit's power supply is built to operate with output voltage ranges of 100-120 VAC and 200-240 VAC with an AC power supply or 19-30 VDC with a DC power supply, and still allow the system to function within its operating margin. As long as the incoming voltage is adequate, the power supply provides all 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, use a constant voltage transformer 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, use a constant voltage transformer.

The constant voltage transformer stabilizes the input voltage to the 1500 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 1500.

## Creating a Power Cable

This section describes how to create both an AC and a DC power cable.

### AC Power Cable

You must create an AC power cable to supply power to 1500 units with AC power supplies. You will need the following materials:

- A three-position power connector (supplied) (refer to figure below).
- A braid/foil shielded power cable, terminated at power source end, with three 18 (1.0 mm), 16 (1.3 mm), or 14 (1.6 mm) AWG solid or stranded copper wires, rated 80°C or better.

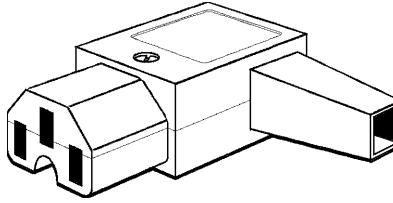


Figure 3-11. 1500 Power Connector.

Follow the steps below to create and attach the cable:

1. Cut wire cable to the desired length.
2. Strip 0.25-inch (6 mm) of insulation from the end of the conductor wire. No bare wire should be exposed when the cable is connected to the workstation.
3. Tin the wire ends with solder if using stranded wire. This will keep the wire from fraying.

### Warning

When inserting the wire ends of the power cable into the block plug, be sure there is no exposed wire. Trim the wire ends of the cable or cut a new cable if necessary.

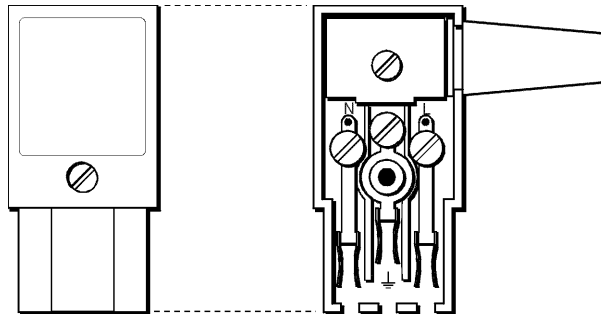


Figure 3-12. Internal View of 1500 Power

4. Insert the three wire ends of the power cable into the hole of the connector plug. Bend the Protective Earth ground (PE) wire, the neutral (N) wire, and the line (L) wire around the corresponding screw. Be sure that no bare wires are exposed.
5. Tighten the three screws above the wires to hold them firmly in place.

### Warning

Never tighten the three screws of the block plug when the cable is connected to a power source. The screws are conductive and have full contact with the cable wire.

6. Use the screw provided to secure and strain-relief the power cable inside the connector. Plug the power cable into the power supply located on the side of the 1500.
7. Once the power cable and other optional interface cables are installed, installation is complete.

### Note

When disconnecting the power cord from the unit, be sure to completely loosen the two securing screws on the retainer bracket.

### Cable Retainer Bracket (optional)

Once the power cable is made, you may attach the retainer bracket that secures the cable connector to the 1500.

1. Plug the completed cable into the 1500 power supply.
2. Place the retainer bracket over the connector so that the shorter sides wrap around the connector and the screw holes on the large flange line up with those on the 1500 case.
3. Insert the two 6-32 screws and tighten to the standard torque (11-in/lb).

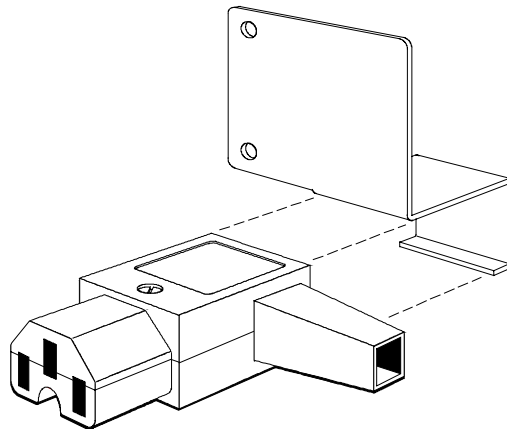


Figure 3-13. 1500 Cable Retainer Bracket

### Note

When using the retainer bracket, the external monitor power connector cannot be used.

### DC Power Cable

You must create a DC power cable to supply power to units with DC power supplies. Xycom recommends using 14 AWG stranded wire (minimum) with terminals such as AMP Spade Terminal 3241656, or equivalent.

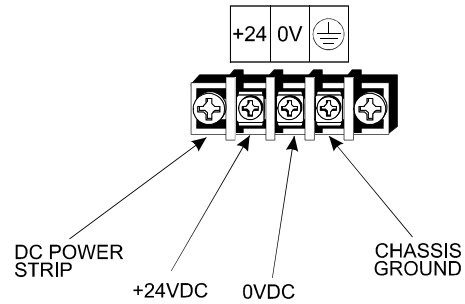


Figure 3-14. 24 VDC Power Connector

## Mounting Dimensions (Wall or Rack)

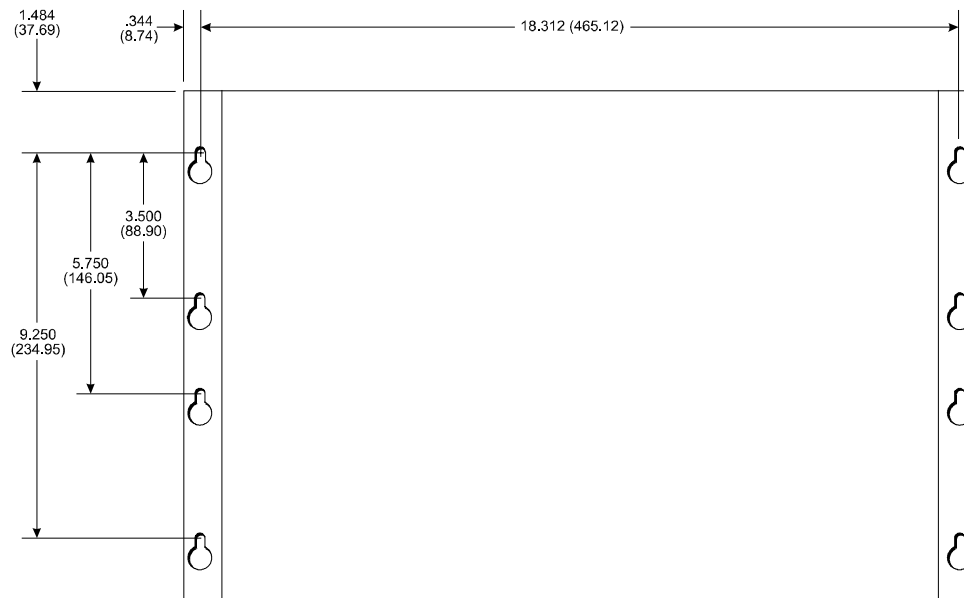


Figure 3-15. 1500 Mounting Dimensions

## Mounting the Unit

Once the mounting considerations in this chapter have been met, mount the 1500 according to the following instructions.

1. Locate a position for your 1500 that meets the specifications required (see previous sections and Appendix A).
2. Refer to the following *Mounting Dimensions* (Figure 3-15) as a guide for positioning your system onto a wall or rack
3. Mount and secure the 1500 unit. Refer to *Installing the System* in this chapter.
4. Attach one end of the power cord to the power receptacle and the other end to a properly grounded 115/230 VAC or 24 VDC outlet, whichever applies.

5. Attach the connector retainer bracket if desired (optional).
6. Implement the proper grounding techniques. Establish a ground path from the 1500 chassis to the enclosure chassis. A 6-32 threaded ground point ( $\perp$ ) hole is provided on the left back of the front panel (as viewed from the front) of the unit. There is also an internal ground point ( $\perp$ ).
7. Turn on the power . The system will boot up to the operating system installed.
8. Install application software via a floppy drive or CD-ROM.

## Safety Agency Approval

The Xycom 1500 is UL approved to meet the following standards:

- *Canadian Standards Association, Specification C22.2 No. 950*  
Information Technology Equipment (CUL recognized, File E181675)
- *Underwriters Laboratories Standard UL 1950*  
Information Technology Equipment (UL recognized , File E181675)

# Chapter 4 – Maintenance

---

The 1500 was designed to withstand the harsh environment of the factory floor. Routine maintenance can help keep your 1500 in good operating condition. Preventive maintenance consists of several basic procedures that significantly reduce the chance of system malfunction. Schedule preventive maintenance along with the regular equipment maintenance to minimize 1500 down time.

## Preventive Maintenance

Here are some preventive measures you can take:

- Clean or change the fan filter periodically to ensure that the air circulating in the unit is clean. Wash the filter with warm water and dish soap, and let it air dry. Do not scrub the filter, and do not re-install it into the unit until it is completely dry.
- Base your maintenance schedule on the operating environment of the system (i.e., if the area is dusty, you should schedule maintenance more often than if it is a dry, clean area). Check the filter often to determine if it needs to be changed ahead of schedule.
- Remove dust and dirt from PC components. If dust builds up on heat sinks and circuitry, an obstruction of 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 secure.
- Remove unnecessary articles, such as drawings or manuals, from the unit. They can obstruct air flow and create hot spots, which causes the system to malfunction.
- Do not place noise generating equipment near the 1500.
- 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. The main CPU cards should have one spare each. Each power supply should have a back-up. In certain applications where immediate operation of a failed system is required, you may need to stock an entire spare computer module. See *Spare Parts List* in this chapter.
- Replace the module with the correct type. If the new module solves the problem but the failure recurs, check for inductive loads that may be generating voltage and current spikes and may require external suppression.

## Fan Filter Replacement

To change the fan filter, remove the grill and filter, as illustrated in the figure below. Clean or replace the filter and snap the grill back into position.

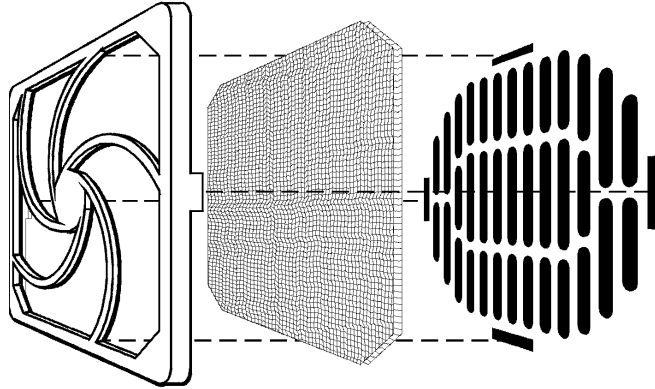


Figure 4-1. Fan Assembly

### Caution

Do not operate the 1500 without a fan filter. Dust build-up could cause the unit to malfunction.

## Fuse Replacement

The 1500 has no accessible fuse. Return the unit to Xycom for fuse replacement.

## Spare Parts List

1500 Spare Parts List

Description	Xycom Part Number
Drives	
Hard Drive (2160 MB)	109456-004
Solid State (Flash) Drive	
10 MB	109469-004
20 MB	109469-001
40 MB	109469-002
60 MB	109469-003
3.5", 1.44 MB Floppy Drive	109443-001
CD-ROM Drive	117822
CPU Assembly	
AHIP4+ CPU kit	117319-001
AHIP5+ CPU kit	
133 MHz Pentium processor	121607-001
200 MHz Pentium processor with MMX technology	121648-001
233 MHz Pentium processor with MMX technology	127075-001
AHIP6+ CPU board <sup>a</sup>	133130-001
300 MHz Celeron processor	134613-001
350 MHz Pentium II processor	133115-001
400 MHz Pentium II processor	133128-001
450 MHz Pentium II processor	134639-001

Description	Xycom Part Number
DRAM (AHIP4+ and AHIP5+ <sup>b</sup> )	
1M x 32 (4 MB)	104273
2M x 32 (8 MB)	104258
4M x 32 (16 MB)	104302
8M x 32 (32 MB)	106054
16M x 32 (64 MB)	123514
SDRAM (AHIP6+)	
8M x 32 (32 MB)	132442-001
16M x 32 (64 MB)	132455-001
32M x 32 (128 MB)	133813-001
9000-RFC 19" Floppy Door Plate <sup>c</sup>	110843-001
Filter Media	110383
Media Retainer	110650
Input Power Connector (AC only)	121610-001
9000 Accessories <sup>c</sup>	
External Floppy Kit	
9000-EXF	116074-001
9000-FKA	116087-001
9000-FFK	116061-001

<sup>a</sup>The CPU board and processor must be ordered separately.

<sup>b</sup> AHIP5+ uses two 16M x 32 of DRAM memory SIMMs per board to equal 128 MB. Unless unit originally shipped with 128 MB DRAM, you will need a different COAST stick. Consult with the factory for use.

<sup>c</sup>Do not order these accessories if the 1500 unit ships with an internal floppy.

## Product Repair Program/Returning a Unit to Xycom

Xycom's Product Repair & Customization Department (PR&C) restores equipment to normal operating condition and implements engineering changes that enhance operating specifications. Xycom tests products returned to Xycom with the standard Xycom test diagnostics.

Follow the steps below to prepare the unit for shipment:

1. Obtain an RMA number for your unit by calling your local Product Repair Department or the Xycom Repair Center 1-800-289-9266 or 734-429-4971. Have the following information available:
  - Company name, shipping and billing address
  - Type of service desired - product repair or product exchange
  - Product model number, part number, quantity, serial number(s), and warranty status
  - Failure mode and failure systems
  - Purchase order number or repair order number
2. Attach failure information to the unit to speed processing.
3. Place the unit securely in its original packaging or an equivalent heavy-duty box.
4. Mark the RMA number on your purchase order and on the outside of the box.
5. Send the unit to your local Xycom repair center.



# Appendix A – Technical Specifications

## Hardware Specifications

*1500 Hardware Specifications*

Characteristic	Specification			
Mechanical				
Height	12.25"			
Width	19"			
Depth	8.5"			
Weight	24 lbs			
Electrical				
AC	115-230 VAC	50-60 Hz	6.3 A autosensing	
DC (not with AHIP6+ board)	19-30 VDC	24 V nominal	16 A maximum	
Power Supply	200 watts			
Available Power <sup>a</sup>		<b>AHIP4+</b>	<b>AHIP6+</b>	<b>AHIP370</b>
	+3.3 VDC	0A	10.6A <sup>b</sup>	*
	+5 VDC	17.1A	10.6A <sup>b</sup>	*
	+12 VDC	4.94A	4.88A	*
	-12 VDC	0.45A	0.76A	*
	-5 VDC	0.50A	0.50A	*
Passive Backplane	Six full length expansion slots: Four ISA Slots One PCI bus expansion slot One ISA/PCI bus expansion slot (4.8" maximum length with AHIP 6+ board)			
Mounting	Panelmount or 19" rackmount.			
Agency Approvals	UL	1950		
	CUL	C22.2, No. 950		
Regulatory Compliance	FCC	47 CFR. Part 15, Class A		
	CE:	EMI	EN55022: 1994 Class A	
		IMMUNITY	EN50082-2:1995	
		SAFETY	EN60950	
ISO 9001	The manufacturing facility at Xycom, Inc. is ISO certified and is accredited by ANSI-RAB and the RvA.			

<sup>a</sup>Total expansion power not to exceed 100 watts

<sup>b</sup>Combined 3.3V and 5V is 10.6A

\* See note below

### Note

Power specifications for the AHIP370 board are unique. The CPU power supply provides a voltage range of 1.30 V to 2.05 V in increments of 50mV. The CPU selects its voltage through its four outputs VID3-VID0. The maximum current that the supply can deliver is 19A.

## Environmental Specifications

### 1500 Environmental Specifications

Characteristic	Specification
Temperature Operating Nonoperating	0° to 50° C (32° to 122° F) -40° to 60°C (-4° to 140°F)
Humidity Operating Nonoperating	20% to 80% RH noncondensing 20% to 80% RH noncondensing
Altitude Operating Nonoperating	Sea level to 10,000 feet (3048 m) Sea level to 40,000 feet (12192 m)
Vibration* Frequency Operating  Nonoperating	56-2000 Hz 5-55 Hz 0.006" peak to peak displacement 1.0g maximum acceleration 5-55 Hz 0006" peak-to-peak displacement 2.5 g maximum acceleration
Shock* Operating Nonoperating	15g peak acceleration, 11 msec duration 30g peak acceleration, 11 msec duration

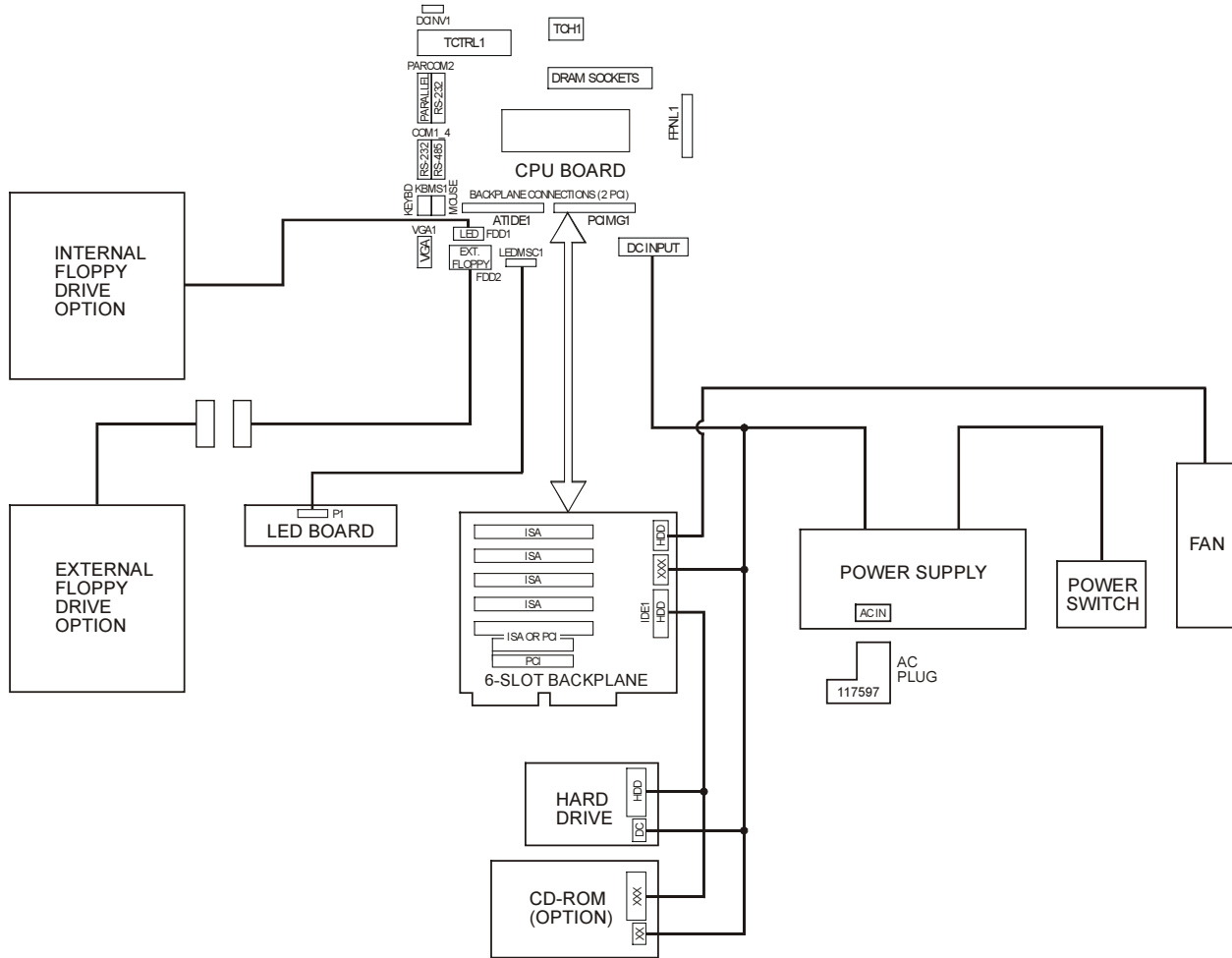
\*These values are with solid state hard drives and **not** rotating media drives.

### Note

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 the 1500 are limited to the shock and vibration specifications of the CD-ROM drive.

# Appendix B – Block Diagram



Appendix B-1. 1500 System Block Diagram



# Appendix C – Pinouts

---

This appendix provides the pinouts for the keyboard, AUX, LPT1, COM1, COM2, USB1, and VGA connectors. The following table defines abbreviations used in this Appendix.

Abbreviation	Definition
NC	No connect

## Keyboard Port Connectors

This connector is a standard PS/2-compatible connector.

Pin	Signal
1A	KB_DATA
2A	NC
3A	GND
4A	5VFUSE
5A	KB_CLK
6A	NC

## Aux Port Connector

This PS/2 mini-DIN connector allows you to attach a serial device.

Pin	Signal
1B	AUX_DATA
2B	NC
3B	GND
4B	5VFUSE
5B	AUX_CLK
6B	NC

## Dual USB Connector (USB1)

Pin Number	Description
1A	5VFUSE
2A	USBP0+
3A	USBP0-
4A	GND

Pin Number	Description
1B	5VFUSE
2B	USBP1+
3B	USBP1-
4B	GND

## Parallel Port Connector (LPT1)

This is a 25-pin DB connector.

Pin	Signal
1A	STROBE
2A	PD(0)
3A	PD(1)
4A	PD(2)
5A	PD(3)
6A	PD(4)
7A	PD(5)
8A	PD(6)
9A	PD(7)
10A	PACK
11A	PBUSY
12A	PE
13A	SELECT

Pin	Signal
14A	AUTOFEED
15A	PERROR
16A	INIT
17A	SELIN
18A	GND
19A	GND
20A	GND
21A	GND
22A	GND
23A	GND
24A	GND
25A	GND

## Serial Port Connectors

Serial ports RS-232 and RS-485 are supported on the AHIP5+ and the AHIP6+ boards. Only one connector can be used at a time. All termination is done outside the unit.

### COM1

#### RS-232

Pin	Signal
1A	DCD1
2A	RXD1
3A	TXD1
4A	DTR1
5A	GND
6A	DSR1
7A	RTS1
8A	CTS1
9A	RI1

#### RS-485

Pin	Signal
1B	TXD-
2B	TXD+
3B	TXD TERM -
4B	TXD TERM +
5B	GND
6B	RXD-
7B	RXD+
8B	RXD TERM +
9B	RXD TERM -

### Technical Note

For TXD termination, connect a 150Ω, ½ watt resistor from pin 3B to pin 4B, with pin 1B connected to pin 3B and pin 2B connected to pin 4B. For RXD termination, connect a 150Ω, ½ watt resistor from pin 8B to pin 9B, with pin 6B connected to pin 9B and pin 7B connected to pin 8B.

## COM2

### RS-232

Pin	Signal	Pin	Signal
1B	ORB_GND	14B	NC
2B	TXD2	15B	NC
3B	RXD2	16B	NC
4B	RTS2	17B	NC
5B	CTS2	18B	NC
6B	DSR2	19B	NC
7B	GND	20B	DTR2
8B	DCD2	21B	NC
9B	NC	22B	RI2
10B	NC	23B	NC
11B	PB_RESET	24B	NC
12B	NC	25B	NC
13B	NC		

## VGA Connector

The VGA connector is a 15-pin connector.

Pin	Signal
1	RED
2	GREEN
3	BLUE
4	NC
5	ORB_GND
6	ORB_GND
7	ORB_GND
8	ORB_GND
9	Fused VCC
10	ORB_GND
11	NC
12	DDCDAT
13	HSYNC
14	VSYSN
15	DDCCLK

## External Floppy Connector

This connector is only available if the unit is ordered without the internal floppy (since the floppy interface supports only one floppy option).

Pin	Signal
1	+5V
2	IDX
3	FDS1
4	+5V
5	NC
6	DCHG
7	NC
8	NC
9	GND
10	MO1
11	NC
12	FDIRC
13	NC

Pin	Signal
14	FSTEP
15	NC
16	FWD
17	GND
18	FWE
19	GND
20	FTK0
21	GND
22	FWP
23	GND
24	FRDD
25	GND
26	FHS

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