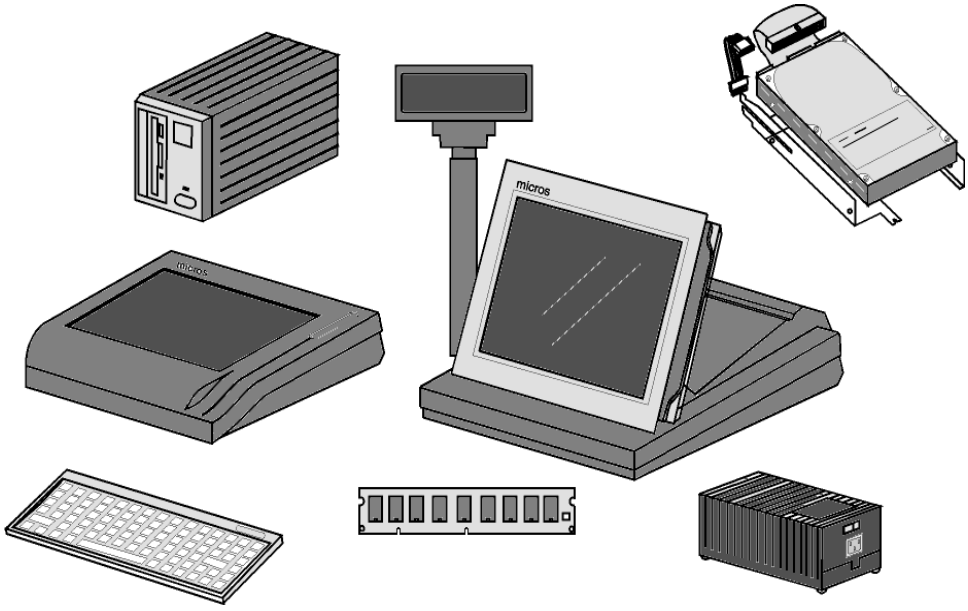
**micros**® Systems, Inc.

# PC Workstation

# Ultra

# Setup Guide






Part Number **100016-103 (2nd Edition)**

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## Printing History

New editions of this manual incorporate new and changed material since the previous edition. Minor corrections and updates may be incorporated into reprints of the current edition without changing the date or edition number.

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# *Preface*

In this preface, you'll find information about this manual. Refer to the preface if you have questions about the organization, conventions, or contents of this manual.

## *In this section*

# *Why Read This Manual?*

## Purpose

This guide is intended for those who will be setting up and installing the PCWS Ultra hardware and as such is not specific to a particular software application. To use the PCWS with a specific application, consult the Related Manuals section listed below.

## Who Should Use This Manual?

This manual is intended for quailifed service personel who have experience with upgrading and configuration of personal computer based systems.

## Related Manuals

> *Ultra Workstation Architectural Overview P/N 100016-106*

> *Schematic Diagrams For The PCWS Ultra, PN 100016-107*

# *How This Manual is Organized*

This manual is divided into five chapters, briefly discussed below.

Chapter 1 describes the PC workstation family, then lists each accessory and provides instructions for installation.

Chapter 2 describes how to use the Phoenix BIOS Setup Utility to configure the system board hardware.

Chapter 3 covers the Ultra system board hardware configuration issues. This includes how to remove the cover, identify the major components, and how to upgrade or configure such items as the main memory and hard disk, or to add a internal customer display.

Chapter 4 provides basic troubleshooting data in the form of BIOS error messages and beep codes.

A Reference section consisting of a Glossary, Equipment Dimensions, FCC/DOC Statement, and Connector Diagrams can be found at the end of this manual.

**SHOCK HAZARD**

No user serviceable parts inside.
Refer servicing to qualified personnel.

# *Notation Conventions*

## Symbols

**NOTE**

This symbol brings special attention to a related item.

**WARNING**

This symbol indicates that specific handling instructions or procedures are required to prevent damage to the hardware or loss of data.

**SHOCK HAZARD**

This symbol calls attention to a potential hazard that requires correct procedures in order to avoid personal injury.

**STATIC SENSITIVE DEVICES**

This symbol indicates that specific ESD handling procedures are required.

## Document Design and Production

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Contents

Chapter 1

# *The System*

This chapter provides an introduction to the PCWS Ultra and accessories, lists care and handling instructions for the hardware and shows you how to connect the components.

## *In this chapter*

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Chapter 2

# *Setup Utility*

The PhoneixBIOS Setup Utility provides a central location for configuring the PCWS Ultra system board hardware. The BIOS Setup Utility is stored in a Flash EPROM, so it is available even if a hard disk or operating system is not installed. All settings are retained in a battery protected CMOS RAM when power is off.

## *In this Chapter*

# *Starting the PhoenixBIOS Setup Utility*

### Requirements:

A PC Keyboard with a PS/2 style connector.

### Procedure:

1. Power-up the PCWS
   - You can power-up, or press the [CTRL]-[ALT]-[DEL] keys at the same time.
2. Press the [F2] key when prompted.
   - You should be at the PhoenixBIOS Setup Utility main screen.
   - For information on how to navigate around the each menu and make selections, press [F1] or check the help information at the bottom of the screen.
   - There are six primary selections: the start-up menu, Main, Advanced, Security, Power, Boot, and Exit. An overview of each selection follows.

#### Main

This menu lets you set the system date and time, define the type of floppy and hard disk installed, and displays the total amount of memory installed on the system board.

#### Advanced

This menu provides access to many Ultra hardware features including Plug and Play OS settings, IDE and PS/2 Mouse configuration, PCI slot resource allocation/exclusion, and IO device configuration.

#### Security

From this menu you can enable the security features of the BIOS, including password entry to enter BIOS setup, and or boot the workstation.

#### Power

This menu provides access to the PCWS power saving modes. A pre-configured power savings mode may be used or the user may configure a power savings mode manually by defining several parameters.

### Boot

This menu allow the user to select the PCWS boot device priority. The boot device may be External Floppy Diskette Unit, internal IDE hard disk, ATAPI compatible CD-ROM Drive or Network Boot ROM.

## Keys Used During Setup

Pressing the [F1] key at any time displays a help menu that shows how to move and around and make selections from each screen.

# *Main Menu*

The following section describes the Main screen settings and lists the recommended default where possible.

### System Time:

### System Date:

This pair of fields set the system time and date. Time is entered in the 24-hour military time format. For example, 1PM is 13:00:00, 6PM is 18:00:00, and so forth. Use the -/+ keys to select a value, then press enter to advance to the next field.

### Legacy Diskette A:

This sub-menu determines if the External Floppy Diskette Unit is installed. Select “1.44/1.25 Mb 3½” to enable the External Floppy Diskette. To boot the workstation from a floppy, see the Boot Menu for more information.

### Primary Master

We recommend you leave this field set to the default of “Auto” for all drives. When you install a hard disk. the BIOS will automatically detect the drive parameters and optimal settings for almost all modern IDE hard drives. If you do not wish to use the Auto selection, you may enter the drive parameters manually by pressing [ENTER] and consulting the item specific help screen. Refer to the “Installing a Hard Disk” section in Chapter 3.

### Keyboard Features

This sub-menu provides access to several keyboard features such as the power-on state of the num lock key, enabling/disabling a keyboard “click”, and defines the Auto-repeat rate and delay.

### System Memory

### Extended Memory

These fields are display only. The size of “System Memory” will typically be 640K. The size of “Extended Memory” is determined by the size of the DIMM installed. The sum of the System Memory and Extended Memory should equal the size of the DIMM installed on the system board.

# *Advanced Menu*

This menu provides several sub-menus where you access many of the Ultra system board hardware features.

### Plug & Play O/S

This selection determines if the operating system on the hard disk supports the Plug and Play specification.

- ❑ If using Windows 95 or 98, select [Yes].
- ❑ If using any version of UNIX, or Windows NT Workstation Version 4.00 select [No].

**WARNING:**

If this field is not set to match the operating system as described above, you may experience problems with the on-board AMD Ethernet controller.

### Reset Configuration Data

Selecting Yes resets the BIOS Plug and Play configuration data. This field automatically resets to No after a re-boot.

### Secured Setup Configurations

If Yes, prevents a Plug and Play operating system from changing any system settings.

### Local Bus IDE Adapter

This selection enables/disables the system board IDE interface. By default, this selection is “Enabled” to ensure a hard disk can be detected automatically when it is installed.

### PS/2 Mouse

This selection enables or disables the rear panel PS/2 mouse port. When set to [AUTO] (default), it is up to the operating system to detect and use the mouse. [Disabled] disables the PS/2 mouse port and frees up IRQ12 for other uses.

### PCI Device Slot

This selection allows you to designate a PCI card installed in the Ultra PCI/ISA Riser Card as a Master. Some very old PCI cards may require this. Consult the documentation supplied with card.

### PCI/PNP ISA IRQ Resource Exclusion

This sub menu allows you to reserve specific IRQ(s) for use by legacy devices and indicates if the IRQ has been assigned.

By default, all IRQ lines are set to [Available], which means they are “available” to the PCI/PNP resource pool. At power up, the BIOS assigns IRQs from this pool as required to the on-board PCI devices (VGA controller, network controller, IDE controller, and USB controller), as well as the system board COM and LPT ports.

If you install a legacy ISA such as a multi-port serial card that requires one or more interrupts, set those IRQ lines to [Reserved] to prevent the BIOS from assigning them to PCI devices.

If the message “Indicates a DMA, interrupt, I/O, or memory resource conflict with another device” appears when you select [Reserved], that IRQ has been assigned to a device in the pool. If the message does not appear, it means the IRQ is available.

Once you know what resources are available, set the board jumpers and set those IRQ lines to [Reserved].

### I/O Device Configuration

This sub-menu allows enable/disable and manually configure the on-board COM and LPT ports, as well as enable the floppy disk controller.

#### Serial port A:

This selection configures the rear panel DB9 serial connector. The Default setting is “Auto” which allows the BIOS to determine the settings. Select “Disabled” to turn off the port and use the resources elsewhere. Select “Manual”, to allocate the resources manually. When you select a Manual configuration, you must enter the following values.

##### Base I/O address:

The Base IO Address determines the COM port designation with three available selections. 3F8 corresponds to COM1, 3E8 corresponds to COM3 and 2E8 corresponds to COM4.

Note: I/O address 2F8 (COM2) is reserved for the touchscreen controller.

##### Interrupt

You must assign IRQ3 or IRQ4 to the COM port.

### Serial LCC Port: (Manual)

This selection configures the multi-function LCC port, consisting of a rear panel RJ45 connector. Select “Disabled” to turn off the port and use the resources elsewhere. Select “Auto” to allow the BIOS to determine the port resources automatically. When you select “Manual”, the default configuration, you must enter the following value.

#### Base I/O address: (COM4)

The Base IO address determines the COM port designation. Three selections are available. 3F8 corresponds to COM1, 3E8 corresponds to COM3 and 2E8 corresponds to COM4. COM1 is already assigned to the rear panel DB9 connector and COM2 is assigned to the touchscreen. The default setting for this port is 2E8, or COM4.

#### Interrupt: (IRQ 11)

You must assign IRQ11 to this port.

#### Mode: (RS422+)

This field selects the operating mode of the port. The [RS422+] (default, on BIOS release 1.00c or later) and [RS422-] modes are a reference to sender (+) or receiver (-) of information in a MICROS Integrated Device Network (IDN). The default setting is RS422+ which allows the workstation to drive IDN devices in applications such as 3400 and 3700.

Selecting the [RS232] mode allows OPOS compatible serial devices to attached to the workstation.

### Parallel Port (Auto)

This selection configures the rear panel parallel port connector. Select “Disabled” to turn off the port and use the resources elsewhere. Select “Auto” (default) to allow the BIOS to determine the port resources. Select “Manual”, to allocate the resources manually. When you select a Manual configuration, you must enter the following values.

#### Base I/O address:

The Base IO address determines the LPT port designation of the parallel port. 378 corresponds to LPT1 and 3BC corresponds to LPT2.

#### Interrupt:

You may assign IRQ5 or IRQ7 to the LPT port, if required.

### Mode: (Bi-directional)

This selection defines the parallel port mode. In most cases, the driver software for any device (a parallel port CD-ROM drive for example) you install enables the fastest possible parallel port configuration.

- "Output only" selects the Centronics parallel mode
- Bi-Directional (default) selects bi-directional mode, also known as PS/2 mode
- "EPP" selects the Enhanced Parallel Port mode
- "ECP" selects the Extended Capabilities Parallel Port. When this mode is selected, you must define a DMA channel. Press enter to see a list of DMA channels. DMA channels 1 or 3 are recommended.

## Floppy disk controller (Enabled)

This selection enables/or disables the system board floppy diskette interface. Always leave this set to enabled, then enter the floppy diskette type in the Main Menu to enable the external floppy.

### Base I/O address:

Leave this selection set to "Primary."

## LCD Contrast

This selection allows the contrast to be adjusted on passive LCD panels. Use the -/+ keys to adjust the contrast setting. Application programs adjust the LCD contrast through the PCWS Application Programming Interface (API).

### Minimum

### Maximum

These fixed values correspond to the minimum and maximum contrast values for a given LCD panel. These values are determined by the BIOS based on the type of passive LCD panel installed.

**NOTICE:**

The LCD contrast setting has no effect on active matrix LCD panels.

## UPS Interrupt Type

This field should be set to [Disabled].

The following fields are found only on BIOS Version 1.00d or later.

### Mag Stripe Reader IRQ: (IRQ9)

This selection allows you to assign an IRQ resource to the internal mag stripe reader. Press [Enter] to view a list of IRQ lines. IRQ conflict checking is not implemented. Use the default of IRQ 9 if possible.

### Mag Stripe Reader Mode: (Special)

This field selects one of two operating modes for the internal mag stripe reader.

#### Magtek

When this mode is selected, track 1 and track 2 card data is converted into standard PC keyboard keystrokes to make it appear as if the card data was entered on the keyboard. However, this means that certain card data such as the LRC (Longitudinal Redundancy Check) character will not be available to applications that require it such as credit authorization software.

#### Special

When this mode is selected, track 1 and 2 mag card data is left intact and placed in a buffer where it can be accessed through the PCWS API. This method is used for credit authorization programs.

# *Security Menu*

This menu provides access to the security features of the Phoenix BIOS.

### Set User Password

This selection allows you to define a password that is required to enter the BIOS Setup screens. If you select [Enter], you will be asked to enter and then confirm a password that will be required to enter setup.

### Password on boot:

This selection, if enabled, and if a password has been entered in the selection above, requires password entry before the workstation will attempt to boot from the selected boot device.

### Fixed disk boot sector

This selection enables/disables write protection for the hard disk boot sector to serve as basic anti-virus protection.

# *Power Menu*

This menu provides access to the Ultra System Board power saving features. These features are disabled in the default settings.

### Power Savings:

This field selects the power management mode.

#### Disabled (Default)

Turns off all power management features. This setting is recommended for most applications.

#### Maximum Power Savings

This selection provides the greatest amount of power savings but may affect system performance. Sets the Auto Suspend Time-out field to 5 minutes.

#### Minimum Performance

This selection conserves less power, but performance is not affected. When enabled, sets the Auto Suspend Time-out field to 15 minutes. The time-out can be adjusted as described below.

#### Customized

This selection lets you define a custom Auto Suspend Time-out value.

#### Auto Suspend Time-out

User defined time period before power saving mode becomes active. Default is 15 minutes.

### Resume on PCI Bus Activity

This ON/OFF toggle determines if PCI bus activity will “wake-up” the system from a power savings mode. This enables PCI devices to restart the system from Suspend Mode through a specific signal on the PCI bus.

### Resume on time

This selection enables/disables the system to wake up at a specific time, defined below.

### Resume Time

When Resume on time is enabled, enter the specific time to wake up in this field. 24 hour time entry.

### IRQ activity monitoring

This sub-menu allows you to select one or more IRQ resources that when active, can be used to wake-up the workstation. For example, in the default configuration, any activity on IRQ3, IRQ4, or IRQ12 will “wake-up” the system.

IRQ3 or IRQ4 are typically assigned to the rear panel DB9 COM port and touchscreen interface. IRQ12 is typically assigned to the PS/2 mouse port. Activity on any of these ports will wake up the workstation from a power-down mode.

# *Boot Menu*

This selection lets you select how the workstation will boot.

### Boot On-Board LAN

This is the setting for a diskless workstation. When this field is set to “enabled”, the workstation will power-up looking for a BOOTP server running Windows NT or SCO UNIX. The default setting is “Enabled”. When this field is set to enabled, the Boot Device Priority settings, described below, are ignored.

When set to “Disabled”, the workstation will look to the Boot Device Priority settings, described below.

### Boot Device Priority

When the workstation powers-up and finishes the Power-On Self Test (POST), it attempts to load the operating system. If the Boot On-Board LAN field described above is disabled, this menu determines the order of devices which the BIOS will search for the operating system. This menu will also appear after a Flash BIOS update. Press [Enter] to view the default list, shown below.

- 1. Diskette Drive (if installed)
- 2. Hard Drive
- 3. ATAPI CD-ROM Drive
- 4. Network Boot

In this example, the External Floppy Diskette will be checked first, then the hard disk. However, if a floppy disk is not installed, the workstation will look for the operating system on the hard disk.

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# *Exit Menu*

This selection allows you to exit the system setup utility while saving or discarding changes made in the various menus. [F10] saves changes and exits with two key strokes.

### Exit Saving Changes

Exit system setup and save changes to CMOS RAM.

### Exit Discarding Changes

Exit system setup without saving changes to CMOS RAM.

### Load Setup Defaults

Load the setup defaults as shipped from the factory. This selection can be used to recover from improper settings made in the Advanced menu.

### Discard Changes

Discard any changes you have made this session, but do not exit setup.

# *What is the PC Workstation?*

The MICROS PC Workstations are a family of touchscreen based personal computers designed expressly to meet the needs of the food service, hotel and retail industries.

This is because the PCWS extends the PC feature set to incorporate point-of-sale functionality including such items as an integral mag card reader, customer display, and cash drawer interfaces among others. A Software Developers Kit is available that provides the software and documentation required to leverage these unique features for third party applications.

Like any personal computer, the PC Workstation is changing to keep up with advances in processor, memory, and LCD technology. The Ultra system board represents the latest development.

To continue our description, the MICROS PCWS (PC Workstation) can be viewed from three dimensions: Profile, Display, and System Board, detailed in the following pages.

## Profile

### Low Profile and Adjustable Display Case

All PC Workstations are available in a Low Profile (LPs), or Adjustable Display Sharp (ADs) case style. The AD case can use a variety of 11.3” and 12.1” active and passive LCD panels. The LP case does not support 12.1” LCD panels. Figure 1-1 shows an example of the LPs (left) or ADs (right) casework.

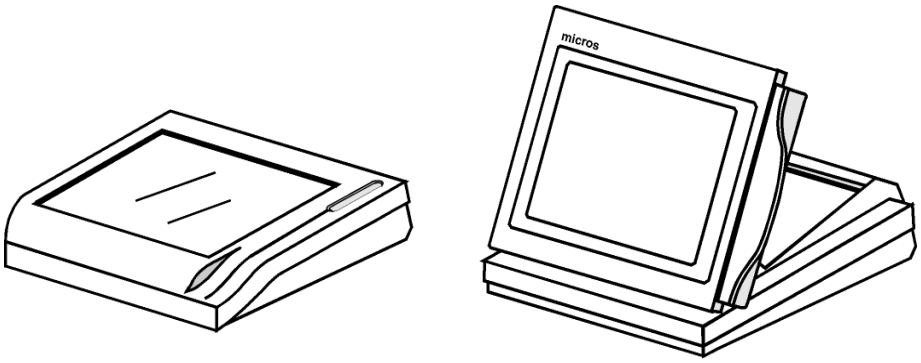



*Figure 1-1: The PCWS Low Profile and Adjustable Display*

## Display and Touchscreen

PC Workstations support a variety of backlit active and passive matrix LCD panels. The display is closely integrated with a highly reliable, 5-wire touchscreen panel which can replace the traditional mouse or other pointing devices.

The AD and LP casework influences the size of the LCD. The Low Profile case supports only 11.3" LCDs. The AD case supports both 11.3" and 12.1" LCD panels. The Ultra system board adds support for a 12.1" passive LCD.

Both the LP case, and the Sharp 11.3" passive LCD goes end-of-life in mid 1999.

## System Boards

With the introduction of the Ultra System Board, there are now four PCWS System Boards in the field. A brief description of each follows. These system boards can be installed in either the LP or AD case.

### Model 32R and 32L

The Model 32R and 32L system boards represent the 486/586 processor class. These system boards set the standards for those that follow.

### Model 64

The Model 64 System Board features the "Classic" Intel P54C Pentium® processor while retaining all of the POS compatible features of the Model 32R and 32L System Boards.

### Ultra

The latest in the series of PC Workstation system boards, the Ultra brings new flexibility to the PCWS family by supporting the Pentium® MMX and AMD K6 processors, as well as a greater number of active and passive LCD panels.

The Ultra system board is designed to fit into the existing LP and AD casework without modifications. However, this does not mean the Ultra system board is a drop-in replacement for the M64 system board.

## PCWS Accessories

Each PC Workstation from the Model 32 through the Ultra uses the same basic set of accessories including:

- ❏ External AC Adapter
- ❏ External floppy diskette unit (optional)
- ❏ PC Keyboard (optional)
- ❏ Remote Customer Display (optional)

Details on connecting these devices to the workstation can be found later in this chapter.

## Expansion Capabilities

A half-size PCI or ISA expansion card can be installed if the optional Ultra PCI/ISA Riser Card is used. This Riser Card is not compatible with the Riser Card used for the Model 64 system board.

## Diagnostics Utilities

There are two versions of diagnostics utilities designed to test the POS extensions of the Ultra PC Workstation. The first, WorkStation Diagnostics Test (WSDT), is intended for the DOS or Windows 95/98 command mode environments. Once installed on a bootable floppy diskette, WSDT forms a complete stand-alone diagnostics utility, used primarily to confirm basic functionality of the workstation POS extensions.

The second version, DEMODIAG, runs in the Windows 95/98 and Windows NT environments. Each diagnostics utility allows you test the LCD, backlight, mag stripe reader, customer display(s), and other ports. Please note that neither diagnostics utility is intended to replace off-the-shelf PC diagnostics utilities that test PC functions such as memory, hard disk, and the processor.

## PCWS API

The PCWS Application Programming Interface (API) is a set of services that resides between the application and operating system (Windows 95/98 or Windows NT) and the unique POS hardware on the system board. This allows the application programmer to use a standard set of API calls to access such POS features as LCD contrast, mag stripe data, and the cash drawers.

## Specifications

The Ultra conforms to the following specifications.

| Specification | Parameters |
|---|---|
| Processors | Intel P54C or P55C |
| Processor Socket | 231-Pin Socket 7 ZIF Socket |
| Displays | 11.3” passive or 12.1” active or passive |
| Touchscreen | Elo five-wire resistive, 100 thousands points-per-inch resolution, screen life of over 35 million touches |
| Backlight(s) | Can be set to one three intensity levels by the API |
| VGA Interface | On-Board PCI based Chips and Technologies 65554 graphics accelerator with 1MB EDO RAM supports VGA, or SVGA standards, and displays up to 4096 colors on passive LCDs and up to 16 million colors on active LCDs. |
| BIOS | Plug ‘n Play, DMI 2.0 compliant in flash EPROM, includes LAN boot software to support diskless workstations. |
| BIOS Setup Utility | Configures system time and date, floppy and hard drive parameters, COM and LPT port resources, and the boot priority device. |
| Spread Spectrum Bus Clock | 60 or 66.8 Mhz, 50 kHz modulation |
| Real Time Clock | Time-of-day clock: 100-year calendar with alarm features and century roll-over, includes 256 bytes of battery backed CMOS RAM, reserved for BIOS use. |
| Memory | Single DIMM socket supports from 8 to 128 MB of 60ns EDO or SDRAM |
| External (L2) Cache | 512 Kb on-board, write back PBSRAM |
| Mag Stripe Reader | ABA compatible, operates in MAGTEK and Special modes. |
| Customer Displays | One-line 20 character display mounts to LP or AD case, and or two-line 40 character remote pole mount display |
| USB Port | Two UHCI 1.1 compliant ports |

| Specification | Parameters |
|---|---|
| LAN Interface | On-board PCNet AMD AM79C970 PCI based Ethernet controller, with rear panel 10BaseT modular connector |
| Parallel Port | Supports centronics, EPP, and ECP standards |
| Riser Card | Supports half-size ISA or PCI expansion card and future sound card |
| Input Power | 50W, max |
| Input Voltage | +24VDC, +25%/-8% (+22VDC to +30VDC) from an external AC adapter or future supplied UPS |
| Input Current | 0.21A to 2.1A |
| Storage Temperature | -25°C (-13°F) to 85°C (185°F) |
| Operating Temperature | 5℃ (40°F) to 45°C (113°F), 90% relative humidity max |
| Weight | 5.5 kg. (12lb), approximately) |
| Case Material | ABS Plastic |
| Physical Dimensions | See Appendix A |

## Approvals

The Ultra meets the following safety and environmental certifications.

| Certification | Number | Comments |
|---|---|---|
| Underwriters Laboratory, Inc., Standard for Safety of Information Technology Equipment | UL-1950 | |
| CE European Union Declaration of Conformity, Electromagnetic Compatibility Directive | 89/336/EEC | |
| FCC Rules for Class A computing devices | Part 15 | |
| Canadian Standards Association | Standard 22.2 | |
| Test and Declaration of Conformity for CE Mark of European Safety Approval | EN60950 | |
| Test and Declaration of Conformity for CE Mark of European EMI Approval | EN55022 | |
| Test and Declaration of Conformity for CE Mark of European ESD, RF, and Transient Susceptibility | EN50082-1 | |
| International Electrotechnical Commission, Electromagnetic Compatibility for Industrial-Process Measurement and Control Equipment | IEC801-2 | 8kV |
| | IEC801-3 | 27-500MHz, 3V/cm (UNMOD) |
| | IEC801-4 | 0.5kV SIGNAL LINES, 1.0kV AC Mains |

# *Care and Handling*

## Environmental Requirements

To ensure proper operation of the equipment, consider the following guidelines for placement of the PC Workstation.

Dimensional data for each workstation case and accessories can be found in Appendix A of this manual. Before you decide on the space each device should occupy, take measurements and compare them to ours.

### Location

Tile is the recommended floor surface for areas surrounding the workstation. If the floor covering adjacent to the equipment is carpeted, an anti-static grade is recommended. If the carpeting surrounding the area containing the equipment is not composed of anti-static material, the use of static-discharge mats should be considered. The recommended type of anti-static mat is one that incorporates a grounding clip with a cable to provide a discharge path to ground.

### Foreign Materials

**WARNING:**

Do not use sharp objects such as a pen or pencil to press keys on the touchscreen as this could damage the sensing layer.
Liquid spillage can cause damage to the circuits in the unit. Do not place the equipment near food preperation areas, disk racks, or water stations. The PCWS includes a gasket seal around the touchscreen which may afford some protection from liquid spillage. Also, the mag card reader assembly is mounted to a tray that is designed to prevent liquid spills from reaching the system board.
If any type of liquid is spilled onto the touchscreen or mag card reader slot, turn off power as quickly as possible and remove the spillage. Do not power-up the unit until it has been determined that no spillage remains inside the unit.

### Electrostatic Discharge (ESD)

The occurrence of electrostatic discharge (ESD) usually takes the form of a discharge from the operator's hand to cash drawers, the workstation, or other peripherals connected to the workstation.

ESD is more common in the dry climates during the winter, and less common in the moist climates. The PCWS has good built-in immunity to ESD in most environments. However, tile or anti-static carpet should still be employed in the area near the workstation.

### Temperature and Humidity

The continuous operating temperature for the PCWS is between 40°F and 113°F (5°C to 45°C). A constant humidity between 40% and 90% is desired for proper operation of the equipment.

## Cleaning

**WARNING:**

Always use a chamois or clean lint-free cloth to clean the PCWS cabinet and touchscreen surface. Do not use chemical, alcohol, or petroleum based cleaners that are not recommended for plastics.
Depending on how much they are used, floppy drives, mag card readers and tape backup drives require periodic cleaning. Cleaning kits are available from a variety of sources. Be sure to follow the instructions supplied with the cleaning kits.

## Transporting the Workstation

If a hard disk is installed, always power down the workstation before transporting it, even if you are just moving it across your work surface. The high density hard drives used today are more susceptible to damage if subjected to a sudden physical shock while they are operating, especially if the heads happen to be reading or writing to the disk surface. Powering off the workstation automatically parks the heads, allowing you to move the unit without risking damage to the hard disk.

# *Connecting the Basic System*

The following pages describe the rear panel connectors, then shows how to connect and configure each external option.

To install or upgrade options within the workstation, refer to Chapter 3.

## Rear Connector Panel

The PCWS Ultra rear connector panel is shown in Figure 1-2, below.

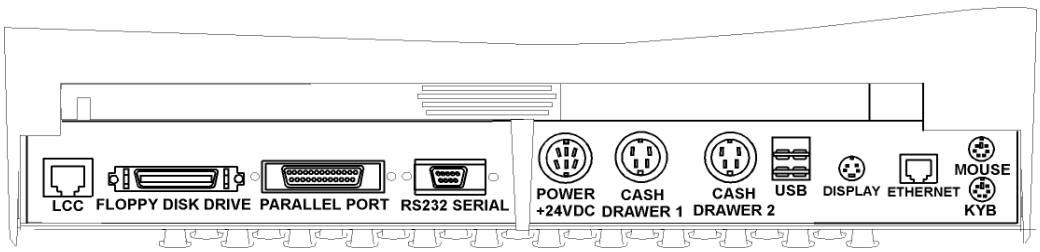



*Figure 1-2: The PCWS Ultra Rear Connector Panel*

**NOTICE:**

This equipment shall only be connected to a public telecommunications network by an external device approved for use in the country in which the equipment is installed.

### LCC

This port has several uses depending on the application software. In the LCC mode with applications that support it, this port typically drives one or more MICROS Stand-alone IDN Roll and Slip Printers. In RS232 mode, this port can support a growing number of RS232 based peripherals such as roll and slip printers, serial cash drawers, remote customer displays, etc.

### Floppy Disk Drive

The External Floppy Diskette Unit is connected to this port. It contains a high-density 1.44 Mbyte 3 1/2” drive and power supply.

### Parallel Port

The parallel port is an industry standard Centronics parallel interface. In addition, the parallel port also supports the EPP and ECP standards.

### RS232 Serial

This industry standard DB9 male connector can be used for an external modem, or other serial peripheral device. This port is supported by a 16550 UART with a 16-byte receive buffer.

### Power +24VDC

All PC Workstations use the same external AC adapter to provide +24VDC @ 2.1A to a compact and efficient current mode switching power supply located on the system board. The PCWS AC power switch is located on the external AC adapter.

### Cash Drawers 1 and 2

These connectors support standard and low profile MICROS cash drawers with DIN style connectors.

### USB

The Universal Serial Bus (USB) interface supports the host controller functions with a built-in Root Hub and 2 USB ports. The USB circuitry is implemented based on OpenHCI, the Open Host.

### Display

This connector supports a pole mount Remote Customer Display. This display contains a two line 20 character alpha numeric display that can be mounted up to 6 feet from the workstation.

### Ethernet

The Ultra system board includes a PCI based Ethernet controller. The rear panel connector uses the 10BaseT version of Ethernet. 10BaseT networks are based on inexpensive and easy to install twisted-pair cabling. See the MICROS Guide to Local Area Networks, P/N 100038-152, or the 3400/3700 and 8700 Hardware Site Preperation Guides for more information about 10BaseT networks.

### KYB

This port accepts a PC keyboard with a PS/2 style connector.

### Mouse

New to the Ultra system board, this port accepts a standard PS/2 style mouse.

## External AC Adapter

The procedure below outlines how to connect the External AC Adapter to the PCWS.

The PCWS Ultra does not include an AC power switch. This switch is located on the external AC adapter.

### Procedure:

1. Locate the power ON/OFF switch on the external AC adapter and make sure it is set to OFF (O).
2. Plug the cable with the DIN connector from the external AC adapter to the "Power +24VDC" connector as shown in Figure 1-3.
3. Connect an AC power cord between the AC adapter and a properly grounded 3-wire AC outlet.
   - The power supply is auto-sensing; a jumper is not required for 230VAC operation.
4. Turn the Power switch to the ON position.

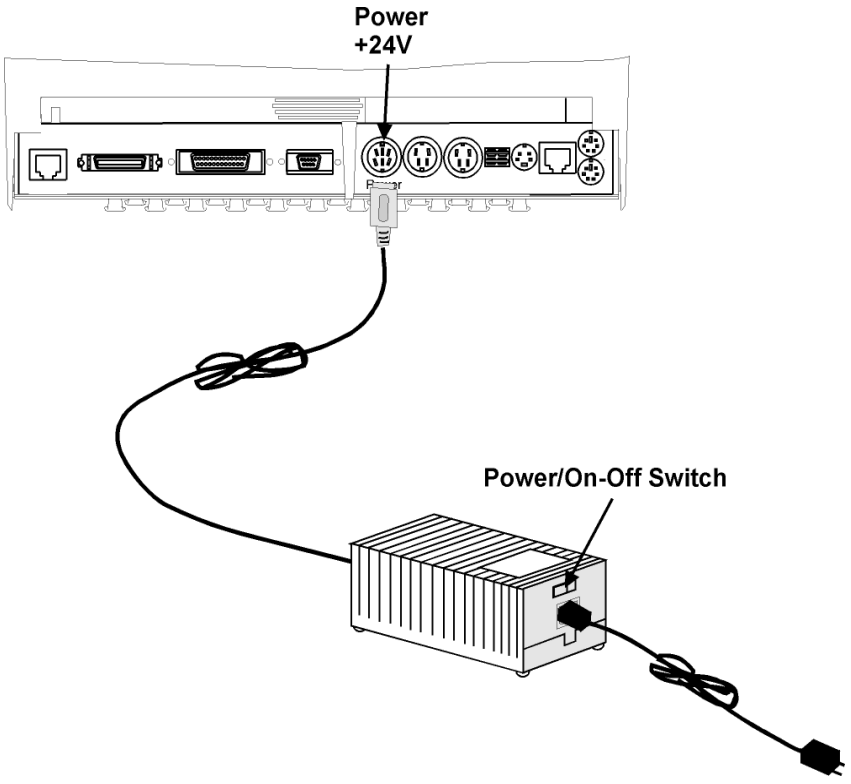



*Figure 1-3: Connecting the External AC Adapter*

## PCWS Floppy Diskette Unit

The optional PCWS Floppy Diskette Unit is installed in the procedure below.

**WARNING:**

Do not connect the external floppy diskette unit to the PCWS when power is ON.
The recommended procedure is to always power-up the PCWS first, then the external floppy disk drive unit. When powering down, the recommended procedure is to power-off external floppy diskette unit first, then the PCWS.

### Procedure:

1. Remove the external floppy diskette and AC power cord from the shipping container.
2. Locate the AC power switch on the external AC adapter and make sure it is set to OFF.
3. Connect the data cable from the floppy diskette unit to the floppy disk drive connector. Figure 1-4.
   - Should you need to remove the connector at a later time, press the tabs on the connector as shown.
4. Connect the external floppy diskette unit to a properly grounded 3-wire AC outlet.
   - The power supply is auto-sensing; a jumper is not required for 230VAC operation.

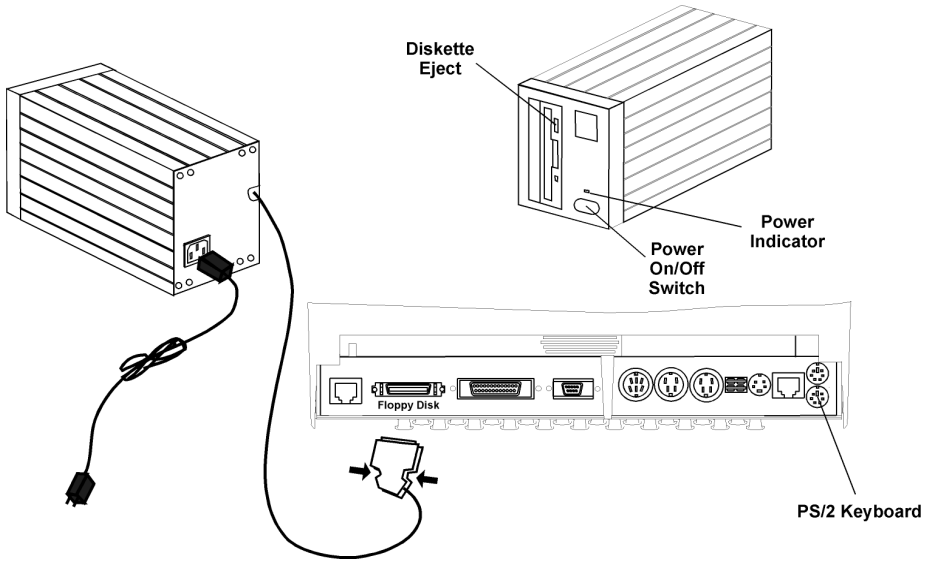



*Figure 1-4: Installing the PCWS Floppy Diskette Unit*

5. Connect a PC keyboard with a PS/2 style connector to the rear panel if one is not already attached.
6. Power-up the PC Workstation.
7. Power-up the external floppy diskette unit.
8. Enter the Setup Utility by pressing [F2] when prompted.
9. From the PhoenixBIOS Setup Utility main screen, scroll down to the "Legacy Diskette A:" field. Use the - or + keys to select "1.44/1.25 Mb 3½.""
   - The External Floppy Diskette Unit is now enabled. If you wish to boot from the floppy disk, continue with the procedure below.
10. Use the right arrow key to select the "Boot" menu. Highlight the "Boot Device Priority" field and press [ENTER].
    - A list of boot devices appears. The device the workstation will boot from is [1]. To boot from the external floppy, it must be moved to the [1] selection as outlined below.
11. Use the up or down arrow keys to select the device to boot from, then use [-] or [+] keys to move the selection (in this case, the Diskette Drive) to the 1 position.
12. Press [F10], then [Enter] to save the new configuration and reboot the workstation.

## PC Keyboard

The PC Workstation supports any IBM-PC compatible keyboard that uses a PS/2 style connector. The following procedure describes the optional Cherry ML 4100 Keyboard, but in fact applies to any keyboard equipped with a PS/2 style mini-DIN connector.

**CAUTION:**

Do not connect or remove the PC Keyboard when the PC Workstation is powered-up.

### Procedure:

1. Power-off the PC Workstation.
2. Connect the keyboard PS/2 connector to the bottom connector as shown.
3. Power-up.
4. The system BIOS will automatically detect the keyboard; no user intervention is required.
   - However, you may through the Setup Utility, define several operating parameters for the PC keyboard. See Chapter 2 for more information.

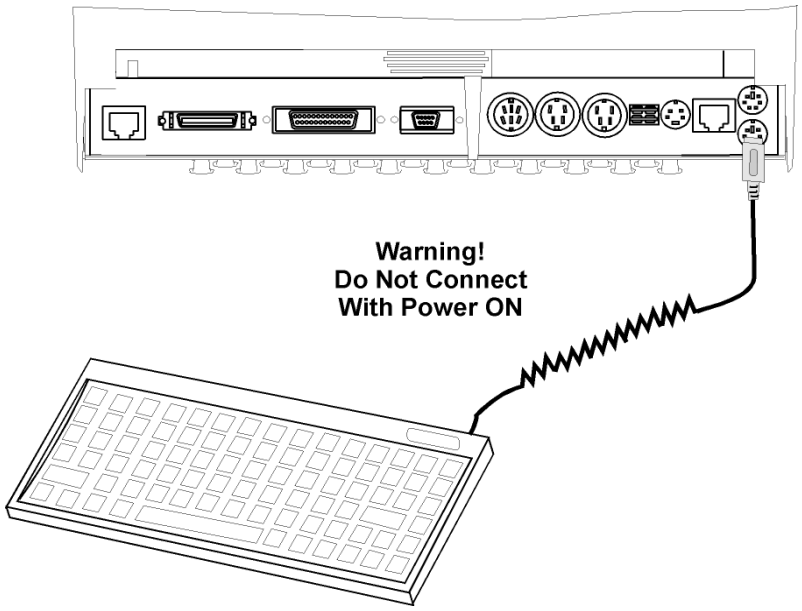



*Figure 1-5: Connecting a PC Keyboard*

## PS/2 Mouse

This procedure shows how to connect a PS/2 style mouse to the Ultra.

**CAUTION:**

Do not connect or remove the mouse when power is on.

### Procedure:

1. Power-off the PC workstation.
2. Connect the mouse to the connector labeled “mouse” (the top most connector on the left side of the rear panel).
   - If left at the factory default setting, the mouse will automatically be detected by the operating system and does not require further configuration.
   - However, if the default setting has been changed, follow the steps below to enable the mouse port.
3. Power-up the workstation and enter CMOS Setup by pressing [F2] when prompted.
4. From the PhoenixBIOS Setup Utility main screen, use the right arrow key to select “Advanced.”
5. From the “Advanced” menu, move down to the “PS/2 Mouse” field and press [ENTER] to view the selections.
   - The “Auto” selection allows the BIOS to enable mouse operation with respect to the operating system. Good choice for DOS users.
   - The “Enabled” selection allows the operating system to detect and use the mouse when installed. Recommended for Windows users.
   - The “Disabled” setting prevents the mouse from working, but frees up IRQ12 for other uses.
6. Press [F10] to save the settings and reboot the workstation.

## Remote Customer Display

The following procedure describes how to assemble and connect the Remote Customer Display to the workstation.

### Procedure:

1. Remove the kit contents from the packing materials.
2. Select the location for the remote display.
   - Since the hardware required to install the remote display mounting plate will vary with the thickness and material used for the counter thus, no hardware is supplied.
3. Use the mounting plate as a template to locate four #14 (.182”/ 4.6mm) holes and one 1 1/4” hole.
4. Refer to Figure 1-6 and assemble the remote display.
   - The inside of one end of the pole is threaded and has two slots. This end faces the mounting plate.
   - Loosen the set screw on the pole to allow the display head to fit inside
   - Route the cable from the display head through the pole, mounting plate and nut
   - Fasten the pole to the mounting plate by lining up the slots on the pole with those on the mounting plate, then tighten the nut
   - Rotate the display head to the desired location and fasten the set screw.

**CAUTION:**

Do not connect or remove the Remote Pole Display connector when the workstation power is on.

5. Be sure the power to the PCWS is off.
6. Plug the display connector into the customer display connector on the workstation rear panel.
7. Power-up the PCWS. Setup configuration is not required.

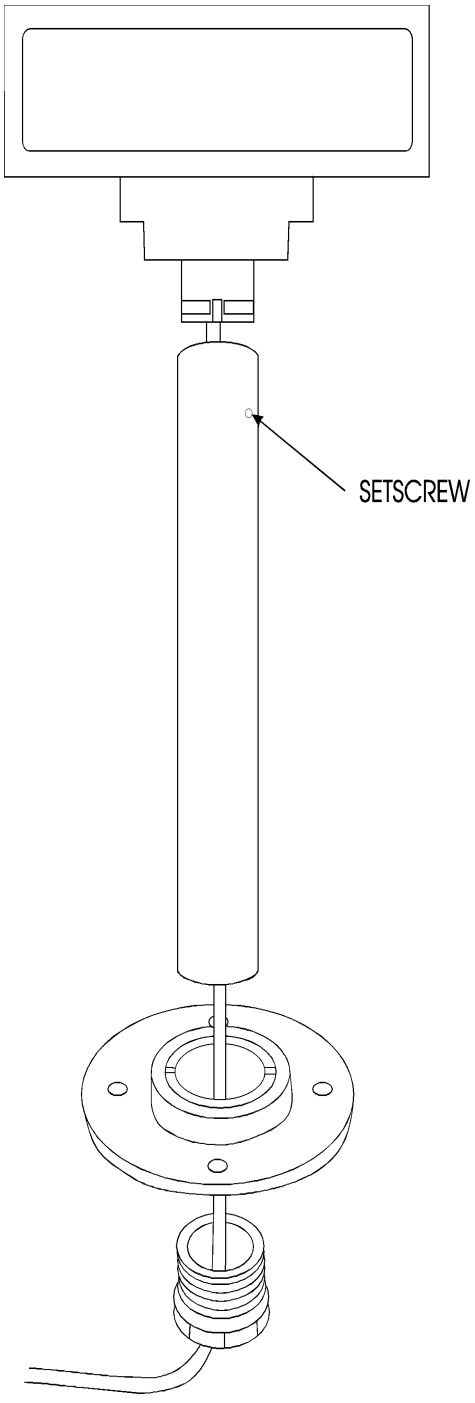



*Figure 1-6: Remote Pole Display Assembly*

Contents

Chapter 3

# PCWS Ultra Hardware Configuration

This chapter includes a brief description of the Ultra system board hardware and configuration instructions for the processor, memory, and hard disk.

## In this chapter

# *Remove the Cover*

Instructions for removing the low profile and adjustable display top cover are shown on the following pages.

**WARNING:**

Turn the external AC adapter OFF and remove the power connector before opening the cover.

### PCWS Low Profile

As shipped from the factory, the cover is held in place with two captive screws.

1. Loosen the two captive screws shown in Figure 3-1.
2. Lift the cover from the unit, setting it to the right as you stand in front of the unit.

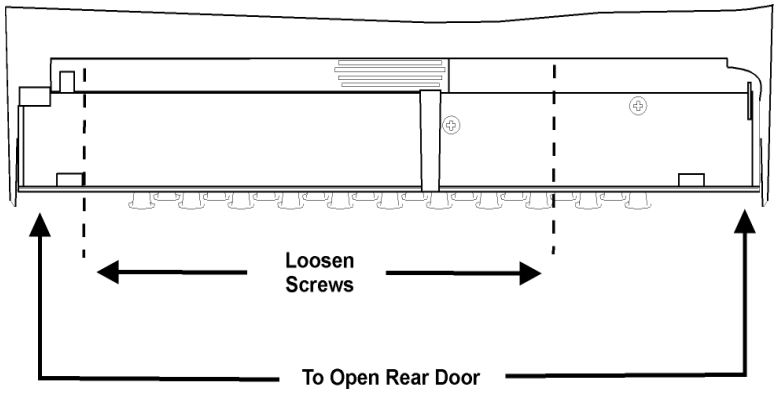



*Figure 3-1: Removing/Securing the PCWS Low Profile Cover*

3. When replacing the cover, secure it with the two screws.

### PCWS Adjustable Display

The PCWS AD cover is held in place with two screws.

1. Remove the two screws from the lid assembly as show in Figure 3-2.
2. Lift the lid assembly up from the base and set it to the right as you stand in front of the workstation.

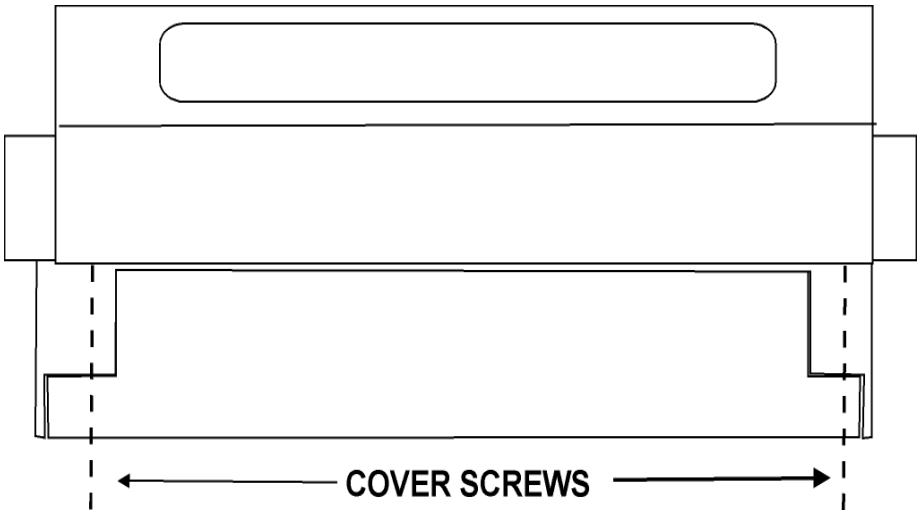



*Figure 3-2: Removing/Securing the PCWS AD Cover*

3. When reinstalling the cover, if it does not fit securely, be sure cables are routed properly.

# *What's Inside?*

## The PCWS Ultra Assembly

Figure 3-3 shows the PCWS Ultra with top cover removed to illustrate the Ultra system board and inverter board.

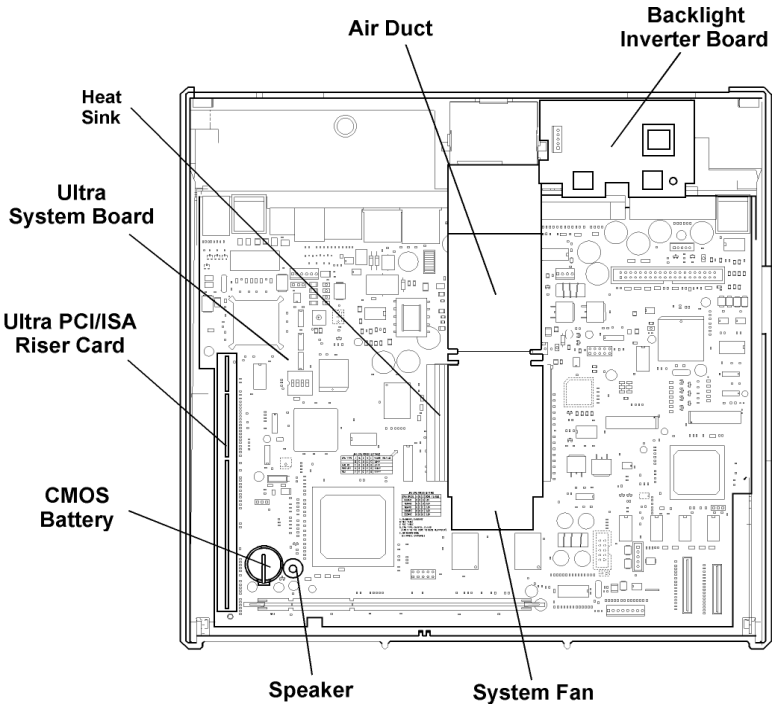



*Figure 3-3: The PC Workstation Ultra Assembly*

## Ultra System Board

The Ultra system board is the latest of the line of MICROS PC Workstation system boards. With it's Socket 7 compatible processor socket, it supports Intel Pentium, Intel Pentium MMX and AMD K6-2 processors at speeds up to 400MHz. The system board also includes support for a single DIMM, a new chipset, and a spread spectrum clock generator to reduce emissions. However, the Ultra system board retains the same form factor, PMW current mode power supply, touchscreen interface, and LAN interface as the previous PCWS system boards.

Like all previous PC Workstation system boards, the Ultra reports its system board type and revision as well as the BIOS software version at power-up.

The dimensions of the Ultra system board allows it to be installed in the existing Low Profile and Adjustable Display casework without modifications.

### Inverter Board

This board includes the DC-to-AC inverter to develop the high voltage, low current AC for the LCD backlight(s). The system speaker and local customer display connector now reside on the Ultra system board. Thus, the inverter/speaker board used on previous PC Workstations, and the Ultra inverter board are not interchangeable.

### Fan/Air Duct

This assembly consists of a single fan mounted to a sheet metal air-duct which fits over the processor and power supply heat sinks. The rear of the air duct fits in place over top of the existing rear fan shroud, but a fan is not installed.

The fan at the front of the air duct draws air in the front of the workstation and moves it across the processor heat sink and power supply components.

### PCWS Ultra PCI/ISA Riser Card

The Optional Ultra PCI/ISA riser card allows a half-size PCI or ISA card (but not both) to be installed within the Low Profile or Adjustable Display case. The Ultra riser card is not compatible with the previous Model 64 PCI/ISA riser card.

### CMOS Battery

Like any personal computer, the Ultra includes a battery to maintain CMOS settings and run the real time clock when power is off. The Ultra system board uses a CR2032 Lithium battery mounted in a holder for easy field replacement.

**WARNING:**

Danger of explosion if battery in incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to manufacturer's or local requirements.

In the next section, the major system board components are examined more closely.

## Ultra System Board Components

Figure 3-4 points out some of the larger devices located on the Ultra system board. In this view, the air duct, heat sink, and processor have been removed to expose the underlying components.

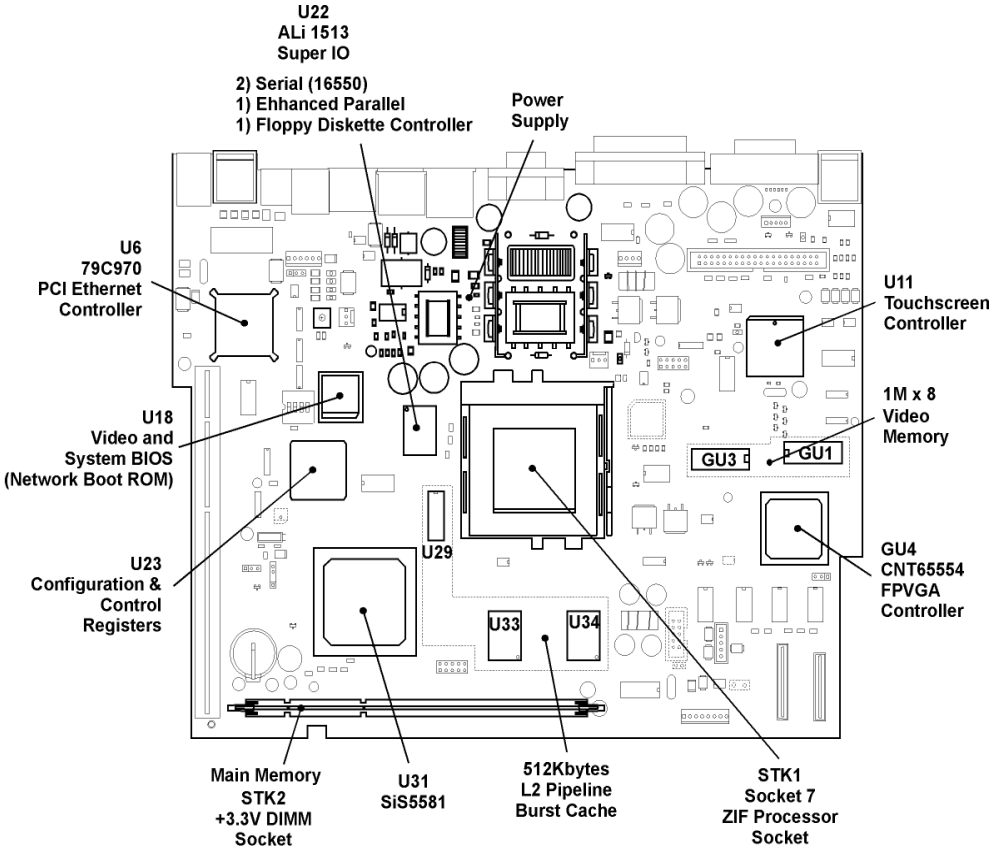



*Figure 3-4: The Ultra System Board Components*

### Power Supply

To reduce the footprint of the Low Profile or Adjustable Display workstation, an external AC adapter or "brick" converts a 110VAC - 240VAC input to +24VDC @2.1A.

The Ultra system board includes a compact and reliable PWM current mode switching power supply that derives all operating voltages from the +24VDC input.

### Processor

The Ultra system board includes a "Socket 7" compatible Zero Insertion Force (ZIF) socket for the processor. In Figure 3-3, the processor, processor heat sink, and air duct have been removed to show the socket.

The Socket 7 architecture provides support for all Intel® P54C Classic and P55C MMX Pentium® Processors as well as the AMD K6-2, and Cyrix 6x86 processors. The Ultra system board initially entered production with a Intel Pentium P54C 166 MHz processor. The processor shipped currently is the Intel Pentium P55C 233 MHz. Testing and certification of AMD K6-2 processors is currently under way.

### Pipeline Burst Cache

The Ultra system board is currently shipped with 512 kbytes of L2 pipelined burst cache. Pipeline burst cache is composed of a special type of high-speed static RAM designed to take advantage of the pipelined architecture of the Pentium processor.

### Main Memory

The Ultra system board supports a single Dual In Line Memory Module (DIMM) socket for main memory. A DIMM resembles two SIMMs placed end-to-end and have replaced SIMMs in a large number of desktop and tower PCs. Approved DIMMs are listed in the section on installing memory.

### SiS 5581Chipset

The term "chip set" in this case, refers to a single chip, the Silicon Integrated Systems Corp SiS5581. A short list of functions includes:

- ❑ L2 cache controller
- ❑ DRAM controller for main memory
- ❑ Host-to-PCI bridge
- ❑ PCI-to-ISA bridge
- ❑ PCI IDE Controller
- ❑ Keyboard Controller
- ❑ USB Controller
- ❑ Real Time Clock
- ❑ Power Management Controller

### System and Video BIOS

The PhoenixBIOS system and video BIOS are integrated into a single flash device. In addition, the BIOS supports diskless workstation operation without installing a separate Boot ROM device.

The PhoenixBIOS incorporates an extensive set of beep codes and POST error codes, detailed in Chapter 4.

### FPVGA Controller

The Ultra system board includes a Chips and Technologies C&T65554 Flat Panel VGA Controller. This device is designed for notebook and laptop computers and therefore supports a wide variety of active matrix (TFT) and passive matrix (STN) LCD panels. In addition, the Ultra system board includes two LCD connectors to increase support for LCD panels.

Video memory consists of a pair of 256K x 16 EDO Page Mode CMOS Dynamic RAM arranged as 1M x 8.

The Ultra system board can use the same 11.3" passive, and 12.1" active LCD panels as the Model 64. In addition, the Ultra system board adds support for a 12.1" STN LCD panel installed in the AD case. LCD panels are configured through a system board DIP Switch and jumper setting.

### Configuration and Control Registers

The Configuration and Control Registers perform the majority of the Ultra POS related functions. It is composed of U23, a EPF6016A144 Programmable Logic Device from Altera, a more advanced version of the AMD MACH part used on previous system boards. In addition to the programmable IO pins and registers, this device adds two UARTs.

### Touchscreen Controller

The Ultra system board uses the same Elo Graphics Touchscreen Controller and 5-wire touch panel as the Model 32 and Model 64 workstations. The touchscreen controller communicates to the system board through COM2.

### PCI Ethernet Interface

The Ultra Ethernet interface is based on an AMD 79C970 PCI based Ethernet controller. The workstation includes a rear panel 10BaseT modular connector.

### Spread Spectrum Clock Generator

A typical Pentium based system board produces clock pulses with rise times that result in greater higher-order harmonic energy than those in previous designs. Spread spectrum clocking modulates the clock signal's frequency at a 50 KHz rate, spreading the energy of the clock fundamental to minimize energy peaks at harmonic frequencies. The clock signal radiates the same amount of energy, but is spread across a wider range of frequencies without affecting the rise and fall times.

Spread spectrum clocking ensures the Ultra system board will more readily comply with EMI standards while at the same time greatly reducing the number of passive components required for EMI suppression. This, combined with the SiS 5581 core logic device, reduces number of system board layers from ten to six, increasing reliability.

### Serial/Parallel Ports

The Ultra system board includes two high-speed serial ports and one enhanced parallel port. One RS232 Port is based on the industry standard DB9 connector and is backed by a 16550 buffered UART.

The second port, also based on the 16550 device, can provide either an RS422 or RS232 interface via a rear panel 8-pin modular connector. In RS232 mode, this port supports simple TX/RX interface lacking hardware hand-shaking support.

In RS422 mode, when used with certain MICROS applications, this port is designed to support MICROS IDN devices. The function of this port is controlled by application software or through the Setup Utility.

## Ultra System Board Connectors

Figure 3-5 shows all connectors on all revisions of the Ultra system board. The processor, processor heat sink, and air duct have been removed.

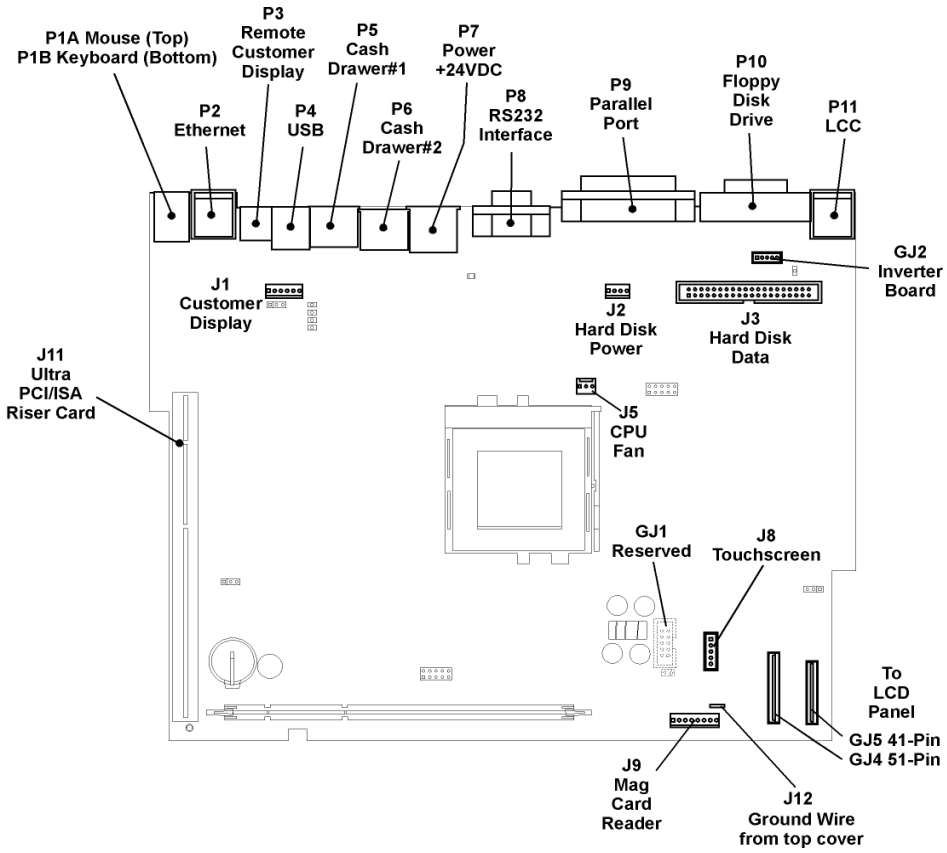



*Figure 3-5: PCWS Ultra System Board Connectors*

Note the pair of LCD connectors. The 51-pin VESA style connector may be used for both passive and active matrix LCD panels while the 41-pin VESA style connector is reserved for passive LCD panels.

J1, the local customer display connector is now mounted on the Ultra system board. It was previously mounted on the M32/M64 Inverter/Speaker board.

J12 is a new connector that terminates a ground wire either the LP cover or the AD pedestal.

## Ultra System Board Jumpers and DIP Switches

Figure 3-6 shows all of the configuration jumper and DIP switch settings for the Ultra system board.

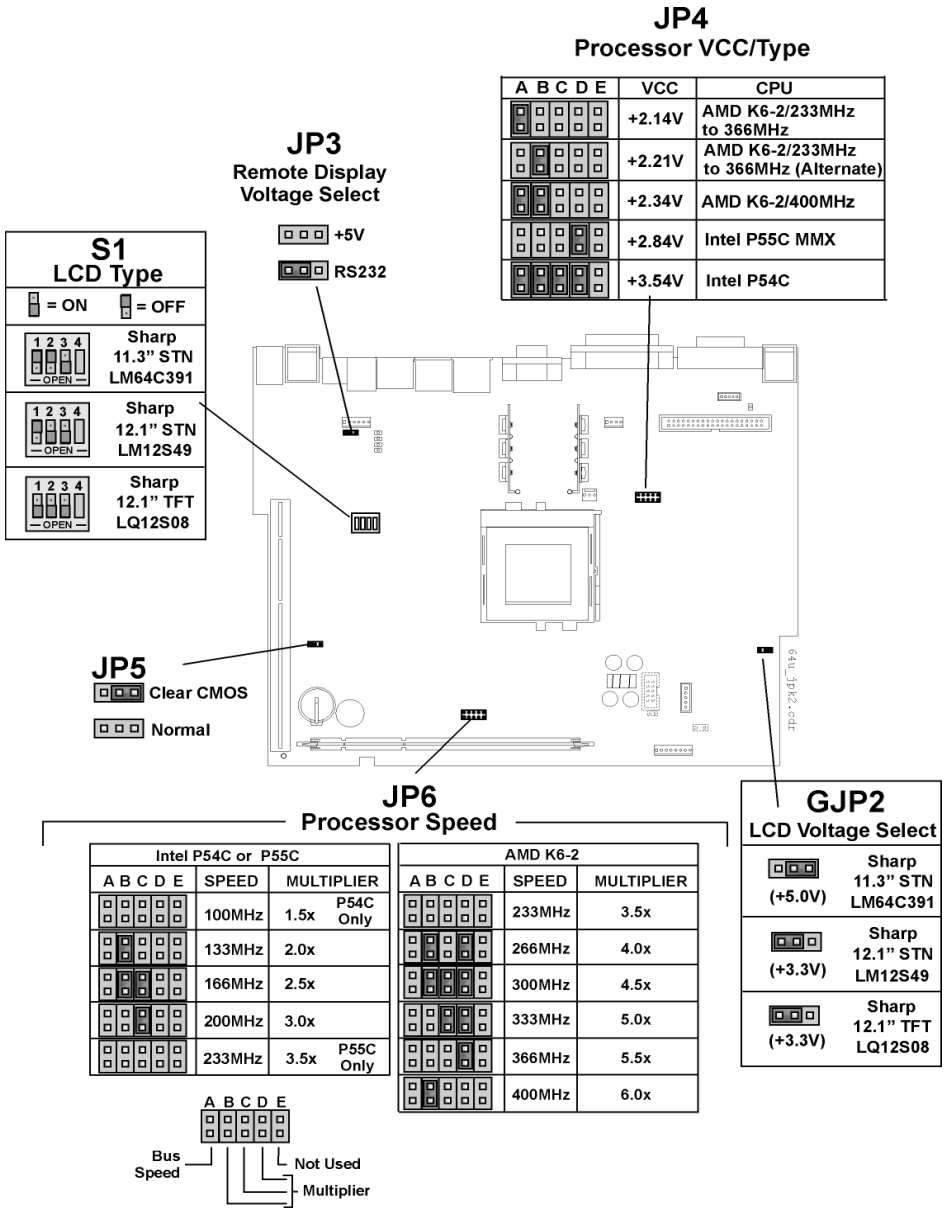



*Figure 3-6: Ultra System Board Jumpers and DIP Switches*

## Ultra System Board Memory Map

The Ultra system board memory map is shown in the Table below.

| From | To | Size | Description |
|---|---|---|---|
| 0000-0000 | 0009-FFFF | 640Kbytes | Conventional Memory |
| 000A-0000 | 000B-FFFF | 128Kbytes | Reserved - VGA Display Buffer |
| 000C-0000 | 000C-FFFF | 64Kbytes | Reserved - VGA BIOS |
| 000D-0000 | 000D-FFFF | 64Kbytes | Available for expansion cards |
| 000E-0000 | 000F-FFFF | 128Kbytes | Reserved - System BIOS |
| 0010-0000 | 07FF-FFFF | 127Mbytes | Extended Memory (DRAM) |
| 0800-0000 | FFFD-FFFF | 4 Gigabyte | Unused, available for Video Acceleration Area |
| FFFC-0000 | FFFF-FFFF | 256Kbytes | System BIOS Ethernet Boot ROM |

*Figure 3-7: Ultra System Board Memory Map*

## Ultra System Board IO Port Map

| IO Address | Device/Location | Description |
|---|---|---|
| 0000-000F | SiS5581 (U31) | DMA Controller 1 (8-bit) |
| 0020-0021 | SiS5581 (U31) | Interrupt Controller 1 |
| 0040-0043 | SiS5581 (U31) | Timer Control Registers |
| 0060, 0064 | M513X (U22) | Keyboard/Mouse Data Port |
| 0061 | Sis5581 (U31) | 8255 Port B |
| 0064 | M513X (U22) | Keyboard/Mouse Status Port |
| 0070-0071 | SiS5581 (U31) | RTC/CMOS Registers |
| 0080-008F | SiS5581 (U31) | DMA Page Registers |
| 00A0-00A1 | SiS5581 (U31) | Interrupt Controller 2 |
| 00C0-00DF | SiS5581 (U31) | DMA Controller 2 (16-bit) |
| 00F0-00FF | Processor (STK1) | Numeric Co-processor |
| 01F0-01F7 | SiS5581 (U31) | IDE Interface |
| 0278-027A | EPF6016 (U23) | Customer Display (LPT2) |
| 02E8-02EF | M513X (U23) | LCC COM Port |
| 02F8-02FF | EPF6016 / 16450 | Touchscreen Port COM2 |
| 0330-033F | EPF6016 (U23) | Config/Status DIP Switch S1 |
| 0340-0345 | EPF6016 (U23) | Mag Stripe Reader Registers |
| 0378-037F | M513X (U22) | LPT 1 |
| 03B0-03BF | 65554 (GU4) | VGA Controller (Mono) |
| 03C0-03CF | 65554 (GU4) | VGA Controller (EGA/VGA) |
| 03D0-03DF | 65554 (GU4) | VGA Controller (CGA) |
| 03E8-03EF | M513X (U22) | Super IO |
| 03F0-03F7 | M513X (U22) | Floppy Disk Controller |
| 03F8-03FF | M513X (U22) | Comm Port 1 |
| 0CF8-0CFC | SiS5581 (U31) | PCI Host Bridge Config Registers |

*Figure 3-8: Ultra System Board IO Port Addresses*

## Ultra System Board IRQ Assignments

The table below shows the default IRQ assignments on the Ultra system board.

| IRQ | Description |
|---|---|
| NMI | IO Channel Check |
| 0 | Reserved - System Interval Timer |
| 1 | Reserved - Keyboard |
| 2 | Reserved - Cascade from IRQ 9 |
| 3 | Reserved - Touchscreen Controller (COM2) |
| 4 | Reserved - Rear Panel DB9 connector (COM1) |
| 5 | Available - |
| 6 | Reserved - Floppy Diskette |
| 7 | Reserved - Parallel Port (LPT1) |
| 8 | Reserved - Real Time Clock |
| 9 | Reserved - Mag Stripe Interface |
| 10 | Reserved - Ethernet Controller, USB Port (PCI) |
| 11 | Reserved - LCC Port (COM4) |
| 12 | Reserved - PS/2 Mouse Port. |
| 13 | Reserved - Processor FPU |
| 14 | Reserved - Primary IDE Controller |
| 15 | Available - |

*Figure 3-9: Ultra System Board IRQ Assignments*

The chart above shows IRQ2, IRQ3, IRQ7, as reserved. However these ports can be disabled in the I/O Device Configuration Sub-screen in the Advanced Setup Utility, freeing these IRQ lines for other purposes.

IRQ12 is another example. Due to the touchscreen, the workstation in many situations does not require a mouse, You can disable the mouse port and make IRQ12 available for your expansion card.

# *Processor*

The PCWS Ultra system board currently supports the Intel Classic Pentium® (P54C) and Pentium with MMX Processors (P55C) at speeds up to 233 MHz. Support has now been added for AMD K6-2/300 and K6-2/400.

**WARNING**

Never operate the Ultra system board without the processor heatsink and air duct/fan assembly installed and the fan operating.

**STATIC SENSITIVE DEVICES**

Follow ESD Procedures when replacing or upgrading the processor.

## Processor Configuration Jumpers

Intel and AMD processors utilize a fractional bus operation where the incoming bus frequency is multiplied to set the processor core operating frequency. This allows the processor core to operate at higher frequency while communicating to the system bus running at a lower frequency.

JP6 sets the bus multiplier input to the processor and JP4 determines the processor supply voltage. For example, the P54C “classic” Pentium processor requires a supply voltage of +3.54V, while the Pentium MMX requires +2.84V. Note the alternative setting for the AMD K6-2/233MHz through K6-2/366MHz. The alternate setting may be required for stable operation due to power supply tolerances.

JP4 presents a 5-bit binary input to a programmable voltage regulator, known as the VCORE regulator.

Settings for JP4 and JP6 can be found in Figure 3-16.

**AMD Processor Note:**

To fully support the AMD K6-2 processors, BIOS Version 1.00d or later is required. BIOS versions prior to 1.00d will report an AMD K5 processor is installed, and does not report the operating speed.

### Processor Heat Sink and Air Duct Assembly

The processor is mounted in a 321-pin Zero Insertion Force (ZIF) Socket 7 compatible socket. The processor heat sink assembly consists of the heat sink itself, the clip which fastens it to the processor socket, and a thermal pad between the heat sink and processor.

The fan is mounted to sheet metal which is formed into a three-sided air-duct or channel. The air duct is attached to the processor heat sink and fits over the power supply heatsink, and rear fan shroud. The heatsink is attached to the processor socket by a clip, with a hinge at one end. A thermal pad is mounted to the bottom of the heat sink. Heat sink compound is currently not used.

The fan pulls fresh air in through the gap between the base and the lid, moves it across the processor heat sink, through the air duct, and out through a shroud at the rear of the base. The shroud is the same as used in previous workstations, but a fan is not installed.

A side view of this arrangement is shown in Figure 3-10, below.

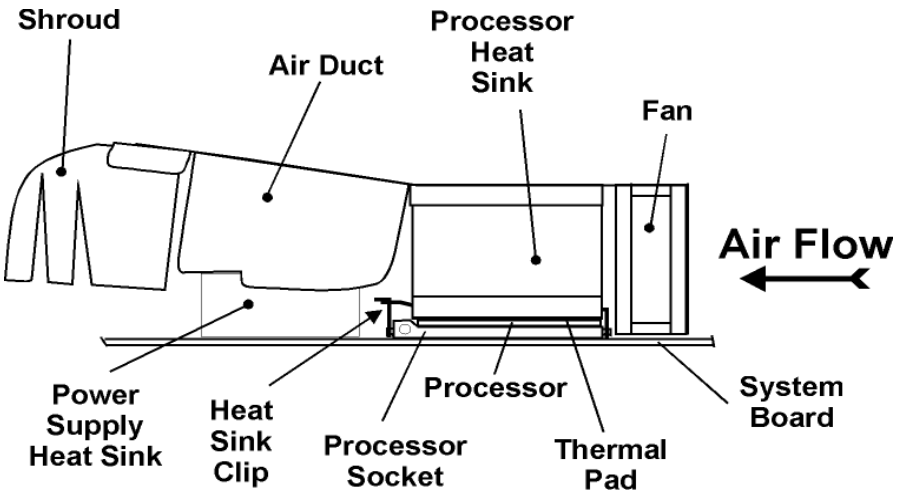



*Figure 3-10: The Processor Heat Sink and Air Duct (side view)*

If you must replace or upgrade the processor, we recommend that you do not remove the air duct from the heatsink. It is possible that the air duct will be deformed, and will not fit properly when reinstalled.

The following procedure describes how to remove and replace the heat sink and air duct as single unit.

## Remove and Replace the Processor

1. Remove AC Power from the workstation.
2. Remove the LP or AD cover.
3. Remove the hard disk and bracket, if installed.
4. Remove the fan power cable from J5 as shown in Figure 3-11.

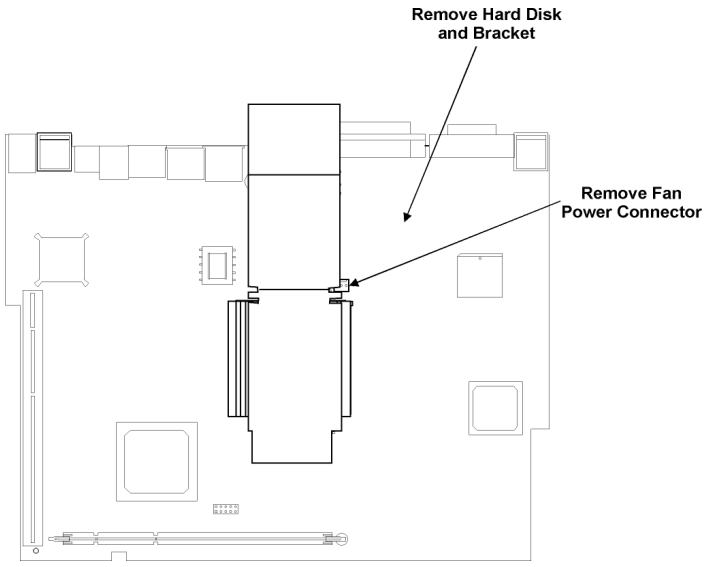



*Figure 3-11: Remove the Fan Power Cable*

5. Remove the heat sink clip. Refer to Figure 3-12. Press down on the hinged end to release the clip from the socket.

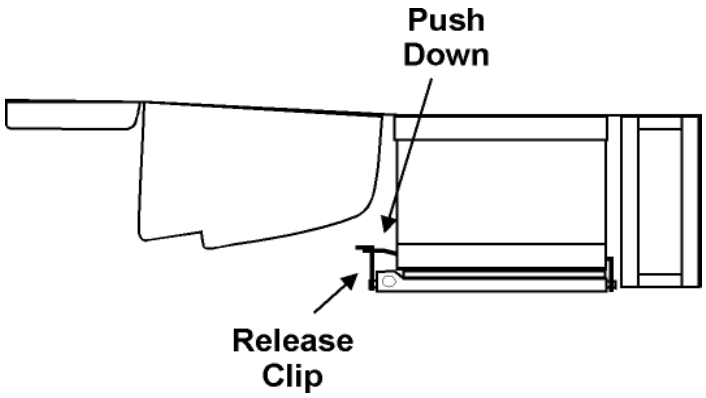



*Figure 3-12: Releasing the Heat Sink Clip*

**6.** Lift the heat sink/air duct up and out. Figure 3-13.

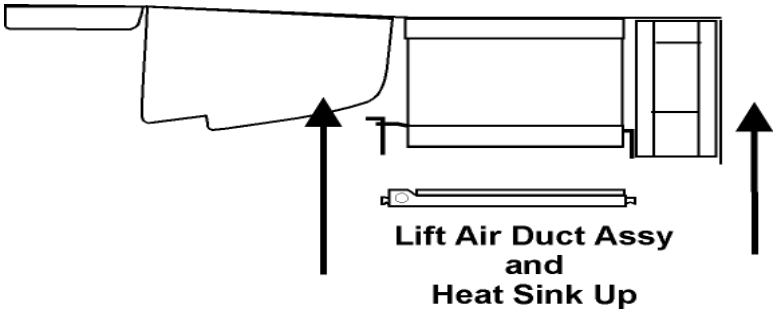



*Figure 3-13: Removing the Air Duct and Heat Sink*

**7.** To remove the processor from the socket, pull the socket release handle outward, then upward to rotate it to its fully vertical position as shown in Figure 3-14A.

**8.** Lift the processor out of the ZIF socket.

**9.** To install a replacement/upgrade processor, make sure the release lever is in the fully vertical position. Orient the pin-1 indicator as shown in Figure 3-14B, and carefully insert its pins into the socket.

**10.** Rotate the release lever to its fully closed position.

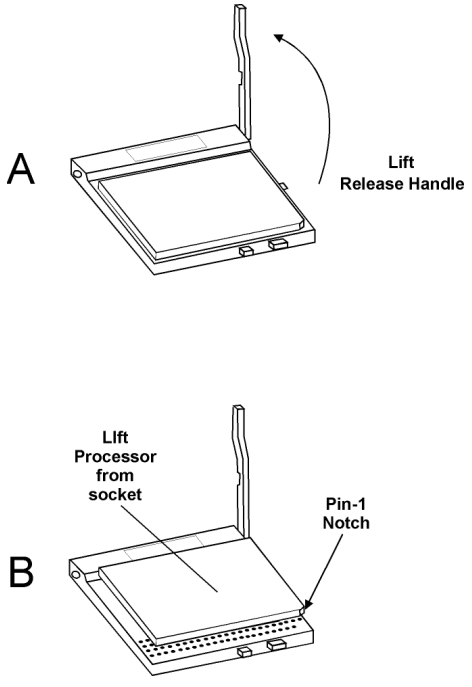



*Figure 3-14: Remove/Replace the Processor*

**11.** Re-install the heat sink/air duct. Figure 3-15.

- Fit the assembly into place. The rear of the air duct should fit over the power supply heat sink and the plastic shroud at the rear of the base.
- Hook the clip to the front of the socket. Then press down on the hinged end of the clamp while at the same time hooking the clamp to the socket,

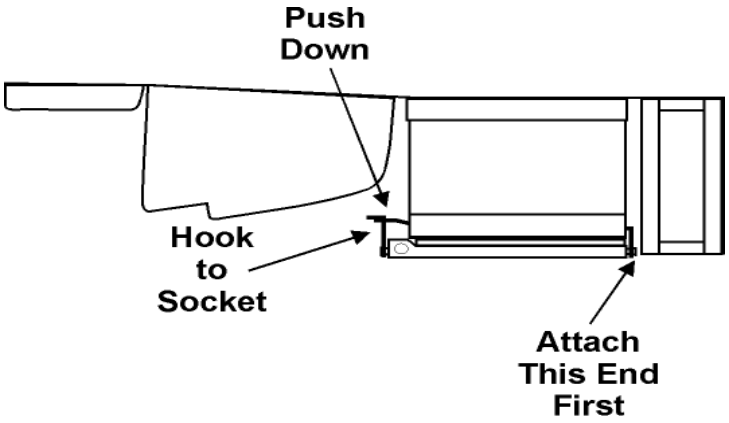



*Figure 3-15: Re-installing the Heat Sink/Air Duct Assembly*

**12.** Reconnect the fan power cable connector to J5 on the system board.

**13.** If you upgraded the processor, refer to Figure 3-16 and set JP4 and JP6 to match the processor type and speed.

**NOTE:**

The markings on current Ultra system boards do not have the correct voltage settings for all AMD K6-2 processor speed settings.

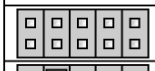
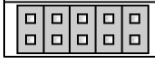
**14.** Replace the hard disk.

**15.** Replace the cover.

## JP4
### Processor VCC/Type

| A B C D E | VCC | CPU |
|---|---|---|
|  | +2.14V | AMD K6-2/233MHz to 366MHz |
|  | +2.21V | AMD K6-2/233MHz to 366MHz (Alternate) |
|  | +2.34V | AMD K6-2/400MHz |
|  | +2.84V | Intel P55C MMX |
|  | +3.54V | Intel P54C |

## JP6
### Processor Speed

| Intel P54C or P55C | | | |
|---|---|---|---|
| A B C D E | SPEED | MULTIPLIER | |
|  | 100MHz | 1.5x | P54C Only |
|  | 133MHz | 2.0x | |
|  | 166MHz | 2.5x | |
|  | 200MHz | 3.0x | |
|  | 233MHz | 3.5x | P55C Only |

| AMD K6-2 | | |
|---|---|---|
| A B C D E | SPEED | MULTIPLIER |
|  | 233MHz | 3.5x |
|  | 266MHz | 4.0x |
|  | 300MHz | 4.5x |
|  | 333MHz | 5.0x |
|  | 366MHz | 5.5x |
|  | 400MHz | 6.0x |

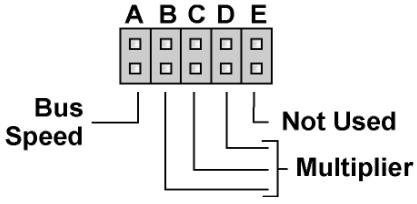



*Figure 3-16: Jumper Settings for Intel and AMD Processors*

# *Main Memory*

The PCWS Ultra system board main memory consists of single Dual-In-Line-Memory-Module (DIMM) socket. A DIMM is roughly the same as a pair of SIMMs connected end-to-end. DIMMs have been replacing SIMMs in most desktop and tower PCs in the last few years, and therefore have become inexpensive and readily available.

The table below shows the available configurations. The Ultra BIOS and chip set will automatically detect and size the DIMM.

| DIMM Type | Memory |
|---|---|
| 1M x 64 | 8MB |
| 2M x 64 | 16MB |
| 4M x 64 | 32MB |
| 8M x 64 | 64 MB |
| 16M x 64 | 128MB |

The Ultra system board is designed to use 168-pin, +3.3V, unbuffered 100MHz Synchronous DRAM (SDRAM) DIMMs. Like the SIMMs used on the M32 and M64 system boards, the DIMM must be less than 1 inch in height. Standard PC100 SDRAMs are taller than 1 inch, preventing the top cover from installing properly.

The table below shows the DIMMs currently approved for use in the Ultra system board. These are devices are custom made for the PCWS to ensure a proper fit.

| Size | Mfg P/N | MICROS P/N |
|---|---|---|
| **16MB** | PNY - 89000193 | 700502-150 |
| **16MB** | Samsung KMM366S203BTL-60 | 700502-150 |
| **32MB** | PNY - 89000214 | 700502-151 |
| **64MB** | PNY - 89000215 | 700502-152 |
| **128MB** | PNY - 89000247 | 700502-157 |

***STATIC SENSITIVE DEVICES***

Follow ESD procedures when handling DIMMs.

## DIMM Orientation

Figure 3-17, below, shows a DIMM designed for the Ultra system board. Note that the individual memory chips on the DIMM are installed horizontally to keep the overall height of the DIMM to less than 1 inch. The illustration also points out the notches that denote its operating voltage and other parameters.

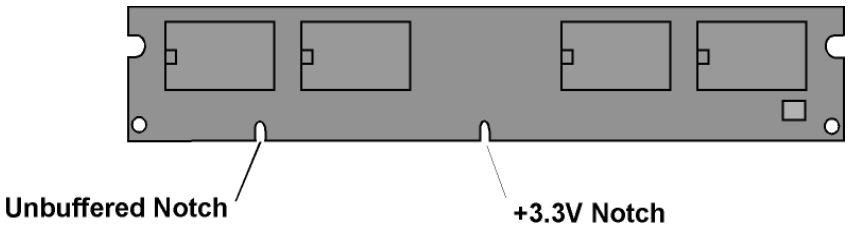



*Figure 3-17: DIMM Orientation*

## DIMM Installation

1. Power off and remove the workstation cover.
   - If you must remove a DIMM, see Figure 3-19, on the next page.
2. Line up the notches in the DIMM to match the socket, then insert the DIMM in the socket. The end clips will snap into place.

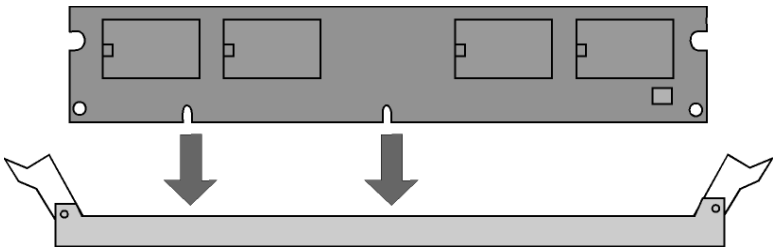


*Figure 3-18: Installing a DIMM*

### Removing a DIMM

**1.** If you need to remove a DIMM already installed, Refer to Figure 3-19, below and gently release the clips on each side of the socket. Lift the DIMM out.

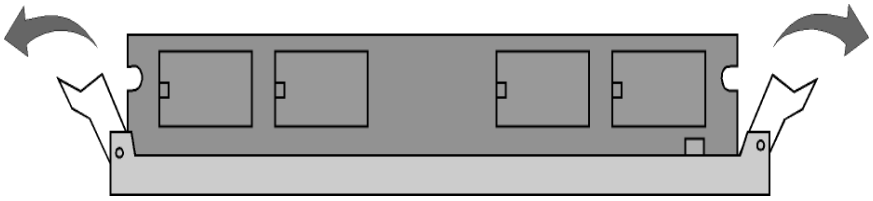


*Figure 3-19: Removing a DIMM*

# *Hard Disk*

The PCWS Ultra supports a single E-IDE hard disk installed within the LPs or ADs case.

***STATIC SENSITIVE DEVICES***

Follow ESD procedures when handling the hard disk.

## Requirements

- ❑ PCWS Hard Drive Kit, available with or without Windows 95 or Windows NT pre-loaded.
- ❑ PC Compatible keyboard
- ❑ PCWS Floppy Diskette.

## Procedure:

1. Carefully remove the hard disk and mounting bracket from it's packing material.
2. If you are installing a hard drive kit from MICROS, you can skip this step. Otherwise, check the drive select jumpers.
   - ❑ All IDE drives include a set of jumpers that designate one of several configurations including "master", "slave", "single", or "cable select". The master, slave, or cable select settings are required when two drives share a common interface cable.

     In a single drive installation such as the PCWS, this jumper must be set to "single". When you purchase a new drive from MICROS or elsewhere, this is the default setting.

     However, should you "borrow" a hard disk from a desktop PC with two hard drives installed, one drive will be configured as a "master" and the other as a "slave". In some cases, the cable select function may be used. None of these settings will function in the PCWS. Consult the documentation supplied with the hard drive for the jumper settings of a single hard drive installation.
3. Power off and remove the LPs or ADs cover.
4. If you are not installing a kit from MICROS, make sure you are using the correct hard disk bracket. Figure 3-20.

- Note the cutouts in the bracket. They leave room for system board components. In addition, a new bracket with a thumbscrew is now being shipped. This bracket is compatible with all system boards, but only the Ultra system board can use the thumbscrew because there is a matching boss on the sheet metal bracket.

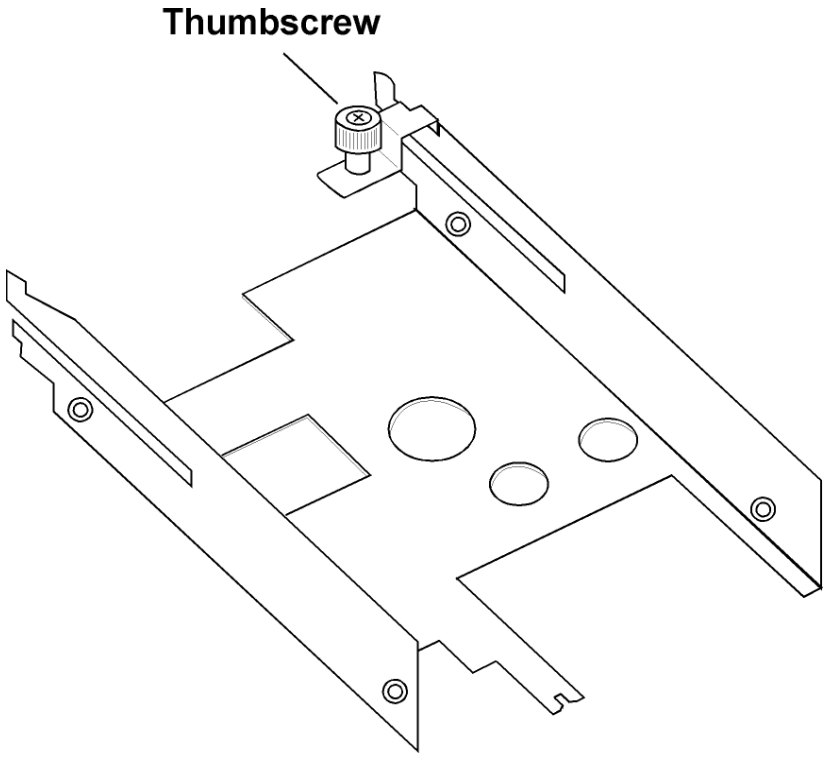



*Figure 3-20: The Hard Disk Bracket*

**5.** Mount the drive in the bracket as shown in Figure 3-21.

- Attach the power and data cables to the drive as shown.
- Connect the power cable to J2 and the data cable to J3 on the system board.

**WARNING:**

Exercise care when installing J2. Figure 3-21. While this connector is keyed, it is possible to force it on backwards. Be sure to orient the connector as shown. Damage to the hard disk and or the system board could result from an improper connection.

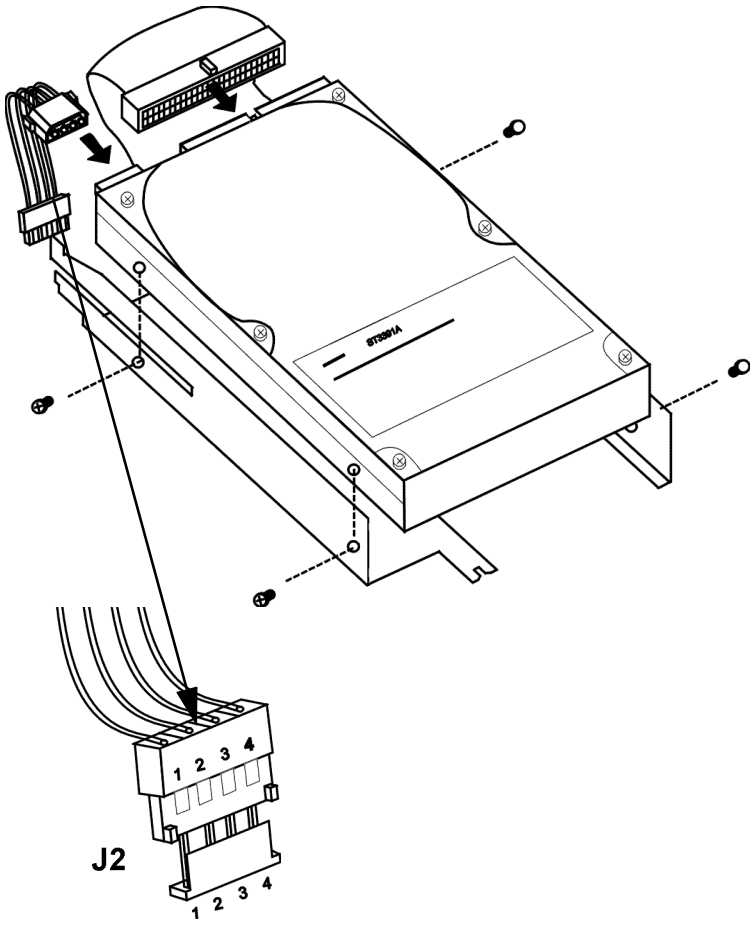



*Figure 3-21: Assembling the hard disk bracket*

**6.** Refer to Figure 3-22 and install the drive assembly. For clarity, the drive itself is not shown.

- Slide the bracket in from the rear until the front slots line up with the slots in the base. Then snap the rear clamps in place outside of the slots as shown.

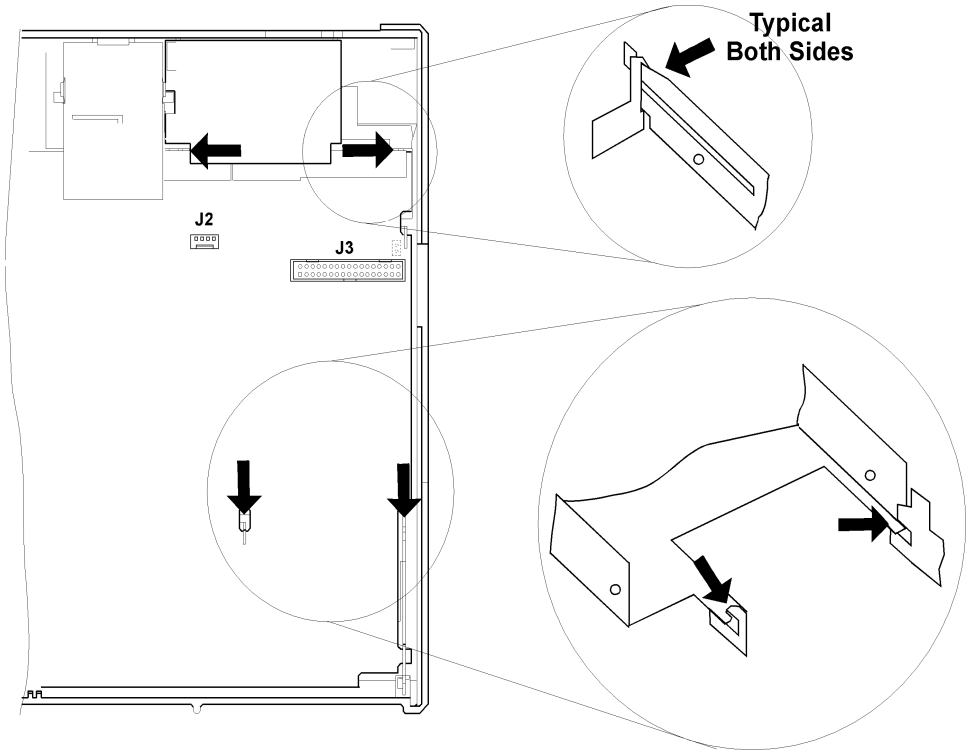



*Figure 3-22: Mounting the Drive Assembly*

- Twist the thumbscrew clockwise to fasten the hard disk bracket to the system board.

**7.** Replace the cover, power-up, and enter the Setup Utility.

- The Phoenix BIOS will automatically detect and size the hard disk.
- If the BIOS does not detect the hard disk, re-check the installation of the cables and the drive select jumpers as described in Step 2. If the hard disk cannot be detected, Step 8.

**8.** Manually configure the hard disk. This step is necessary only if the hard disk was not automatically detected at power-up.

**9.** Power up the PCWS and enter Setup by pressing [F2] when prompted.

- The Phoenix BIOS Main screen should be displayed.
- Move to the “Primary Master” field, and press [ENTER].

- Enter the values for the number of cylinders, heads, and bytes per sector. This information should appear on a label on the hard disk case.
- Press [F10], then [Enter] to save the new configuration and reboot the workstation.
- If the workstation still fails to detect the hard disk, try a new data cable.

# *Customer Display*

Both the Low Profile and Adjustable Display case styles support an optional Customer Display that mounts directly to the rear of the workstation. The LP version consists of a display board and housing, assembled and ready to attach to the rear of the workstation base. The AD version consists of the display board only, which mounts to the AD support bracket at the rear of the base.

### LP Procedure:

1. Power-off the workstation, remove all cables from the rear connector panel, then remove the cover.
2. Remove the shipping materials from the customer display.
3. Refer to Figure 3-23 and attach the customer display assembly to the case at the points shown.
   - Route the cable through the slot on the PCWS case, behind the rear fan shroud, then connect it to J1 on the system board.

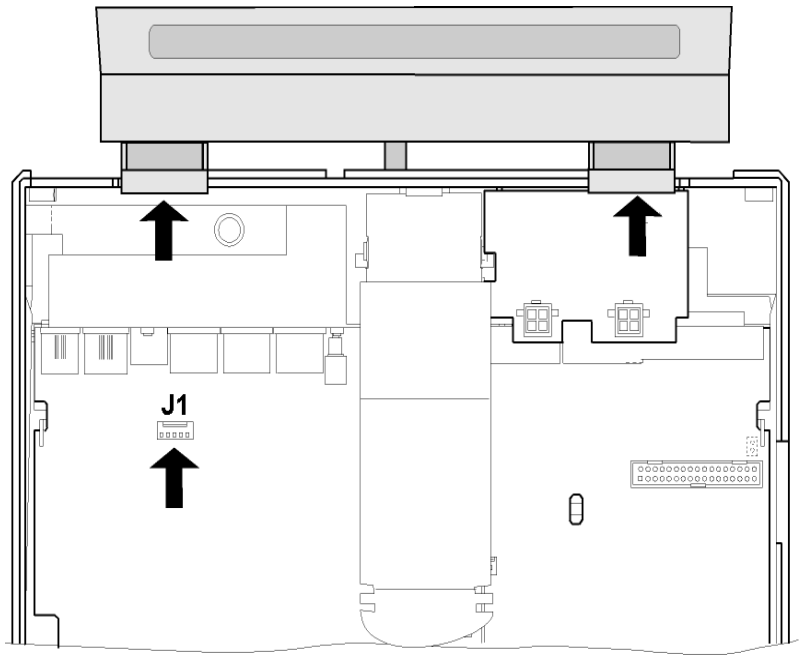



*Figure 3-23: Attaching the Customer Display (Low Profile Case)*

4. Power-up the workstation.
5. The Customer Display is ready to run.

### AD Procedure:

1. Refer to Figure 3-24 and remove the screws that hold the cover in place.

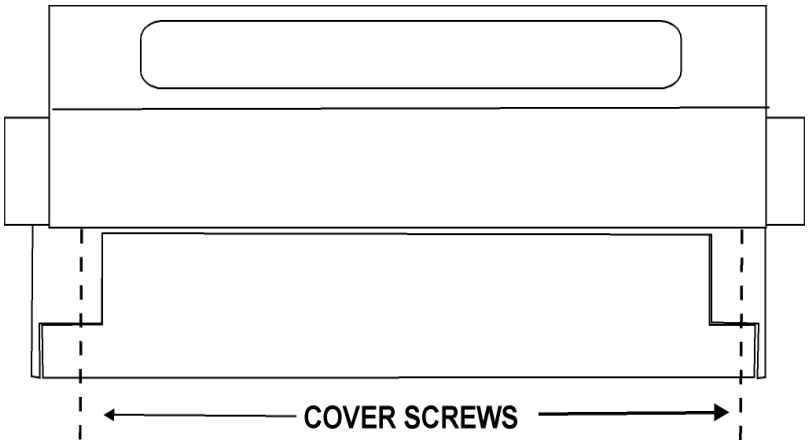



*Figure 3-24: Removing the PCWS AD Cover*

2. Lift the cover up and set it to the right side.
3. Remove the Customer Display assembly and cable from its shipping container.
4. Orient the base so that the AD support bracket on the rear of the unit is visible.

5. Orient the board so that the display is facing you and the cable is on the right. Refer to Figure 3-25, and hook the two holes at the top of the display board to the mounting tabs on the bracket, then rotate the display in place.

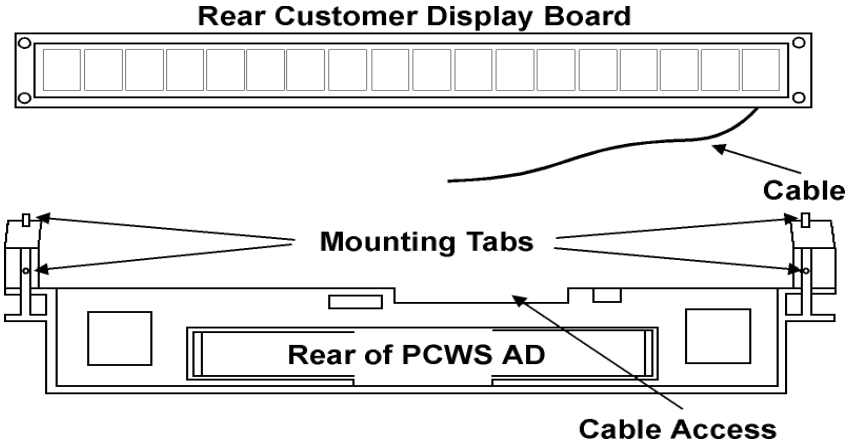



*Figure 3-25: Mounting the Customer Display Board*

6. Route the cable through the slot in the base, behind the shroud, and connect it to J2 on the system board.
7. Replace the AD cover.
8. Power-up.

# *LCD Configuration*

Currently, the Ultra system board supports three LCD configurations.

- ❏ Sharp 11.3” (640x480) Passive
- ❏ Sharp 12.1” (800x600) Passive*
- ❏ Sharp 12.1” (800x600) Active

* Standard display configuration

Note that the Low Profile (LPs) case supports only 11.3” LCDs. The Adjustable Display Sharp (ADs) case can accommodate any of the LCDs listed above. Per PMA99-565, the LP case went end-of-life in mid 1999.

The LCD type is selected through DIP switch S1. The operating voltage of the LCD panel (+3.3V or +5V) is determined by GJP2. Settings for current LCD configurations can be found in Figure 3-27.

The Ultra system board is accompanied by a new backlight inverter board, shown in Figure 3-26, below.

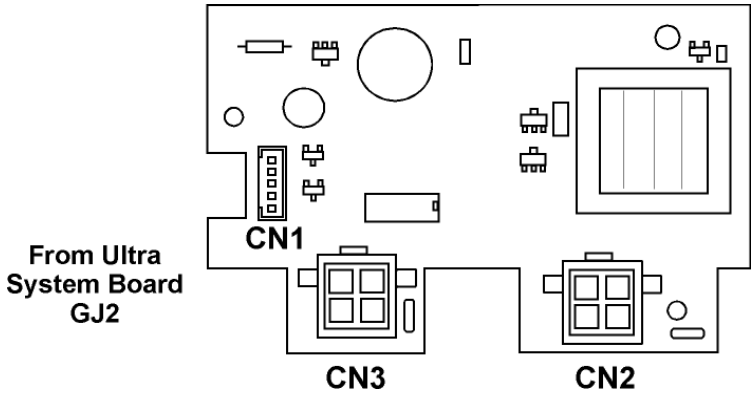



*Figure 3-26: Ultra Backlight Inverter Board*

This board contains the backlight inverter circuit only. In Model 32 and Model 64 workstations, this board also hosted the system speaker and the connector for the rear mounted customer display. These items now reside on the Ultra system board.

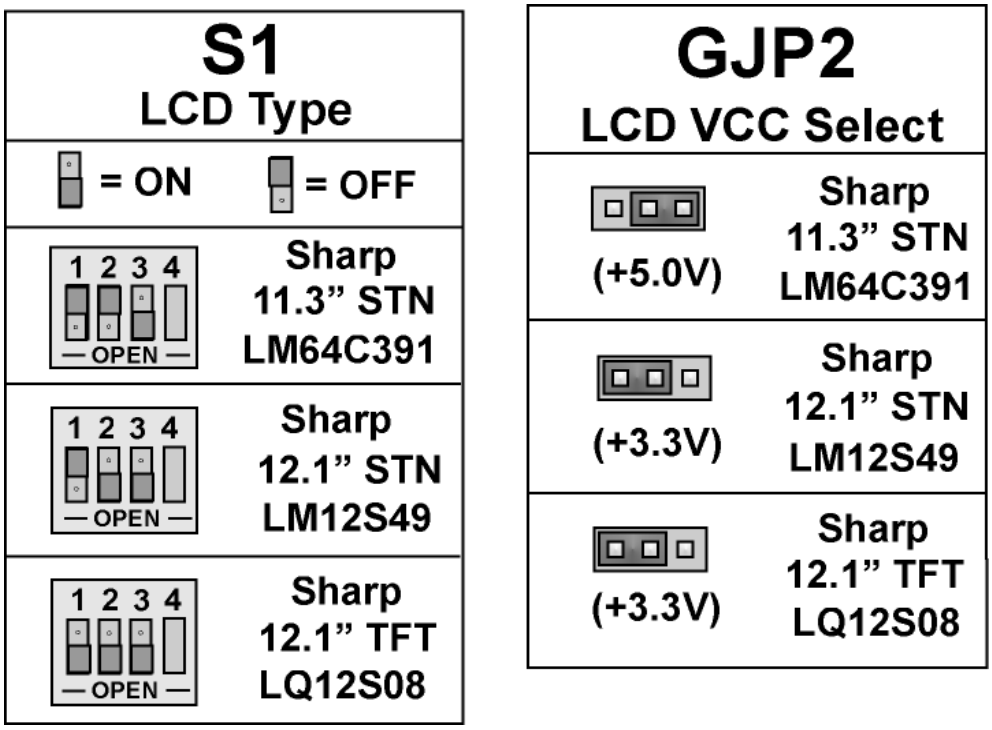



*Figure 3-27: LCD Configuration Jumpers and DIP Switches*

# *Expansion Card Installation*

This section provides an overview of Plug and Play, describes the Ultra PCI/ISA Riser Card, and provides instructions for installing a PCI or ISA expansion card.

## Plug and Play

The following information is not intended to repeat the details of the Plug and Play specification, but merely to provide an overview of its operational concepts and how they affect you, the installer adding peripheral cards to the PC workstation. It also important to note that at the time this Setup Guide was written, true Plug and Play compatibility was available only on the Windows® 95 or 98 operating system.

Plug and Play (PNP) is aimed at one of the shortcomings of the open and extensible architecture of the AT class personal computers: management and allocation of system resources such as IO Ports, interrupt requests lines, DMA requests lines, etc. These resources are in limited supply but are required for almost all peripheral add on cards. As more add-on cards are added to the AT bus, the possibility of device conflicts increases because in most cases, these resources cannot be shared.

Although the pool of resources is finite, it is still quite extensive. This is why it makes sense to manage them more efficiently than to simply add more. In fact, the Peripheral Component Interconnect (PCI) bus represents a step towards better management of resources at the BIOS and chipset level, but does not include the operating system. The PCI bus maintains its own set of internal interrupts associated with each PCI card or system board device. To manage these resources, they are combined and placed in a PCI/ PNP “resource pool” where they can be assigned as needed to PCI or Plug and Play devices.

## Legacy ISA Card

The term Legacy ISA card is used to denote older ISA bus cards that do not conform to PNP specifications. To install these cards, the technician must know the resource requirements of the card as well as what resources are available. Configuration of these cards is typically performed by setting DIP switches to decode IO port addresses and or setting jumpers to steer IRQ and DMA request lines to the proper bus pins. Legacy ISA cards may also be configured by a software utility. Still, the installer must know what resources are available and enter them into the configuration software.

Plug and Play spreads the burden of resource management between the BIOS and chip set, the operating system, and the manufacturer of the add-in card or chip.

With PNP, the installer simply plugs in the card, turns on the PC, and lets the BIOS, chipset, and operating system determine the resource requirements, then assign them.

Thus, the PNP compatible BIOS assumes the role of resource manager. It is responsible for configuring PNP cards and system board devices during the Power On Self Test. Once the POST is complete, and the operating system starts up, it becomes responsible for managing PNP devices with the BIOS providing run-time services for the operating system.

### Ultra PCI/ISA Riser Card

You can install a half-size PCI or ISA expansion card in the Ultra workstation by using the optional Ultra PCI/ISA Riser Card. See the illustration below.

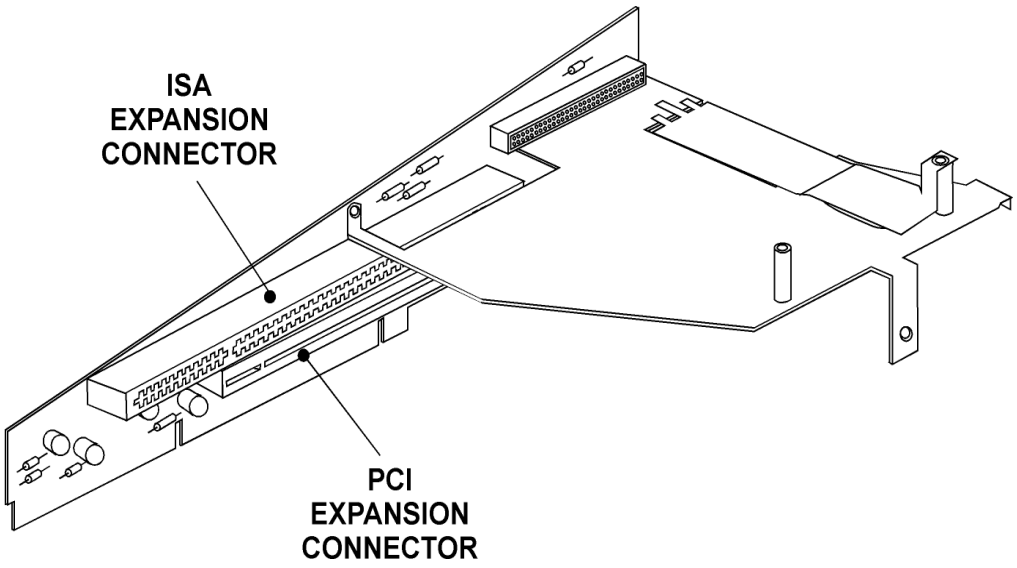



*Figure 3-28: The Ultra PCI/ISA Riser Card*

**NOTE:**

The Ultra PCI/ISA Riser Card is not compatible with the Model 64 PCI/ISA Riser Card.

## Installing Expansion Cards in the Ultra PCI/ISA Riser Card

The following procedure describes how to install a PCI or ISA expansion card in the Ultra PCI/ISA Riser Card. The procedure consists of three steps: Installing the expansion card, installing the PCI/ISA Riser Card in the workstation, and using the Setup Utility to configure the add-on card if required.

### Procedure:

1. Remove all cables from the rear connector panel, then remove the cover.
2. From inside the unit, remove the red plastic bracket covering the rear card slot.
3. Install an ISA card in the Riser Card.
   - If you are installing a legacy ISA card, select a non-conflicting IRQ (if required) resource and set the jumpers
   - Install the ISA card in the socket with the solder side up as shown in Figure 3-29
   - Secure the ISA card bracket to the riser card bracket with a screw as shown in the illustration
   - Proceed to the section entitled “Installing the Riser Card in the System Board.”

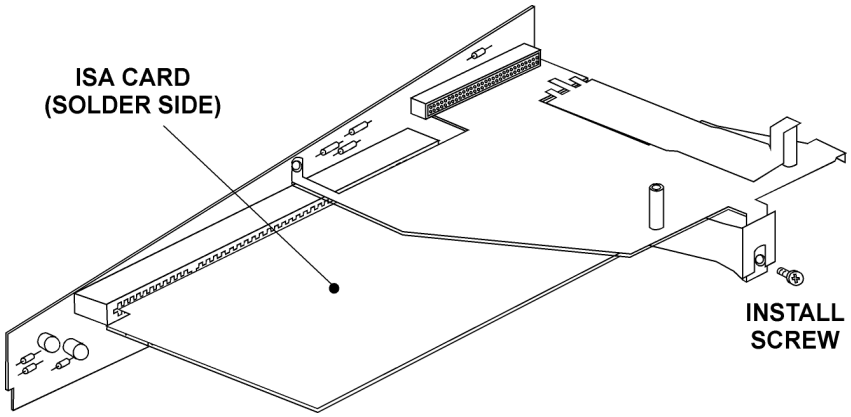



*Figure 3-29: Installing an ISA Card*

4. Install a PCI card in the Ultra PCI/ISA riser card.
   - Jumper settings are not required for a PCI card
   - Install the PCI card with the component facing up as shown in Figure 3-30
   - Secure the PCI card bracket to the riser card bracket

- Proceed to the section entitled “Installing the Riser Card in the System Board”.

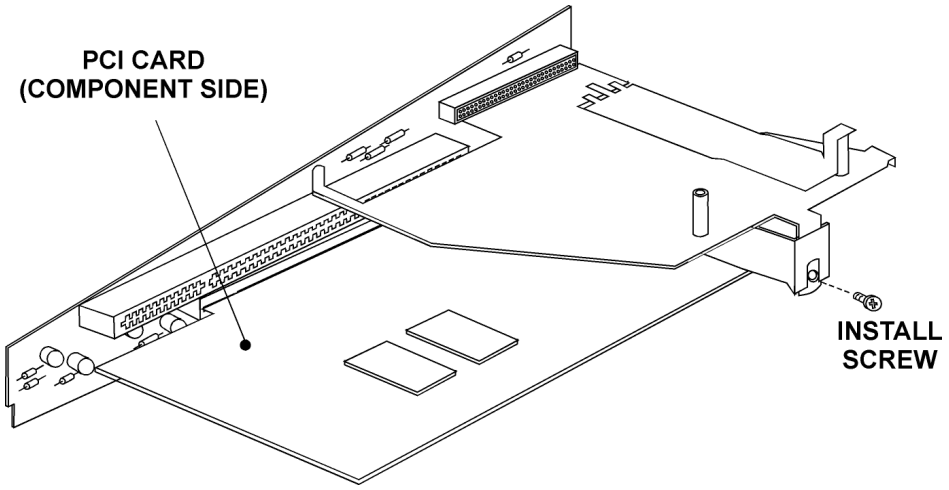



*Figure 3-30: Installing a PCI Card*

## Installing the Riser Card in the System Board

After installing the expansion card, follow the procedure below to install the Ultra PCI/ISA Riser Card in the dedicated system board connector.

**1.** Insert the riser card bracket rear tab under the plastic cutout in the base as shown in Figure 3-31

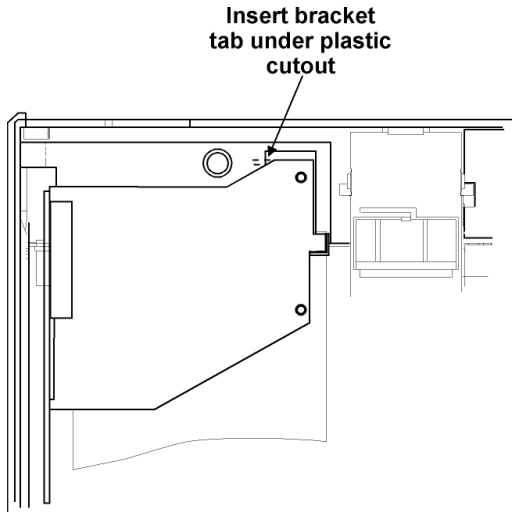



*Figure 3-31: Installing the PCI/ISA Riser Card*

- Install the PCI/ISA riser card in socket J37, along the left side of the unit. It should slide most of the way into the connector. When you feel some resistance, re-check the alignment at each end of the socket, and press firmly to seat the board in the socket.

**2.** From the rear of the unit, install a screw as shown in Figure 3-32 to secure the Riser Card to the chassis.

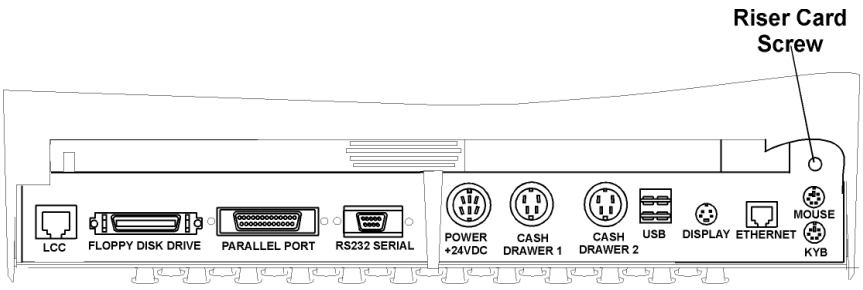



*Figure 3-32: Securing the Riser Card*

**3.** Replace the workstation top cover.

**4.** Reconnect all external cables. Check the headings below to configure the device in CMOS Setup.

**5.** Connect a PC Keyboard to the workstation if one is not already.

**6.** Proceed to “System Configuration”, below.

## Expansion Board Configuration

Depending on the type of card you installed, you may have to enter the Setup Utility and configure it.

### Legacy ISA Card

If you installed a legacy ISA card, for each IRQ line it requires, you must reserve an IRQ in the "PNP/PCI IRQ Resource Pool Exclusion" screen of the Setup Utility.

The primary question when installing a legacy ISA card is "what IRQs are available for use with this card?" One way to find out is to change each IRQ from [Available] to [Reserved] in the IRQ Resource Pool Exclusion screen. The BIOS will report if the IRQ has been assigned to a PCI/PNP device and is not available for a legacy ISA card. If you are running Windows® 95, 98, or NT, you can also see the IRQ assignments through the control panel.

By default, IRQ3, IRQ4, and IRQ7 are assigned to the system board COM and LPT Ports. IRQ10 is assigned to the AMD Ethernet controller. IRQ12 is assigned to the PS/2 Mouse. IRQ14 is assigned to the primary IDE channel. Otherwise, the remaining IRQ lines should be available for the legacy ISA card.

Should you need to remove an IRQ line from the PnP/PCI resource pool, proceed as described below.

- Power-up the workstation and enter the Setup Utility by pressing [F2] when prompted
- Use the right cursor key to select the Advanced Menu
- Cursor down to the "PCI/PnP ISA IRQ Resource Exclusion" field and press [Enter]

  By default, all IRQ resources are made "available" to the PNP/PCI resource pool
- Cursor down to the IRQ line you wish to reserve for the legacy ISA card and press the [-] key to select [Reserved]

  If the message "Indicates a DMA, interrupt, I/O, or memory resource conflict with another device" appears when you attempt to reserve an IRQ, it means the IRQ line has been assigned to a PnP or PCI device by the BIOS. Try another IRQ line.

### ISA PNP Card

If you installed a PNP compliant ISA card such as a modem, no further configuration is necessary.

### PCI Card

If you installed PCI based expansion card, no further configuration is required unless the documentation states that PCI card must be designated as a “Master”. If the PCI card requires this:

- Power-up the workstation and enter the Setup Utility by pressing [F2] when prompted
- Use the cursor keys to select the Advanced Menu
- Cursor down to the “PCI Device Slot” and press [Enter]
- Press the [-] key once to select [Enabled]
- Press [F10], then [Enter] to save the changes to CMOS RAM and re-boot the workstation.

Contents

Chapter 4

# PCWS Ultra Diagnostics

This chapter includes diagnostics information on the Ultra system board.

## In this chapter

# *Basic Troubleshooting*

This section provides a brief troubleshooting chart for the PCWS Ultra.

| Problem | Possible Cause | Solution |
|---|---|---|
| PCWS is dead. LCD is blank, LCD backlight is off, fan(s) not running | No Power to PCWS | Check AC power switch on AC adapter. Make sure cable from AC outlet to the AC adapter and cable from AC adapter to PCWS is secure. |
| System Boots from Floppy Diskette. Does not boot from or read from hard disk. | Bad power or data cable to hard disk. | See Chapter 3 and check the connections to the hard disk. |
| | Disk parameters lost in CMOS Setup. | Restarting should restore hard disk parameters. |
| | Boot Priority not set correctly. | Check Boot Priority setting in Setup Utility (Chapter 2) |
| System Boots from Floppy Diskette. Does not boot from hard disk, but you can read hard disk directories and access data files | Hard disk boot sector lost | Backup all files and reformat drive. Restore all files |
| System Boots from Hard Disk. Does not boot from Floppy Diskette. | No Power to Floppy Diskette. Cable not connected. | Check power and data cable to Floppy Diskette. |
| | Floppy Diskette not enabled in Setup Utility | Set Legacy Diskette A: to “[1.44/1.25 Mb 3½]” |

| Problem | Possible Cause | Solution |
|---|---|---|
| The LCD is too light or dark | LCD Contrast not adjusted | Run one of the contrast adjustment utilities or use the “IO Device Configuration sun-menu” to change LCD contrast. |
| PS/2 Mouse installed but not detected. | PS/2 Mouse port not enabled. | Set “PS/2 Mouse” field in Advanced menu to [AUTO], reboot. |
| | PS/2 Mouse not fully connected or connected to keyboard port. | Check the mouse connection to make sure it is secure. Mouse connector is above keyboard connector. |
| | Defective mouse | Replace the mouse |

# *Diagnostics LEDs*

The Ultra System Board contains several LEDs, used to indicate various conditions about the system board. The location of each LED is shown in the illustration below.

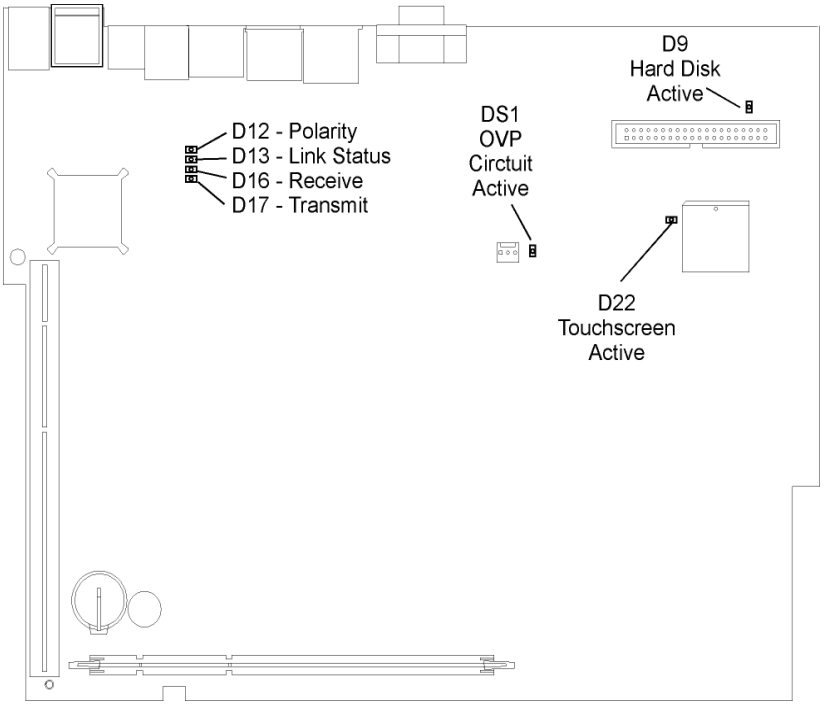



*Figure 4-1: Ultra System Board Diagnostics LEDs*

When DS1 is ON, this is an indication that the Over Voltage Protection (OVP) circuit has shut down the on-board power supply.

- This condition occurs should the +5V output become shorted to a higher voltage such as +12V. This could be the result of a component failure in the power supply, or through a foreign object/ spillage on the system board.

D12, D13, D16 and D17 are part of the 10BaseT interface and have the following functions.

- D17 is active when the interface is transmitting data.
- D12 is active if the cable transmit and receive polarity is reversed. The polarity check function is active after a reset or Link Fail. See the explanation for D13. The controller has the ability to invert the polarity of the signal appearing on the RXD+/- pair if the polarity of the received signal should be reversed due to an improperly wired connector.

- D16 is active when the interface is receiving data.
- D13 is active when the interface has a good link status.
  When the transmit pair is inactive, “link beat pulses” are periodically sent over the twisted pair cable by all devices to monitor cable integrity.

  The absence of link beat pulses and receive data on the RXD+/- pair will cause the controller to enter the link fail state and illuminate D13. While in the link fail state, all data transmission, reception, loopback and collision detection functions are disabled and will remain so until valid data or more the 5 consecutive link beat pulses appear at the RXD+/- pair.
- D22, when blinking, indicates that the Touchscreen Controller, U30 is functional and ready to receive input from the touchscreen.
- D9, when illuminated, indicates the system is accessing the hard disk.

# *POST Error Messages*

Here is a partial list of non-fatal error messages that may appear as the workstation completes it's Power-On Self Test. These messages will be accompanied by two beeps at the completion of the POST.

**COM A configuration error - device disabled**

**COM B configuration error - device disabled**

**Parallel Port Configuration error - device disabled**

Each of these errors indicates an IRQ conflict in the I/O Device Configuration menu of the Setup Utility. This can happen when ports are configured manually. Using the [AUTO] selection for the COM and LPT ports helps to prevent device resource conflicts because the system assigns them automatically.

# *POST Error Beep Codes*

The following table shows a partial list of fatal Phoenix BIOS beep codes.These are related to the keyboard, Flash BIOS, VGA, CMOS RAM, VGA interface, DRAM, and the IDE interface.

| Beep Code | POST Code | Description |
|---|---|---|
| 1-2-2-1 | 14 | Error initalizing keyboard controller |
| 1-2-2-3 | 16 | BIOS ROM Checksum Error |
| 1-3-3-1 | 28 | Error Autosizing DRAM (DIMM is defective or not installed) |
| 1-4-2-1 | 34 | CMOS RAM read/write failure |
| 2-1-3-3 | 4A | Error initalizing VGA controller |
| 2-2-4-1 | 5C | Error testing RAM between 512 and 640k (DIMM is defective). |
| 2-3-1-1 | 60 | Error testing expanded memory (DIMM is defective) |
| 2-3-1-3 | 62 | Error testing extended memory address lines (DIMM is defective) |
| 2-4-2-1 | 74 | Error testing Real Time Clock |
| 3-1-4-1 | 8C | Error testing floppy disk interface |
| 3-2-1-2 | 91 | Error initalizing local-bus hard disk controller |

*Figure 4-2: Phoenix BIOS 4.0 Fatal POST Beep Codes*

Not all tests will be executed on all systems, nor will they always be executed in the order shown.

For a more complete list see the Ultra POST Code Reference Guide.

Contents

# *Glossary of Terms*

### 10BaseT

An implementation of the Ethernet IEEE (802.3) based on shielded or unshielded twisted pair cable. 10BaseT uses the star wiring topology based on a centrally located hub.

All MICROS PC Workstations include an Ethernet 10BaseT port.

### Active Matrix LCD

A type of LCD that uses a transistor at each pixel to produce a high quality image without the temporary visual loss of the screen pointer associated with passive matrix displays. Active displays are brighter, crisper, can be viewed from greater angles than passive matrix displays, and they do not tend to produce ghost images, or trails when motion is displayed.

*See* Passive Matrix

### ASCII

Abbreviation for American National Standard Code for Computer Information Exchange. The standard ASCII code consists of a pre-defined set of alphanumeric, control, and graphics characters. The 7-bit coded characters allow information to be exchanged between computers and peripheral devices.

### Adapter Card

A printed circuit card that can be installed in the expansion connectors of an IBM Compatible PC to extend or enhance its operation. An internal modem board is an example of an adapter card. *See* Also: ISA Riser Card.

### Adapter ROM

The read-only memory on some expansion boards which contains code to control the device. The contents of Adapter ROMs are normally appended to the system BIOS ROM at start-up.

## Analog

A term used to describe any device that represents values by a continuously varied physical property such as voltage or current.

## API

Abbreviation for Application Programming Interface (API). The PCWS API is a hardware API that resides between the application and the hardware, providing a set of hardware services that the programmer can call upon to access the POS features of the PCWS.

For example, to open a cash drawer, the programmer calls an API function. The API determines which system board is installed and selects the appropriate register and bit in the Configuration and Control register to open the drawer. Changes to a register port address, or a new version of the system board is handled by the API and thus are transparent to the programmer. The current PCWS API supports all PCWS system boards.

PCWS APIs are unique to the operating system where they will be used. In the Windows 3.1 and Windows 95/NT environments, the API is implemented as a virtual device driver. In a DOS environment, a terminate and stay resident program is used.

## AUTOEXEC.BAT

A special start-up file executed by MS-DOS at power-up if present on the root directory of the boot disk. It defines operating parameters such as PATH and PROMPT and executes memory resident programs such as mouse drivers.

## AT Bus

Part of the ISA bus architecture, the 16-data and 24-bit address path used to interconnect the processor to peripheral devices.

## AT Compatible PC

Any computer that can run software programs written for the IBM AT computer. The AT bus signals and standards are collectively referred to as the Industry Standard Bus (ISA).

## BIOS

Abbreviation for Basic Input Output System (BIOS). A layer of firmware in the PC that resides between the hardware and the operating system and application programs. The BIOS is stored in non-volatile EPROM or Flash EEPROM so that it is always available to start the computer.

The BIOS provides the following services:

- **The POST (Power On Self Test).** The POST initializes and tests the CPU, RAM, AT chipset, detects and tests any optional hardware installed, and assigns resources to Plug and Play devices if installed. A copy of the current hardware configuration is compared with that stored in CMOS RAM. If the current hardware configuration differs from that stored in CMOS, the BIOS produces an error message. In either case, the POST then turns control over to a bootstrap loader to start the operating system from a floppy, hard disk, or network boot ROM.
- **The Setup Utility**. Consisting of a series of menus, the Setup Utility provides a central location where the majority of PCWS Ultra IO Ports are enabled and resources applied. It allows the user to define such basic items as the type of floppy and hard disk installed, and the current time and date.
- **Runtime support.** After the PC has booted and is running an operating system and application software, the BIOS remains active to handle requests by these programs to use hardware devices. The BIOS receives these instructions from the operating system as a software interrupt and translates them into a form the hardware understands.

## Bit

A bit is the smallest unit of information the computer can process. The binary value can either be a 0 or a 1.

## Boot[strap]

Often referred to as the act of booting or re-booting the PC, this term describes the process of bringing the machine into the desired state by means of its own actions. Boot[strap] generally refers to the BIOS software routine whose first few instructions are dedicated to finding and loading the operating system from a floppy diskette, a hard disk, or a network boot ROM.

## Boot ROM

An EPROM, that when installed on the System Board, allows the PCWS to load its operating system, start-up files, and network files, directly from image files located on a network sever running either SCO-UNIX, or Windows NT. This allows the workstation to function in a Client/Server environment such as 3700 RES without a hard disk.

On the Ultra System Board, the Boot ROM is not implemented as a separate device. It is included in the System Flash BIOS chip and enabled as needed through a Boot Menu. See Chapter 2 for more information.

## Buffer

An area of memory set aside to temporarily store data until it can be processed, printed, or displayed.

## Burst Cycles

Refers to the ability of the Pentium® Processor to access up to 16 sequential memory locations during read or write cycles. Burst cycles are the fastest means of transferring data between the memory and processor when the data or instructions are located at contiguous memory addresses.

*See* Cache and Pipelining.

## Bus

A set of electrical conductors used for communication between two or more devices, a bus is a shared hiway that connects the CPU with memory and peripheral devices.

## Bus Mastering

A device that takes control of the ISA or PCI Bus in order to mediate its own data transfers. The device that receives data from the bus master is designated the bus slave or target. A process called bus arbitration determines which device takes control of the bus.

## Byte

A unit of data made up of eight contiguous bits. A byte is the smallest unit of memory that can be addressed.

## Cache

A method of speeding access to information in a slower device by temporarily storing the information in a faster device. Consisting of a small block of high speed static RAM placed between the processor and main memory, the cache hold copies of the most recently requested code and data. A dedicated SRAM, the Tag RAM, contains the addresses of main memory that are stored in the cache.

The processor can access code and data stored in the cache much faster than when it is stored in main memory. A caching algorithm, built into the chip set cache controller, determines what data is stored in the cache. Memory caches differ in size, location, logical arrangement, and operation.

An *internal* cache (also referred to as *on-chip, primary, or L1*) refers to the 16 kbytes of cache located inside the Pentium® processor.

An *external* cache (also referred to as *secondary*, or *L2*) resides outside of the processor between it and system DRAM controller.

A *write-through* cache forces the processor to bypass the cache and write directly to main memory during memory write cycles.

In a *write-back* cache, the processor writes data to the faster cache instead of main memory.

The Ultra System Board is equipped with 512 KB of external write back pipeline burst cache. Pipeline burst cache refers to a special type of cache chip designed to take advantage of both the burst cycle capability and the pipelined architecture of the Pentium processor.

*See* Burst Cycles and Pipelining.

## CD-ROM

Abbreviation for Compact Disk Read Only Memory. A device that uses laser optics in place of magnetic heads to read data. To use a CD-ROM player with the Ultra, you must use an external parallel port version.

## Centronics Parallel Interface

An industry standard PC IO port, the Centronics Parallel Interface provides eight parallel data lines plus additional control signals. The original parallel port was designed as a printer output, thus the data flow is from PC-to-Printer. A few signals were returned from the printer to the PC to monitor printer status.

Over time, this port has evolved from a relatively slow unidirectional port to a much faster bidirectional port capable of bus mastering. The Ultra System Board supports all enhanced versions of the parallel port.

## Checksum

An error checking mechanism for a range of data. The sum of a data block is compared with the sum of another data block. The carry is ignored. A discrepancy indicates an error.

## Chip

An Integrated Circuit.

## Chipset

One or more integrated circuits that when combined, comprise all of the original support circuitry of the IBM AT PC. The original implementation included a clock generator, bus controller, memory/ cache controller, real time clock, counter/timers, interrupt controller, and DMA controller. In addition, modern chips sets add DRAM, cache, PCI-to-ISA host controllers and power management features.

The PCWS Ultra System Board uses a Silicon Integrated Systems Corp. SiS5581.

## Client

A workstation or personal computer that requests services from a server over a network. The server is usually a high speed microcomputer, minicomputer, or mainframe, providing access to a database. The client provides the user interface and may perform some or all of the application processing.

## CMOS

Abbreviation for Complementary Metal Oxide Semiconductor. A method of fabricating integrated circuits. CMOS RAM chips typically consume very little energy which allows a battery to maintain the contents.

## CMOS RAM

A small amount of memory located in every IBM AT Compatible PC that stores system configuration information. Information is stored or retrieved from the CMOS RAM by the system BIOS Setup Utility. The CMOS RAM is backed-up with a battery to preserve the contents when the system is turned off.

## COM Port

A type of IO Port that is generally referred to as a serial interface or asynchronous communications port. This type of IO port transmits information to and from the computer in a serial fashion, one bit at a time.

## Conventional Memory

Refers to the 640 kbytes of user memory below 1 Mbyte, managed by MS-DOS.

## Cylinder

A vertical column of tracks on a disk arranged so that they can be accessed without moving the read/write heads. One of the three parameters required by the BIOS to properly address an IDE Hard Disk.

*See* Sector, Track.

## Default

A predefined value, option, or setting.

## Device Driver

A program that is linked with and extends the operating system to provide an interface to a hardware device not originally part of the PC hardware standard. Device drivers are typically included with add-on hardware devices such as CD-ROM and tape backup drives to allow them to be mapped into the operating system as another disk drive.

## DIMM

Abbreviation for Dual-In-Line-Memory Module. To the processor, BIOS and chip set, a DIMM is equivalent of a pair of SIMMs placed end-to-end, but occupies less board space. Therefore, when installing them, it is not necessary to add or remove DIMMs in pairs.

The Ultra System Board uses a single 168-pin, +3.3V, 100MHz, unbuffered Synchronous (SDRAM) DIMMs. See Chapter 3 for more information.

## DMA

Abbreviation for Direct Memory Access. Refers to a technique of moving information from one place to another without the intervention of the CPU. A device called a DMA Controller assumes control of the system address, data, and control busses to manage the data transfer.

The AT Bus architecture supports 7 DMA channels, one of which is used for the floppy disk interface. The remainder are made available to ISA and PCI bus cards. The IDE interface uses PCI bus mastering to transfer data to and from the hard disk, without requiring a DMA channel.

*See* Bus Mastering.

## DRAM

Abbreviation for Dynamic Read Only Memory. The most common form of memory in a PC. A reasonably fast inexpensive Random Access Memory, a DRAM stores each bit of information in a capacitor. To maintain the charge in the capacitor, it must be refreshed. DRAM is a volatile type of memory, meaning that when power is lost, the contents of the device is also lost.

*See* SRAM.

## Driver

*See* Device Driver.

## EDO RAM

Abbreviation for Extended Data Out. A newer type of FPM memory designed for Pentium systems that speeds up memory access by allowing pipelined memory reads. It does this by holding data on its output from the previous read cycle as its address input changes for the next read cycle, allowing data to be read as the address for the next read cycle settles down. EDO RAM speeds up the memory cycle, with improvements in memory performance of as much as 40% over other types of memory such as Fast Page Mode (FPM) RAM. EDO RAM is effective only up to bus speeds of 66MHz.

## EEPROM

Abbreviation for Electrically Erasable Programmable Read Only Memory. EEPROMs differ from EPROMs in that they can be erased and reprogrammed without being removed from the circuit.

## EIDE

Abbreviation for Enhanced Integrated Drive Electronics. An extension of the Integrated Drive Electronics that supports more devices at higher transfer rates. EIDE supports multiple channels, each able to connect to two devices at transfer rates up to 11 MB/s and hard disks with capacities greater than 528 Mbytes. It supports at AT Attachment Packet Inteface, which also allows access to CD-ROMs, tape drives, and optical disks.

## EPROM

Abbreviation for Erasable Read Only Memory. EPROMs are basically used for storing information that is not likely to change, at least not very often. Unlike DRAM or SRAM, when the power is turned off, an EPROM retains its contents. However, once programmed, the device can only be erased and reused by removing it from the circuit and placing it under a strong ultra-violet light source. Programming is accomplished by placing the device in an EPROM programmer.

An EPROM is typically used to hold the BIOS in most personal computers. The BIOS must be stored in non-volatile memory since the computer may be turned off for long periods of time but must be available to start up the computer and load the operating system.

*See* Flash EEPROM

## Expansion Bus

Refers to a connector on the original IBM PC's System Board that houses expansion cards. The optional Ultra PCI/ISA Riser Card supports one ISA or PCI expansion card.

## External Cache

*See* Cache.

## File

A collection of similar data organized in the same format. A file is kept on a disk drive rather than random access memory.

## Flash EEPROM

A Flash EEPROM is a special type of EEPROM that can be electrically erased and reprogrammed while remaining in the circuit. The Ultra BIOS is contained in Flash EEPROM. Should it be required, a software utility is used to update the contents of Flash EEPROM from diskette.

## Floppy Disk Drive

A flexible, removable mass storage device consisting of a thin round piece of plastic, coated with magnetic particles and enclosed in a rigid plastic container. The PCWS Floppy Diskette Unit houses one 3 1/2" floppy disk drive.

## FPM RAM

Abbreviation for Fast Page Mode RAM. Fast Page Mode devices have faster memory access times within a memory address that defines the address of a single row of cells (of memory page boundary). The row address is held fixed while the column address changes to allow faster access times within a boundary.

## Gate

A combinational logic circuit having one output channel and one or more input channels that conform to the rules of Boolean logic. The state of the output channel is determined by the state of the input channels.

## Gigabyte

Abbreviation for 1,073,741,824 bytes.

## Hard Disk Drive

A rigid non-removable mass storage device. Hard disks are typically much faster and capable of storing larger amounts of data than a Floppy Diskette.

## Head

A small electromagnetic device inside a disk drive that reads, records, and erases the data on the media. The number of heads on a hard disk is one of the factors that determines disk size.

## High Memory Area

Microprocessors with extended memory addressing capabilities (a 286 or better) have the ability to address more than 1M of memory while in real mode. The 8088/8086 processors cannot go beyond 1Mbyte because the addresses “wrap” around and start back at zero.

With a 286 or better microprocessor, when the 21st address line is activated, the first 64 kbytes of the 1 mbytes in extended memory is available while the processor is still in Real Mode.

This 64 kilobyte segment, minus 16 bytes is called the High Memory Area. Because it is not part of the 640 kbytes of conventional memory, it cannot be accessed by DOS applications. However, it can be used like upper memory blocks to load driver or TSR software but is more likely to be occupied by the DOS kernel when using MS-DOS 5.0 or later. This relocation frees up about 40 kbytes of conventional memory.

## IDE

Abbreviation for Integrated Device Electronics. A type of hard disk where the majority of the disk controller electronics resides on the drive itself. IDE is in itself a hardware standard defining the electrical connections between the hard disk and the system board, the number of devices connected to a single cable, and data transfer rates. IDE has been superseded by IDE-2 (or E-IDE), which allows more devices to be connected to a single cable while at the same time, increasing the data transfer rate.

See EIDE

## IDN

Abbreviation for Integrated Device Network. Also referred to in MICROS documentation as the Stand-alone Device Network or Remote Printer Network. The MICROS IDN is a full-duplex RS422 interface designed to support MICROS Stand-alone Printers and Video Display Units connected in a multi-drop or daisy chain configuration. IDN devices include the Stand-alone Roll and Slip Printer, a thermal autocut printer, as well as others.

The Ultra system board has one RS422 port labeled LCC, and through application software, can be used to drive a network of IDN devices.

## Input Output

Pertaining to an electrical device or circuitry that allows the CPU of a computer system to communicate to the outside world. The IO Port can appear in several different forms such as serial, parallel, etc.

## Internal Cache

*See* Cache.

## Interrupt

The suspension of program execution by an event external to that program. The suspension of program execution is performed in a manner which makes it possible to resume execution of the original program. The source of the interrupt can be hardware or software.

*See* IRQ.

## IRQ

Abbreviation for Interrupt Request Line. These are the signal lines over which hardware devices request interrupt service. A total of 16 IRQ lines are available in the PC. Some of these lines are used by the circuitry on the system board while others are made available to the bus slots for use by expansion cards.

An interrupt controller (part of the AT Chip Set) assigns priority levels to interrupt lines so that the CPU can determine the relative importance of incoming requests. Interrupts can be masked (disabled) by software instructions.

IRQ lines in the AT Bus Architecture are said to be edge-triggered. This means they are recognized by the interrupt controller when they change logic levels.

The PCWS handles IRQ line assignments in a more flexible manner than the ordinary Personal Computer. *See* Integrated Peripherals setup screen in Chapter 2.

*See* NMI

## Interrupt Handler

A set of program instructions that performs a specific function when called by an interrupt. For example, INT 10H provides access to the Video BIOS routines which in turn provides many services for controlling the video screen.

## Interrupt Vector

An address or offset address that holds a pointer to a memory location where an interrupt handler is stored. Interrupt Vectors are stored in a table with other interrupt routines. When an interrupt occurs, the interrupt controller places part of the interrupt vector on the data bus and the CPU supplies the remainder of the address.

### ISA

Abbreviation for Industry Standard Architecture. ISA refers to the hardware components and the bus and signal timing that has evolved around the original IBM PC-AT. Other bus architectures have emerged such as PCI.

### Jumper

A small plug or wire that connects different points in an electrical circuit to alter some aspect of hardware operation. Jumpers are used to configure system hardware.

### Kbytes

Abbreviation for 1024 bytes.

### Keyboard Controller

A microcontroller in the keyboard that scans for keystrokes, processes them, and sends to the PC via a serial interface. A second microcontroller on the System Board receives the serial data, converts it to parallel data, and makes the keystrokes available to the application program by placing them in the keyboard buffer. The keyboard BIOS handles these functions.

### Landing Zone

An unused track on a disk surface where the read/write heads will auto-park when power is turned off. The landing zone is generally equal to the total number of cylinders on the disk.

## LCD

Abbreviation for Liquid Crystal Display. This type of display consists of a sandwich constructed from two plastic sheets with a special liquid made from rod-shaped or *nematic* molecules. By applying an electrical current the molecules can be aligned in grooves in the plastic to bend the polarity of the light that passes through them. A polarized filter laminated over the electrodes blocks the polarized light, transmitting only the non-polarized light. In this manner, a grid of electrodes can selectively turn on a pixel that contains the liquid crystal, making it turn dark.

LCDs are available in two forms, *active* and *passive*. Passive LCD panels have a grid of horizontal and vertical conductors, with a pixel located at the intersection of these conductors. The pixel is darkened by sending current through the conductors to the liquid crystal. This is called a passive matrix LCD.

The alternate design, an active matrix, puts a transistor at every pixel. When a small current is sent through it, the transistor switches on, providing a much higher current to activate the LCD pixel. Active matrix LCDs are more expensive than passive displays but are many times brighter and can be viewed from greater angles.

## LED

Abbreviation for Light Emitting Diode. A semiconductor that converts electrical energy to light. LEDs are available in many colors including IR, and are typically used as power or status indicators.

The Ultra System Board includes several LEDs, called Diagnostic LEDs, which provide instant feedback on the condition of key circuits. See Chapter 4 for more information.

## Legacy ISA Card

A term for ISA cards that require the installer to determine the resource requirements of the card and to manually configure the board through jumpers or configuration software.

## Main Memory

Another term for conventional memory or system memory. Resides between 0 and 1 mbyte.

## Megabyte

Abbreviation for 1,048,576 bytes.

## Memory

A generic term for a device that stores information in a form the CPU can recognize and manipulate. Memory appears in several forms, each of which has a specific role in the operation of the Personal Computer.

A distinction must be made between primary and secondary storage systems in microprocessor based systems. Memory devices such as EPROMs, DRAMs, and SRAMs are called primary storage because they store information that is immediately accessible to the processor through its address and data busses.

Secondary storage (sometimes called mass storage) operates as the PCs long term memory. It holds the operating system, software applications, or in other words, the bulk of the information the computer deals with. Secondary storage consists of disk and tape drives which typically hold many times the capacity of primary storage.

To be useful however, this data must be moved into primary storage where it can be accessed and manipulated by the CPU. This is one of the roles of the operating system in conjunction with the system BIOS.

*See* RAM, DRAM, EPROM.

## Mouse

A type of pointing device that sits on a flat surface and duplicates its movements on the screen. It essentially replaces the keyboard arrow keys.

## Operating System

System software that acts as a master control program to manage the execution of application programs. The kernel, or core of the operating system remains in memory to receive user input as well as to provide an interface to the hardware through the system BIOS. Operating systems perform other tasks such as establishing the structure of the disk file system, moving executable files from disk to memory, communications, and system security.

Examples of operating systems are UNIX, MS-DOS, and Microsoft Windows® 95.

## Parallel Port

*See* Centronics Parallel Port.

## Parity

An error checking mechanism in which the number of 1s (or 0s) must always be the same for each group of bits checked. The parity bit is added to a unit of data that makes the sum total of the unit either odd or even.

## Partition

A method of dividing a hard disk into one or more sections so that the operating system sees each division as a separate disk to allow multiple operating systems to occupy the same physical disk drive.

## Passive Matrix LCD

An LCD driven by transistors that are outside of the display screen.

*See* active matrix LCD.

## PCI Bus

Abbreviation for Peripheral Component Interconnect Bus. PCI is a recent bus architecture designed to overcome the performance shortcomings of the classic AT bus. The PCI bus does this by providing a more direct data path between the processor and peripheral devices.

The features of the PCI bus architecture also extend to software. All PCI devices incorporate a set of registers that contain device specific information. This information allows the system BIOS to automatically configure resources for the PCI chip or add-in card. Automatic device configuration eliminates the need for hardware jumpers and software configuration utilities, and reduces the possibility of device resource conflicts.

*See* PCI/ISA Riser Card.

## PCI/ISA Riser Card

The Ultra System Board can support 1 PCI add-on card. However, to install a PCI card, you must use the optional Ultra PCI/ISA Riser Card. This card plugs into a dedicated connector on the system board to allow a single half-size PCI or ISA card to be installed with the LP or AD case.

## Peripheral Device

Any device external to the microprocessor used for Input Output operations. Examples are disk drives, modems, parallel port, or plotter.

## POST

Abbreviation for Power On Self Test. *See* also BIOS.

## Plug and Play

Plug and Play (PnP) is an attempt to overcome the limitations inherent in the open and extensible architecture of the IBM Personal Computer and it's descendents. In a Plug and Play computer, the system BIOS, the operating system, and expansion board supplier combine to provide an automated method of determining the resource requirements of all devices in the system and providing them without user intervention.

## Pipelining

Pipelining is a technique employed by Pentium® processors to improve instruction throughput. In a 486 processor, an instruction is executed in sequential steps such as fetch, decode, execute, and save. During steps such as decode and execute, which occur within the processor, the system busses are under-utilized.

To improve bus utilization, pipelining allows one instruction to be fetched at the same time another is being decoded, yet another being executed, and the results of yet another instruction being saved, all during the same clock cycle.

The pipelined architecture is combined with the burst cycle capability of the processor to attain performance several times greater than a 486 class processor which does not utilize instruction pipelining.

*See* Burst Cycles and Cache.

## Polyswitch

Like a traditional fuse, a Polyswitch resettable fuses limit the amount of current flowing through a circuit to prevent damage should a fault condition occur. Unlike traditional fuses however, when the fault is removed, the Polyswitch device automatically resets and does not have to be removed from the circuit.

The Ultra system board uses Polyswitches on the PC keyboard, PS/2 mouse, remote customer display, and USB ports.

## Protected Mode

The native, 32-bit operating mode of the 386, 486, and Pentium® processors. These processors power-up in the Real Mode to be compatible with 8088/8086 based systems, but operating systems like Windows® 95 switch the processor into protected mode, where depending on the processor in question, up to 4 GB of memory can be available.

*See* Real Mode.

## RAM

Abbreviation for Random Access Memory. This type of memory can be accesses randomly; that is, any byte of memory can be accessed without affecting other bytes. RAM is the most common form of memory found within computers and other devices such as printers. The term is commonly used as a synonym for main memory, or the memory available to programs.

*See* ROM, SRAM, and DRAM.

## Real Mode

The addressing mode used by the 8088/8086 microprocessors in the original IBM PC. In Real Mode, only 20 address lines are used, limiting access to conventional memory (0 to 1024 kbytes, or 00000H - FFFFFH). Real mode addresses have a segment:offset format.

This is the operating mode of application programs running in conventional memory under MS or PC-DOS.

*See* Protected Mode.

## Real Time Clock

Abbreviation for Real Time Clock (RTC). Part of the original PC-AT standard, the RTC is connected to a battery and separate crystal oscillator to maintain time-keeping when the computer is turned off. In some computers, the RTC is a discreet chip, in others, it is incorporated into the chipset.

## ROM

Abbreviation for Read Only Memory. ROM refers to a special type of memory used to store programs that boot the computer and perform diagnostics. Most personal computers have a small amount ROM, usually the system BIOS. Like RAM, ROM allows random access, but does not allow the content to be changed.

## ROM Shadowing

A method of copying the contents of a BIOS EPROM (stored in relatively slow 8 bit devices) to RAM (much faster 32-bit devices) to speed up access by a factor of up to four.

When a ROM is shadowed, a copy resides in RAM, reducing the amount of total RAM available. In an ISA computer, shadowing usually takes place in available memory between 640K and 1M. Shadowing is enabled or disabled through the system BIOS.

## RS232

The RS232 specification defines signal lines and voltage levels to define the transmission of serial data between computing devices. There are two RS232 interfaces: DTE (Data Terminal Equipment), used by computers, and DCE (Data Communications Equipment), used by modems, printers, plotters, etc.

## SDRAM

Abbreviation for Synchronous Dynamic RAM. SDRAM is a dynamic RAM that can be synchronized with the system clock. SDRAM memory interleaves two or more internal memory arrays so that while one array is being accessed, the next one is being prepared for access, making it faster than EDO RAM. Random access times are the same as those for EDO RAM, but an SDRAM's burst mode obtains the second and subsequent, contiguous locations at the rate of 10ns, some five to six times faster than the first location, so that it can handle bus speeds of up to 100MHz. SDRAM technology allows two pages of memory to be opened simultaneously.

*See* RAM, EDO RAM, and SRAM.

## Socket 7

The form factor for fifth-generation processor chips from Intel, Cyrix, and AMD. All current x86 processors, except Intel's Pentium Pro (Socket 8), and Pentium II (Slot 1), conform to the Socket 7 specifications.

## Spread Spectrum Clock

The Ultra uses a spread spectrum clock generator as a timing reference. The clock signals are modulated, spreading out the energy of its fundamental frequency to minimize energy peaks at any specific fundamental or harmonic frequency. Modulating the clock in this way ensures compliance with EMI standards, while reducing the number of EMI suppression components that increase costs and may compromise performance.

## SRAM

Abbreviation for Static Random Access Memory. A type of semiconductor memory, capable of great speed, that uses flip-flops to store each bit of information. SRAM retains data as long as power is applied. SRAMs typically are more expensive and store less information than does a DRAM, but can be accessed much faster and does not require refreshing.

Two different types of SRAM are typically used in the PC Workstation.

- An SRAM constructed from CMOS has slow access times, but requires very little power, allowing a battery to maintain it's contents when the computer is turned off. This type of SRAM is part of the system real time clock and stores all the settings entered through the CMOS Setup Utility. Also known as the CMOS RAM.
- Another type of very fast SRAM is used to implement the external pipeline burst cache on the Ultra System Board. This type of SRAM is more expensive, consumes more power than a CMOS SRAM, but can operate at the speeds required to implement an external cache.

*See* RAM, EDO RAM, and SDRAM.

## UHCI

Abbreviation for Universal Host Controller Interface. UHCI is Intel's proprietary interface standard for interactions between a USB controller, the processor, and the operating system. UHCI uses the processor to control the USB bus. UHCI's simple design reduces the hardware complexity required to implement the USB interface on the host computer, and ensures full compatibility will all USB devices.

## UPS

Abbreviation for Uninterruptable Power Supply.

## USB

Abbreviation for Universal Serial Bus. A PC cable bus endorsed by Intel and Microsoft. It supports simultaneous data access between a host computer and a wide range of peripherals. The USB carries data using a host-scheduled token based protocol that provides a total bandwidth of 1.5MB/s or 12 MB/s over a daisy chain of up to 128 peripheral devices.

## VGA

Abbreviation for Video Graphics Array. A video standard that incorporates all previous video modes while at the same time adding more video modes with higher screen resolutions and a greater number of colors.

The Ultra system board uses a CNT 65554 Flat Panel Video controller which is 100% VGA compatible at the register, gate, and BIOS levels and is capable of driving a wide variety of passive and active LCD panels.

## XMS

The Extended Memory Specification (XMS) was developed by AST Research, Intel Corporation, Lotus Development, and Microsoft Corporation to take advantage of the extended memory capabilities of 286 or better processors. XMS is normally added to your system by loading an Extended Memory Manager through the CONFIG.SYS file. The most popular extended memory manager is HIMEM.SYS, supplied with the more recent versions of MS-DOS and Microsoft Windows®.

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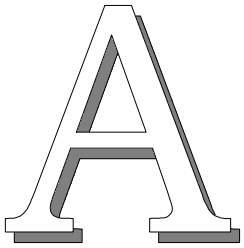


# *Equipment Dimensions*

## *In this appendix*

# *Overview*

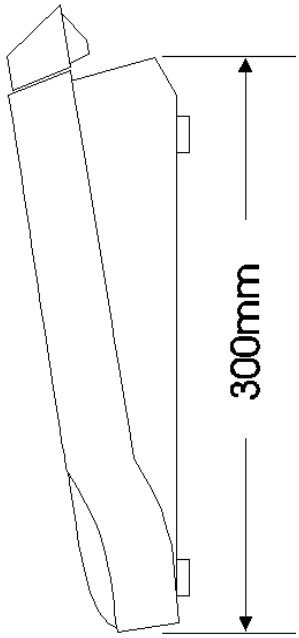
In this appendix you will find dimensional drawings for each PC Workstation and peripherals. Each diagram is preceded by a description and may include a part number and/or notes.

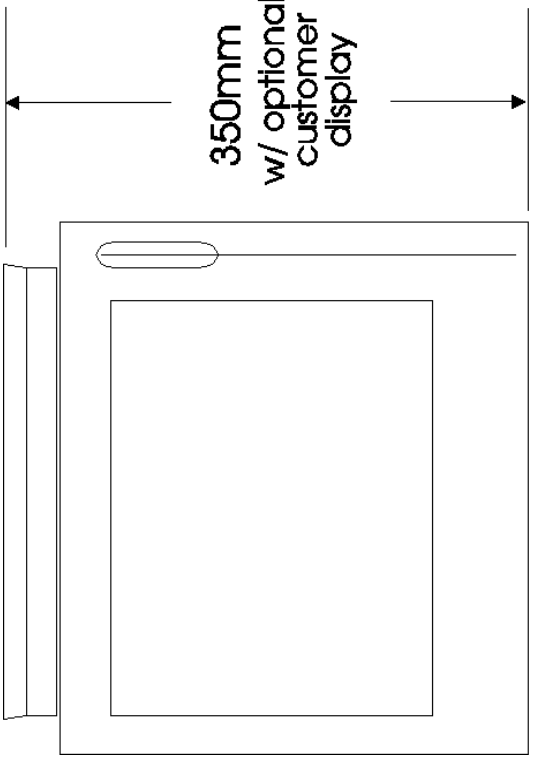
These dimensions are provided to help you plan your equipment areas. While planning these areas you should take into consideration equipment space requirements. This will ensure that all equipment will have adequate room for cable running, necessary outlet availability, and user access space.

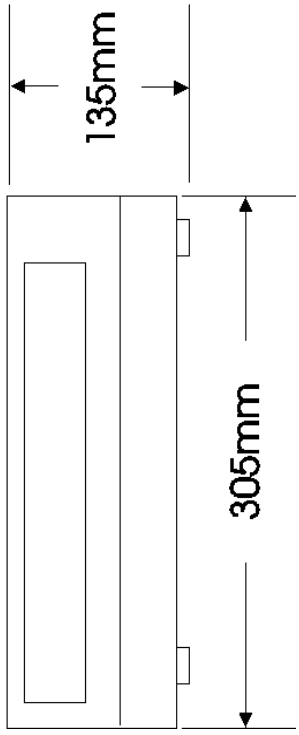
# *PC Workstation - Low Profile*

NOTES:

1. Cables exit from bottom of unit.
2. Leave room at front of unit for card swipe.
3. Orient unit to avoid glare from overhead lights on Touchscreen.
4. 77mm hole required under unit if Cash Drawer mounte under counter.
5. Cash Drawers located at customer's discretion.



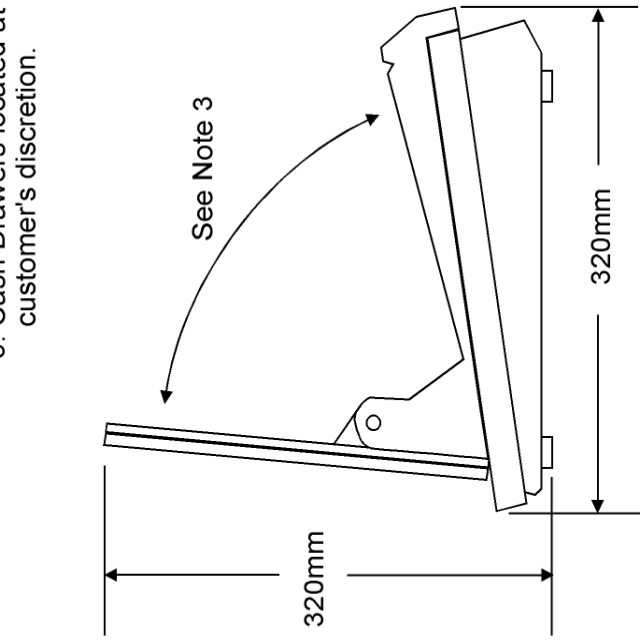



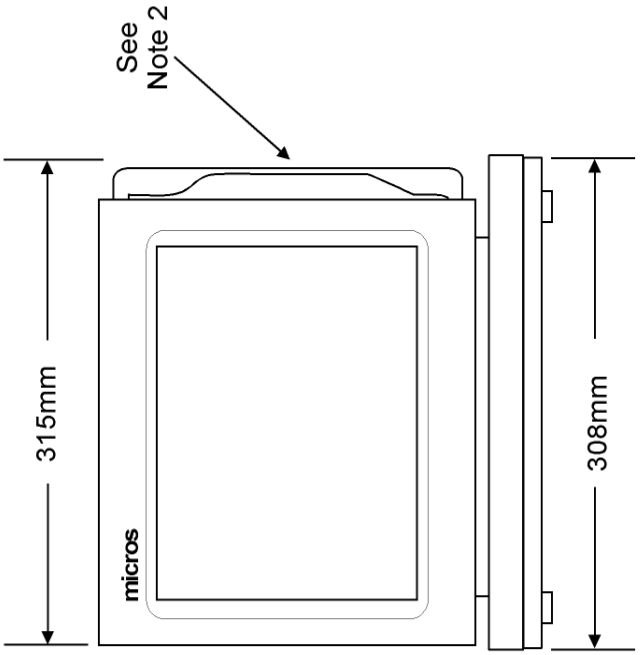



# *PC Workstation - Adjustable Display*

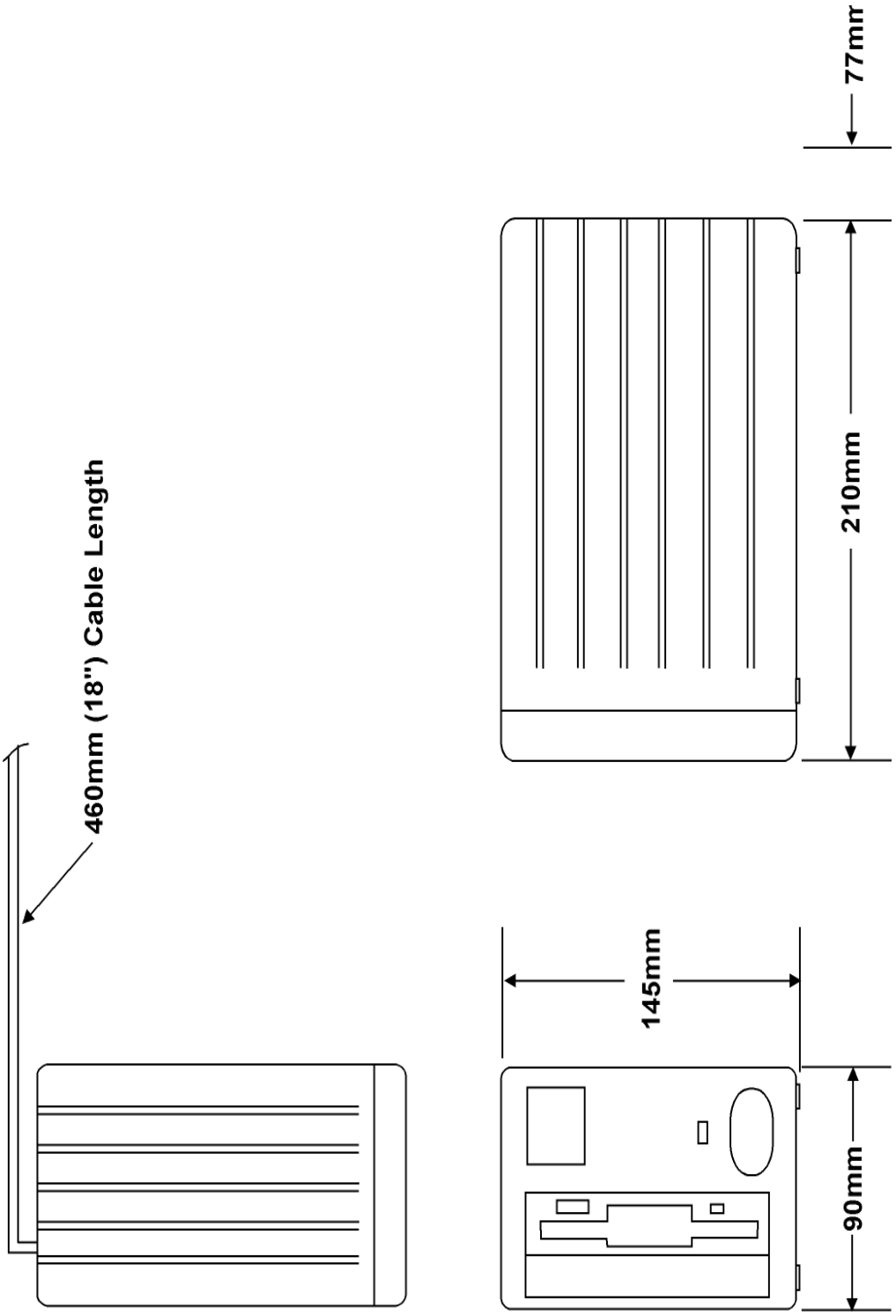
NOTES:

1. Cables exit from bottom of unit.
2. Leave room at right of unit for card swipe.
3. Orient display to avoid glare from overhead lights on the Touchscreen
4. 77mm hole required under unit if Cash Drawer mounted under counter.
5. Cash Drawers located at customer's discretion.

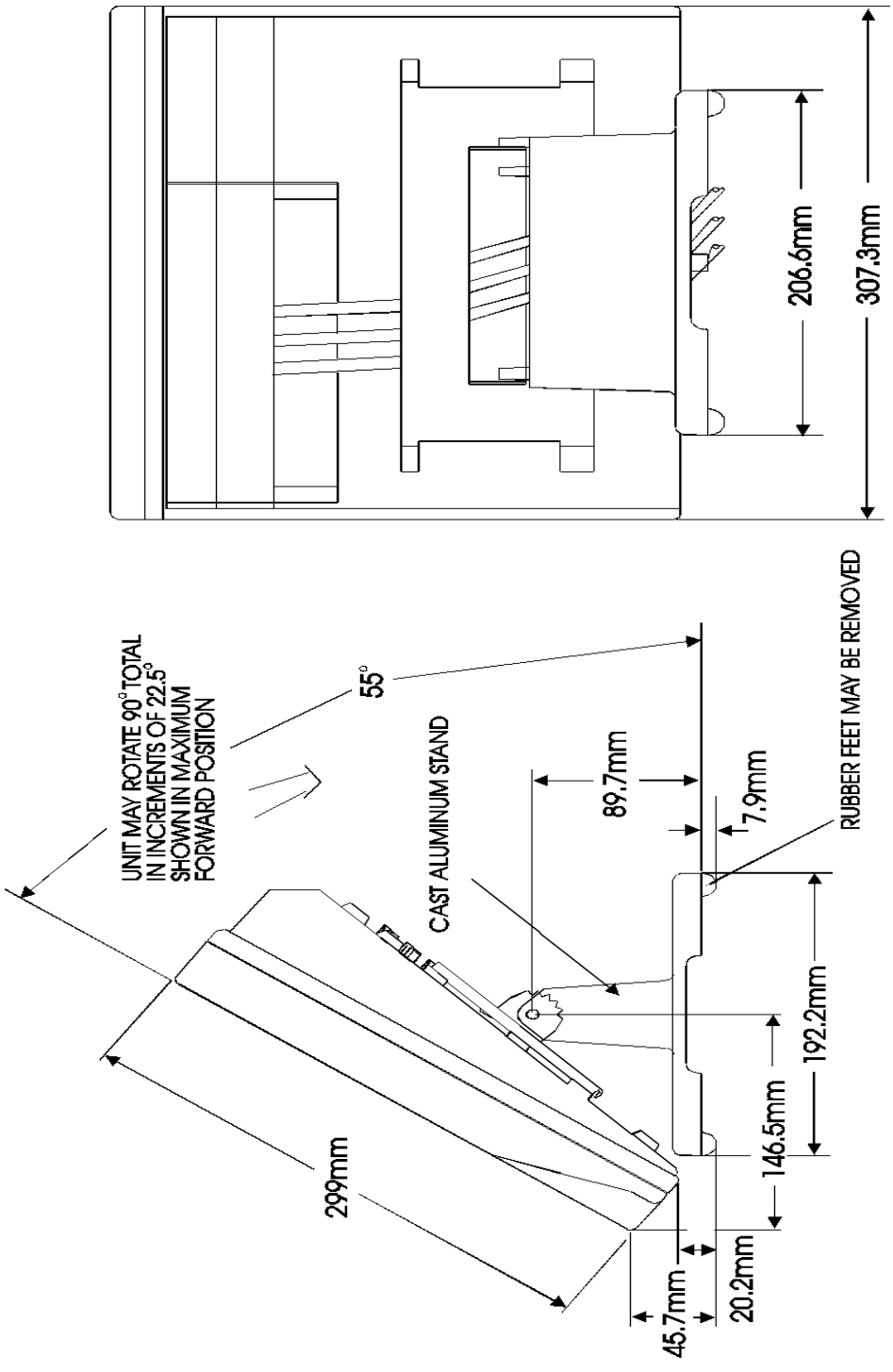


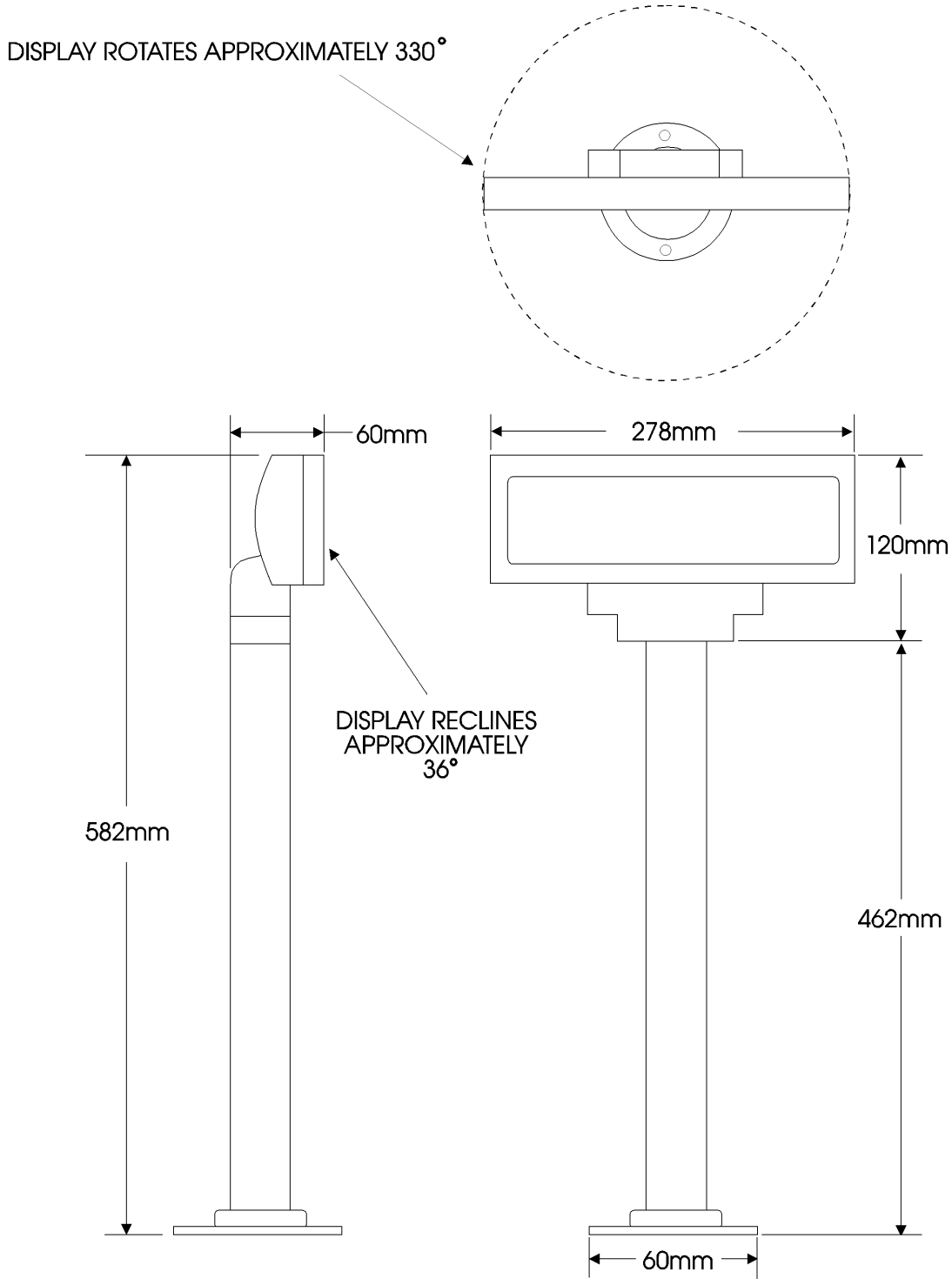
# *PC Workstation Floppy Diskette Unit*



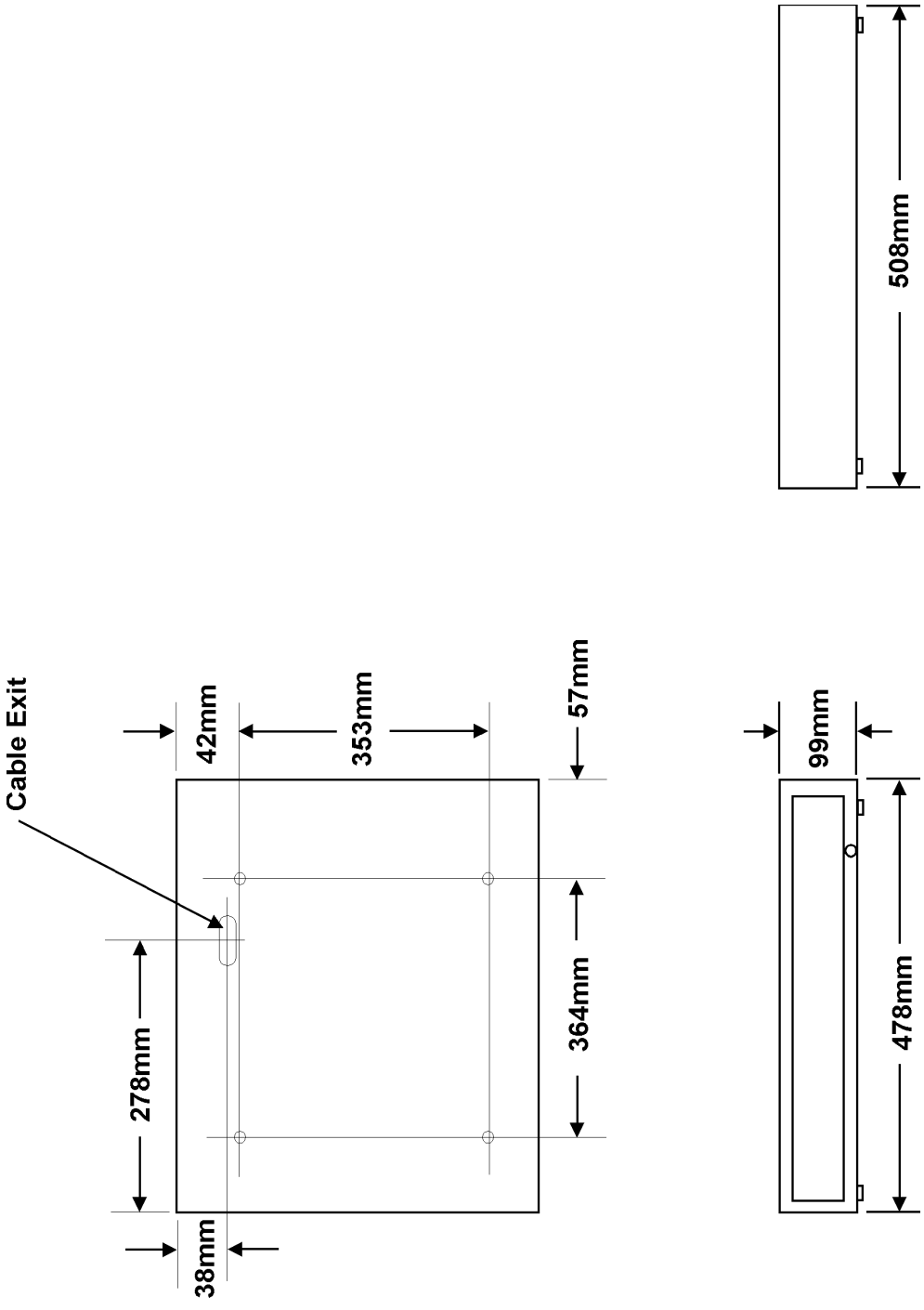
# *PCWS LP Adjustable Stand*



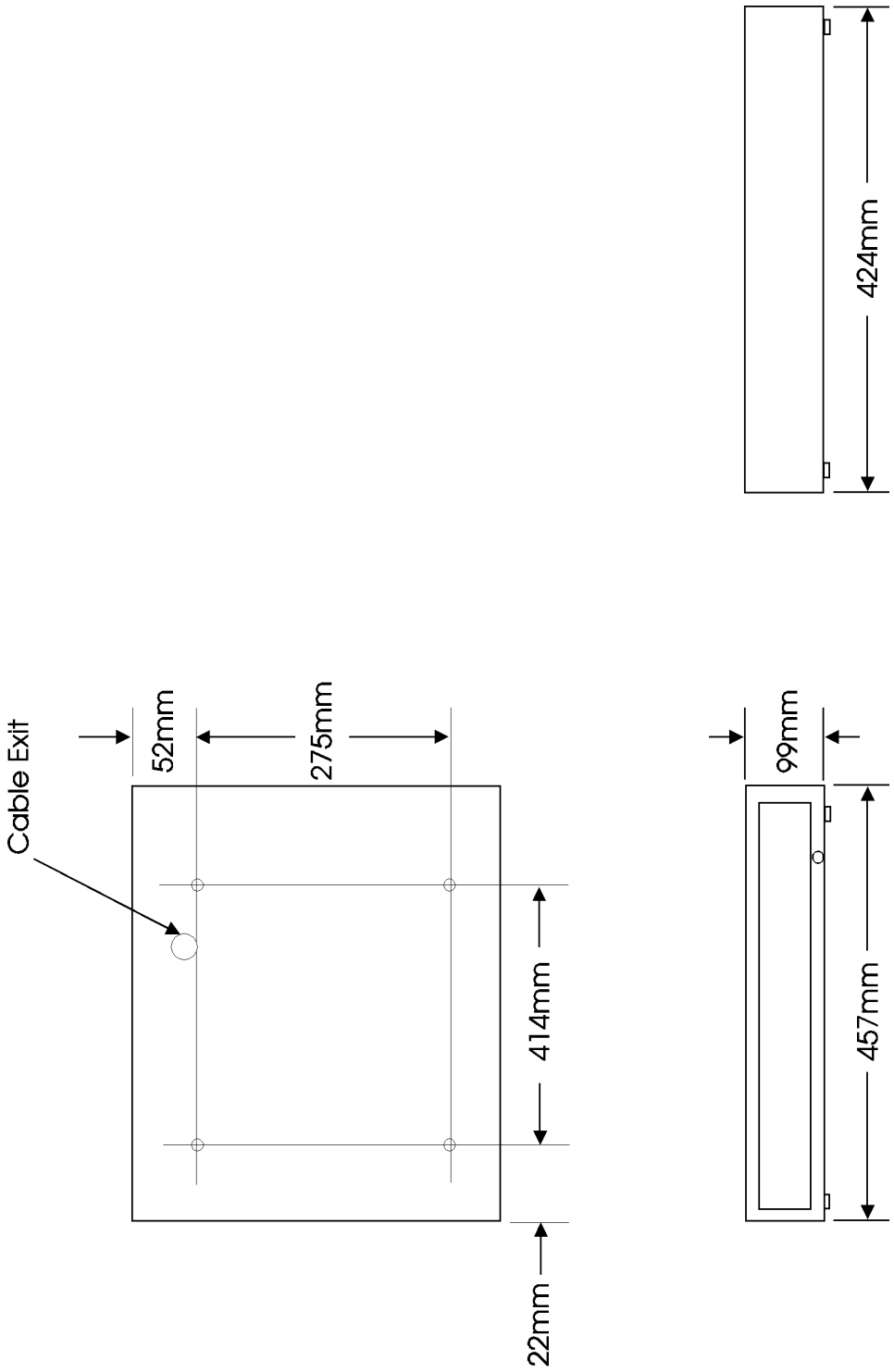
# *PCWS Remote Pole Display*



# *Cash Drawer*


508mm
Cable Exit
42mm
353mm
57mm
278mm
364mm
38mm
99mm
478mm

# *Cash Drawer, Low Profile*



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Appendix B

# *Connector and Cable Diagrams*

This appendix provides pin-outs of the Ultra rear panel connectors.

## *In this appendix*

# *Overview*

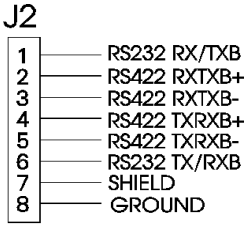
On the pages that follow, you will find diagrams of the Ultra workstation rear panel connectors. A description of each connector/cable and schematic diagram are provided.

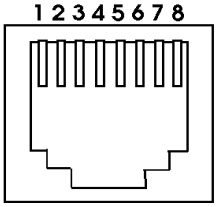
# *PCWS Ultra Connectors*

The following connectors are located on the Ultra rear panel.

## LCC Port

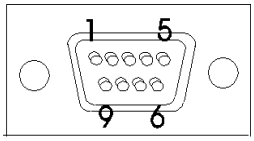
The LCC port connector is available on all current PC workstations including the Model 32L, 32R, 64, and Ultra.




## RS232 Interface

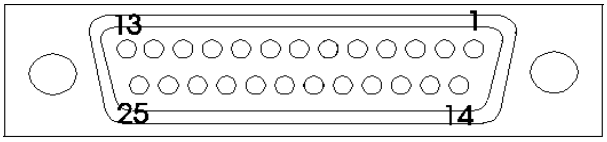
The DB9F RS232 connector, standard on all PC Workstations, is shown in the diagram below.




1 - DCD
2 - RXD
3 - TXD
4 - DTR
5 - NC
6 - DSR
7 - RTS
8 - CTS
9 - RI

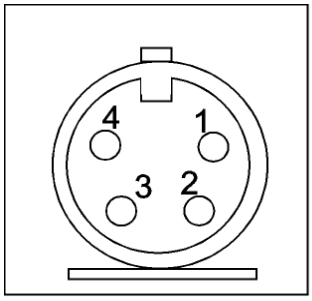
## Parallel Port Connector

Parallel ports (often referred to as a Centronics port) can be used to connect printers, tape drives, and CD-ROM drives to all PC Workstations. The port consists of a standard DB25 female connector, with the pin-outs (centronics mode) listed below.



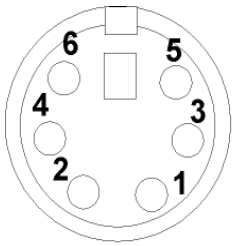

1 - $\overline{\text{PRNSTB}}$
2 - PRND0
3 - PRND1
4 - PRND2
5 - PRND3
6 - PRND4
7 - PRND5
8 - PRND6
9 - PRND7
10 - $\overline{\text{PRNACK}}$
11 - $\overline{\text{PRNBSY}}$
12 - PRNPE
13 - $\overline{\text{PRNSLTO}}$
14 - $\overline{\text{PRNAFD}}$
15 - $\overline{\text{PRNERR}}$
16 - $\overline{\text{PRNINIT}}$
17 - $\overline{\text{PRNSEL}}$
18 TO 25 - GND

## Cash Drawer Connectors



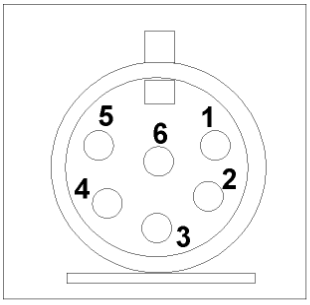

| | |
|---|---|
| 1 | +12V |
| 2 | OPEN DRW |
| 3 | GND |
| 4 | DRW CLOSED |

## PS/2 Keyboard Connector



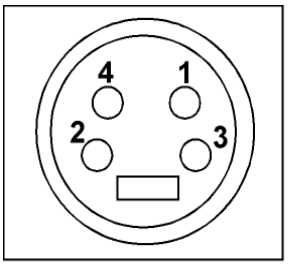

1 - KD
2 - NC
3 - GND
4 - +5V
5 - KC
6 - NC

## Power +24VDC Connector



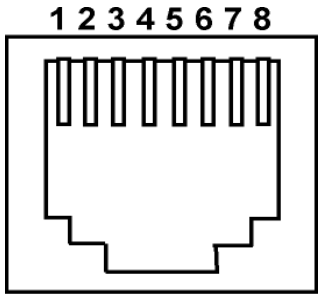

1 - +24V
2 - +24V
3 - BATLOW
4 - GND
5 - GND
6 - ACFAIL/$\overline{PD}$

## Remote Customer Display




1 — +5V
2 — CDATA (TTL)
3 — CDATA (RS232)
4 — GND

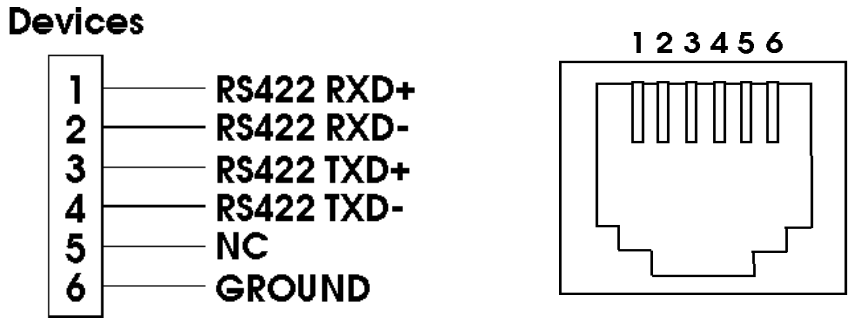
## Ethernet Connector




**1 - TXD+**
**2 - TXD-**
**3 - RXD+**
**4 - NC**
**5 - NC**
**6 - RXD-**
**7 - NC**
**8 - NC**

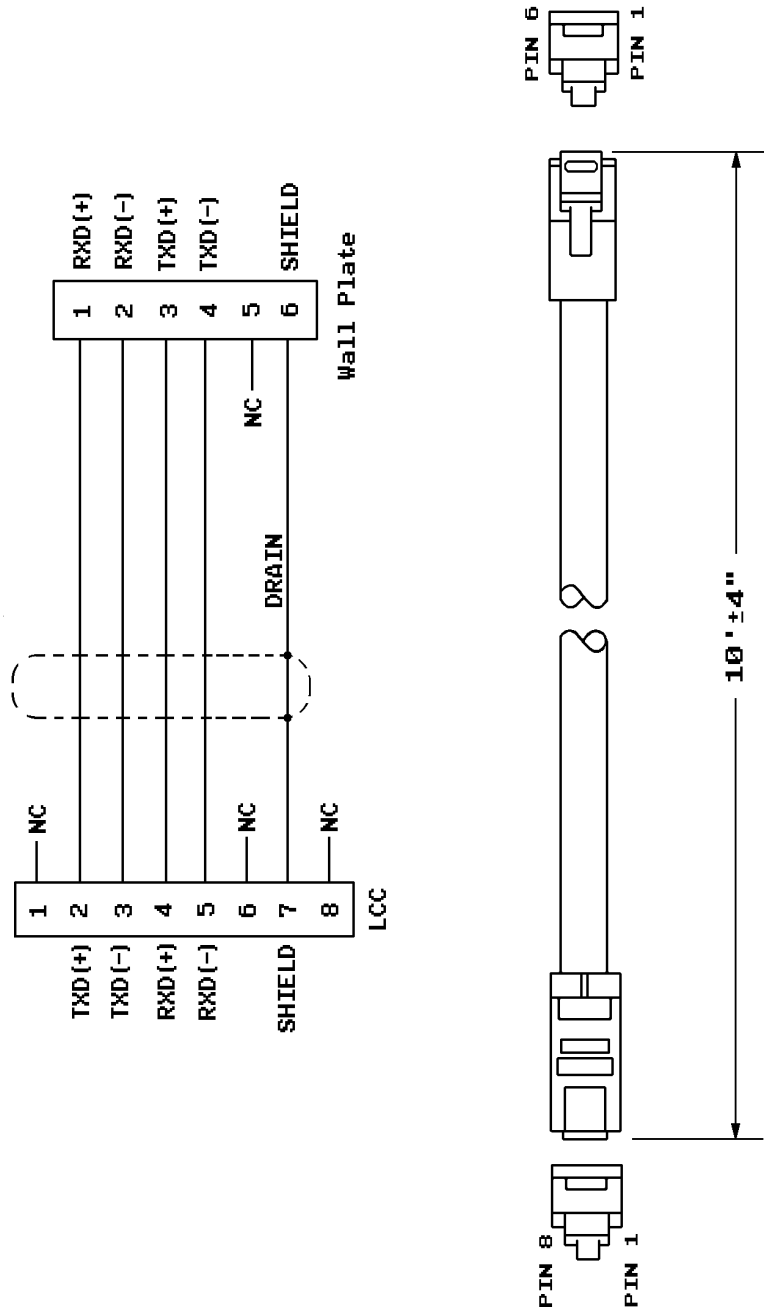
# *IDN Device Port*

The illustration below shows a diagram of the 6-pin modular connector found on all MICROS IDN devices

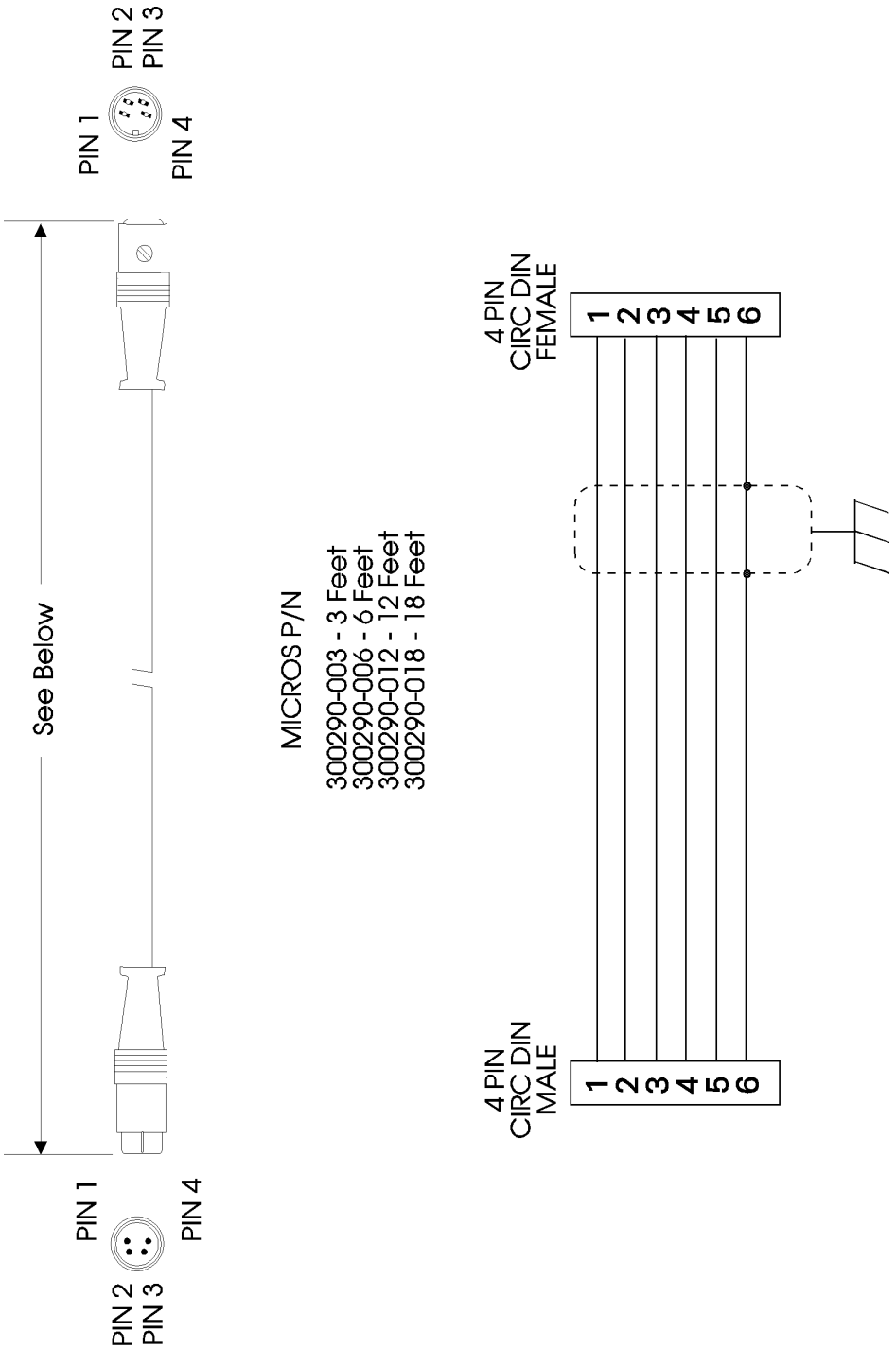


# *8-Pin to 6-Pin Hook-up RS422 Cable (300319-001)*

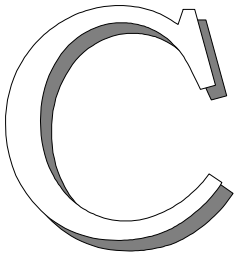
This cable is typically used to connect the 8-pin LCC port of a PCWS to a 6-pin modular wall plate connector to drive IDN Printers.



# *Cash Drawer Extension Cable*



Appendix



# *FCC/DOC Statement*

## Federal Communications Commission Radio Frequency Interference Statement

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in equipment, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

If this equipment appears to cause interference the user could consult the installer/dealer or an experienced radio television technician.

A booklet prepared by the Federal Communications Commission entitled "How to Identify and Resolve Radio - TV Interference Problems" may be useful. This booklet may be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. with stock number #004-000-00345-4.

***Caution***

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Shielded interface cables must be used in order to comply with the emission limits.

## Canadian Department of Communications Statement

This digital apparatus does not exceed the Class A/Class B (whichever applies) 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'êmet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe A/de Classe B (selon le cas) prescrites dans Le Règlement sur le Brouillage Radioélectrique Idicté par le Ministère des Communications du Canada.

***Attenition:***

Tous changement ou modification, non expressément agrées par la partie responsable pour la conformité de l'installation, pourraient annuler l'authorisation de l'exploitation par l'utilisateur du materiel installé. Il est obligatoire d'utiliser pour la communication ou la réalisation d'intorfaces un cable blindé, afin d'être en conformité avec les limites légales d'émission.