micros® Systems, Inc.

Workstation 4 Setup Guide

Declarations

Warranties

Although the best efforts are made to ensure that the information contained in this manual is complete and correct, MICROS Systems, Inc. makes no warranty of any kind with regard to this material, including but not limited to the implied warranties of marketability and fitness for a particular purpose. Information in this manual is subject to change without notice. MICROS Systems, Inc. shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Trademarks

MICROS is a registered trademark of MICROS Systems, Inc.

National Semiconductor and a registered trademark, and Geode is a trademark of National Semiconductor Corporation.

Microsoft, Windows, and Windows CE, are trademarks of Microsoft Corporation in the United States of America and in other countries.

Adobe, Photoshop, and FrameMaker are either registered trademarks or trademarks of Adobe Systems, Incorporated in the United States of America and/or other countries.

All other trademarks found herein are the property of their respective owners.

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.

1st Edition: March 2003
2nd Edition: April 2003
3rd Edition: July 2003

4th Edition: October 2004

Table of Contents

Appendix C: FCC/DOC Statement

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, installing and operating the MICROS Workstation 4 (WS4) and as such is not specific to a particular software application.

How This Manual is Organized

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

Chapter 1 describes the workstation and each of its hardware and software components. The chapter also provides specifications, care and handling instructions, and information on how to connect peripherals to the I/O Connector Panel.

Chapter 2 covers the WS4 system unit hardware configuration. Topics include how to remove the cover, identify and upgrade the major components.

Chapter 3 covers the WS4 installation from arranging cables at the connector panel to using the Client Application Loader to connect to the system POS server and obtain the application software.

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

A Reference section consisting of Glossary, Equipment Dimensions, FCC/DOC Statement, and Connector/Cable 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

Desktop Publishing by Adobe FrameMaker 6.0

Digital imaging by Nikon

Image processing by Paint Shop Pro, Adobe Photoshop, and CorelDraw.

What is The Workstation 4?

This chapter describes the Workstation 4 and accessories and discusses the various software components.

In this chapter

The System

The following section describes the hardware and software features of the Workstation 4.

The MICROS Workstation 4 is a diskless Windows CE client, based on a highly integrated AMD Geode SC3200 processor. It is enclosed in a low profile case design with a self-contained power supply. A number of installation, mounting, and customer display options are available, detailed in the following pages.

Figure 1-1 shows the Workstation 4 and points out the main controls.
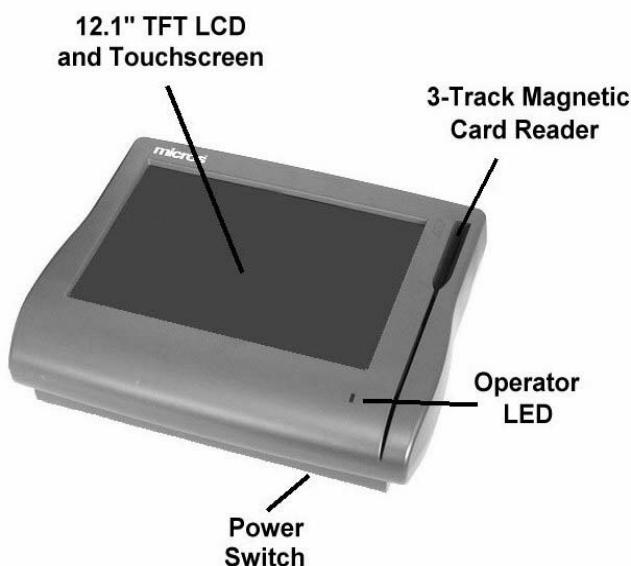
Figure 1-1: The Workstation 4

Standard features include a 12-inch Active Matrix LCD, 5-wire resistive touchscreen, and integrated 3-Track Mag Stripe Reader.

Operator LCD and Touchscreen

The Operator Liquid Crystal Display is 12.1" in size, and runs at a resolution of 800x600 and is capable of supporting up to 64K colors. The touchscreen glass is a Microtouch/3M 5-wire resistive touchscreen.

Magnetic Card Reader

The 3-track magnetic card reader can be serviced in just a few minutes. The reader is attached to the workstation 4 system board with a modular connector.

Operator Power Switch

The power switch is recessed and located at the lower right corner of the unit. It is used to power the workstation on or off, and to enter/exit the suspend state.

Compact Flash (CF) Personality Card

Figure 1-2 shows an underside view of the workstation featuring the I/O Connectors, Compact Flash and PCMCIA access slots. More information about the I/O Panel Connectors can be found in Chapter 3.

Required on the WS4, the CF card is secured behind a removable bracket at the IO connector panel. The CF card contains the POS application, system registry, and optionally, Stand Alone Resilient (SAR) totals. In other words, it contains the 'personality' of the workstation. Should the workstation fail, the CF card can be removed and installed in the replacement workstation.

Optional PCMCIA PC Card Bus Slot

The WS4 includes an optional PCMCIA Card Bus Slot. Windows CE device driver support for the PCMCIA slot is limited, so all PC Cards are not supported. An 802.11b wireless version of the WS4 is available.

Reset Switch

The Reset Switch can be activated by inserting a paper clip into the access hole.
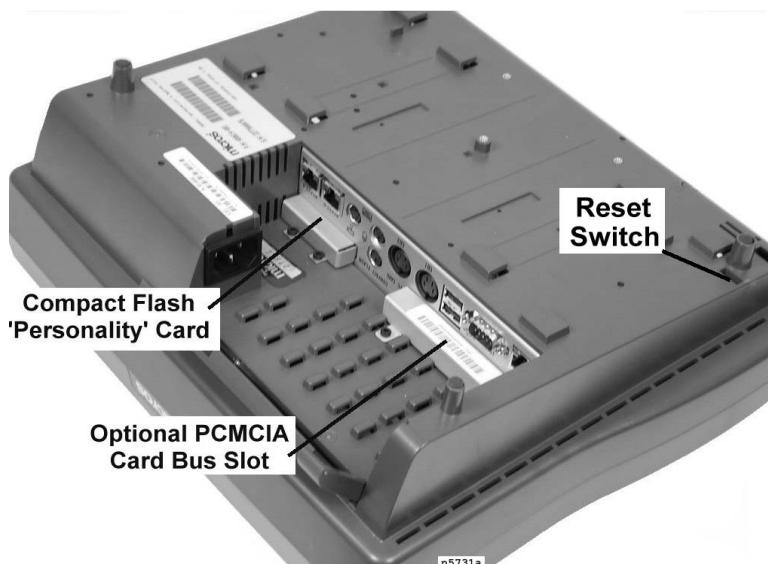
Figure 1-2: The Workstation 4 CF and PCMCIA Slots

Workstation Mounting Options

A number of mounting options are available for the Workstation 4, as shown in the following pages.

The Adjustable Stand

The Adjustable Stand, shown in Figure 1-3, converts the low profile WS4 into an adjustable display design. The stand has a weighted base for stable operation, and self-locking hinges that allow the workstation to be tilted in a range of between 25 and 70 degrees. The base includes holes for mounting the VFD Pole Display Bracket shown in Figure 1-3.

In addition, the Workstation 4 base is compatible with the existing User Workstation/3 adjustable stand.

Figure 1-3: The Adjustable Stand

Cable management is accomplished by bundling cables with tie wraps, then routing the bundle through a channel in the stand where they can exit from the side, rear, or bottom as shown in Figure 1-4, below.

Figure 1-4: Adjustable Stand Cable Management

Wall Mount Bracket

In addition to the Adjustable Display stand, a flexible wall mount bracket is available as shown below in Figure 1-5

Figure 1-5: The Wall Mounting Bracket

The wall mount bracket can be used to place the WS4 on a wall, or to suspend the unit under a counter or custom cabinets.

Pole Stand

Yet another option for mounting the WS4 is the Pole Mount Stand. On the left of Figure 1-6, the components of the Pole Stand are show, and on the right of the illustration shows the KWS4 mounted on the pole stand.

Figure 1-6: The Pole Mount Stand

As shown on the left of the illustration, the Pole Mount Stand consists of several components. The base includes an oversize mounting plate for counter surfaces, and includes a cable opening at the base. The adjustable section allows the height of the workstation to be positioned between approximately 12 and 16 inches from the counter surface. The mounting plate is non-adjustable and fixed at an angle of 115°.

The workstation is placed in the VESA Compatible Mounting Adapter, which in turn is fastened to VESA compatible hole centers in the Pole Stand Mounting Plate.

The VESA Compatible Mounting Adapter is also available as a separate item for use as a workstation security mounting bracket suitable for secure mounting of the Low Profile workstation to a counter surface. See the WS4 Product Marketing Announcement (PMA) for more information on pricing and part numbers.

Adjustable Mounting Arm

The Adjustable Mounting Arm is yet another option for installing the WS4, shown in the illustration below.

Figure 1-7: The Adjustable Mounting Arm

It can be used to mount the WS4 to a counter surface, wall, or under a shelf. The VESA compatible mounting bracket attaches to the adjustable mounting arm plate and the WS4 is attached to the adapter. See the WS4 Product Marketing Announcement (PMA) for information on pricing and part numbers.

Customer Display Options

A variety of integrated and pole mount Customer Display options are available for the Workstation 4, described in the following pages. Part Numbers can be found in the WS4 PMA.

VFD Customer Display

This customer display is composed a 2 Line, 20 Character Vacuum Fluorescent Display (VFD). Two pole mount versions are available. It is mounted to a pole approximately 6" in length that in turn is secured to the WS4 Adjustable Stand with a customer made bracket. This version is shown in Figure 1-8.

Figure 1-8: VFD Pole Display Mounted to the Adjustable Stand

A full size version of the VFD Pole Customer Display is shown in Figure 1-9. This version mounts to a counter surface and includes a 4 foot cable.

Figure 1-9: VFD Pole Customer Display

Optional LCD Customer Display

A pair of new LCD based Customer Display options are scheduled for release in mid-2004. Each is based on a 240x64 monochrome STN LCD and a companion LCD Control Board.

The Integrated version includes a hinge assembly that mounts between the top and bottom covers of the workstation, receiving power and data from the system board. The upper portion of Figure 1-10 shows the LCD display mounted to an WS4 LP (left) or to a WS4 placed on the Adjustable Stand (right).

The lower half of Figure 1-10 displays several views of the pole mount version of the LCD customer display. This version receives power and data from a 4-pin Mini-DIN connector on the workstation IO panel. Both the Integrated and Pole Displays can operate simultaneously and is capable of emulating the 2x20 VFD.

Figure 1-10: LCD Customer Display Options

Appendix A includes dimensional drawings for the LCD Customer Display.

Software Components

The WS4 is comprised of several software components, described below.

Boot Loader

The Boot Loader is stored in a 2MB Flash EEPROM and is specific to the SC3200 processor. It performs chip level register configuration of the system board devices, executes a Power On Self Test (POST) specific to the WS4 hardware, then copies the OS image into RAM and starts it.

The Boot Loader also includes custom extensions unique to the WS4 hardware. These functions permit access to platform specific hardware such as the Compact Flash Card, and handles such tasks as checking the CF card for an updated copy of the operating system at boot time, then copying it to the DOC if present.

Windows CE .NET

Windows CE .NET is a modular operating system sometimes found in hand-held and portable information appliance devices. Classified as an embedded operating system, Microsoft provides a tool called the Windows CE Platform Builder (CEPB), that allows MICROS to custom build an operating system using with only the modules and drivers required to support the WS4 hardware and application software. This results in an operating system where the memory footprint and CPU requirements are substantially less than a traditional desktop operating system.

POS Application

The Workstation 4 is a hardware platform, capable of supporting one of several MICROS POS Applications and possibly third party applications. Throughout this manual, the term 'POS Application' is used somewhat generically, and could in fact apply to any of the following software products.

- RES - 3700 Client
- 8700 - Workstation Client
- 9700 - WinStation Client
- e7 - Restaurant Management System

Refer to the appropriate application documentation for more information.

MICROS Serial Application Loader (SAL)

The SAL provides the Workstation 4 with the same serial interface software found in the MICROS User Workstation/3. This allows the Workstation 4 to download 8700 or 9700 client software via the 8700 or 9700 Confidence Test. See MD0006-025 for more information about using SAL with 9700; documentation for 8700 is currently pending.

MICROS Client Application Loader (CAL)

The CAL plays a key role in managing the installation and ongoing maintenance of the Workstation 4 POS application software. The CAL consists of two parts. One part resides on the WS4, (CAL Client) and the second part resides on the system server (CAL Server). The CAL Server is installed along with the POS Application. This document describes the CAL Client and its role in setting up a new workstation and maintaining the application software on a day-to-day basis.

New WS4 Installation

When a new WS4 is connected to the system LAN, and powered up for the first time, the CAL starts through a Windows CE Registry setting. The first time it starts, it checks the system registry and determines that the workstation is not yet configured. It broadcasts a Universal Datagram Protocol (UDP) discovery request and displays a User Interface (UI) that contains the name of any server that responds.

The UI displays the CAL server name, along with the Server Application Type (3700, 9700, or 3rd party - in most installations there will be only one CAL server). When the CAL server is selected, the installer is presented with a list of workstations, pre-programmed in the application's device database.

When the installer selects a workstation from the list, the WS4 name and TCP/IP network configuration (DHCP or Static IP Address) are entered in the workstation's registry. The CAL then transfers the application 'package' consisting of the application and support files. A CAL server configuration file called SETUP.DAT specifies the name of each file to be transferred as well as its destination. All application and support files are placed on the CF Card.

When the transfer is complete, the CAL forces a restart. After the restart, the CAL again checks the registry settings and this time determines that an application is installed. It starts the application and uses the TCP/IP network configuration to establish a LAN connection with the server.

Day-to-Day Operation

If the WS4 is powered off each night, or should AC power fail, the CAL client is responsible for re-starting application software when the WS4 is powered up.

As the WS4 operates on day-to-day basis, the CAL remains in the background, periodically checking the server for updated versions of the application, operating system or a newer version of the CAL itself.

POS Application Update

An update to the POS application becomes available. The updated application files are staged on the system server and the configuration file is modified. Each CAL Client periodically checks with the CAL Server to see if updates are available and recognizes the updated configuration file.

- If the CAL recognizes the update at boot time, it automatically downloads the updated application and or support files, copies it over the previous application and starts it.

- If the CAL recognizes the update while the workstation is operating, it gives the user the choice of updating the application now or deferring to a later time. If the operator chooses to complete the update now, the updated files are retrieved, and copied over the application on the CF card. Upon completion, the workstation is restarted.

Windows CE Operating System Update

During its routine check for updated applications on the system server, the CAL Client also checks for an update to the Operating System (OS). An updated OS becomes available and is staged on the system server.

- If an OS update is found, it is copied from the server to the CF card.

- The CAL invokes a cold boot of the WS4.

- The Boot Loader detects the OS image (a file called NK.BIN) on the CF, transfers it to the DOC, and starts it. While this transfer is underway, a black border appears around the MICROS logo and progress bar as shown in Figure 1-11. The CAL deletes the updated image from the CF card when it starts.

Figure 1-11: WinCE OS Update In Progress

Should a power failure occur during an OS image update, the boot
loader starts the process again when the workstation is restarted.

Workstation Personality Swap

An installed WS4 becomes inoperative. A replacement WS4 is installed,
and the hardware peripherals transferred. The CF Card is removed from the
defective workstation and installed in the replacement workstation.

- The CF card removed from the defective workstation contains the
  registry files, POS application and optionally, SAR data. The registry
  contains configuration data including the WS4 name, TCP/IP network
  settings, and the number and type of peripherals installed. This allows
  the replacement workstation to take on all of the characteristics of the
  defective workstation without the need to restore recovery images.

- When the CF card is installed in the replacement workstation and the
  unit powered-up, the CAL starts, checks the registry settings and
  determines that an application is already installed and takes no action.

Workstation 4 Diagnostics

Based on DEMODIAG, the hardware level diagnostics program for the PCWS
Eclipse, the Workstation 4 Diagnostics resides on the Disk On Chip in the
\Utilities folder. This program is documented in Chapter 4.

Memory Architecture

This section highlights the key features of the WS4 memory architecture and defines where each of the various software components are stored.

Boot Loader

The Boot Loader is contained on a system board Flash EPROM. The contents of the Boot Loader are shown in Figure 1-12.

Boot Loader Hardware Initalization and POST	OEM Adaptation Layer (Platform Specific Code)	

Figure 1-12: WS4 Boot Loader EPROM Contents

The Boot Loader is similar to the BIOS in a PC. It is specific to a given processor and chip set, in this case, the x86 compatible Advanced Micro Devices (AMD) SC3200. When the WS4 is powered-up, the CPU starts executing instructions in the boot loader and performs the following tasks.

- Hardware Initialization and Power On Self Test (POST). See Chapter 4 for more information about POST errors.

- The Boot Loader checks the CF card (CF\), looking for an OS image file (NK.BIN) placed there by the CAL as part of an upgrade. If the OS image file is not found, the Boot Loader copies the current OS image located on the DOC into system RAM and starts it.

- If the NK.BIN is found, it is copied over the existing OS image on the DOC, replacing it. The NK.BIN file is deleted by the CAL after the upgrade process is complete.

The OEM Adaptation Layer (OAL) is a collection of custom extensions added to the boot loader to support platform specific hardware. In the WS4, this includes the code to access the CF card and the ability to determine that an OS update image is available.

The contents of the boot loader can be upgraded, either through a manual procedure or through the CAL.

Disk On Chip (DOC)

The DOC is currently a 32M device factory populated in a 32-pin Dual In Line Package (DIP) socket. Larger sizes may be used in the future. The DOC represents the non-removable half of the Workstation 4 mass storage solution.

Windows CE views the DOC as a Windows file system. In Windows Explorer or My Computer, it appears as '\DOC'.

The contents of this device are shown in Figure 1-13, below.

Windows CE .NET Image (Hidden Parition)	CAL	SAL	WS4 API	WS4 Drivers

Figure 1-13: WS4 Disk On Chip Contents

- The Windows CE .NET image resides in a hidden partition and includes a copy of the default system registry.
- The MICROS CAL (Client Application Loader) resides on the DOC in the \McrsCAL folder. Through a registry setting, the CAL starts each time the WS4 starts.
- The MICROS SAL (Serial Application Loader) resides on the DOC in a folder called \McrsSAL. This utility supports a RS422 serial interface to the 8700 and 9700 POS Applications when the WS4 replaces the UWS/3.
- The WS4 API is implemented as a DLL file and allows POS Applications to access hardware such as the cash drawers, mag stripe reader, and the various customer display options.
- The WS4 Drivers consists of a collection of DLL files that provide access to WS4 hardware including the LCD, network, power button, and the persistent registry.

Compact Flash (CF) Card

The Compact Flash (CF) Card represents the removable component of the WS4 mass storage solution. Accessed from the IO panel, the device is installed at the factory but contains no data. *In addition the CF card must be installed in order for the workstation to boot.*

A 64M device is currently installed, and larger sizes may be used in the future. Windows CE views the card as a Windows file system. In My Computer, it appears as '\CF'.

Figure 1-14 shows the contents after the workstation has been installed and configured.

OS Update Image (NK.BIN Present only if update is being staged)	Persistant Registry	Application and Support Files	Optional SAR Totals

Figure 1-14: WS4 Compact Flash Card Contents

- Working from left to right in the illustration, the OS update image will be present only if the CAL detects that a newer version of Windows CE has been staged on the system server and places it on the CF Card.

  When the OS update image is present on the CF at boot time, the Boot Loader copies it over the existing OS image on the DOC.

- The CF Card contains the persistent registry. A WS4 driver called the PRD (Persistent Registry Driver) periodically copies the working registry from RAM to the CF card. The PRD ensures that any changes made to the registry by the OS or application are placed on the non-volatile CF card.

- The POS application and all support files are stored on the CF Card. The application is installed by the CAL when a workstation is powered up for the first time and a LAN connection to the system server is established.

- POS Application software that supports SAR will use a portion of the CF card to store off-line transaction totals.

SDRAM - Working System RAM

System or 'working' RAM is contained in a single 168-Pin DIMM socket. Currently, a 128M PC133, 168-Pin, +3.3V, unbuffered SDRAM is populated in socket DIMM1. The contents are shown in Figure 1-15, below.

Figure 1-15: WS4 System RAM Contents

- The RAM holds the runtime requirements of Windows CE and the POS application code as the WS4 operates. RAM contents are preserved when the workstation is placed in the **SUSPEND** state, but lost if AC power is removed from the workstation.

- The working copy of the registry is located in system RAM. The contents of the RAM are lost if AC power is lost, but the Persistent Registry Driver (PRD) places the working registry on the non-volatile CF card.

Summary

The Disk On Chip provides a permanent means of storing the operating system and associated device drivers, as well as system utilities such as the CAL, SAL, and WS4 diagnostics software.

The CF card contains the POS application and support files, a current copy of the registry, and optionally application transaction data, or in other words, the workstation 'personality". The CF card is accessible from outside of the workstation, it can be removed, forming the basis of a 'personality swap'.

Should a WS4 fail, the CF card can be removed and installed in a replacement unit, giving it the same configuration as the inoperative workstation from which it was removed.

Even though the Workstation 4 is diskless in the classical sense, the combination of the Disk On Chip and CF card provide a mass storage solution to preserve application and registry settings that require a lifetime that extends across system reboots. Through the CAL, updates to the OS and applications are staged on the POS server and automatically propagated to each client Workstation 4.

Power Management States

This section introduces the Windows CE power management state nomenclature used by the WS4 and describes how each state is displayed on the WS4 Operator LED.

References to Windows CE power management states are specified in bold capitol letters, e.g., **NOPOWER**, **SUSPEND**, etc. See the section on Operating the WS4 in Chapter 3 for more information on how to enter and exit the various power states.

UNPLUGGED

- The AC power cord is not connected to a wall outlet. The WS4 will be in this state when it is started for the first time or if the unit experiences an AC power failure while operating, but is not connected to a UPS.

- The Operator LED is Off.

NOPOWER

- The AC power cable is attached, but the operating system and applications are not running. RAM contents are undefined.

- The Operator LED is Off.

ON

- Windows CE and POS application is operating. RAM contents are maintained.

- The Operator LED is solid Green.

SUSPEND

- Windows CE and POS application is not running,. RAM contents are maintained. Restoring the unit from **SUSPEND** restores the LCD screen and contents of the LCD Customer Display(s), if attached.

- While in the **SUSPEND** mode, the behavior of individual MICROS POS Applications may vary. Refer to the POS Application Documentation for more specific information.

- The Operator LED is solid Amber.

IDLE

- This Windows CE power management state is not supported by the Workstation 4.

Last Power State Retention

The WS4 retains the current power management state in an on-board EEPROM. This means if the unit is **ON** and AC power fails, it returns to **ON** when AC power is restored with no action required by the operator.

Workstation 4 Power Management State Table

Fig 1-11	Current State	Event Source	Scenario	New State
1	*UNPLUGGED*	AC Power	AC Power becomes available and the last recorded state was not the *ON* or *SUSPEND* state.	*NOPOWER*
2	*NOPOWER*	Operator	The operator presses the power button for less than 5 seconds.	*ON*
3	*NOPOWER*	Operator	The operator presses the power button for more than 5 seconds.	*ON*
4	*NOPOWER*	Server Application	A server application sends a 'Wake On LAN' command.	*ON*
5	*ON*	Operator	The operator presses the power button for more than 5 seconds.	*NOPOWER*
6	*ON*	Operator	The operator presses the power button for less than 5 seconds.	*SUSPEND*
7	*ON*	WS4 Application	The application shuts down the workstation.	*NOPOWER*
8	*ON*	WS4 Application	The application places the WS4 in *SUSPEND* state.	*SUSPEND*
9	*SUSPEND*	Operator	The operator presses the power button for less than 5 seconds.	*ON*
10	*SUSPEND*	Operator	The operator presses the power button for more than 5 seconds.	*NOPOWER*
11	*SUSPEND*	Server Application	A server application sends a 'Wake On LAN' command.	*ON*
12	*SUSPEND*	WS4 Application	The WS4 application calls an application program at a predetermined time.	*ON*
13	*ON*	Server Application	A server application sends a "Wake On LAN" command.	*ON*
14	*ON*	WS4 Application	Warm boot is called by the application.	*NOPOWER* then *ON*
15	*NOPOWER*	AC Power Failure	AC Power Fails, then is restored	*NOPOWER*
16	*SUSPEND*	AC Power Failure	AC Power Fails, then is restored	*NOPOWER*
17	*ON*	AC Power Failure	AC Power Fails, then is restored	*ON*

Figure 1-16: WS4 Power Management States

Workstation 4 Power Management State Diagram

Figure 1-17 shows the workstation power states. Numbers in bubbles correspond to the left column in Figure 1-16.
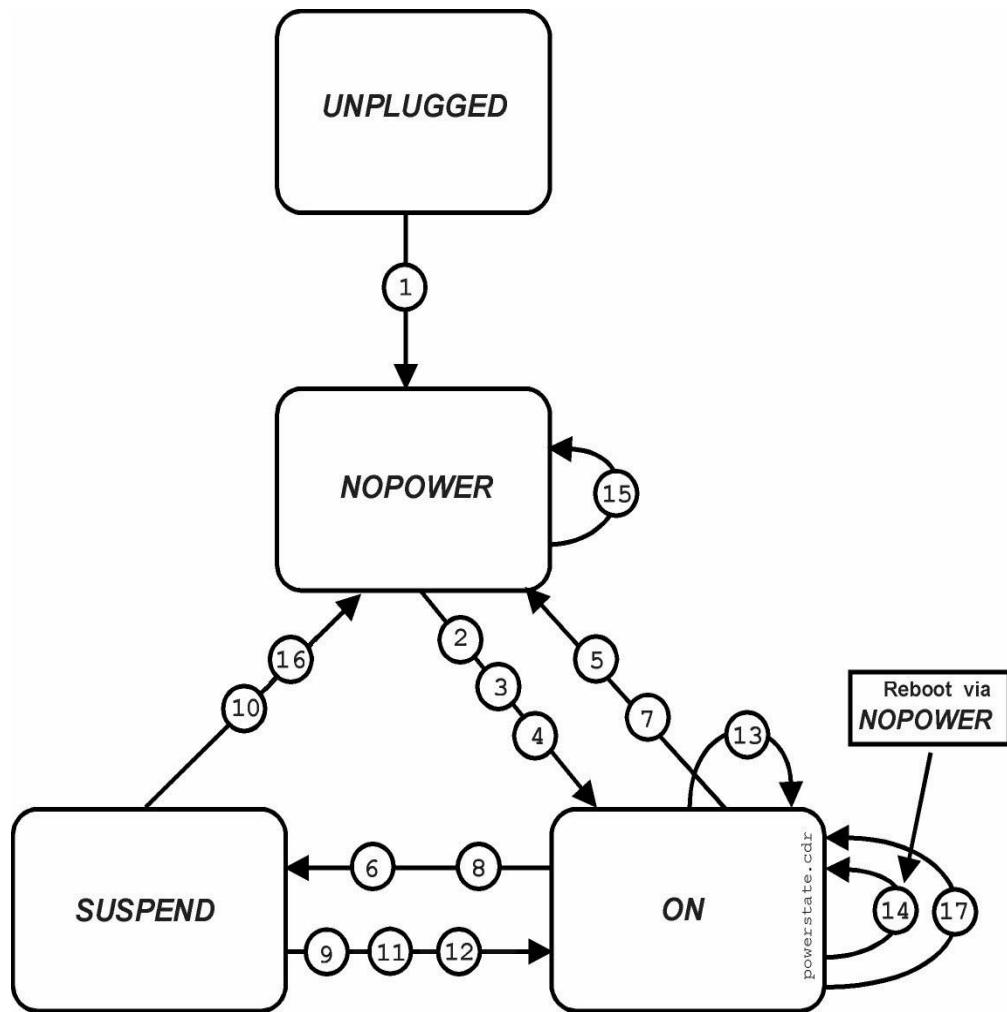

Figure 1-17: WS4 Power Management State Diagram

Specifications

The Workstation 4 conforms to the following specifications.

Specification	Parameters
Processor	AMD Geode SC3200 WebPad on a Chip
Cache	16KB Unified L1 Cache (No L2 Cache)
Display	12.1" Active LCD Panel (800x600)
Touchscreen	Microtouch/3M Five-wire resistive, 100 thousand points-per-inch resolution rated at a screen life of over 35 million touches.
Backlight(s)	Can be set to one of 120 intensity levels along with three preset intensity levels
Real Time Clock	Software compatible with DS1287 and MC146818. 100-year calendar with alarm features and century roll-over, includes 242 bytes of battery backed CMOS RAM.
Memory	One 168-Pin DIMM socket supports 32 MB to 256 MB of PC133 SDRAM (+3.3V, Unbuffered)
Mag Stripe Reader	3-Track ABA compatible, operates in MAGTEK and Special modes.
Customer Displays	Optional 2 x 20 VFD or 240x64 graphics based LCD available in both integrated and pole mount versions.
USB Ports	Two external UHCI 1.1 compliant USB ports
LAN Interface	On-Board National DP83815 Ethernet Controller supports 10BaseT (IEEE 802.3) or 100BaseT (IEEE 802.3u) using twisted pair cabling.
Serial Ports	1 DB9 RS232 Serial /w handshake, 2 Modular TX/RX RS232 Serial, no handshake.
Input Voltage	Universal Input - 85 to 264VAC, 47 to 63Hz.
Input Power	65W Max
BTU/Hour	104.3 (Typical) 222 (Maximum)
Storage Temperature	-25 °C (-13°F) to 85°C (185°F)
Operating Temperature	0 °C (32 °F) to 45°C (113°F), 90% relative humidity max
Weight	7.75 lb. (3.5 kg) / Shipping weight 11 lb. (5 kg)
Case Material	ABS Plastic
Physical Dimensions	See Appendix A

Approvals

The Workstation 4 meets the following safety and environmental certifications.

Directive	Specification	Year	Expiration Date	Comments
SAFETY :	EN60950	2000	7/1/06	
EMC :	EN 55022	1998	Current	A1: 2000 (Radiated)
	EN 55024	1998	Current	A1: 2001
	EN 61000-3-2	2000	Current	(Harmonics)
	EN 61000-3-3	1995	Current	A1: 2001 (Flicker)

Chapter 2

What's Inside?

This chapter describes how to open the workstation, provides a description of the system board and peripheral boards, shows how to install options, then shows how to reassemble the unit.

In this chapter

Disassembling the Workstation 4

The following procedure describes how to disassemble the workstation and access the internal components.

> ⚠ **SHOCK HAZARD**
>
> When the AC Power Cable is connected to the workstation, hazardous AC and DC voltages are present in the power supply. Always remove the AC power cable from the unit **before** you open the cover.

1. Remove all cables from the workstation I/O panel including the *AC Power Cable* before disassembling the unit.

2. Place a towel or other soft cloth on your work surface to protect the LCD and touchscreen glass, then place the workstation face down on this surface.

    o   The WS4 cover is held in place by a pair of screws accessible from the underside of the unit as shown in the top half of Figure 2-1. A pair of hinges are located at the rear of the base. Figure 2-1.
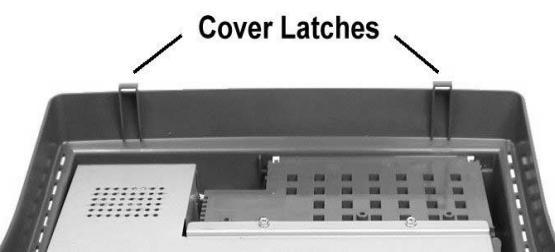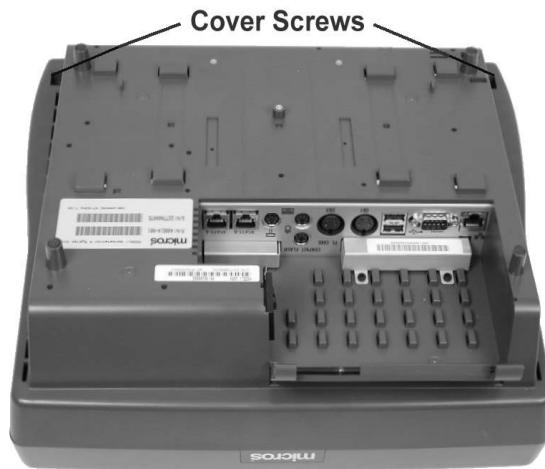
Figure 2-1: WS4 Cover Hinges and Screws

3. Loosen the two captive screws from the under side of the unit as shown in Figure 2-1

4. Remove the top cover from the base. To avoid damaging the hinges on the rear of the base, push the top cover towards the rear of the base a little to release them, then lift up. *If you lift up on the cover without first releasing the hinges, you can break them.*

5. Raise the rear of the cover and remove the toroid mounted to the RF shield as shown in Figure 2-2. The toroid is fastened to a cable held in place on the RF shield with a pair of clips.
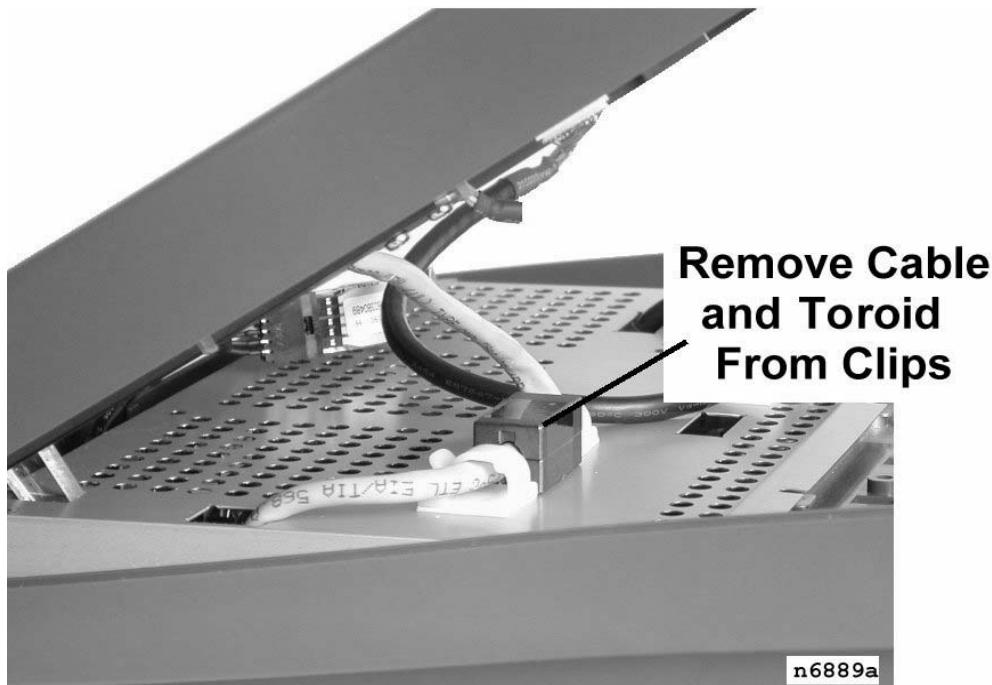
Figure 2-2: Removing the Mag Stripe Reader Cable Toroid

6. When you remove the toroid and cable from the clips, lift the top cover and position it directly in front of the base.

7. Remove the remaining cables between the top cover and the base. If a Samsung LCD is installed, refer to Figure 2-3. If a Sharp LCD is installed, refer to Figure 2-4.

   o Use a flat bladed screwdriver to release the Magnetic Stripe Reader Cable modular connector from its system board socket.

   o Remove the backlight cable from the backlight board.

   o Remove the touchscreen cable from the touchscreen extension cable.

   o Remove the customer display cable from the Rear LCD Display (if this option is installed).

   o Remove the LVDS cable from the LVDS board on the Samsung LCD or directly from the Sharp LCD panel.
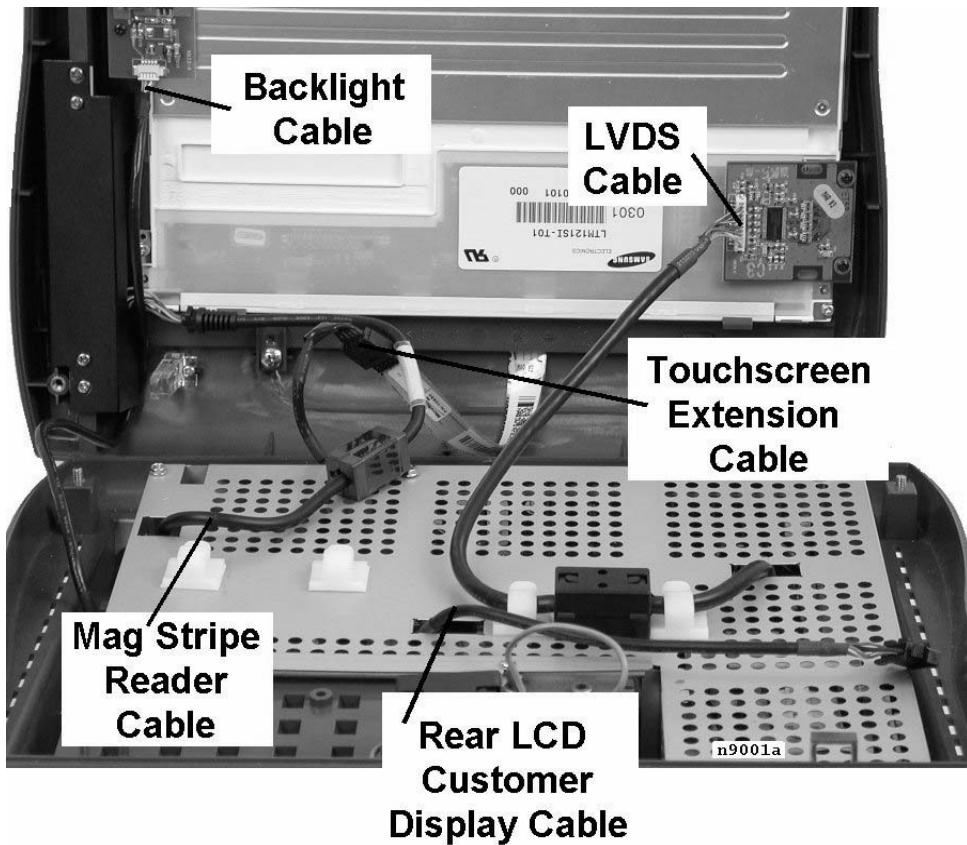
Figure 2-3: Removing Cables from the Top Cover - Samsung LCD

8. The top cover can now be set aside.
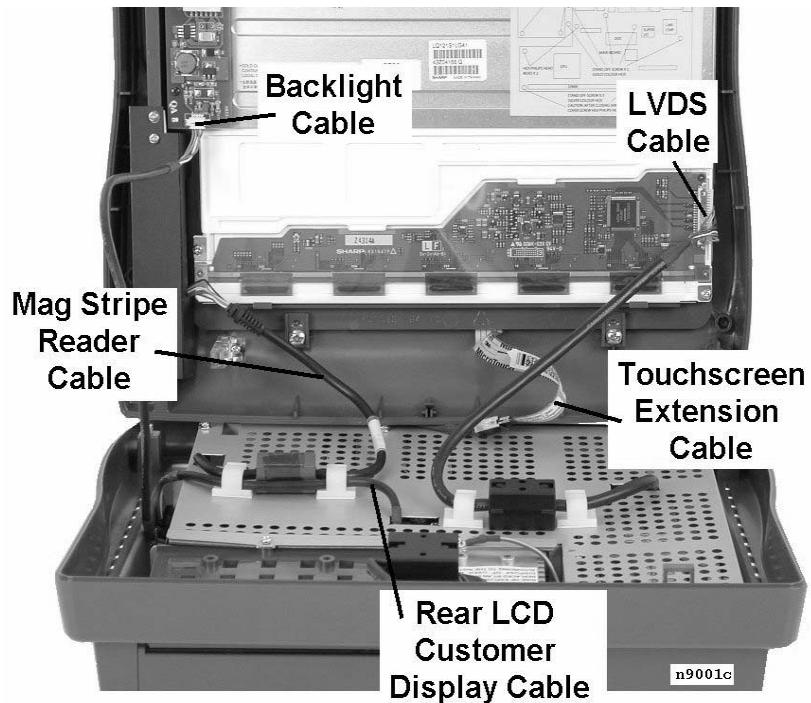
Figure 2-4: Removing Cables from the Top Cover - Sharp LCD

9. Remove the RF shield. First, remove the five screws shown in Figure 2-5
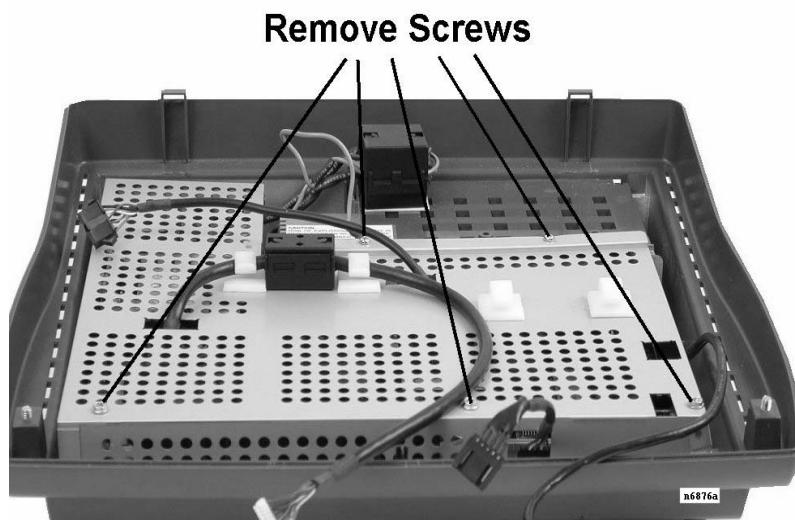
Figure 2-5: Removing the RF Shield screws

10. Remove the LVDS cable and toroid from the clips on the RF shield. Remove the toroid from the LVDS cable by releasing the latch as shown in Figure 2-6.
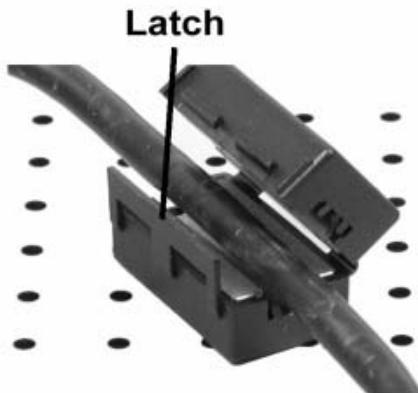
Figure 2-6: Removing the LVDS Cable from the Toroid

11. Lift up to remove the RF shield and take care to avoid damaging the LVDS or Backlight Cable.

Figure 2-7 shows the workstation with the RF shield removed and points out system board and power supply.
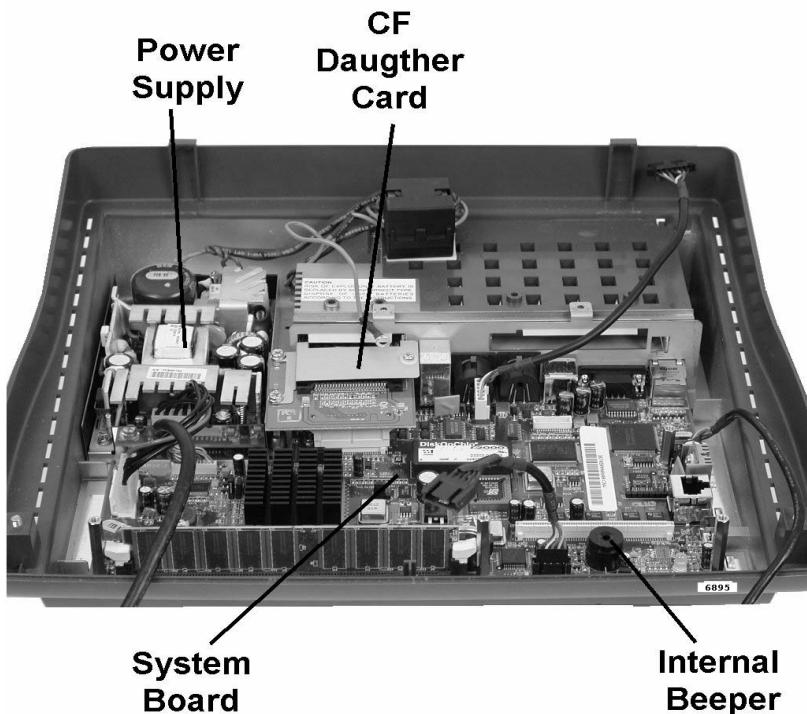
Figure 2-7: Workstation with RF Shield Removed

System Board

This section shows the system board components, connectors, and jumpers. A block diagram and brief technical description is also included.

Main Components

Figure 2-8 shows the major components of the Workstation 4 system board.
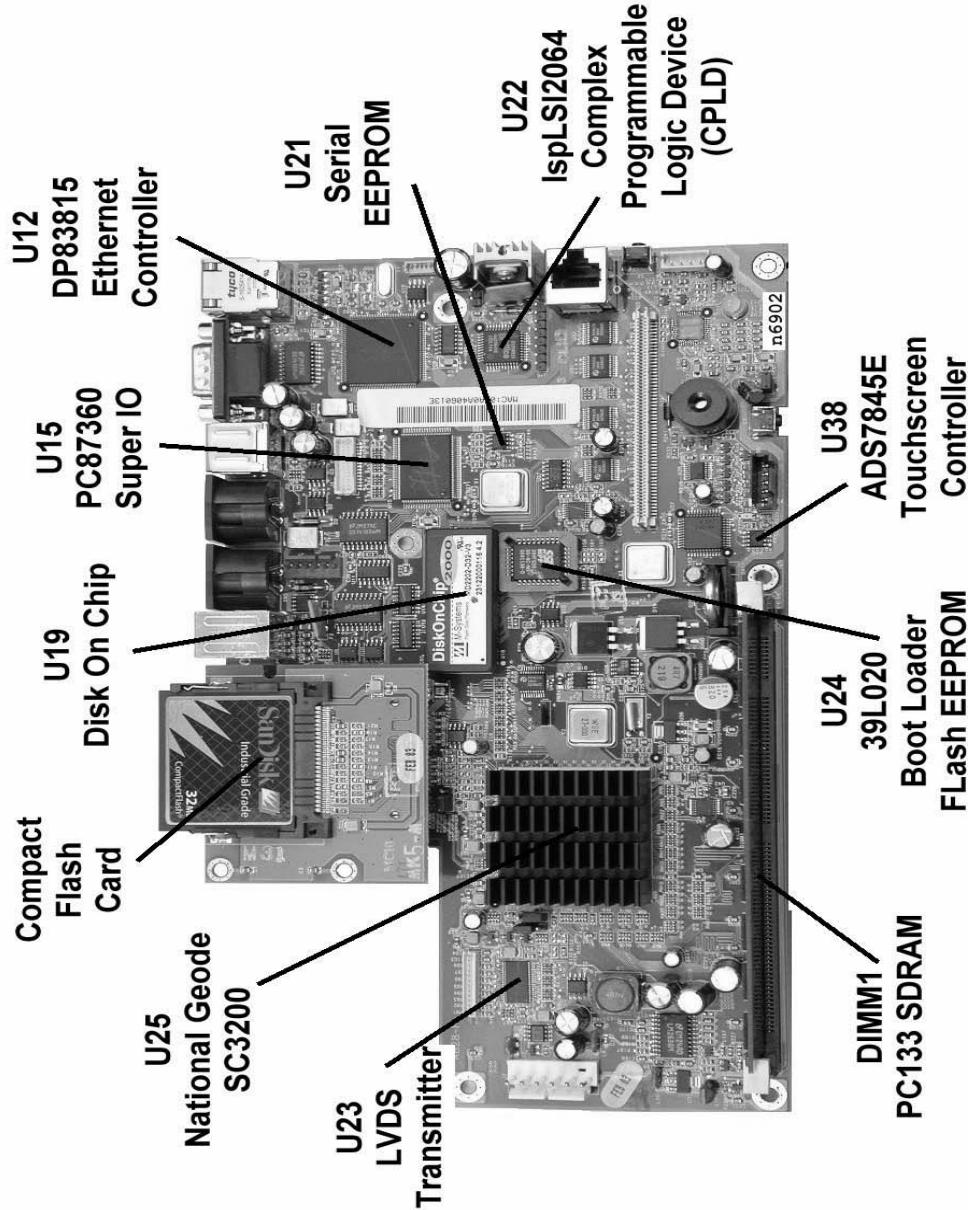
Figure 2-8: Workstation 4 System Board - Main Components

Connectors

Figure 2-9 shows the Workstation 4 System Board connectors.
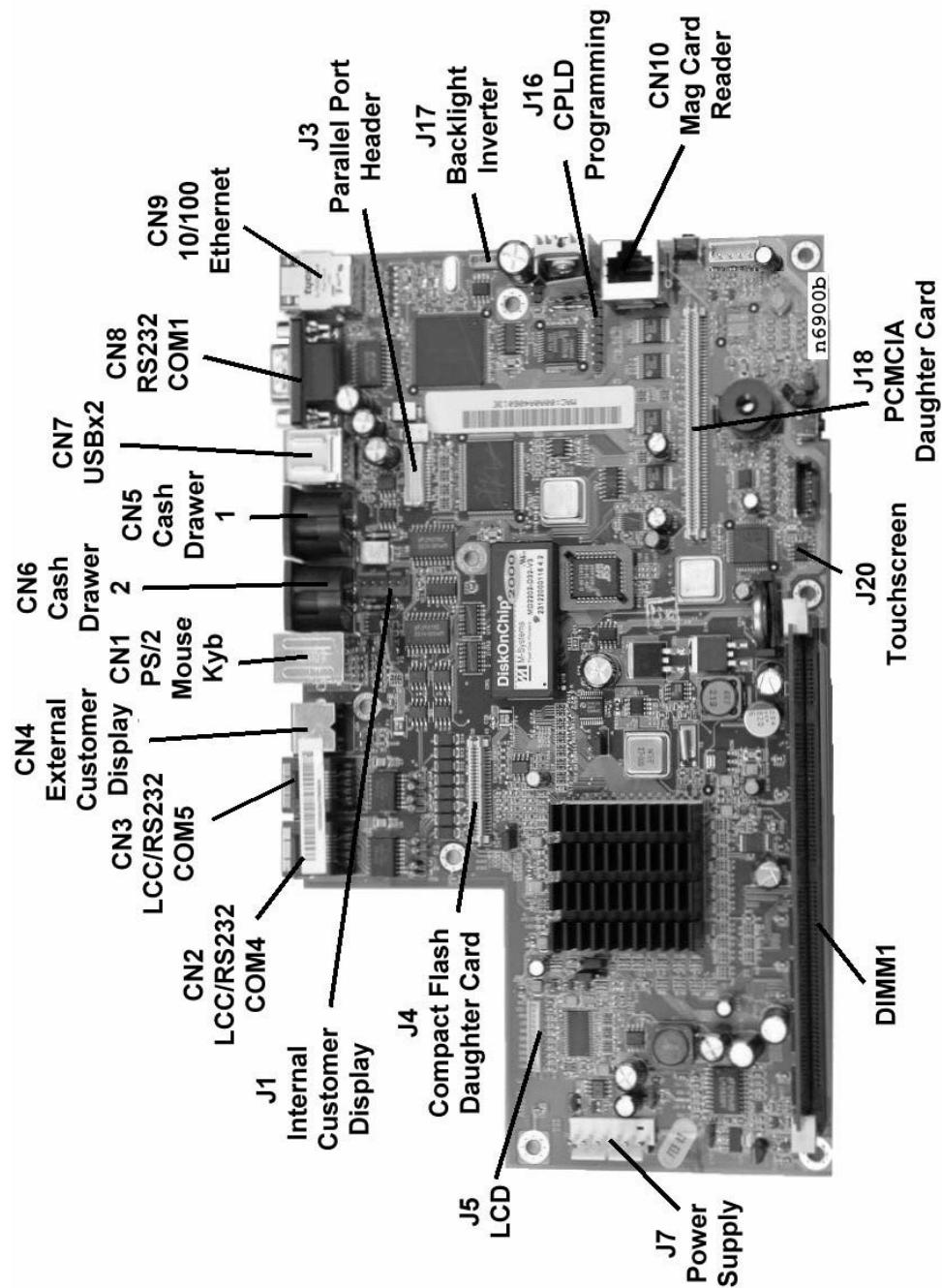
Figure 2-9: Workstation 4 System Board Connectors

Jumpers and Switches

Figure 2-10 points out the system board jumpers and switches.
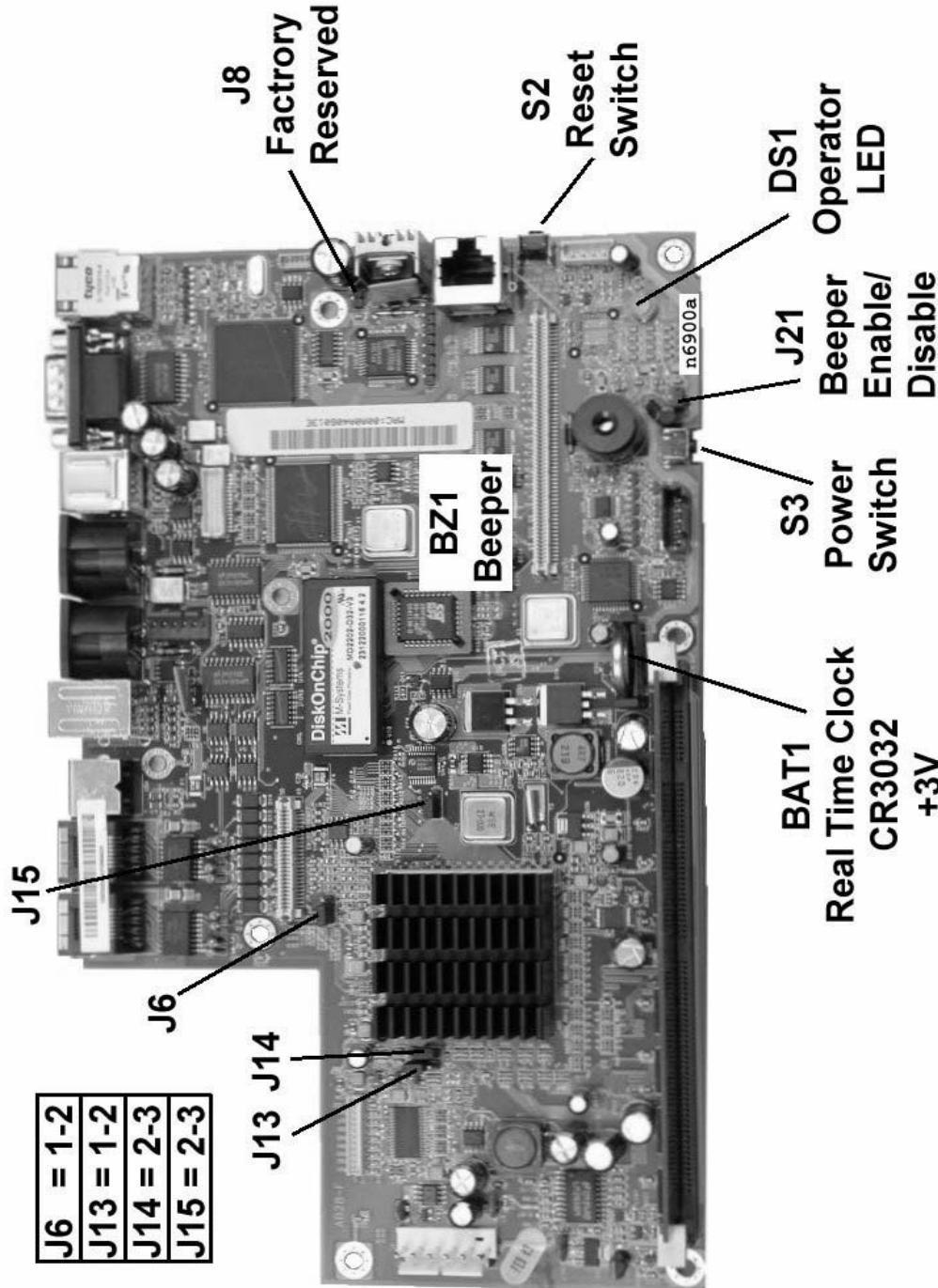
Figure 2-10: System Board Jumpers and Switches

Workstation 4 Block Diagram

Figure 2-11 shows a block diagram of the Workstation 4, including the system board, internal power supply, as well as the Touch Screen and LCD.
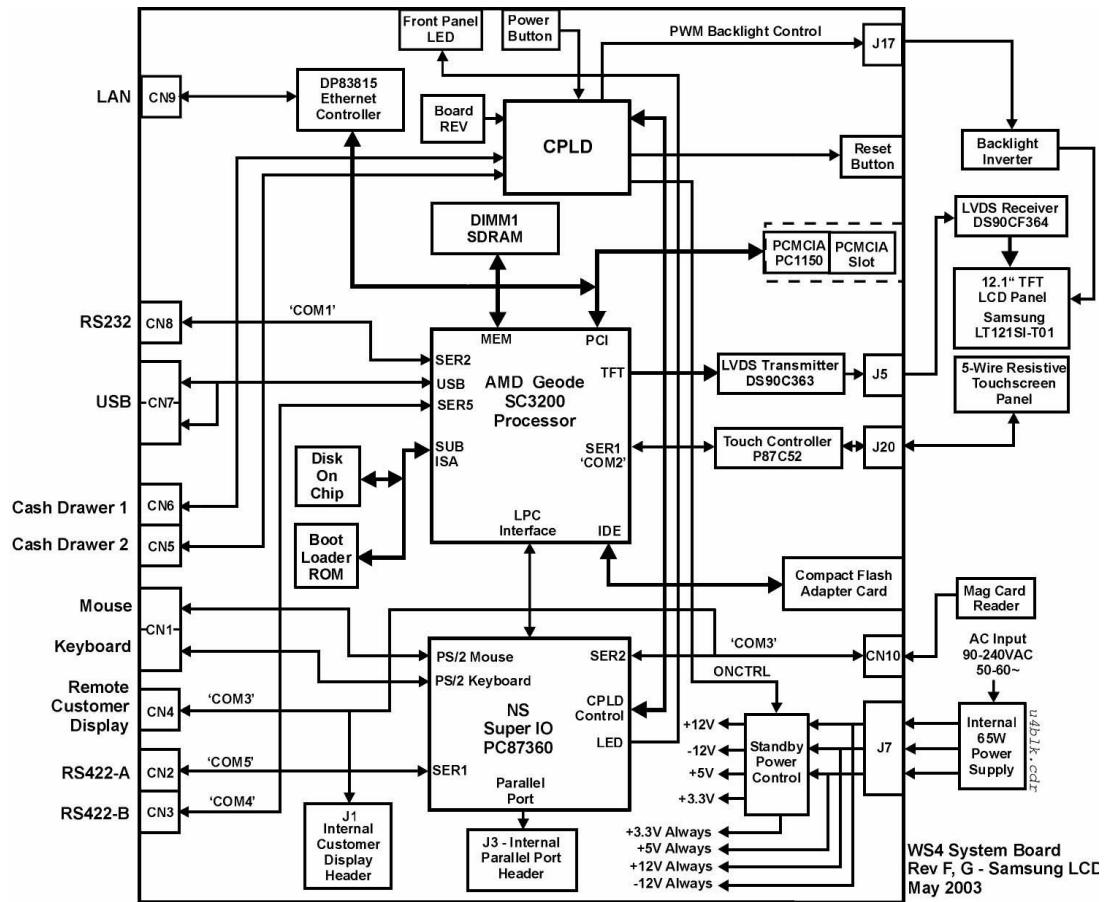
Figure 2-11: Workstation 4 Block Diagram

Advanced Micro Devices (AMD) Geode SC3200

The SC3200 is now a member of the Advanced Micro Devices (AMD) WebPAD on a Chip family of highly integrated x86 system devices. AMD purchased National Semiconductor Corporation Geode processor line in 2003. The SC3200 consists of a GX1 processor core integrated with a TFT LCD video controller, x86 PC compatible core logic and super IO. The features of this chip are listed below.

- GX1 266MHz 32-bit x86 compatible processor with MMX instruction set support.

- 64-Bit SDRAM memory controller (78Mhz memory bus)

- TFT LCD Video Processor with 2D hardware acceleration support.

- PC AT functionality core logic

- PCI Bus Controller

- Low Pin Count Interface to external Super IO

- ATA33 IDE Interface

- Sub ISA Bus Interface to Boot Loader EPROM and DiskOnChip

- USB Interface, Open HCI 1.0 compliant

- Three serial ports

- One parallel port

- Two ACCESS.bus Interface Ports

- ACPI 1.0 Power Management Support.

PC87360 Super IO

The PC87360 is a member of the National Semiconductor Super IO family, and a companion to the Geode SC3200. Outstanding features of the device include:

- Low Pin Count (LPC) Interface to the SC3200

- PS/2 Keyboard and Mouse Controller

- Two Serial Ports

- One Parallel Port

- LED Driver

- Up to 45 General Purpose IO pins. In the WS4, these pins are dedicated to RS422/RS232 Serial port control, and Complex Programmable Logic (CPLD) Device Control.

DP83815 Ethernet Controller

The National Semiconductor DP83815 is a highly integrated fast Ethernet controller coupled with a 10BaseT (IEEE 802.3) or 100BaseT (IEEE 802.3u) twisted pair cable interface.

- 10/100 Ethernet Controller - Twisted Pair Cabling

- PCI Interface with Bus Master Capability

- EEPROM stores MAC address and vendor ID data

- Wake On LAN Support

• Activity LED and Link/Integrity Speed LED integrated into the modular connector which can be viewed from the rear mounted connector panel.

Disk On Chip (DOC)

The Disk On Chip 2000 is part of M-Systems 3rd generation of Disk On Chip products. It combines a disk controller and TrueFFS firmware with flash memory on a single die, providing a cost effective solid state alternative to a conventional hard disk.

The DOC is housed in a 32-Pin Dual In Line (DIP) Package. The WS4 currently ships with a 32M part, but larger sizes could be used in the future. The TrueFFS firmware makes the DOC appear as a windows file system to Windows CE.

The Windows CE image and associated files reside in a hidden partition. Each time the workstation starts, the Boot Loader is responsible for copying the OS image from the DOC into system RAM and starting it.

Compact Flash (CF) Card

The Compact Flash Card (CF) is accessible from outside of the unit, at the I/O panel. A compromise between accessibility and security, the CF card is covered by a bracket that must be removed with a hex head allen wrench. *The CF card must be installed in order for the workstation to start. In addition, the CF card must not be removed or inserted when power is on.*

Like the DOC, the Windows CE operating system views the card as a Windows file system. The workstation initially shipped with a 32M part, and switched to a 64M part in early 2004. Larger sizes may be used, but always consult the approved CF card list located in the hardware support section of the MICROS web site.

The CF card contains the POS Application and support files. Applications that support SAR options use the CF card to store off-line transaction data.

In addition to the application and optional totals, the CF card contains the working copy of the Windows CE registry. As the workstation operates, changes to the registry are copied to the CF card by the Persistent Registry Driver (PRD).

Because the CF card contains a current copy of the Windows CE Registry as well as the POS application and optionally SAR data, it represents the 'personality' of the workstation. This is why it is accessible from the IO panel. It can be removed from a defective workstation and installed in a replacement workstation in a matter of minutes.

Should an update to the operating system become available, the Client Application Loader (CAL) places a copy of the operating system image file (NK.BIN) on the CF card. When the workstation restarts, the Boot Loader detects the file and copies it over the existing OS image on the DOC.

The CAL deletes the image from the CF card before it restarts the workstation. See the Memory Architecture description in Chapter 1 for more information about CAL.

Boot Loader

The Boot Loader is stored in U24, a 2MB Flash EPROM and is specific to the x86 compatible Geode SC3200 processor and integrated chip set. When the WS4 is powered-up, the first lines of code executed are in the boot loader. It performs hardware initialization of system board integrated circuits at the register level, then runs a Power On Self Test (POST) of major sub-system components.

See the Software Configuration section in Chapter 1 for more information about the Boot Loader.

LVDS Transmitter

U23, the DS90C363 LVDS transmitter converts 21 bits of CMOS/TTL data from the SC3200 TFT controller into 3 Low Voltage Differential Signalling (LVDS) data streams. A Phase Lock Loop (PLL) clock is transmitted in parallel with the data streams over a forth data stream. This device, and the companion LVDS receiver provide a means to reduce the EMI emissions normally associated with wide, high speed TTL interfaces to active LCD panels.

Touchscreen Interface

The WS4 Touchscreen Interface consists of micro controller U37, Touchscreen Controller U38, and serial EEPROM U40. U37 is an 87C52 micro controller with firmware supplied by 3M touch systems to manage the Burr-Brown ADS7845E Touchscreen Controller. The device consists of a 12-bit sampling analog-to-digital converter (ADC) with a synchronous serial interface to micro controller U37. Serial EEPROM U40 stores screen calibration and serial interface data while the system is off.

Complex Programmable Logic Device (CPLD)

This device controls the POS features of the workstation including Cash Drawers and Backlight brightness. In addition, it manages the Power and Reset switches, and provides control signals to the on-board power supply regulators to control the WS4 power management states.

LCD/Touchscreen and Mag Stripe Reader Assembly

Figure 2-12 includes two views of the top cover. In addition to the Backlight Inverter and Mag Stripe Reader assembly, the upper half shows the Samsung LTM121SI-T01 LCD panel used in production units up to July-August 2004. The lower half shows the replacement, a Sharp LQ121S1LG41. Note the absence of the LVDS receiver board on the Sharp LCD; the equivalent circuitry is built-into the panel.
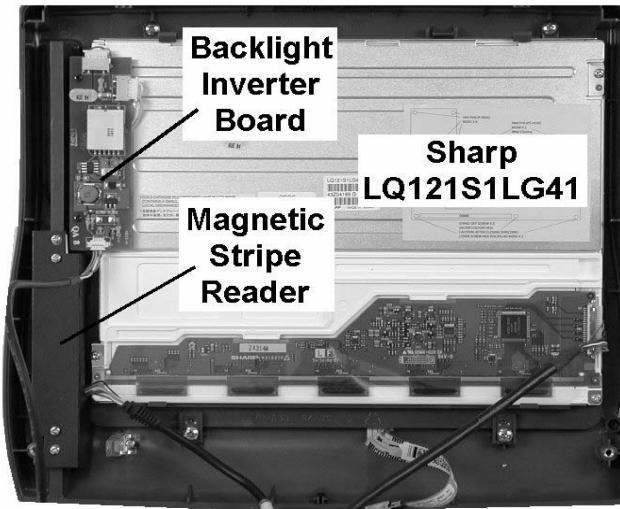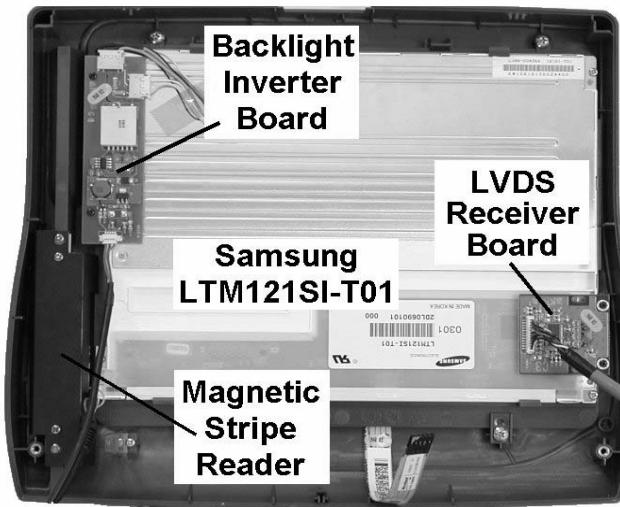
Figure 2-12: Top Cover Assembly

Low Voltage Differential Signalling (LVDS) Receiver Board

This board, used only with the Samsung LCD, attaches directly to the panel and fastened to the LCD bracket. It consists of U1, an DS90CF364 LVDS Receiver. The receiver converts LVDS data streams generated by the system board LVDS transmitter into 21-bits of CMOS/TTL data compatible with the LCD Panel. The Sharp LCD incorporates the LVDS receiver internally; therefore a separate receiver board is no longer required. A new interface cable between the system board and LCD panel is required.

Backlight Inverter Board

The Backlight Inverter Board is mounted to the LCD bracket. Both the Samsung and Sharp LCD panels use the same backlight inverter board. It receives +10.4VDC and a Pulse Width Modulation (PWM) signal from the system board to control backlight brightness.

Magnetic Card Reader

The 3-track serial interface magnetic card reader assembly is mounted in the mag stripe channel on the top cover with two brackets. The interface cable attaches to a modular connector located on the system board. The mag card reader cover is shaped in the form of a trough to divert liquid spills into a slot in the base, away from the system board.

Hardware Updates

This section includes procedures for removing and replacing the Workstation 4 options.

CF Daughter Card

The CF Daughter Card is mounted to the base of the workstation with three stand-off, two of which are mounted to the base and the third mounted to system board. Some units will not have the screw mounted to the system board.

You may remove the CF card prior to removing the daughter card, but this is not required.

Removal and Installation

1. Remove the WS4 Cover.
2. Remove the system board RF shield.
3. Locate the CF Daughter card and remove the screws shown in Figure 2-13.
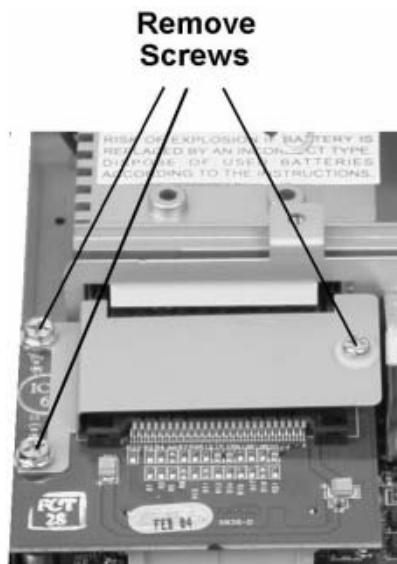
Figure 2-13: Removing the Compact Flash Daughter Card

4. Lift up on the daughter card to remove it from its system board socket, then pull it slightly forward to allow the CF socket to clear the I/O panel bracket.
5. To reinstall the daughter card, position it to allow the CF card or bracket to project through the slot in the I/O bracket. When the holes in the daughter card are positioned over each stand-off, press the card down to seat it in system board socket J4. Reinstall the bracket and install the screws.

Optional PCMCIA Daughter Card

The optional PCMCIA Daughter Card mounts to the system board.

Installation

1. Place the unit face down on your work surface and remove the bracket covering the OPT Slot.

2. Remove the WS4 top cover.

3. Remove the system board RF shield.

4. Refer to Figure 2-14 and note the location of each stand-off and the daughter card socket.
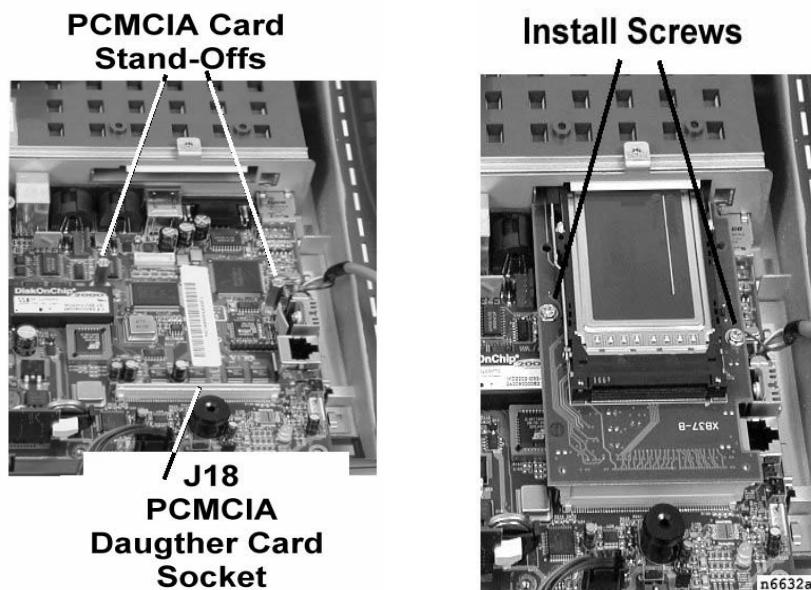
Figure 2-14: PCMCIA Daughter Card Installation

5. Install the PCMCIA Card in the Daughter Card.

6. Position the daughter card so that the PCMCIA card will project from the I/O bracket slot. When the holes in the card line up with each stand-off, press down on the daughter card to seat it in J18.

7. Install screws in each stand-off as shown on the right side of Figure 2-14.

8. Reinstall the RF shield and WS4 top cover.

9. Place the unit face down and connect the antenna to the card.

10. Route the antenna lead through the slot in the bracket supplied in the kit, then install the bracket with two hex screws.

Rear LCD Customer Display

The following procedure describes how to attach the Rear LCD Customer Display to the case and connect it to the system board cable. The display is provided as a complete assembly, ready to install.

1. Remove the WS4 top cover as described on page 2-2.

2. The interface cable is pre-installed on WS4s shipped after May 2004 (S/N 4083019472).

    o   If the cable is not installed, proceed to Step 4, otherwise continue with the next step.

3. Connect the cable from the LCD Display assembly to the cable protruding through the opening in the shield cover. Figure 2-15. Skip to Step 8,
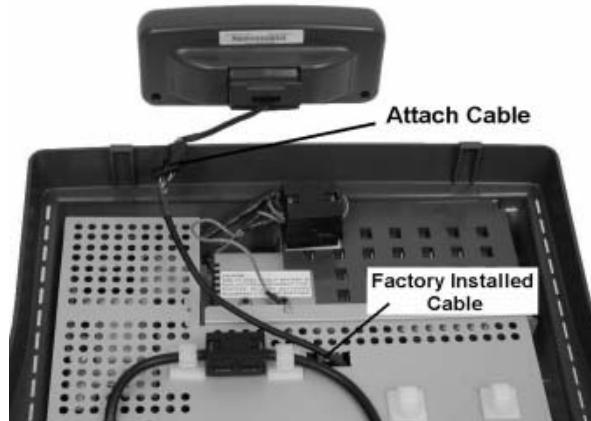
Figure 2-15: Connecting the LCD Customer Display

4. Obtain display interface cable P/N 400416-007.

5. Remove the RF shield cover as described on page 2-2.

6. Attach 400416-007 to System Board connector J1. Figure 2-16.
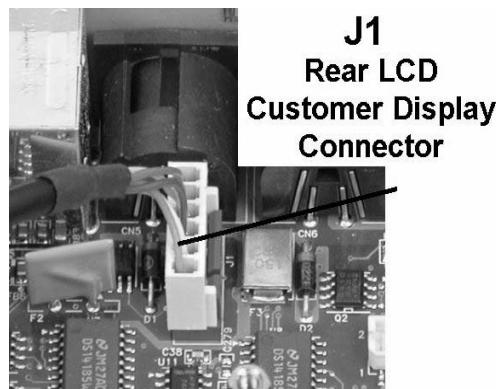
Figure 2-16: Attaching the Rear LCD Cable to the System Board

7. Replace RF shield cover as described on page 2-23.

8. Remove the logo plate from the cut-out at the rear of the top cover.

9. Place any excess cable inside the workstation.

10. Orient the LCD assembly as shown in Figure 2-17, placing the hinge assembly in the cut-out place the hinge in the cut-out and fit the top cover to the base.

Figure 2-17: Installing the Rear LCD to the Workstation

11. Proceed to the next section and install the required software files.

Software Configuration

The WinCE image on a WS4 configured to run the e7 POS Application includes the necessary drivers to support the LCD Customer Display. However the majority of WS4s currently in the field (as of September 2004) are running the GR1.0 or GR1.1 software platform. If connected to a WS4 running GR1.0 or GR1.1, the LCD customer display will not function. An upgrade to GR1.2 or later is required to support the 2x20 VFD emulation mode. In addition, the graphics features of the display are not yet supported by POS Applications such as RES or L&E, however, the 2x20 VFD emulation is supported.

Pole LCD Customer Display

This procedure describes how to install the Pole LCD Customer Display on the Workstation 4. The pole version is provided as a kit consisting of the LCD Display Assembly /w cable, pole, base, extension cable, and nut. Due to the varying thickness and materials used on the counter surface, the installer must provide mounting hardware for the base. The cable length is approximately 5 feet.

1. Use the base as a template to locate the mounting holes in the counter surface.

2. After mounting the pole display base to the counter surface, route the extension cable through the pole and connect the LCD assembly cable. Figure 2-18. Mount the LCD assembly to the pole, position the display head in the desired position and use a 1mm hex screw to lock the LCD assembly in place.
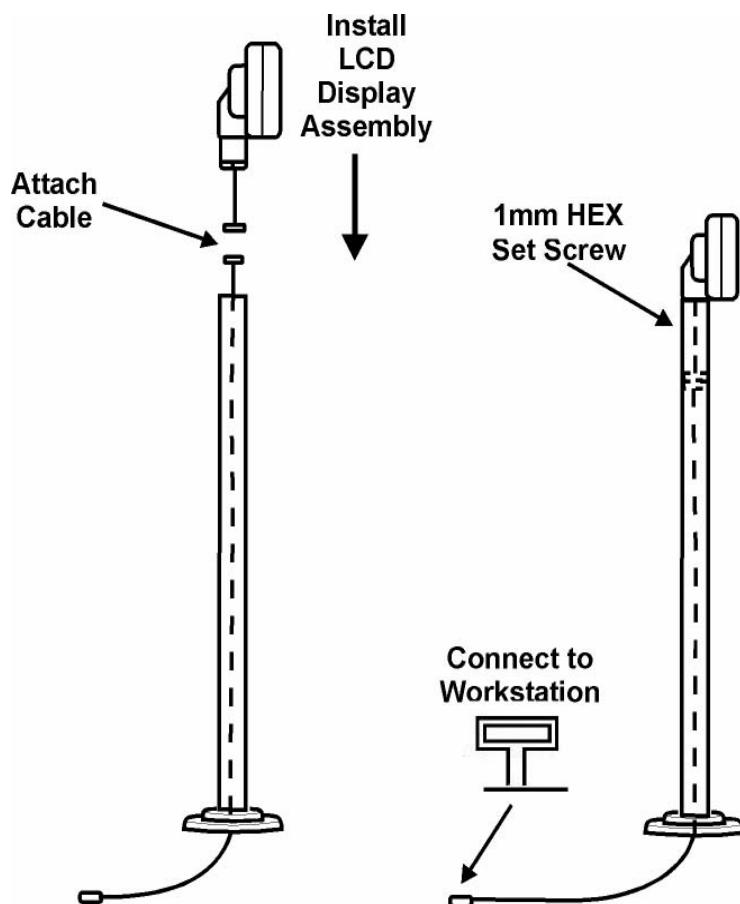
Figure 2-18: Assembling the LCD Pole Display

3. Figure 2-19 points out the location of the Pole Display connector. Power-off the WS4 and attach the keyed 4-Pin DIN connector on the cable to the Customer Display Connector on the workstation IO Panel.
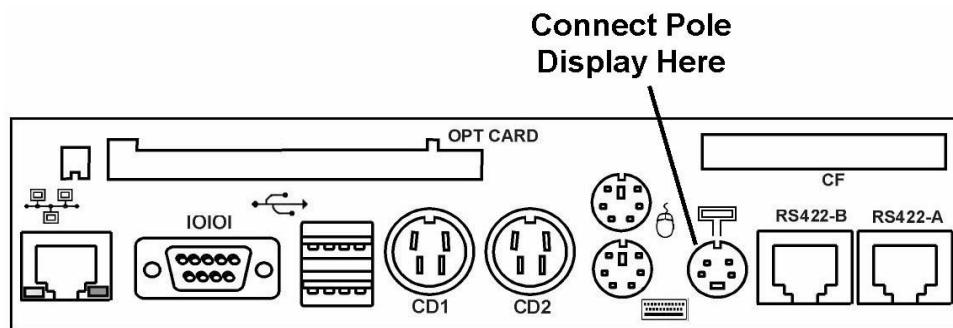
Figure 2-19: Connecting the Pole Display to the WS4 IO Panel

4. Refer to the software requirements section below.

Software Configuration

The WinCE image on a WS4 configured to run the e7 POS Application includes the necessary drivers to support the Rear/Pole LCD Customer Display. However the majority of WS4s currently in the field (as of September 2004) are running the GR1.0 or GR1.1 software platform. If connected to a WS4 running GR1.0 or GR1.1, the LCD customer display will not function. An upgrade to GR1.2 or later is required to support the 2x20 VFD emulation mode. In addition, the graphics features of the display are not yet supported by POS Applications such as RES or L&E, however, the 2x20 VFD emulation is supported.

Disk On Chip

The Disk On Chip (DOC) is located in a 32-Pin DIP socket positioned at the center of the WS4 system board. As you can see in Figure 2-20 below, the DOC is somewhat larger than the socket.
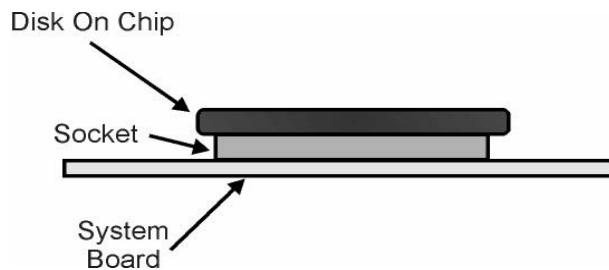
Figure 2-20: Disk On Chip Mounting

To void damaging the socket or delicate DOC pins as you remove it, the series of illustrations in Figure 2-21 show how to use a flat blade screw driver to gently lift one side of the DOC, then the other before removing the DOC from its socket.
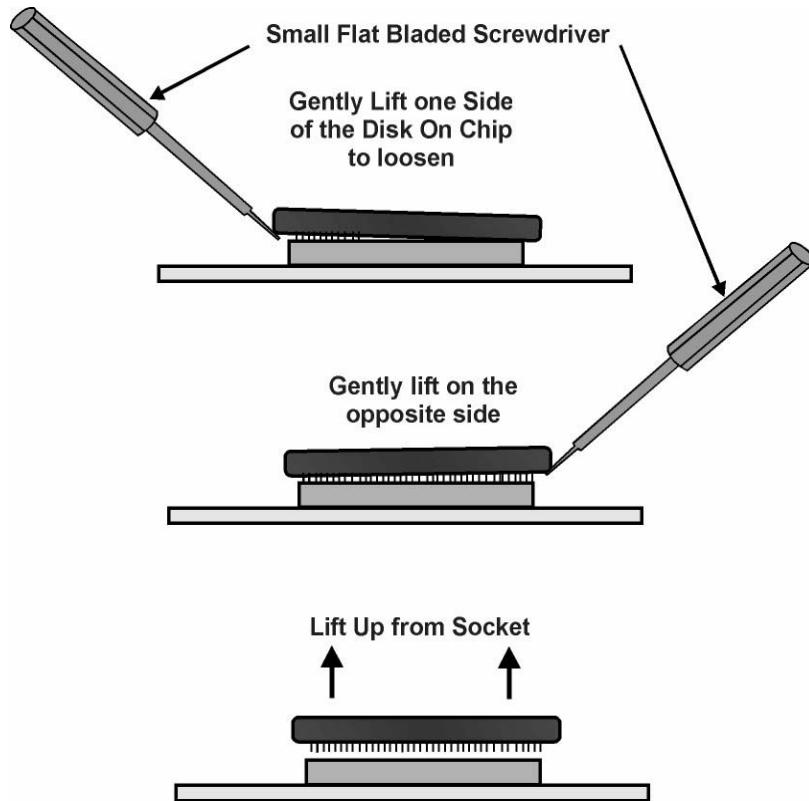
Figure 2-21: Disk On Chip Removal

Reassembling the WS4

1. Make sure the AC input cable is disconnected from the unit.
2. Reinstall the RF Shield. Figure 2-22 shows the details.
    o   Place the AC input cables in the cutout at the rear of the shield as shown on the left.
    o   If installed, route the optional customer display cable through the opening at the center of the RF shield.
    o   Route the LVDS cable through the opening on the top of the shield. Reinstall the toroid on the cable and place the toroid/cable in the holders as shown.
    o   The touchscreen extension cable should project from the opening in the front of the shield.
    o   The backlight cable should exit the shield through the cut-out on the right side.
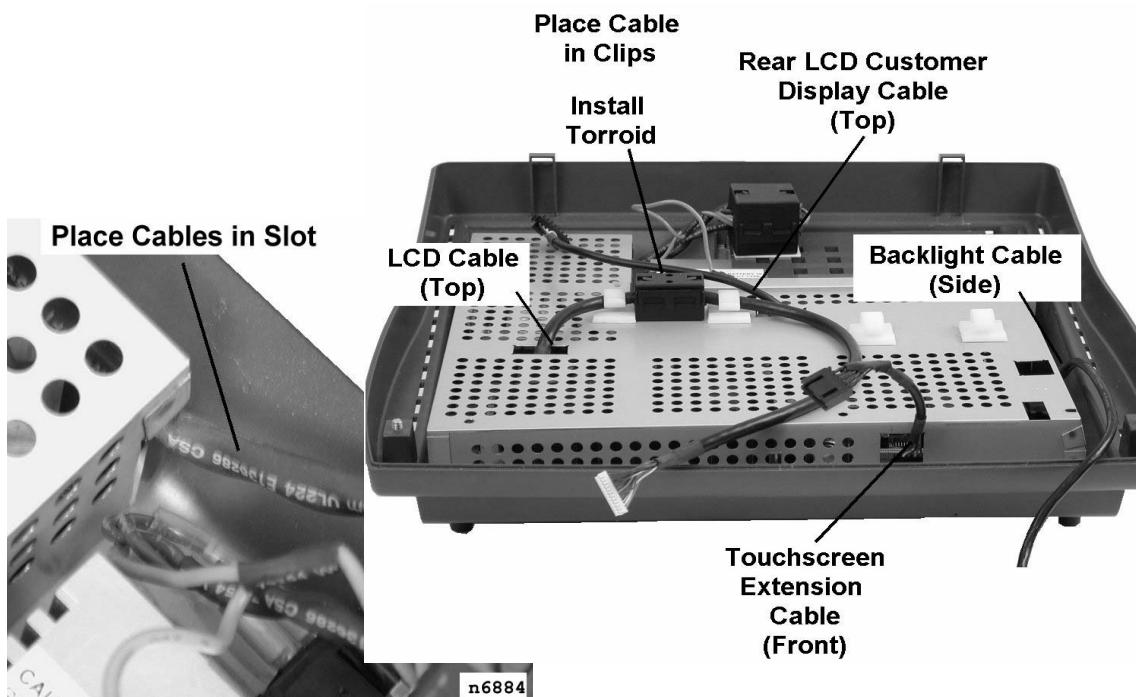
Figure 2-22: Routing cables through the RF Shield

3. Fit the RF shield in place over the power supply and system board.

> ⚠️ **_WARNING:_**
>
> Before continuing, take a moment to ensure the shield is fitted to the _outside_ of the power supply tray, in particular, the area near the _power supply AC fuse and input cables._

4. Fasten the RF shield screws. Figure 2-23. Be sure to install the ground wire fastened with left rear shield screw.
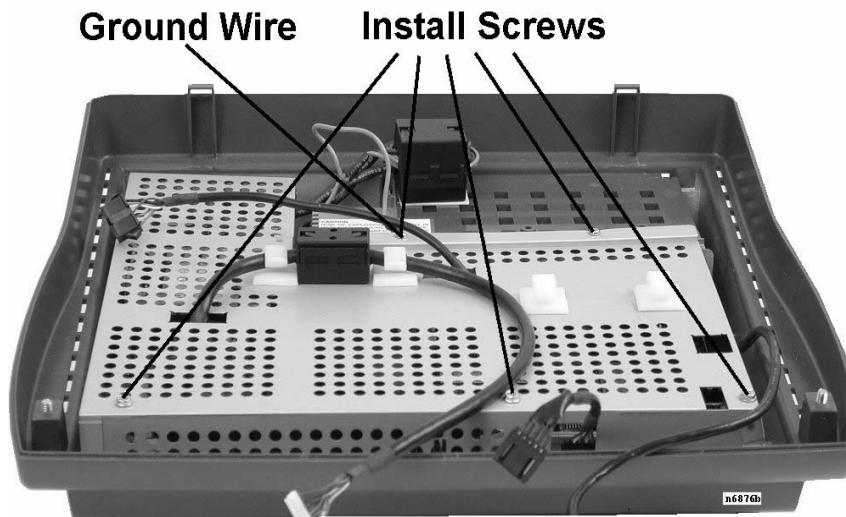
Figure 2-23: Securing the RF Shield and Fastening the AC Ground Wire

5. Position the top cover directly in front of the base.
6. Connect the following cables to the top cover. Figure 2-24.
   - Touchscreen ribbon cable to the keyed touchscreen extension cable projecting from the front of the shield.
   - LVDS cable to the LVDS Receiver Board on the Samsung LCD (Figure 2-24), or directly to the Sharp LCD Panel (Figure 2-25), and the Backlight Cable to the Backlight Inverter Board.

o   Insert the modular connector on the Mag Stripe Reader Cable through
the cut-out in the shield and attach it to the system board connector.
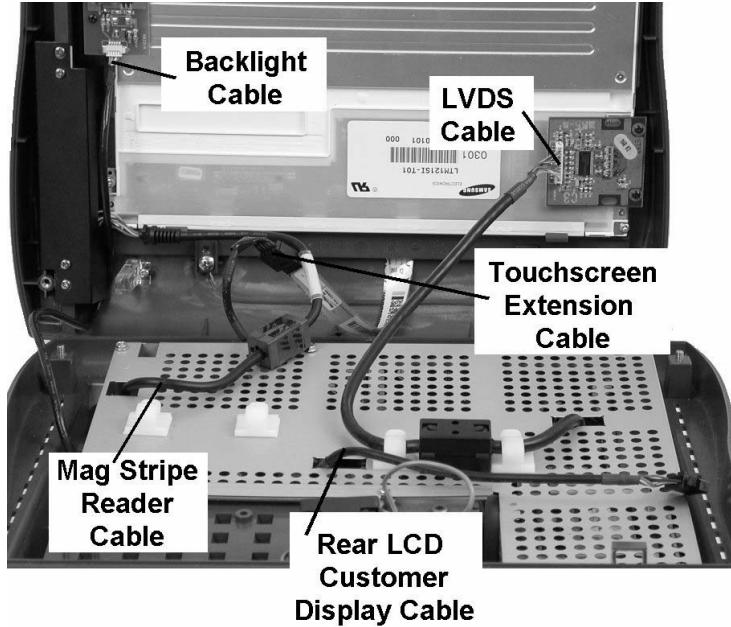
Figure 2-24: Connecting Cables to the Top Cover - Samsung LCD
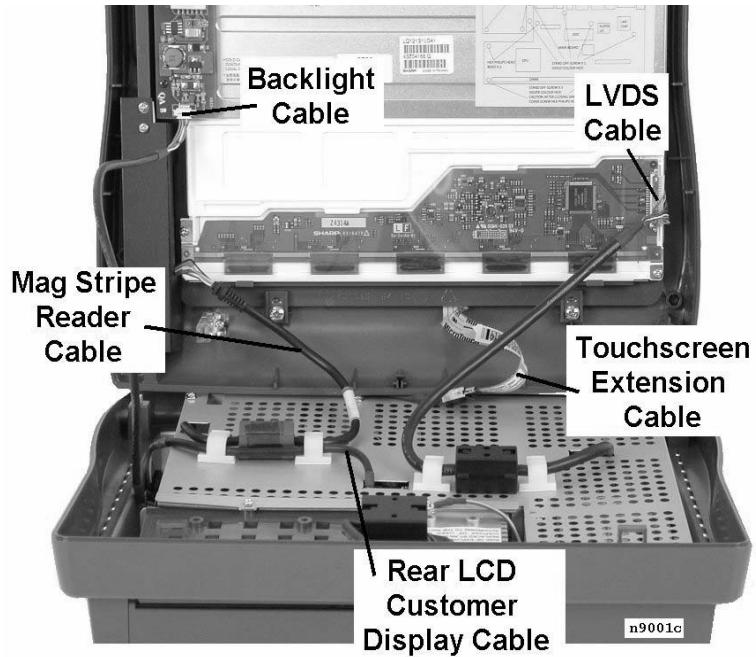
Figure 2-25: Connecting Cables to the Top Cover - Sharp LCD

7. Before closing the cover, place the toroid on the mag stripe reader cable in the cable clamps mounted to the shield. Figure 2-26.
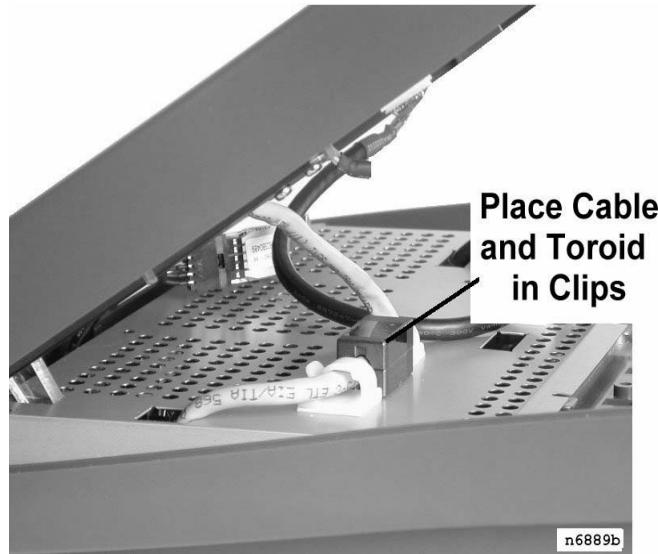
Figure 2-26: Securing the Mag Card Reader Cable to the RF Shield

8. Tighten the cover screws to secure the top cover to the base.

Chapter 3

Installing and Operating the Workstation 4

This chapter describes how to install and the operate the Workstation 4.

In this chapter

Care and Handling

Following are some considerations for placement of the workstation and related peripheral equipment.

Equipment Placement

To ensure proper operation of the WS4, consider the following guidelines for placement of the unit.

Before you decide on the space each device should occupy or if you plan to provide custom enclosures, refer to the dimensional data for the workstation and peripheral printers found in Appendix A of this manual.

Location

- Appendix A contains dimensional drawings of the workstation and peripheral equipment.
- Locate all equipment so that it is accessible to service personnel.
- 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. An anti-static mat incorporates a grounding clip with a cable to provide a discharge path to ground.

Proximity to 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 preparation areas, dish racks, or water stations. The Workstation 4 LCD includes a gasket seal around the touchscreen which may afford some protection from liquid spillage.
> If any type of liquid is spilled onto the touchscreen or on the top of the unit, turn off power as quickly as possible by removing the AC power cord from the wall plate. Do not reconnect the AC power cord to an outlet until it has been determined that no spillage remains inside the unit.

Noise Induction

In addition to the AC Power Requirements outlined in Chapter 3 or the appropriate Site Preparation Guide, other sources of electromagnetic interference must be eliminated to ensure trouble-free operation of the equipment.

• Noise radiating from the AC power lines throughout a site can be absorbed by MICROS AC power and communications cables and induced in to the equipment. Consequently, no exposed cable dedicated to the MICROS equipment should be run in the vicinity of any AC power lines.

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, the magnetic stripe card reader or other peripherals connected to the workstation.

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

Temperature and Humidity

The Workstation 4 can operate in temperatures between 32°F and 113°F (0°C to 45°C). A constant humidity between 40% and 90% is required for proper operation of the equipment.

Before applying power to the unit, ensure that its temperature is within 15°F (8°C) of room temperature to prevent damage to the LCD or internal circuitry.

To maintain the internal temperature of the equipment at specified levels, adequate ventilation is required. Consequently, the equipment must not be mounted in an enclosure that could impede airflow to any side of the workstation. A three sided (front and back open) enclosure with 4 inches of clearance on all sides is acceptable.

AC Power and Data Cabling Requirements

AC Power and ground cabling, Ethernet, and MICROS IDN data cabling should be installed in accordance with the appropriate MICROS Site Preparation Guide.

Cleaning the Workstation 4 Touchscreen and Cabinet

Instructions for cleaning the Workstation 4 Cabinet and LCD/Touchscreen are described below.

> *SHOCK HAZARD*
>
> Always turn the WS4 off and unplug the AC cable before cleaning or performing any preventive maintenance.

LCD/Touchscreen

The touchscreen surface can be cleaned using any common household glass cleaner applied with a clean cotton cloth. Always spray the cloth with the cleaner and then use the cloth to clean the touchscreen.

Cabinet

Always use a chamois or clean lint-free cloth to clean the cabinet and touchscreen surface. Do not use chemical, alcohol, or petroleum based cleaners that are not recommended for plastics.

Magnetic Card Reader

Depending on how much they are used, magnetic card readers may require periodic cleaning. MICROS recommends cleaning the heads once a day if the reader is subjected to heavy usage.

Cleaning kits are available from a variety of sources including MICROS using P/N 600439-003 and P/N 600439-004. Be sure to follow the instructions supplied with the cleaning kits.

The IO Panel

Figure 3-1 shows the rear mounted Workstation 4 Connector Panel.
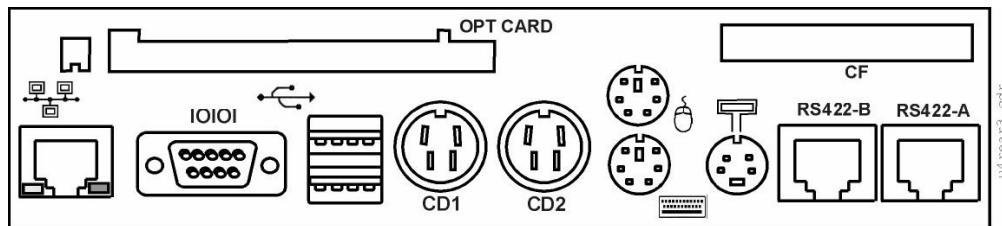
Figure 3-1: Workstation 4 I/O Connector Panel

Working from left to right in the illustration...

OPT Card (Optional)

At the top left of the I/O Panel is access to an optional PCMCIA Daughter Card. Access to the slot is protected by a bracket mounted to the unit with two hex screws.

Established by the Personal Computer Memory Card International Association (PCMCIA), the CardBus PC Card is a 32-bit version of the original 16-bit PC Card standard, offering higher levels of performance and conforming to an established physical form factor.

Currently, PCMCIA device driver support in Windows CE is limited. Consult the Workstation 4 PMA or your MICROS representative for more information about compatible PCMCIA cards.

Compact Flash (CF)

The Compact Flash Card (CF) is factory populated on a daughter card and is accessible from the I/O Panel. In a compromise between security and accessibility, the CF card is protected by a bracket fastened to the case with two hex screws.

After the WS4 is installed and in operation, the CF card contains the 'personality' of the WS4, storing a copy of the Windows CE registry, as well as the POS application and optionally SAR totals. See the Memory Architecture section for more details about how the CF card is utilized.

10/100 Ethernet

The WS4 system board includes a National Semiconductor PCI based 10/100 Ethernet Controller with a UTP modular connector. The modular connector features an integrated isolation transformer as well as a link status and network activity indicators. The interface is fully IEEE 802.3 compliant and features Wake On LAN support.

IOIOI RS232 (COM1)

This industry standard DB9 male connector can be used for serial printer if supported by the POS application. The port is supported by an 16550A UART with a 16-byte receive buffer.

USB
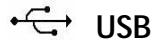
The Universal Serial Bus (USB) interface supports the host controller functions with a built in Root Hub and 2 USB ports. The USB circuitry is implemented based on Open HCI Version 1.1, the Open Host Specification.

USB is based on a tiered star topology capable of operating at speeds of up to 12Mb per second. All USB devices are plug and play compatible and can be attached to the workstation when the power is on.

Consult the Workstation 4 PMA or your MICROS representative for more information about compatible USB devices.

Cash Drawers 1 and 2

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

PS/2 Keyboard and Mouse

The keyboard port supports a standard PS/2 style keyboard. The mouse port supports a PS/2 style mouse or other pointing device.

Customer Display

This connector supports a pole mount Remote Customer Display. The Display contains a two-line display with twenty characters per line. The display can be mounted up to 4ft. from the workstation.

RS422-A (COM4) and RS422-B (COM5)

These multi-purpose ports are configured through application software as either four-wire full-duplex RS422 ports capable of supporting MICROS IDN printing devices or two wire RS232 ports.

> **WARNING:**
>
> Do not insert a 6-Pin modular plug into the 8-Pin RS422-A and RS422-B connectors. The 6-Pin plug can push pins 1 and 6 of the connector (used by the RS232 Interface) out of position where they can short to the connector shell. This can damage the IDN and or RS232 Interface. Always use an 8-Pin modular plug when you connect IDN printers to the workstation

Installation

This section discusses the recommended method of cabling the workstation when used with the Adjustable Stand.

Cabling the Workstation

This procedure describes how to cable the WS4 and attach it to the optional adjustable stand.

1. Attach the AC Power cable to the AC input connector. Secure it to the 'cable cleats' with a pair of tie wraps as shown on the left side of Figure 3-1. The AC cable is somewhat heavier than most peripheral cables and will serve as the 'strength member' for the entire bundle.

2. Connect each peripheral cable to the appropriate I/O connector. Bundle each peripheral together with the AC power cable and attach two tie wraps to the bundle as shown on the right side of Figure 3-1.
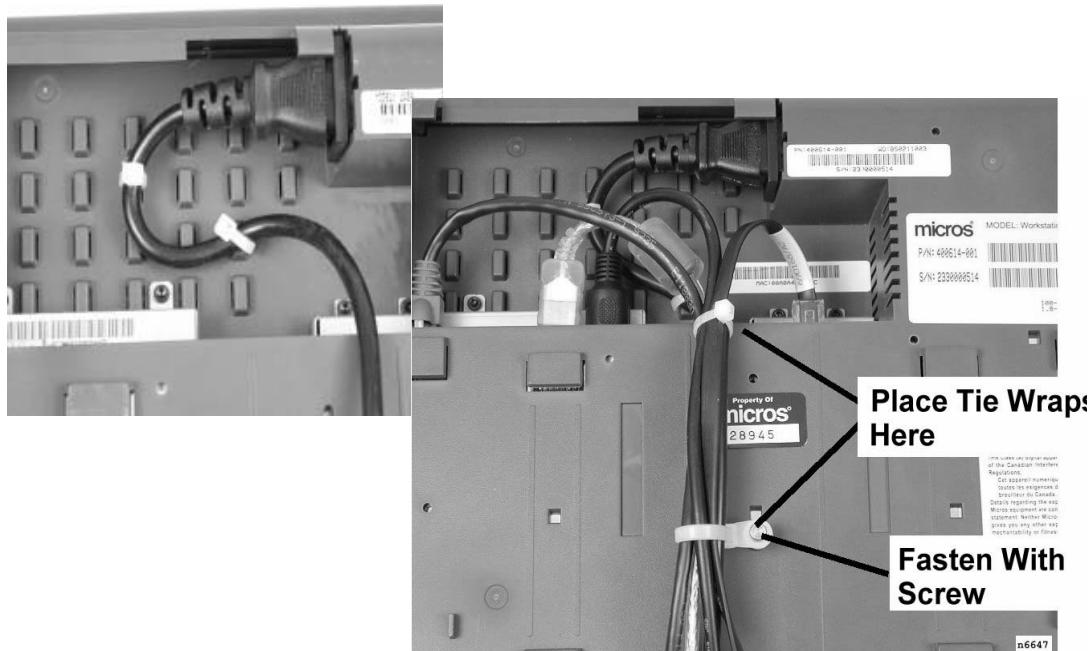
Figure 3-1: Securing the AC Power Cable and Bundling the Peripheral Cables

Figure 3-1 shows two tie wraps. The tie wrap shown in the upper portion of the illustration near the IO panel must be installed as shown to prevent the cable bundle from interfering with cut-outs in the stand when you attach it.

The second tie wrap is supplied with the stand and must be fastened to the case with the screw supplied.

3. Line the four inside plastic hooks on the workstation with the four rectangular holes on the stand and place the unit on the stand as shown in Figure 3-2. The workstation will slide down and lock into place.

Figure 3-2: Attaching the WS4 to the Stand

4. Tilt the workstation to the fully reclined position and install the pair of thumbscrews supplied with the stand to secure it to the workstation. Figure 3-3.
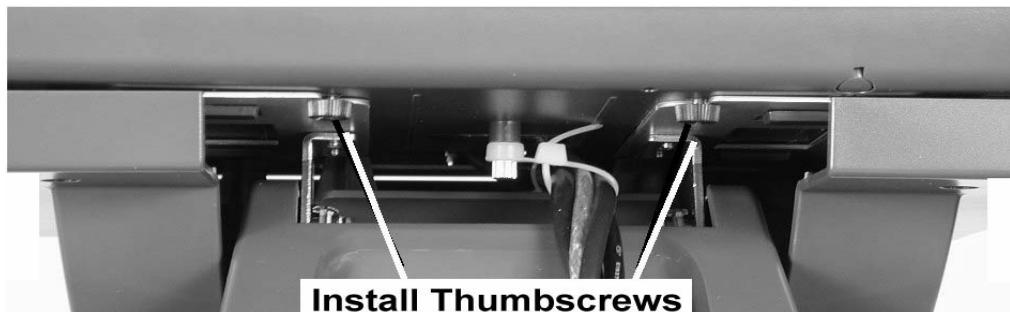
Figure 3-3: Securing the Workstation to the Stand

5. Place your peripherals near the workstation and attach cables as required.

6. Connect the AC power cord to an electrical outlet installed in accordance with the appropriate site prep guide. See the Starting the Workstation for the first time procedure.

Operation

This section presents operational procedures for the Workstation 4 including how to use the power button to transition the unit between the **NOPOWER**, **ON** and **SUSPEND** power states.

Figure 3-4 points out the location of the Workstation 4 Power Switch, Operator LED, Magnetic Card Reader, and the Operator LCD.
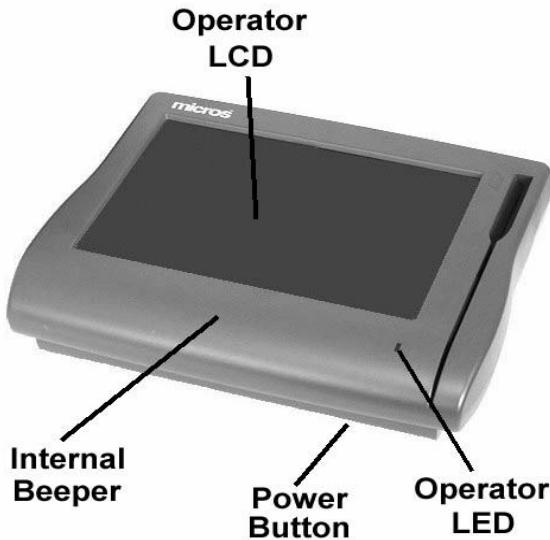
Figure 3-4: Workstation 4 Operator Features

Operator LCD

The Operator LCD is an 12.1" Active Matrix Display with a resolution of 800x600. The 5-wire resistive touchscreen glass is positioned over the LCD.

Power Switch

The power switch is used by the operator to transition the Workstation 4 between the various power management states.

Operator LED

The Operator LED displays the current power state and is capable of displaying three colors - Green, Amber, and Red. In addition, each color can be solid, or blink at one of three rates .25Hz, 1Hz, or 4Hz.

Internal Beeper

A Beeper is located inside the workstation to provide information to the operator about the Workstation's status.

Turning the Workstation from NOPOWER to ON

When the WS4 is in the NOPOWER state, the Operator LCD will be blank and the Operator LED is off. See Chapter 1 for a complete description of the Workstation 4 power management states.

1. Be sure the workstation is connected to AC power.

2. Press the power button for 2 seconds, then release it.

    •   The Operator LED turns Orange as soon as you press the power button, then starts blinking every four seconds until the WS4 boots to the OS.

    •   The Internal Beeper produces a single beep.

    •   The Operator LCD displays a boot splash screen similar to that shown in Figure 3-5. A progress bar centered under the logo indicates that the workstation is proceeding with the boot process. The Windows CE operating system will start in approximately 60 seconds.

Figure 3-5: Workstation 4 Boot Splash Screen

    •   When the workstation completes booting to the operating system, the Operator LED turns solid Green.

    •   If you are starting the WS4 as part of a new installation, see the section entitled 'Starting the Workstation for the First Time' found later in this chapter.

    •   Otherwise, Windows CE will start the MICROS Client Application Loader (CAL) which in turn starts the POS application, presenting the operator with a sign-on screen.

•   If the WS4 boot splash screen does not appear, the progress bar stops, or the beeper sounds more than once, refer to Chapter 4 for troubleshooting information.

Turning the Workstation from *ON* to *NOPOWER*

1. Press and hold the power button until the Operator LED changes from solid Green to OFF, then release it. This takes about 4 to 5 seconds.

Starting the Workstation for the First Time

When a new workstation is powered up for the first time, through a register setting, the CAL starts and determines (by checking other registry settings) that a POS application is not installed. CAL presents User Interface (UI) and proceeds to search the network for a server running the CAL service. When contact is established, a list of computers running CAL server are displayed.

1. Double click the server entry. This will connect you to the device database and display a list of pre-programmed Workstation 4s. See your application programming documentation.

2. Select your Workstation 4 from the list. Double-click the entry.

    *   Each workstation is pre-programmed with a workstation name, IP address, and other application related settings. This information is downloaded to the workstation and placed in the registry.

    *   If the version of the CAL on your workstation is older than the version of CAL on the server, CAL will update itself before proceeding to download the application.

    *   The Workstation proceeds to download the application 'package' and automatically reboots when complete. When the reboot is complete the CAL automatically starts the application.

Using SUSPEND

The Workstation 4 can be placed in **SUSPEND** by the operator when it will not be used for a period of time. **SUSPEND** differs from the **NOPOWER** state in that memory contents are preserved. Restoring the unit from the **SUSPEND** state to **ON** takes less time than the **NOPOWER** to **ON** sequence described above.

Entering SUSPEND

1. When the WS4 is **ON**, press and the power button for less than two seconds, then release it.

    *   The Operator LED indicator changes from solid Green to solid Amber.

    *   The Operator LCD is blank. If a customer display is attached, it will be blank as well.

    *   When in the **SUSPEND** mode, the WS4 will not respond to touchscreen, swiping a magnetic card, or using any peripheral device. The power button must be used to return the unit to the **ON** state, as described below.

Turning the WS4 from SUSPEND to ON

1. When the WS4 is in **SUSPEND**, press and release the power button for one second.

- The Operator LED changes from solid Amber to solid Green.
- The previous LCD screen data is restored. If a customer display is attached, the previously displayed data is restored.

Using the Magnetic Stripe Card

The Workstation 4 Magnetic Stripe Reader is mounted on the right side of the top cover as shown in Figure 3-6, below. A symbolic representation of how the card should be inserted is embossed on the cover. Figure 3-6 shows how to insert the card and pull it through the reader slot past the reader head.

Figure 3-6: Using the Magnetic Card Reader

Tips for using Magnetic Cards

Magnetic cards should always be kept dry, and away from magnets or sharp objects that could damage the encoded information on the card. If a mag card is damp or wet, or appears damaged in any way, DO NOT insert into the reader.

If the unit does not read the mag cards consistently, the read head may be dirty or contaminated. A cleaning card can be used to clean the reader head. This type of card has a felt strip in place of the magnetic stripe which cleans the head as it is swiped through the reader.

Getting to know the Compact Flash Card

If you have not used a Compact Flash (CF) Card before, take a moment to familiarize yourself with this device.

- A CF Card must be installed or the WS4 will not start. A POST error will occur. See Chapter 4.

- The Workstation 4 currently ships with a 64M CF Card. Larger sizes can be used, but please check the Approved CF Card List on the Hardware Support section of the web site.

- Never remove or insert the CF card when AC power is connected. The System Board and CF Daughter Card are not provisioned to support 'hot-swapping'. Always remove the AC power cable from the workstation before inserting or removing the CF card for any reason.

- The CF card is a keyed device - it can only be installed one way, but it is possible to force the card into its socket upside down. A CF card installed at the factory includes a label showing the correct orientation of the card as you insert it. See Figure 3-9 for an example. Also keep in mind that when properly oriented, very little force is required to insert it.

Calibrating The Touchscreen

Calibrating the touchscreen is the process of aligning the touchscreen glass with the underlying video display.

When to Calibrate the Touchscreen

- When installing a new workstation. The first time a WS4 is powered up from the factory, the Touchware Properties Utility starts.
- Any time the cursor does not follow the movement of your finger, or does not reach the edges of the touchscreen.
- If the LCD and or touchscreen glass have been replaced.
- After Performing a workstation 'ID' or personality swap.

Tips for Calibrating the Touchscreen

- Perform the calibration procedure in the position (sitting or standing) that the workstation is normally used.
- Face the Touchscreen directly. If the workstation is on a stand, adjust it to the optimum viewing angle.

Procedure

1. From the desktop, press or click Start -> Settings -> Control Panel, press or click the 'Touchscreen' icon twice to start the calibration program.
    - The Touchware Properties window appears. From this window you can also make other touchscreen related adjustments.
2. Press the Calibrate button.
    - A calibration target appears in the lower left corner of the screen.
    - The calibrate process will terminate within 20 seconds if you do not touch the screen.
3. Position you fingertip precisely over the target, touch, and lift it.
    - The calibration target appears in the upper right corner of the screen.
4. Repeat Step 3.
    - A window appears asking you to test the calibration by ensuring the cursor follows you finger and is able to reach each corner of the screen. Press the [Calibrate] button to re-calibrate or [Done] to continue.
5. Press OK to close the Touchware Properties window.

Personality Swap

The following procedure describes how to remove the Compact Flash personality card from an inoperative WS4 and install it in a replacement WS4. If required, see page 3-14 to learn more about the CF card.

Tools Required

• 2.5mm hex wrench. Included with each Workstation 4 in the loose parts kit.

• Small or Medium Wire Cutters. Most installations use tie wraps to secure cables to the cable cleats at the I/O panel. These tie-wraps must be removed before a workstation can be replaced.

Procedure:

1. Remove all cables from the inoperative workstation's I/O panel including the AC Power Input.

   • If may be helpful to create a diagram of where each cable is connected as you remove it.

   • If a cable is fastened to the cable cleats with tie-wraps, use the wire cutters to clip them.

   • If the WS4 is mounted to the optional stand, remove (but do not cut) the tie wrap fastened with a screw to the base of the unit. This and other tie-wraps used to bundle the cables can be re-used.

2. Place the inoperative unit face down on a counter surface to access the Personality Card bracket. Figure 3-7.
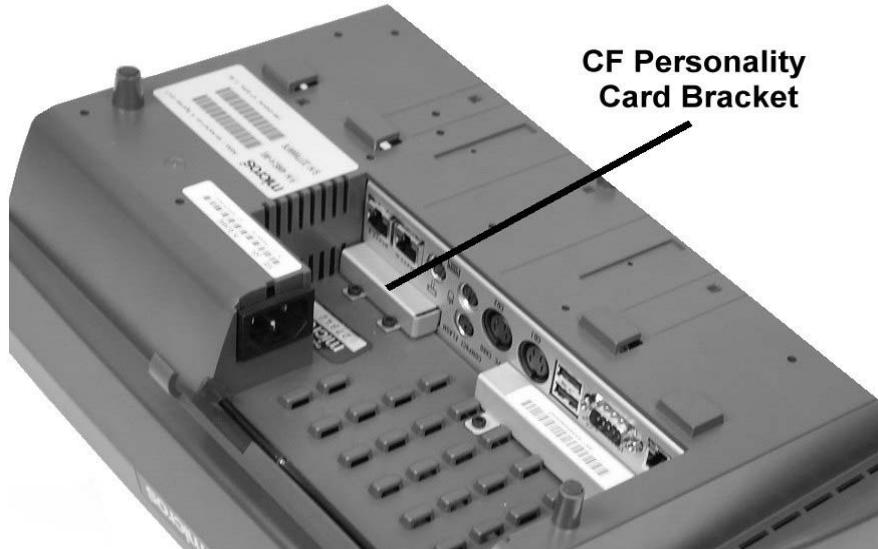
Figure 3-7: WS4 Personality Card Location

3. Insert the hex wrench into the bracket screws and turn it counter clock-wise to remove each screw.

4. Remove the bracket. Set the bracket and screws aside for the moment.

   • Figure 3-8 shows the CF personality card with the bracket removed. Note the keying lip on the bottom of the card and the guides that hold it in place.
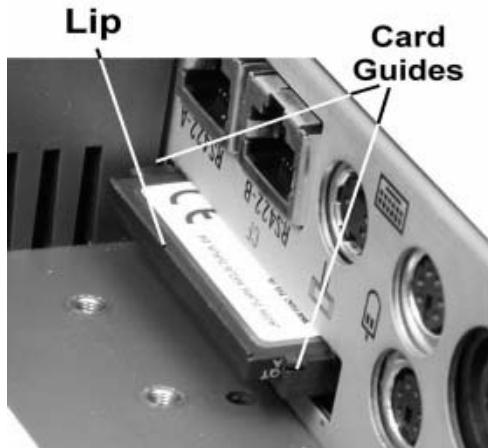
Figure 3-8: Compact Flash Card Removal

5. Remove the CF card from the inoperative WS4. Use your thumbnail or pen to catch the lip and remove the card from the socket. Figure 3-8. *Hold on to this card - it must be inserted into the replacement WS4.*

6. Un-box and remove the packing material from the replacement WS4. If a CF card is installed in this unit, repeat Step 4 to remove the bracket, then Step 5 to remove the CF card. Set this card aside for the moment.

To assist in orienting the card as you install it, a label similar to that shown in Figure 3-9 will be added to the CF card after July 2003. Note the arrow showing the proper orientation of the card.
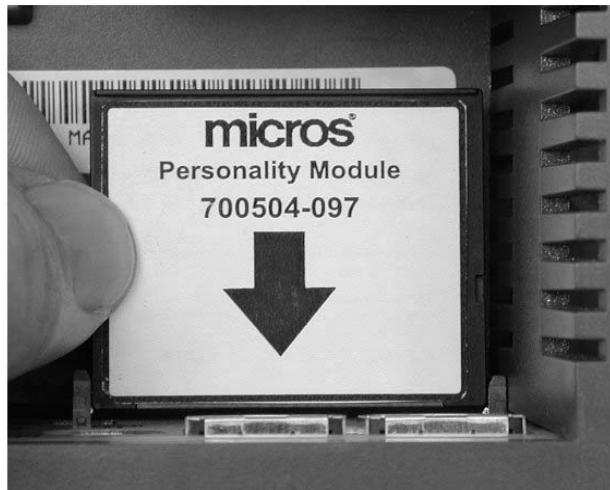
Figure 3-9: CF Personality Card Label

If the label is not present, Figure 3-10 denotes the location of a lip that can also assist you in orienting the card as it is installed.
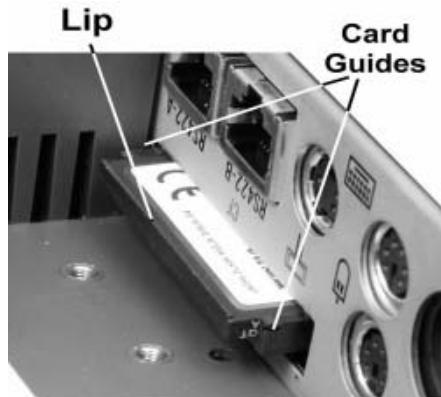
Figure 3-10: CF Personality Card Orientation

7. Install the personality card removed from the inoperative WS4. Refer to Figure 3-11, it displays a series of illustrations describing how insert the card.

Figure 3-11: Inserting the CF Card

Starting at the top of Figure 3-11, position the CF card as shown with the lip and label facing you, then insert it into the guides. When the card is properly aligned in the guides as shown in the middle illustration, rotate it to the position shown in the middle illustration, then push the card in until it is fully inserted. It does not require a great deal of force to insert the card. If it does, recheck the orientation of the card before proceeding.

8. Re-install the CF card bracket and fasten with the pair of screws.

9. Re-cable the replacement WS4. Reconnect each cable to the appropriate I/O connector. When complete, this unit will be ready for use.

10. Install the CF card removed from the replacement WS4 in the inoperative WS4 as described in Step 7. Replace the bracket and screws. Use the packing material and re-box this unit for return to the depot repair center.

Chapter 4

Workstation 4 Diagnostics

This chapter includes diagnostics information on the Workstation 4.

In this chapter

Basic Troubleshooting

This section provides a brief troubleshooting chart for the Workstation 4.

Problem	Possible Cause	Solution
WS4 is dead. Operator LED Indicator is Off. Operator LCD does not display blue splash screen. Beeper does not sound.	No Power to WS4	Be sure AC power cable is connected to the workstation and surge protector outlet or wall outlet. Press the power switch for 2 seconds, then release it.
Operator LCD is blank. LED Indicator is solid Amber. WS4 does not respond to touchscreen or mag card swipe.	WS4 is in Suspend mode	Press the power button for two seconds, then release it. Display should be restored.
The Beeper Sounds once. Operator LCD displays blue screen but multiple beeps are reported. Operator LED is blinking Red four times per second (.25Hz).	Power On Self Test (POST) Error See POST Section	Replace WS4.
The Beeper Sounds once. Operator LCD displays blue screen but hangs before booting. Operator LED is blinking Amber times per second (.25Hz).	Defective or Corrupted Disk On Chip.	Replace WS4.
WS4 does not connect to LAN.	Network Patch cable not connected.	Install appropriate patch cable between workstation and wall jack.
System cannot read mag cards.	Mag card read head dirty or contaminated. Mag card reader defective.	Use mag card cleaning kit on reader. Replace mag stripe reader.

Power On-Self Test (POST) Errors

Should the POST encounter a problem, the single beep will be followed by a combination of long and short beeps detailed in the table below. There is little difference between a short and long beep, you may have to hear the beep code several times to interpret it.

In addition to multiple beeps, the Operator LED blinks Red once every four seconds. All POST errors are considered fatal and will prevent the WS4 from booting to WinCE.

How the WS4 behaves after encountering the POST error depends on the boot loader version. The boot loader version can be determined by checking the System Information screen in the WS4 Diagnostics Utility.

If the POST in Boot Loader V2.0.08 or earlier encounters an error, the beep code sounds once, the WS4 halts and does not respond to the power button. You must remove, then reconnect the AC power cable to restart the unit.

If the POST in Boot Loader V2.0.09 or later encounters a problem, the error code sounds three times and halts, but the WS4 responds to the power button.

Please note that WS4 Diagnostic Utility versions prior to 1.87 do not display the Boot Loader version correctly. For example, Boot Loader version 2.0.08 is incorrectly reported as version 2.08.

WS4 POST errors are summarized in the following table.

Beep Code	LED	Description	Note
1 Short (No other beeps)	Amber 0.25Hz	POST OK - No Problem Found - System should boot to Windows CE	
1 Long	Red Solid	DOC present, but OS image not found	1
Short-Long-Short	Red 0.25Hz	Missing or defective DOC	2
Short-Short	Red 0.25Hz	Missing Compact Flash Card	3
Long-Short	Red 0.25Hz	Defective SDRAM (DIMM1)	4
Short-Long	Red 0.25Hz	Defective Touchscreen Controller U40	5
Long-Short-Long	Red 0.25Hz	Defective EEPROM U21	6
Long-Long	Red 0.25Hz	PCI Bus Error	7

Note 1

The POST detected the Disk On Chip, but the boot partition and or Windows CE OS image was not found.

Note 2

The POST did not detect the Disk On Chip. This could be result of the device not being installed, not formatted, defective, or a system board/socket problem preventing the POST from accessing the DOC.

Note 3

The POST cannot detect the Compact Flash (CF) Card. It is either not installed, defective, not formatted as a Windows file system, or a system board/daughter card socket problem is preventing the POST from accessing the card.

Note 4

If the POST indicates a touchscreen controller failure, make sure there are no objects such as a pencil or pen on the screen. Cleaning the screen or placing an object on the touchscreen during the POST can cause the touchscreen controller to fail.

Note 5

The POST SDRAM test toggles each bit in each memory location by reading and writing 0xAA and 0x55 patterns. The test will not detect a missing DIMM. If the DIMM is missing, the beeper will sound once, but the blue splash screen and logo do not appear.

Note 6

EEPROM U21 stores the system board serial number and the last power management state.

Note 7

This error indicates a problem was found on the PCI Bus and could point to any of the following devices.

- Ethernet Controller and Serial EEPROM.

- USB Controller.

- TFT Video Controller.

- IDE Controller.

- Audio Controller.

Workstation 4 Diagnostics Utility

The Workstation 4 includes a diagnostics utility located on the Disk On Chip. Based on the DEMODIAG utility found in the MICROS PC Workstations, the WS4 Diagnostics Utility includes a comprehensive test of the internal hardware and peripherals including IDN printing devices.

Update Highlights

The Diagnostics Utility continues to be updated to support the latest enhancements. Listed below are some of the features and bug fixes that have been added since release.

Version 1.87

o   *Boot Loader version display bug*. Boot Loader version 2.010 now correctly displays as 2.0.10.

o   *LCD Display Test* - now displays up to five solid colors on the Operator LCD to assist in detecting hot or cold pixels.

Version 1.90 (Included with GR 1.2)

o   *System Info Dump*. A new button on the System Info screen writes all values to a text file called WS4Dump.txt on the root of the CF Card.

o   *Rear and Pole LCD Customer Display Support* - New tests include Backlight Control, Contrast Adjust, Pixel ON/OFF, Reset, firmware version reporting and firmware upgrades. The LCD Customer Display can operate on Revision D through G system boards, but a Revision I system board must be used to perform firmware upgrades.

Running the WS4 Diagnostics Utility

The diagnostics utility is included in the utilities folder of the Disk On Chip.

Procedure:

1. From the Desktop, touch the My Computer icon twice.

2. Touch the DOC icon twice.

3. Touch the Utilities folder twice.

4. Touch the 'DiagUtilty' icon twice to start the WS4 diagnostics utility.

    o   The WS4 Diagnostics utility starts and displays the System Info Screen, described in more detail in the next section.

System Information Screen - Hardware Components

When the WS4 Diagnostics Utility is started, it displays the System Information screen, shown in Figure 4-1, below. The following section details each of the hardware components found on this screen.

Figure 4-1: The System Information Screen (Hardware Platform)

The System Information screen combines many of the WS4 hardware and software components into a central location. In general, the left half of the screen displays hardware related information, while the right half displays information about the software platform components. A brief description of the hardware components follows.

Diagnostic Version

This field displays the WS4 Diagnostic Utility Software Version.

Hardware Revision

This field displays the WS4 System Board hardware revision. It is read directly from the system board by the WS4 API. Most current units in the field will include Revision D through G system board. There is very little difference between these boards in terms of feature set.

However, in the September-October 2004 time frame, the Revision I System Board will appear. This system board adds new features and capabilities and ships with the GR1.2 software platform files. These workstations will also ship with the Sharp LCD and use different LCD and Backlight cables. Details on this board will be included in a future release of the WS4 Field Service Guide.

CPU Type

All current and future Workstation 4 system boards run the AMD Geode SC3200. AMD purchased the National Semiconductor Corp. Geode embedded processor line in 2003.

RAM Space Available

This field displays the amount of available RAM, located in the single DIMM installed on the system board. The value displayed on your WS4 will not always agree with that shown in Figure 4-1. This because early units shipped with a 64M DIMM, while the workstation currently ships with a 128M DIMM. The change from 64M to 128M was not driven by application software requirements, but memory price points. A 64M DIMM is adequate to run all current application software.

CPLD Version

The CPLD (Complex Programmable Logic Device) is located on the WS4 System Board. Greater detail can be found in the system board technical descriptions located in the WS4 Field Service Guide. The device contains a microprocessor and firmware, therefore the CPLD Version field refers to the firmware version running on that device.

The CPLD firmware can only be changed using a specialized parallel port programmer attached to system board connector J16. The factory and authorized repair centers have this capability.

Boot Loader Version

The Boot Loader is located on the WS4 system Board. Greater detail can be found in the system board technical descriptions located in the WS4 Field Service Guide or in Chapter 1 of this manual.

The Boot Loader is a Flash EEPROM programmed at the factory. Page 4-3 details changes to the Boot Loader that affect how the WS4 behaves if a POST error occurs. In January 2004, a change made to the Boot Loader (Version 2.0.10 or later) provides support for a Sandisk (202 Series) 64M CF Card.

After the WS4 leaves the factory, the boot loader can be updated in one of two ways. One way is the DOC Utility, or DOCUTILITY.EXE, located in the \DOC\Utilities folder. DOCUTILITY also supports a command line mode that allows the CAL to upgrade the Boot Loader as part of an application download or upgrade. In either case, the Docutility requires that a binary file called LOADER.ROM is present on root of the CF card.

CF Space Available

This field displays the space available on the CF Card. The value displayed on your WS4 will not always agree with that shown. Figure 4-1 displays the available space on a factory fresh 64M CF card *before* the POS application and support files are installed. In addition, early units shipped with a 32M CF Card, while the workstation currently ships with a 64M CF Card. An optional 128M CF card is available.

CF Serial Number

This field displays the CF Card serial number. The number displayed is actually derived from the Volume Serial Number assigned to the card when the Windows File System format is applied by the manufacturer of the CF card.

DOC Space Available

This field displays the free space available on the Disk On Chip. All units ship with a 32M device; migration to a larger device is not anticipated at this time. Unlike the values shown in the RAM or CF Space Available fields, the value displayed in this field will be consistent across most workstations. This is because the DOC contains the WinCE operating system, software utilities such as the CAL, and the software platform files described in greater detail in the following section.

Physical Address

This field displays the network Media Access Control (MAC) number assigned to the system board Ethernet Controller at the factory. Each workstation will display a unique value in this field.

Motherboard Serial Number

This field displays a 19-digit serial number created at the time the system board is manufactured. The number is stored in a serial EEPROM. Each workstation will display a unique value in this field.

System Information Screen - Software Platform Components

Figure 4-2 displays the System Information Screen with the software platform components highlighted. The software platform is composed of the WinCE .NET operating system and a collection of WS4 specific device drivers and utilities installed on the DOC as it leaves the factory. The software platform is a foundation upon which all POS client applications are installed.

Collectively, the software platform components are referred to as a General Release (referred to as GR x.x). GR 1.0 has been in place since product release, and is current as of June 2004. However, changes are on the horizon. The first will be driven by the change over from the end-of-life Samsung LCD panel to the replacement Sharp LCD Panel (GR1.1).

GR1.2 Features

- Support for the Revision I System Board COM 3 Muxtiplexer.

- Support for the Rear and Pole LCD based customer display.

- Updated 3M Touchware Calibration Utility that fixes the 25-point calibration issue reported in FB04-003.

WS4 Diagnostic Utility

Diagnostic Version	1.87	UWS4.DLL Version	1.06
Hardware Revision	G	UWS4Power.DLL Version	1.05
CPU Type	National Geode	PRD.DLL Version	1.00
RAM Space Available	51949568 Bytes	LED.DLL Version	1.00
CPLD Version	10	EEPROM.DLL Version	1.01
Boot Loader Version	2.0.10	WS4Beep.DLL Version	1.02
CF Space Available	31950848 Bytes	WinCE Version	4.10.908
CF Serial Number	4932295321	MICROS Build Version	11.1
DOC Space Available	3426304 Bytes	CAL Version	1.0.2.27
Physical Address		DHCP Server Address	
Motherboard Serial		IP Address	

Figure 4-2: The System Information Screen (Software Platform GR 1.0)

UWS4.DLL

This file contains the Workstation 4 API, or Application Programming Interface. POS Applications use the API to access hardware such as the Cash Drawers, Mag Stripe Reader, and IDN Interface. The GR 1.2 platform updates uws4.dll with many new features to support the graphics based LCD customer display.

UWS4Power.DLL

This driver controls the power button while WinCE is running. It polls the system board CPLD every 150 milliseconds checking for switch closures and transitions the workstation between the various supported power management states. In addition, applications such as the CAL call on this driver to force a restart of the workstation during upgrade cycles. When the unit is in the **NOPOWER** or **SUSPEND** modes, the CPLD controls the power button.

PRD.DLL

The PRD, or Persistent Registry Driver manages the WS4 persistent registry. When the workstation boots and starts WinCE, the PRD retrieves the persistent registry from the CF Card and places it in RAM as the working registry. As the workstation operates, changes are made to the working registry by applications, or utilities such as the CAL, and the PRD periodically copies these changes to the CF card in the background.

LED.DLL

The LED driver controls the Operator LED color and blink rate while the operating system is running. At start-up, the Boot Loader controls the Operator LED, turning it solid green as the operating system starts. A POS application access the Operator LED through this driver.

EEPROM.DLL

This file provides access to the system board serial EEPROM, used to store the system board serial number and last power management state.

WS4Beep.DLL

This driver allows POS applications to access the system board beeper. At boot time, the Boot Loader controls the beeper.

WinCE Version

The current Microsoft WinCE Version number.

MICROS Build Version

The MICROS Build version represents the combination of the WinCE operating system and it's internal drivers. An internal driver is not accessible in the same manner as the WS4 platform drivers located on the \DOC, but are included in the OS image by the WinCE Platform Builder. All WinCE device drivers fall into this category. Another example is the 3M Touchscreen drivers and utilities. Should a change be required to these drivers, a new operating system image is created and the MICROS Build Version number is updated.

CAL Version

This field displays the current CAL Client Version residing on the workstation.

Using the Soft Keyboard

Some of the diagnostics procedures may require a keyboard for alpha or numeric entry. No need to connect a physical keyboard, however, a USB or PS/2 keyboard can be connected if desired. Windows CE provides a soft keyboard as part of the Software Input Panel. It is located at the right side of the task bar tray at the lower right of the desktop near the time display.

To use the soft keyboard, touch the pencil icon once, then touch the 'LargeKB' entry from the menu that appears. The keyboard can be repositioned by pressing and holding the gray bar at the top of the keyboard with your finger, and dragging it to the desired position. To disable the keyboard, press the pencil icon again and select 'Hide Input Panel' from the menu that appears.

Testing the WS4

Many of the tests are self-explanatory or include on-screen help.

To perform a Cash Drawer test, apply the following formula to the six-digit number that appears when you attempt to access the test:

Digit 1 x Digit 2 + Digit 4 + Digit 6 = Access Code

For example, if the number is 374236, the formula would be 3 x 7 + 2 + 6 = 29.

Enter the calculated access code from the soft keyboard and press Return to access the Cash Drawer Test.

Workstation 4 Wipe Compact Flash (WCF) Utility

In addition to the Diagnostics Utility, the \DOC\Utilies folder also contains WCF.EXE, the Wipe Compact Flash utility. Originally developed for the WS4 production line, it has also been useful during the initial testing of Windows CE and POS Applications. We feel it has use as a service tool.

> **CAUTION:**
>
> However, if used in a careless or malicious manner, WCF is capable of deleting optional SAR totals and rendering a functioning workstation temporarily inoperable. WCF is not required during on-site setup and operation of the WS4 and could be removed from the DOC before installation.

When you start the utility by double clicking or touching WCF.EXE, it displays two options, detailed below.

• *Clear all Registry Settings?*

This selection deletes the copy of the persistent registry stored on the CF Card. It is used at the factory just prior to shipping the unit to clear any registry changes made during testing.

• *Erase Compact Flash?*

This selection erases the entire contents of the CF card including the persistent registry folder, the POS application and SAR totals, if present.

> **NOTE:**
>
> The WCF utility deletes the files indicated, it does not format the CF card. To format a CF card, it must be removed from the WS4 and installed in a USB or PCMCIA CF card reader and formatted through Windows Explorer.

After execution of either selection, WCF restarts the WS4 using the factory default register settings. The default registry starts the CAL client, and assuming the CAL server is configured properly, a new or updated application can be downloaded within minutes.

WS4 Glossary

API

Abbreviation for Application Programming Interface (API). The WS4 API is a direct descendant of the PCWS hardware API that resides between an application and the hardware, providing a set of hardware services that the application programmer can call upon to access the POS features of the Workstation 4.

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 CPLD 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.

Backlight

One or more fluorescent lights located behind the LCD panel of an active or passive display. It illuminates the panel to make the background brighter and its contents sharper, especially under dim lighting.

Boot Loader

The WS4 Boot Loader is contained in a 2M Flash EEPROM located on the system board. Boot loaders are specific to a given CPU and chip set, in this case, the x86 compatible AMD Geode SC3200 WebPad on a Chip, which includes the GX1 processor core.

When the WS4 is started, the boot loader performs platform initialization and runs a Power On Self Test (POST) customized for the system board hardware. Once the POST is complete, the boot loader copies the Windows CE image into RAM and starts it.

The boot loader also contains a collection of functions unique to the WS4 hardware platform. These functions permit access to platform specific hardware such as memory, IO ports and handles such tasks as checking the CF card for OS image updates, managing the Operator LED and controlling backlight brightness.

CAL

Abbreviation for Client Application Loader. The MICROS CAL is a software utility that assists in the installation of the Workstation 4 application software, then manages the ongoing maintenance of the operating system and application software. The CAL consists of two parts, one part resides on the WS4 client and the second part resides on the system server.

CEPC

Abbreviation for Windows CE Platform Builder. The CEPC is a tool used to build the WinCE OS image. The CEPC allows the developer to target a hardware platform like the x86 based WS4 and build it with selected components appropriate to the platform.

CF Card

Abbreviation for Compact Flash card. Compact Flash is a matchbook size removable mass storage device first introduced in 1994 by SanDisk Corporation. CF cards are designed with flash technology, producing a non-volatile storage solution that does not require a battery to maintain. Because a CF card is solid state device with no moving parts, it provides five to ten times the reliability of a conventional magnetic disk drive.

CF cards are available in sizes ranging from 8M to 1G. The Workstation 4 currently uses a 32M CF Card installed in an accessible but secure location near the I/O panel connector. Larger sizes may used in the future. In the WS4 memory architecture, the CF card contains workstation 4 'personality'. It contains the POS application, a current copy of the Windows CE registry, and optionally, SAR data.

Client

A workstation or personal computer that requests services from a server over the network. The server is usually a high-speed personal computer with fast hard drives providing access to database services. The client provide the user interface and may perform some or all of the application processing depending on which POS application software is in use.

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.

CPLD

Abbreviation for Complex Programmable Logic Array. The WS4 system board uses one of these devices, custom programmed to handle such tasks as power button management, controlling cash drawers, and backlight LCD brightness.

Customer Display

A display that shows the customer information about the transaction being performed on the workstation. A customer display can be mounted behind a window on the rear of the terminal or mounted at eye level on a pole located near the workstation.

The Workstation 4 customer display is a pole mount version which displays alpha-numeric character in a 2x20 format.

DIMM

Abbreviation for Dual In Line Memory Module.

Device Driver

A program that is linked with and extends the operating system to provide an interface to a hardware not originally supported by the operating system. Device drivers are typically included with add-on hardware devices such as modems or PCMCIA cards.

DOC

Abbreviation for Disk On Chip. The WS4 uses the Disk On Chip 2000, a single chip solid state flash drive packaged in a 32-Pin-Dual-In-Line Package (DIP). Combining a disk controller with flash memory, the device is available in capacities ranging from 16M to 1G. Future versions will offer increased capacity. The WS4 will ship with a 32M part initially.

Using TrueFFS technology, the Disk On Chip appears as a windows file system and includes the ability to boot the Windows CE operating system. The Disk On Chip contains the Windows CE OS image along with all device drivers and utility programs such as diagnostics and the MICROS CAL.

IDN

Abbreviation for Integrated Device Network. Also referred to in previous MICROS documentation as the Stand-alone Device Network or Remote Printer Networks. The MICROS IDN is based on 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 primarily consist of thermal and dot matrix based roll printers.

The Workstation 4 has two RS422 ports, labelled RS422-A and RS422-B, each of which is capable of driving IDN devices. However the application software determines which port will be used for IDN printing.

LED

Abbreviation for Light Emitting Diode. A LED is 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 Workstation 4 Operator LED is a two color device, modified to display Green, Amber, and Red colors. Each of the three colors can be combined with 4 unique blink rates to provide twelve discreet indications.

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.

LVDS

Abbreviation for Low Voltage Deferential Signalling.

Magnetic Stripe Card

A plastic or paper card with a magnetic stripe attached. The magnetic stripe has the same qualities as magnetic tape.

See Also MAGTEK Mode and Special Mode.

MSR

Abbreviation for Magnetic Stripe Reader. An MSR contains a transducer that reads the data from multiple tracks on a mag stripe card. The workstation 4 is equipped with a 3-track MSR.

See also: MAGTEK Mode and Special Mode.

MAGTEK Mode

MAGTEK mode emulates the output from the MAGTEK series of card readers manufactured by MAGTEK, Inc. In MAGTEK mode, the WS4 hardware converts the MSR track data into a series of keystrokes that the API directs into the window that has focus under Windows CE.

MAGTEK mode is typically used for swiping MICROS employee and manager cards in MICROS applications.

See Also: Special Mode.

Memory

A generic term for a device that stores information in a form that the CPU can recognize and manipulate. Memory appears in several forms, each of which has a specific role in the Workstation 4.

A distinction must be made between the primary and secondary storage in microprocessor based systems. Memory devices such as Flash EEPROMs and SDRAM, are considered to be primary storage because they store information in a form that is immediately accessible to the processor through its address and data busses.

Secondary storage (sometimes called mass storage) is composed of the Disk On Chip and Compact Flash both of which serve as the workstation's long term memory. The Disk On Chip contains a copy of WinCE and drivers and is configured to boot the workstation. The CF card stores the WinCE registry, POS application and optionally transaction data.

To be of use, this data must be moved from the mass storage device into primary storage, in this case, the SDRAM where it can be accessed and manipulated by the CPU. The bootloader and WinCE OS manage this.

See also: SDRAM.

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. Operating systems perform other tasks such as establishing the structure of the disk file system, moving executable files from disk to memory, network communications, and system security.

Examples of operating systems are Microsoft Windows CE, Microsoft Windows XP.

PCMCIA

Abbreviation for Personal Computer Memory Card International Association. The Workstation 4 includes a single Type II 32-bit PCMCIA CardBus slot, accessible from the connector IO panel. The CardBus PC Card is a 32-bit version of the original 16-bit PC Card standard, offering higher levels of performance.

Part of the PC Card family, a CardBus PC Card conforms to an established physical form factor, providing a rugged card that can be inserted completely in its host workstation without any external cabling (except when the card must be attached to a LAN, telephone line, or a wireless antenna).

Poly Switch

Like a traditional fuse, a Poly switch fuse limits the amount of current flowing through a circuit to prevent damage should a fault condition occur. Unlike traditional fuses however, when the over-current fault is removed, the poly switch automatically resets and does not have to be physically removed from the board and replaced.

The WS4 system board uses poly switches on the PS/2 Mouse/Keyboard, remote customer display, backlight inverter, cash drawer outputs, and USB ports.

POST

Abbreviation for Power On Self Test. In the Workstation 4, the POST is built into the Boot Loader, which executes each time the workstation is powered up. It checks for the presence of the Disk On Chip and Compact Flash Card, checks several key hardware circuits. If these devices are missing or defective, the POST flashes the Operator LED and sounds the beeper in a predefined fashion to report the error.

Registry

The registry is a database that acts as a central repository for all hardware and software configuration information for the Windows operating system and applications.

When Windows CE is running, the registry is located in RAM where it can be quickly accessed. When the OS or application examines, modifies, or creates a registry entry, it occurs in the RAM version, called the *Working* registry.

A driver called the Persistant Registry Driver (PRD) periodically copies the working registry in RAM to the Compact Flash card where it becomes the *Persistant* registry. This protects the registry contained in RAM, which will be lost if AC power fails. If AC power is lost, the PRD restores the persistant registry on the CF to RAM when the OS boots.

Because the CF card contains in addition to an up-to-date copy of the system registry, the POS application and optionally SAR data, it represents the personality of the workstation. This forms the basis of a WS4 'personality swap.'

Registry Editor

An editor that can modify the contents of the *Working* registry directly, but is only used for technical reasons or as a last resort. Registry settings are typically modified only by application installation programs, or by changing settings in the Windows Control Panel.

RJ-11 Connector

A four or six pin modular telephone connector. The IDN located on IDN devices is an example of a six-pin RJ-11 connector.

RJ-45 Connector

An eight-pin modular telephone connector. A 10/100 BaseT Ethernet connector is an example of an RJ-45 connector.

RS232

Abbreviation for Recommended Standard 232. A physical layer standard for serial transmissions between computers and serial devices (mice, modems, printers) that are less than 50 feet apart.

The RS232 specification defines signal lines, voltage levels, and connector pin-outs and is issued by the Electronics Industry Association and Telecommunications Industry Association.

The Workstation 4 has a total three RS232 ports.

RS422

Abbreviation for Recommended Standard 422. A physical layer standard for serial transmissions that extend beyond RS232.

The RS422 specification defines signal lines, and voltage levels and is issued by the Electronics Industry Association and Telecommunications Industry Association.

A full-duplex version of RS422 is used by the Workstation 4 to drive IDN printing devices. The workstation has two RS422 ports.

RTC

Abbreviation for Real Time Clock. The RTC is connected to a battery and separate crystal oscillator to maintain time-keeping when the workstation is unplugged or turned-off. When an operating system such as WinCE CE starts, it reads the contents of the RTC to obtain the current time and date.

SAR Client

Abbreviation for Stand Alone Resilient Client. SAR is an option available with some POS applications that permit the client workstation continue to perform basic POS transactions should the server or network connection to the server fail. Transaction data is stored locally on the client until the network connection or server is restored. POS applications supporting the SAR Client on the WS4 use the CF card to store transaction data.

When the network connection is restored, system totals are automatically balanced, allowing a smooth return to normal operations.

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 133MHz. SDRAM technology allows two pages of memory to be opened simultaneously.

Special Mode

A Magnetic Stripe Reader input mode which buffers track data into the API, allows the POS application to detect that the MSR track data is available, then allows the application to retrieve MSR data for processing.

See Also: MAGTEK Mode.

System Board

The motherboard or mainboard for the Workstation 4. The System Board contains the majority of the workstation circuitry including the CPU, Chipset, SDRAM, Disk On Chip, Compact Flash, and Input/Output Ports.

TCP/IP

Abbreviation for Transport Control Protocol/Internet Protocol.

Windows CE is supplied with a TCP/IP stack and is the only network transport protocol supported.

UPS

Abbreviation for Uninterruptable Power Supply. A backup power supply that provides power to the workstation when the line voltage fails or drops to unacceptable levels. (like off). The UPS keeps the workstation running with a battery powered DC-to-AC inverter circuit. The amount of time the UPS can power the workstation is determined by the load requirements of the workstation and the capacity of the UPS.

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.

The WS4 includes two USB 1.0 compatible ports. Currently, only a USB keyboard and mouse are supported.

Appendix A

Equipment Dimensions

In this appendix

Workstation 4 - Low Profile

ws4lp-dim.cdr
March 2004

296mm

110mm

NOTES:

1. Cables exit from rear of unit.
2. Leave room at front/side of unit for card swipe and power button.
3. Orient unit to avoid glare on touchscreen from overhead lights.
4. Cash Drawers located at customer's discretion.
5. 77mm hole required under unit if Cash Drawer mounted under counter.

Magnetic Card Slot

Power Button

340mm

Workstation 4 - Low Profile with Rear LCD Customer Display
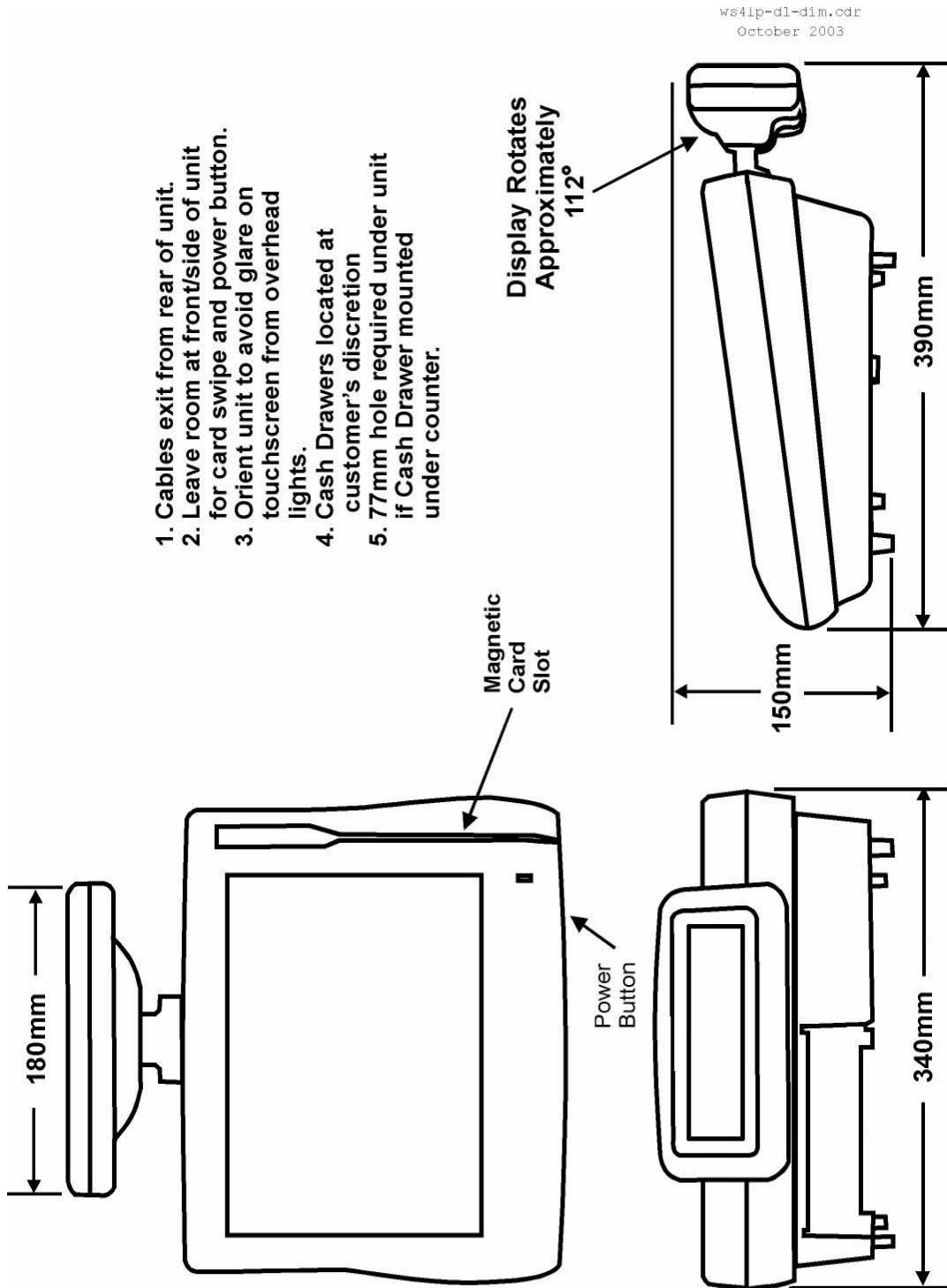
ws4lp-dl-dim.cdr
October 2003

Display Rotates
Approximately
112°

390mm

150mm

1. Cables exit from rear of unit.
2. Leave room at front/side of unit for card swipe and power button.
3. Orient unit to avoid glare on touchscreen from overhead lights.
4. Cash Drawers located at customer's discretion
5. 77mm hole required under unit if Cash Drawer mounted under counter.

Magnetic
Card
Slot

Power
Button

180mm

340mm

Workstation 4 on Adjustable Stand

ws4st-dim.cdr
Jan 2003

Magnetic Card Slot

Power Button

Cable Slot

340mm

325mm

204mm

330 (max)

290 (max)

204mm

NOTES:

1. Cables from IO Panel routed through cable slot to exit stand
2. Leave room at front/side of unit for card swipe and power button.
3. Orient unit to avoid glare on touchscreen from overhead lights.
4. Cash Drawers located at customer's discretion.
5. 77mm hole required under unit if Cash Drawer mounted under counter.
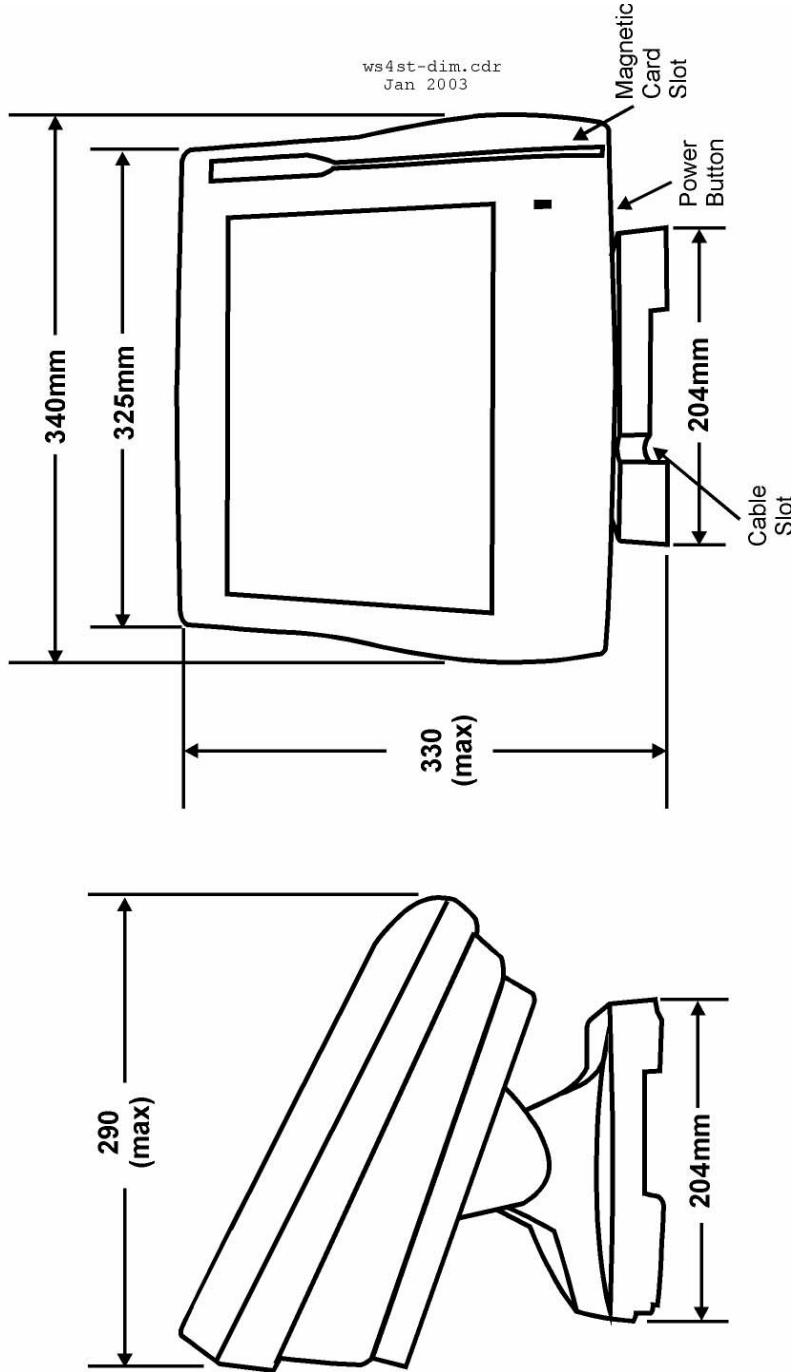
WS4 on Adjustable Stand with Rear LCD Customer Display

ws4st-lcd-dim.cdr
March 2004

Magnetic Card Slot

Power Button

Cable Slot

340mm

325mm

180mm

204mm

80mm

296mm

30mm

350mm (max)

55mm (max)

204mm

390mm (max)

Display Rotates Approximately 112°

NOTES:

1. Cables from IO Panel routed through cable slot to exit stand
2. Leave room at front/side of unit for card swipe and power button.
3. Orient unit to avoid glare on touchscreen from overhead lights.
4. Cash Drawers located at customer's discretion.
5. 77mm hole required under unit if Cash Drawer mounted under counter.
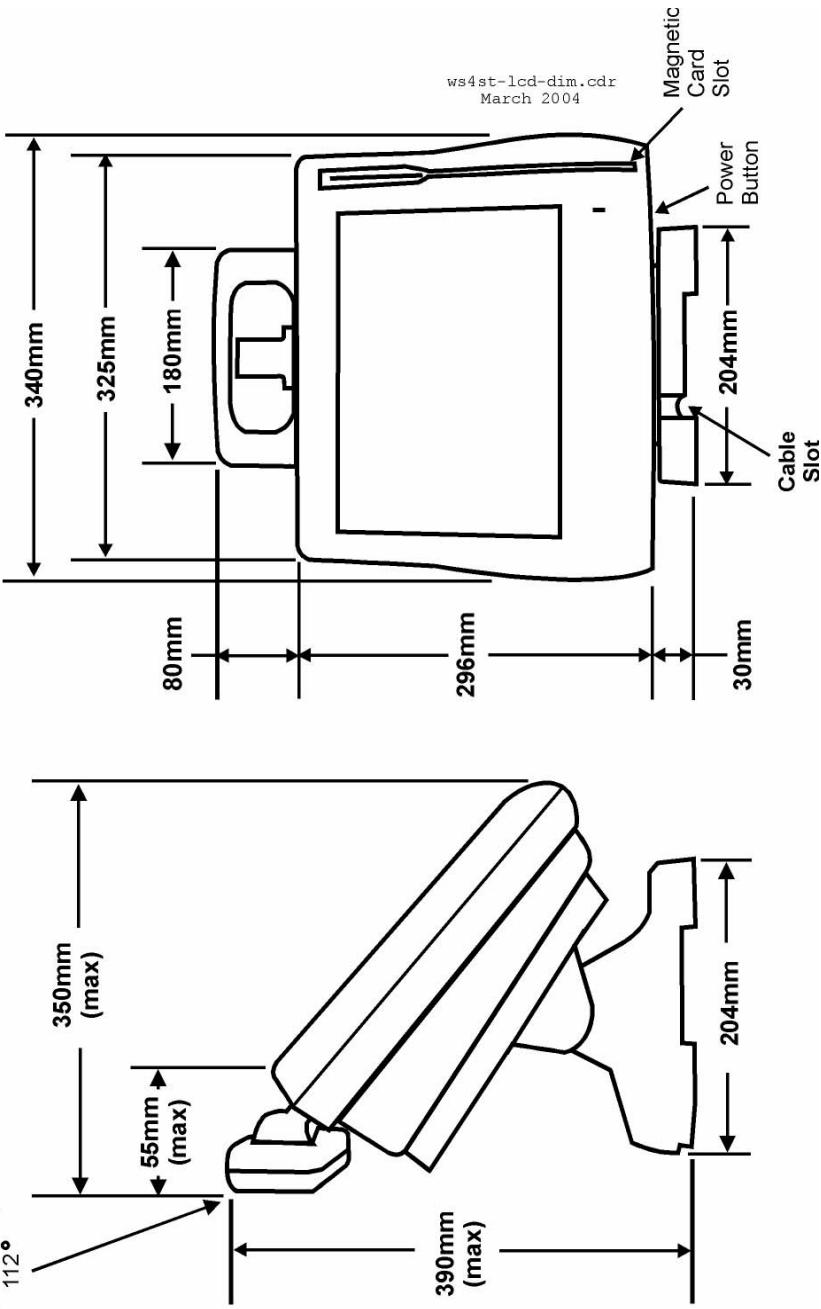
Workstation 4 on Adjustable Stand with VFD Pole Display

ws4st-pd-dim.cdr
March 2004

Magnetic Card Slot

Power Button

Cable Slot

342mm

325mm

204mm

296mm

30mm

Notes:

1. Cables from IO Panel routed through cable slot to exit stand
2. Leave room at front/side of unit for card swipe and power button.
3. Orient unit to avoid glare on touchscreen from overhead lights.
4. Cash Drawers located at customer's discretion.
5. 77mm hole required under unit if Cash Drawer mounted under counter.

280mm (max)

390mm (max)

175mm

275mm

Display Reclines Approximately 30 degrees
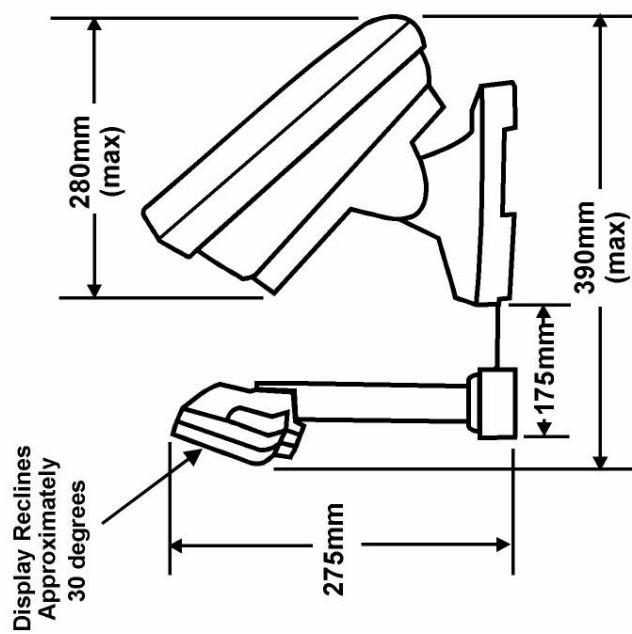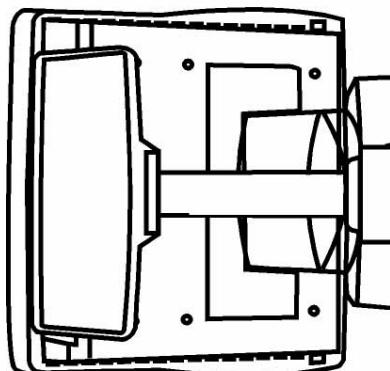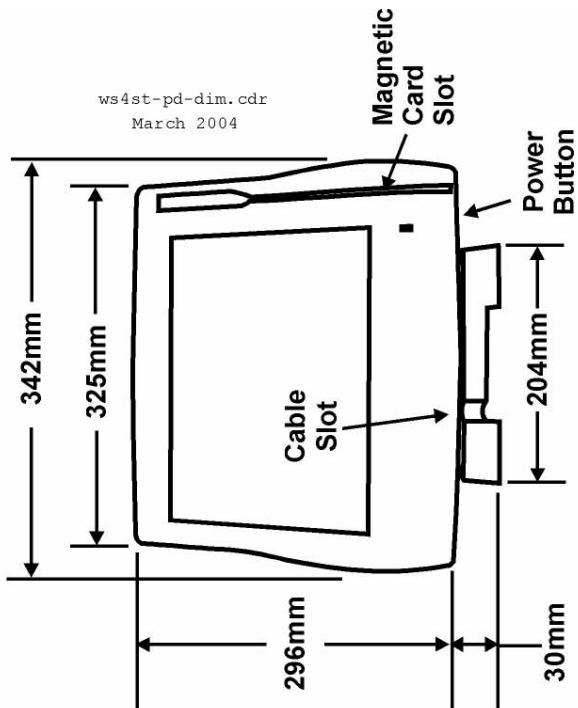
Workstation 4 on Wall Mount Stand

wall_mount2f.cdr
March 2004

360mm (max)

120mm (max)

200mm

140mm

230mm

Maximum Distance from Wall when Fully Extended

Customer Discretion

NOTES:

1) WS4 weight approx 3.5 kg.
2) Wall mount hardware not included. Use hardware appropriate for wall material.
3) Leave room at front/side of unit for card swipe and power button.
4) Orient unit to avoid glare on touchscreen from overhead lights.
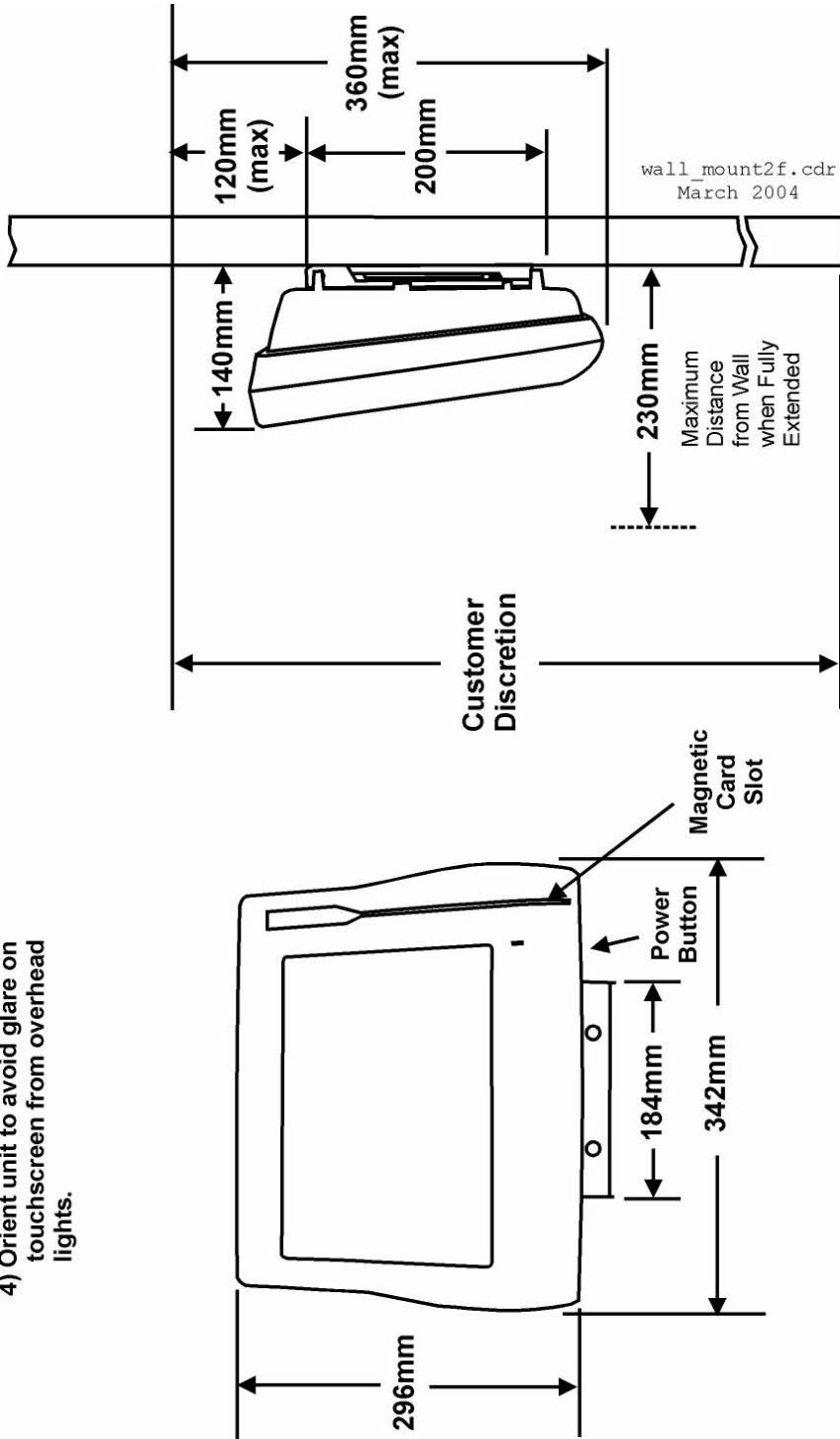
Magnetic Card Slot

Power Button

184mm

342mm

296mm

LCD Pole Display

Display Rotates Approximately 330 degrees

lcd-pole-dim.cdr
March 2004

180mm

80mm

480mm

Display Reclines Approximately 45 degrees

60mm

95mm

560mm

Cash Drawer

425mm

275mm

Cable Exit

22mm

383mm

413mm

205mm

56mm

37mm

95mm

55mm

22mm

110mm

457mm
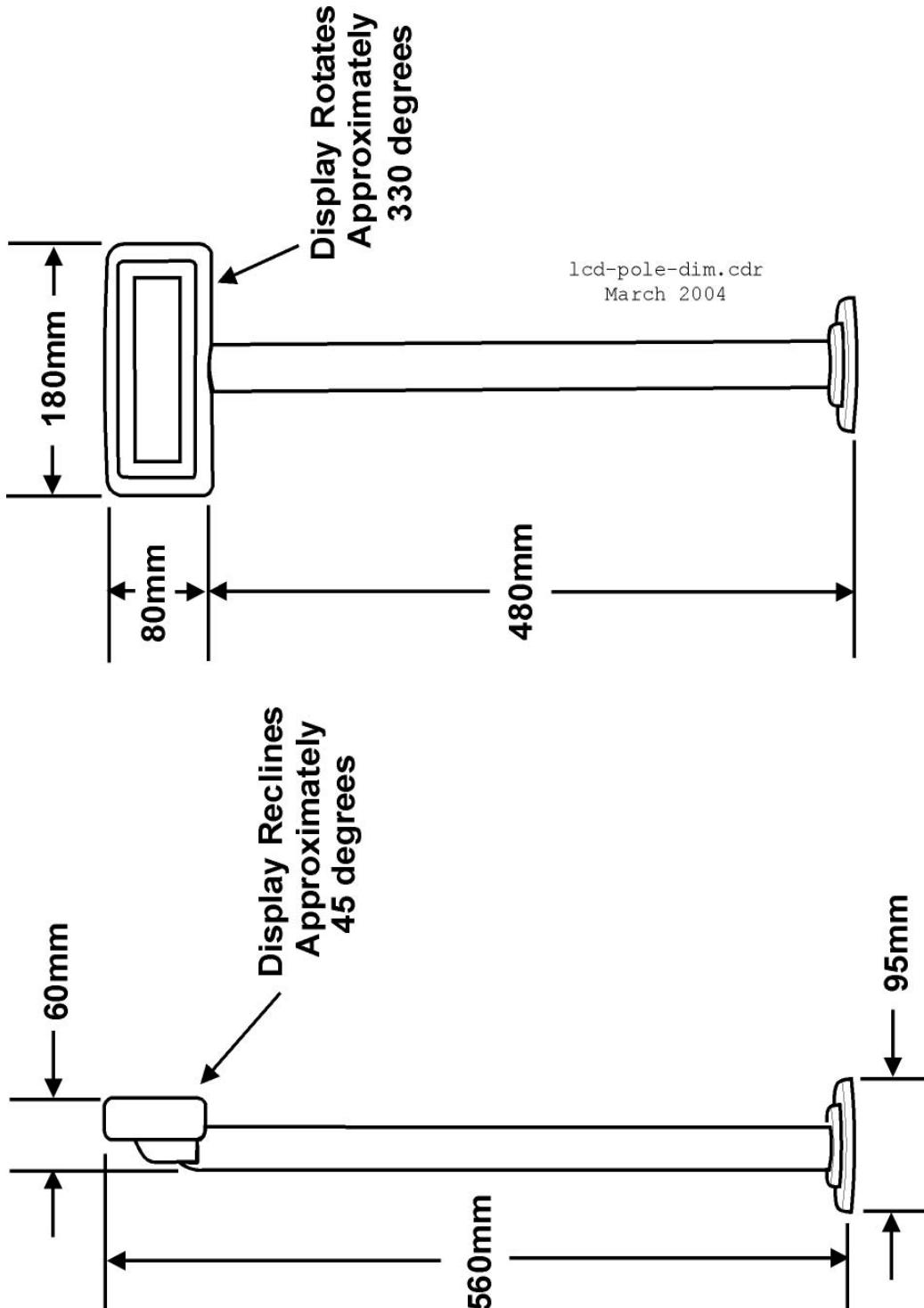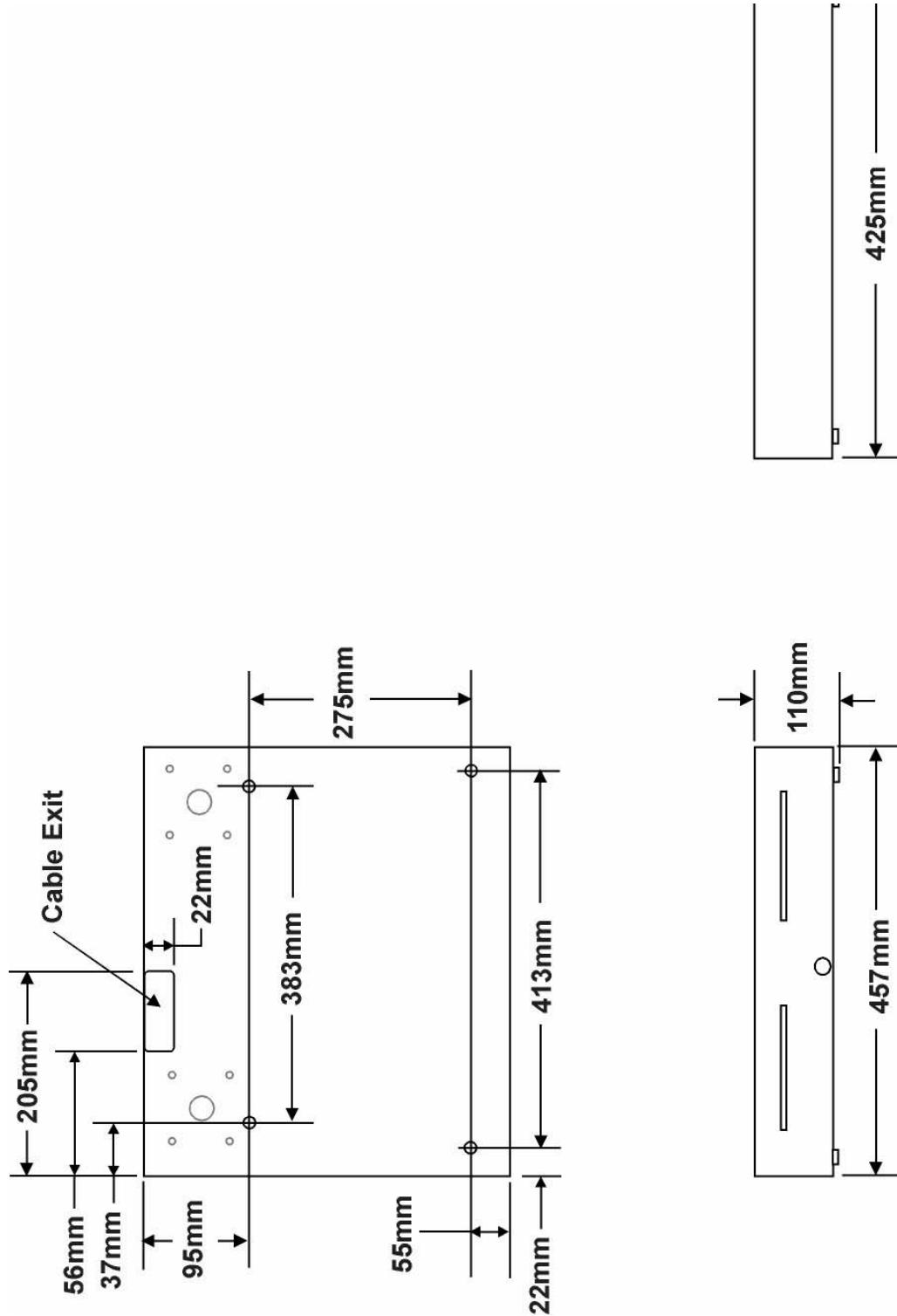
Cash Drawer, Low Profile

VFD Pole Display

Display Rotates Approximately 330°

60mm

230mm

100mm

**Display Reclines
Approximately
30°**

562mm

462mm

60mm
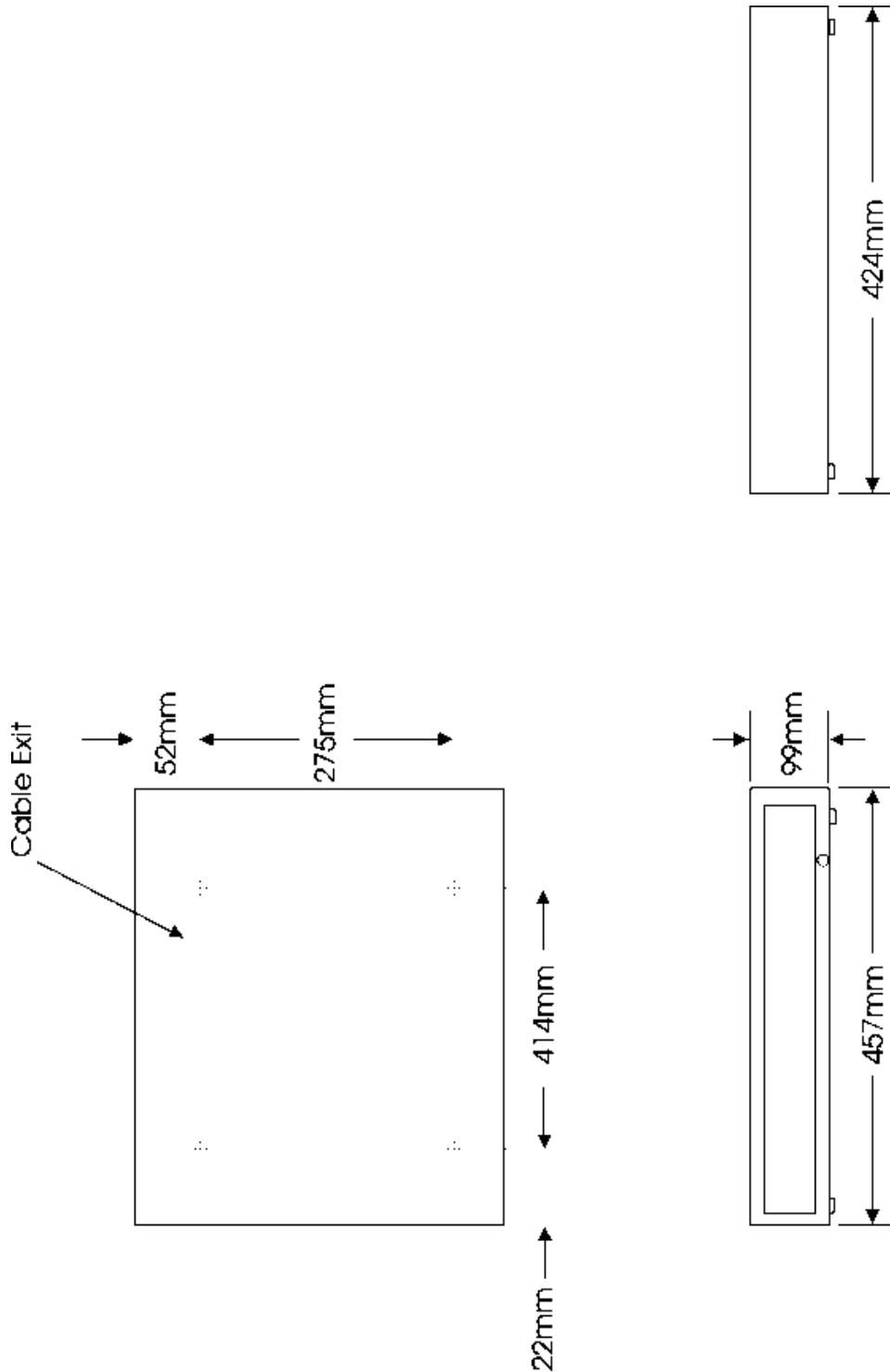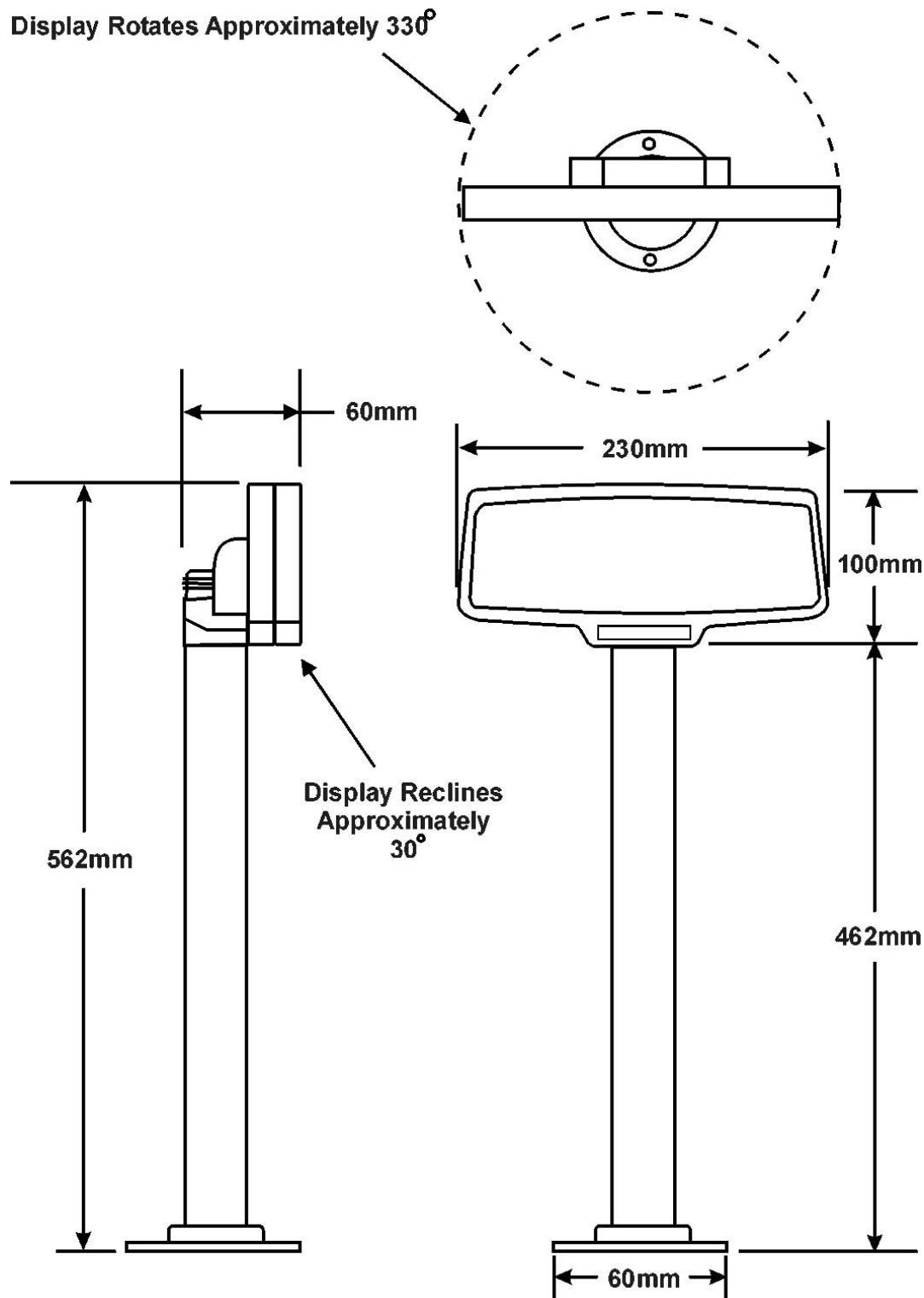
Appendix B

Connector and Cable Diagrams

On the pages that follow, you will find diagrams of the Workstation 4 I/O Panel connectors, system board connectors, and commonly used hook-up cables. A description of how each cable or connector is used is provided.

In this appendix

IO Panel Connectors

The following connectors are located on the WS4 IO Panel.

RS422-A (COM4) and RS422-B (COM5)

The Workstation 4 includes a pair of these connectors wired identically. Each may be used in one of three different configurations, two for RS422 and one for RS232. The specific configuration is determined and configured through the POS application. The three configurations are detailed in the following pages.

> ⚠ **WARNING:**
>
> Do not insert a 6-Pin modular plug into the 8-Pin RS422-A and RS422-B connectors. The 6-Pin plug can push pins 1 and 8 of the connector out of position. These pins are used by the RS232 Interface. Should you wish to use the RS232 Interface at a later time, it may not function. Always use an 8-Pin modular plug to connect an IDN printer to the workstation.

IDN(+)

The most popular configuration of these ports is the RS422 based IDN(+) mode. The RS422-A port is configured as COM4, and the RS422-B port is configured as COM5. Either port is capable of driving MICROS IDN printing devices if supported by POS applications such as 9700 or 3700. Figure B-1 shows the pin-out for this configuration.
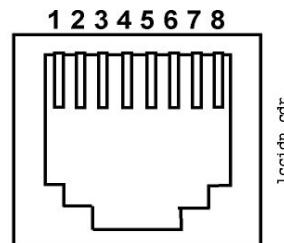

Figure B-1: LCC Connector Configured for IDN Printing

LCC(-)

Figure B-2. In the LCC(-) configuration, the RS422-A COM4 port can be connected to the LCC, RCC, or NetCC over RS422 twisted-pair cable. This port allows the WS4 in conjunction with the Serial Application Loader (SAL) to directly replace the UWS/3 in 8700 and 9700 installations. MD0006-025 describes how to replace a UWS/3 with a WS4 in 9700 installations; support for 8700 installations was pending at the time this manual was released.
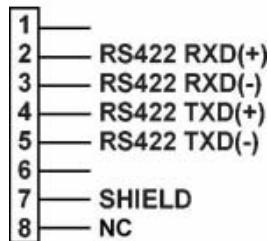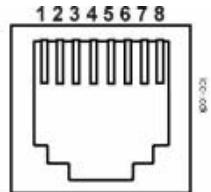

Figure B-2: LCC Connector Configured in LCC(-) mode

RS232

The RS422-A (COM4) and RS422-B (COM5) ports include a basic RS232 interface. This configuration is shown in below.
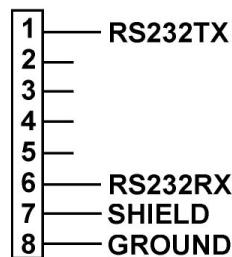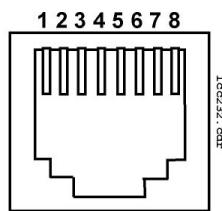
Figure B-3: LCC Port Configured for RS232

10/100 Ethernet Connector

The pin-out for the 10/100 Ethernet port is shown in Figure B-4, below.

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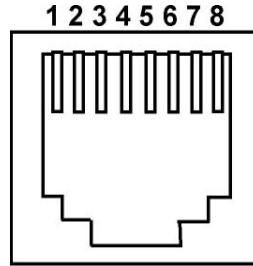
1 - TXD+
2 - TXD-
3 - RXD+
4 - NC
5 - NC
6 - RXD-
7 - NC
8 - NC

Figure B-4: 10/100 Ethernet Connector Diagram

RS232 Connector

A single DB9F RS232 connector assigned to COM1 is provided. The pin-out is shown below.
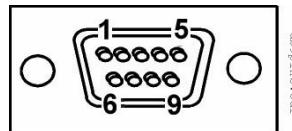
1 - DCD
2 - RXD
3 - TXD
4 - DTR
5 - GND
6 - DSR
7 - RTS
8- CTS
9- RI

Figure B-5: DB9 RS232 Connector Diagram

USB Connectors

A pair of USB ports are located on the IO panel, shown in Figure B-6, below.

A1 A2 A3 A4

A1 - +5V
A2 - DATA_A-
A3 - DATA_A+
A4 - Ground

B1 - +5V
B2 - DATA_B-
B3 - DATA_B+
B4 - Ground

eusb.cdr

B1 B2 B3 B4
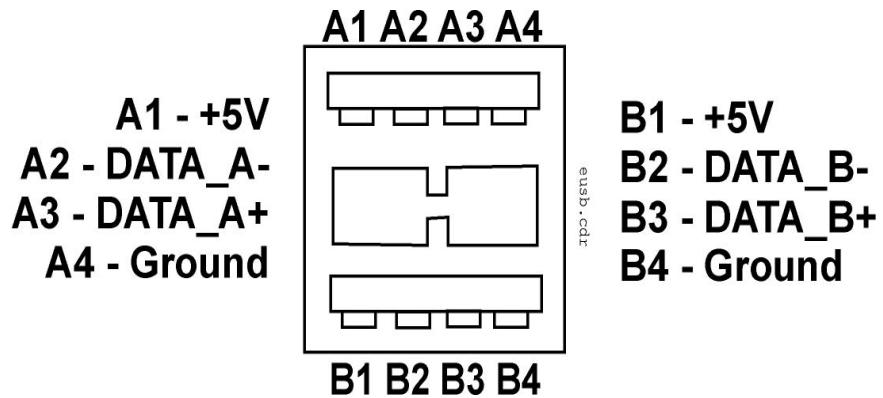
Figure B-6: Universal Serial Bus Connector Diagram

Cash Drawer 1 and 2 Connectors

4 1
3 2
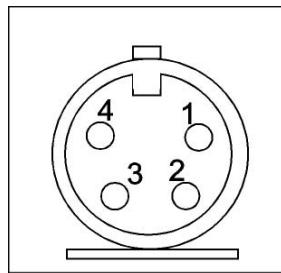
1 — +12V
2 — OPEN DRW
3 — GND
4 — DRW CLOSED

Figure B-7: Cash Drawer Connector Diagram

PS2 Mouse/Keyboard Connectors

PS2 Mouse
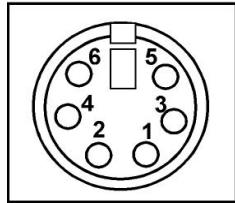
1 - Mouse Data
2 - NC
3 - GND
4 - +5V
5 - Mouse Clock
6 - NC

PS2 Keyboard
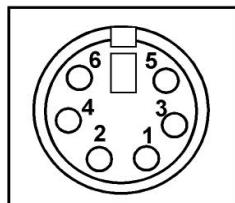
1 - Keyboard Data
2 - NC
3 - GND
4 - +5V
5 - Keyboard Clock
6 - NC

Figure B-8: PS2 Mouse and Keyboard Connector Diagrams

Remote Customer Display Connector

This port supports either the 2x20 VFD customer display or the graphics based LCD customer display.


WS4
Rev F & G

1 — +5V
2 — POLE_TX
3 — GND
4 — GND

WS4
Rev I
or later

1 — +5V
2 — POLE_TX
3 — POLE_RX
4 — GND
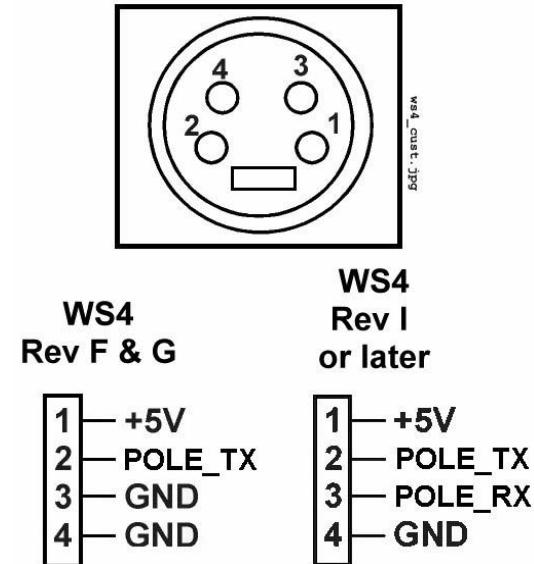
Figure B-9: Customer Display Connector Diagram

System Board Connectors

This section details connectors located on the Workstation 4 system board.

Magnetic Stripe Interface

The internal magnetic card reader connector is CN10, located on the system board. The pin-outs for this connector are shown in Figure B-10,

```
1 2 3 4 5 6 7 8

   CN10

1 —— MSR-RTS
2 —— MSR-DTS
3 —— MSR-RxD
4 —— GND
5 —— MSR-TxD
6 —— N/C
7 —— GND
8 —— N/C
```
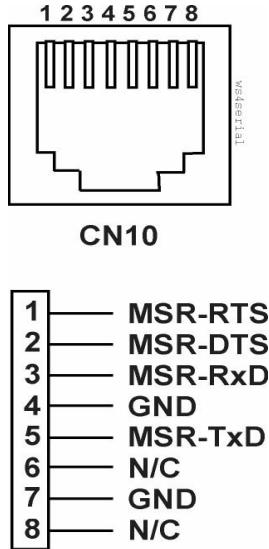
Figure B-10: System Board Magnetic Card Reader Connector

Hook-up Cables

The following pages show wiring diagrams of various hook-up cables that may be used with the Workstation 4.

RS232 from the RS422-A and RS422-B Ports

Figure B-11 shows a cable that includes the RS232 signals from RS422-A and RS422-B ports to a DB9 male connector. This cable is available from MICROS by ordering P/N 300319-102.
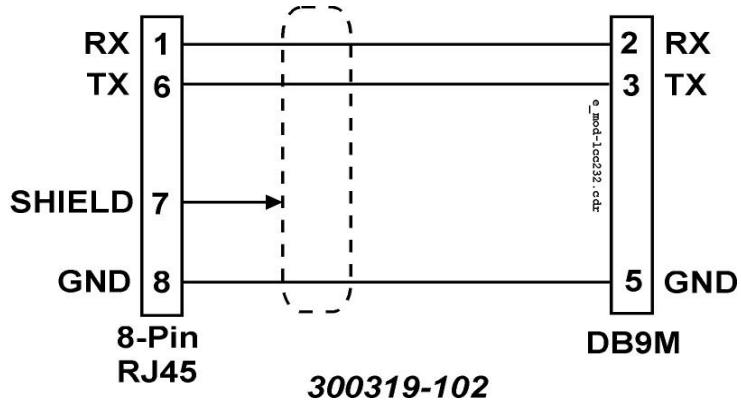

Figure B-11: Modular LCC/RS232 to DB9 Male Connector

Figure B-12 shows a cable diagram that adapts the same RS422-A and RS422-B ports to a DB25 connector.
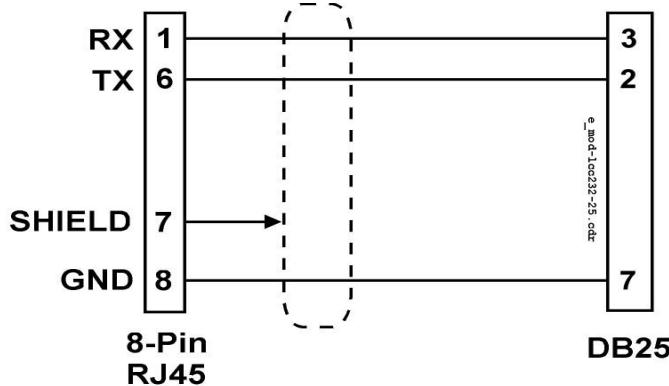

Figure B-12: Modular LCC/RS232 to DB25 Connector

LCD Customer Display Cables

The new LCD based Customer Display is accompanied by three new cable assemblies. The function of each cable is detailed in the following pages.

System Board Integrated Cable

This cable is attached to System Board connector J1 and pre-installed in WS4s built after May 2004. A diagram is shown in Figure B-13. This cable mates with the cable from the LCD customer display assembly, shown in Figure B-14.

J3

+5V	6	Red	7
REAR_TX	5	Blue	5
REAR_RX	4	Yellow	6
LCD_RST	3	Brown	4
LCD_PSEN#	2	White	3
GROUND	1	Gray	2
		Black	1

System Board

P/N 400446-007

To
LCD Customer
Display Assembly
Cable
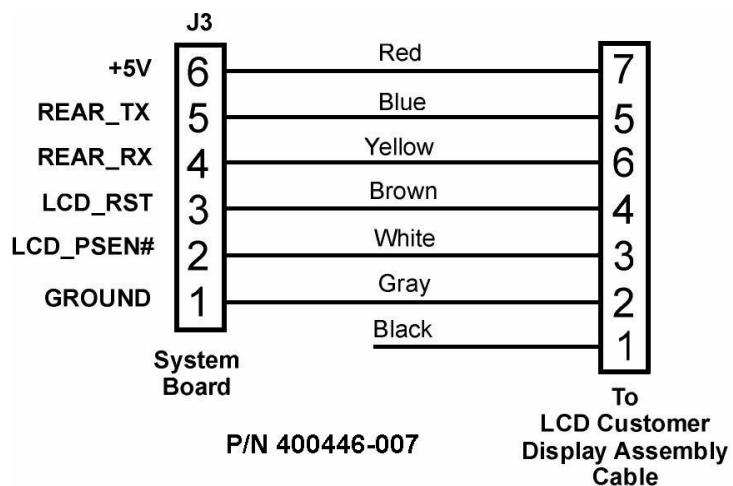
Figure B-13: System Board to Rear LCD Customer Display

LCD Customer Display Assembly Interface Cable

The LCD Customer Display Assembly includes the LCD Display Housing, which in turn consists of LCD Panel, Interface Board, mounting bracket and interface cable. A diagram of this interface cable is shown in Figure B-14. The only difference between the Rear and Pole versions of the LCD customer display housing is the mounting hinge.

When the LCD customer display is attached directly to the rear of the workstation, this cable plugs into the system board cable shown in Figure B-13.

When the LCD customer display assembly is mounted on the pole, this cable attaches to the cable shown in Figure B-15, below.
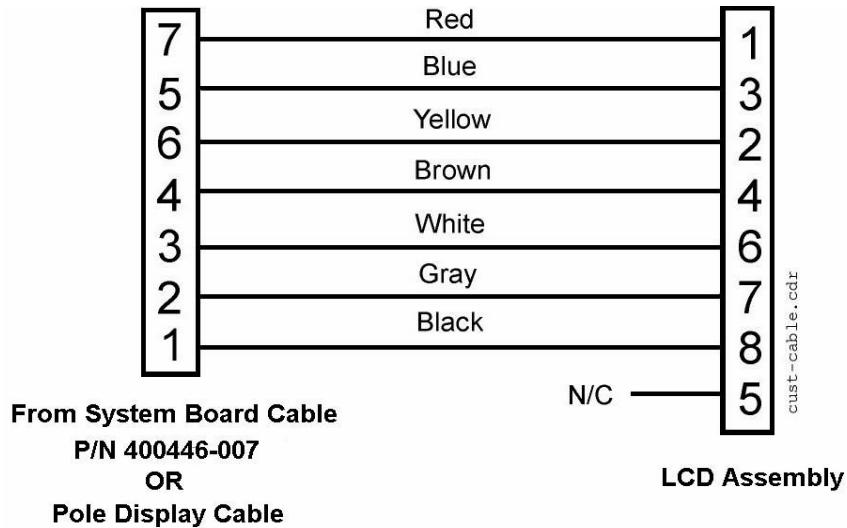
Figure B-14: LCD Customer Display Housing Cable

Remote Pole LCD Customer Display

This cable, shown in Figure B-15, is supplied with the Pole LCD Customer Display kit. It attaches between the 4-pin DIN customer display connector on a WS4 or KWS4 IO Panel, up through the pole to mate with the cable from the LCD Display Assembly shown in Figure B-14.
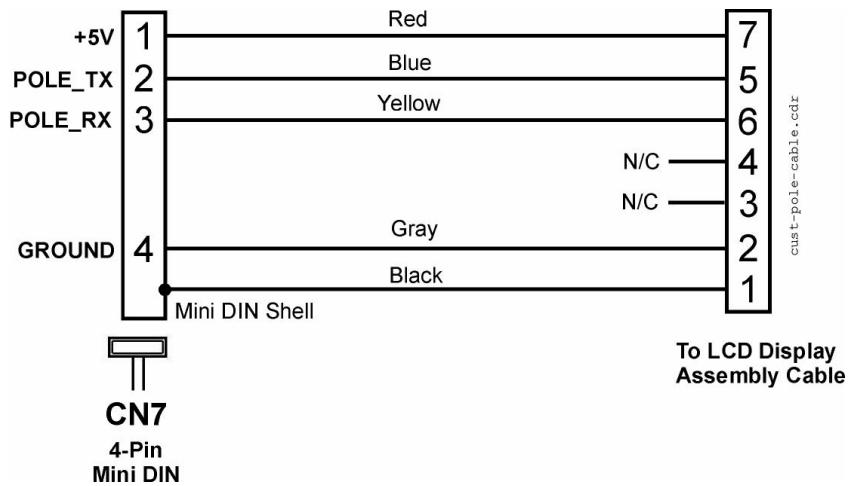

Figure B-15: Remote Pole LCD Customer Display Assembly

Ethernet

Figure B-16 shows a diagram of a standard Cat 5 Ethernet hook-up cable. This cable would be connected from a workstation or server to the system hub.
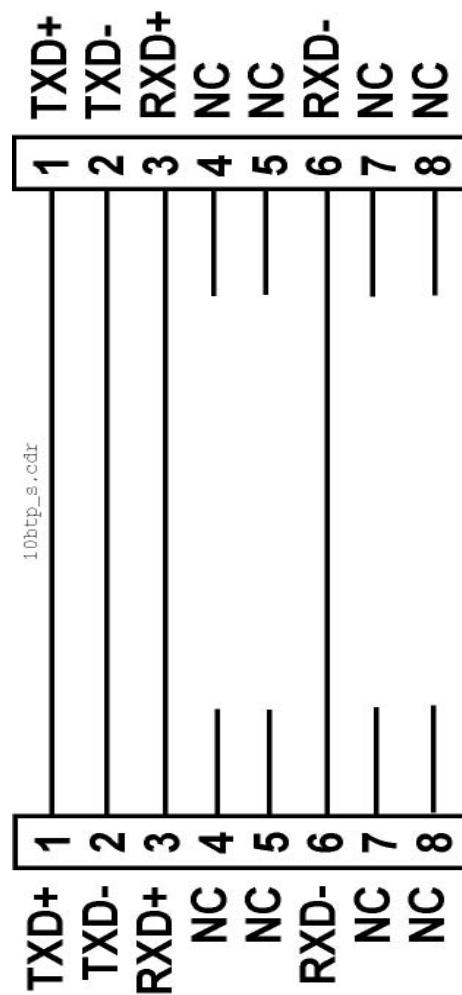

Figure B-16: EIA/TIA-568-A Cat 5 Ethernet Hook-up Cable Diagram

Cross-over Pinning

Figure B-17 shows a diagram of a typical Category 5 hook-up cable with the transmit/receive cross-over pinning implemented. This cable can be used when only two devices must be connected. For example it can be used to connect two workstations, or a server connected to a single client.
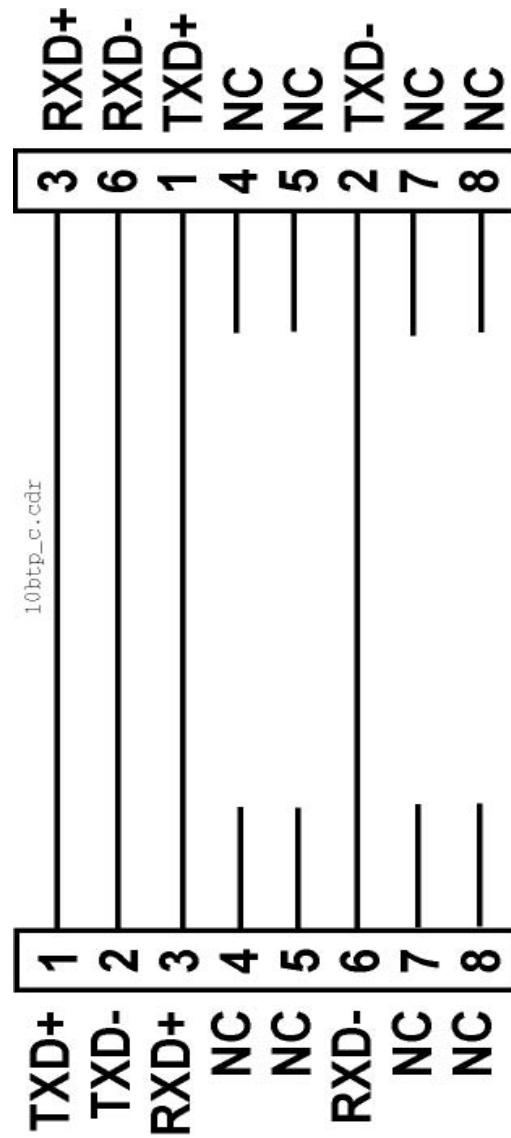

Figure B-17: Cat 5 Ethernet Hook-up Cable Diagram (cross-over)

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

This cable brings out the RS422 signals from the 8-pin LCC/RS232 connector to a 6-pin wall plate or directly to the 6-pin connector located on the IDN device.
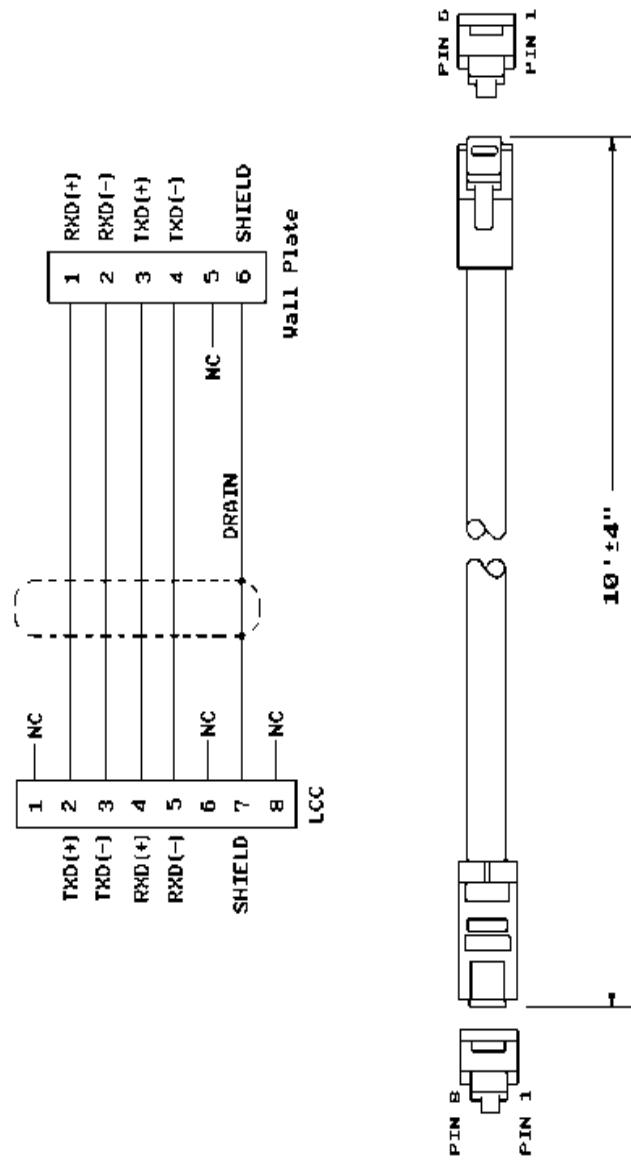

*Figure B-18: 8-Pin to 6-Pin RS422 Hook-up Cable Diagram*

Cash Drawer Extension Cable

4 PIN
CIRC DIN
FEMALE

1 2 3 4 5 6

MICROS P/N

300290-003 - 3 Feet
300290-006 - 6 Feet
300290-012 - 12 Feet
300290-018 - 18 Feet

4 PIN
CIRC DIN
MALE

1 2 3 4 5 6
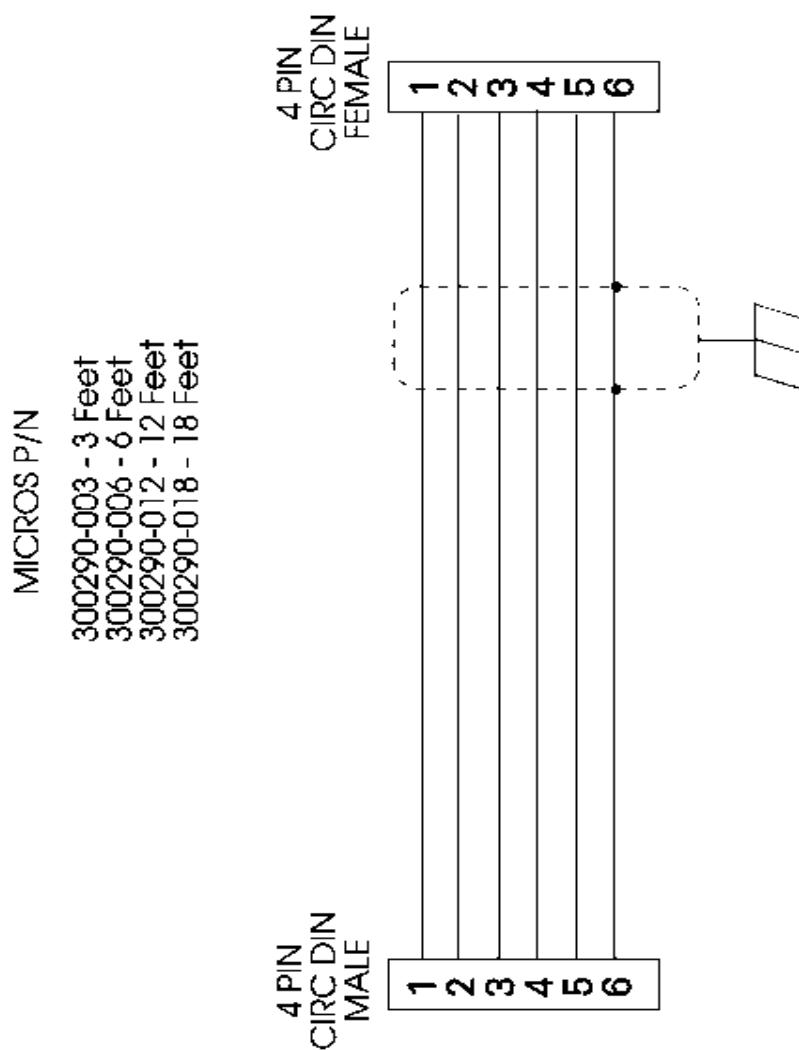
FCC/DOC Statement

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.