Declarations

Warranties

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Printing History

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

1st Edition: September, 2007
2nd Edition: December, 2007
3rd Edition: June, 2008
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.

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Why Read This Manual?

Purpose

This hardware only guide is intended for those who will be troubleshooting and repairing the MICROS Workstation 5 in the field or on the bench.

Who Should Use This Manual

This manual is intended for qualified service personnel who have experience with the configuration and troubleshooting of MICROS point of sale terminals. The ability to read schematics and a working knowledge of microprocessor based systems and related test equipment is required.

The circuit and detailed start-up descriptions contained in this manual are intended to give the technician a working knowledge of the hardware to be used as an aid in the troubleshooting and repair of the equipment.

Bibliography

The following materials were used in the preparation of technical descriptions found in Chapter 2.

AMD Geode™ LX Processor Databook - October 2005
AMD Geode™ CS5536 Companion Device Databook
Realtec RTL8110SC Integrated Gigabit Ethernet Controller Data Sheet
SMSC Integrated USB 2.0 Compatible Hub Datasheet Revision 1.8
Winbond W83627HF/F Super IO Datasheet Version 2.0
Texas Instruments TPS5130 Triple Synchronous Buck Controller - May 2002.
How This Manual is Organized

Welcome to the First Edition of the Workstation 5 Field Service Guide.

Chapter 1 combines the Workstation 4 and Workstation 4 LX spare Field Replacement Units (FRUs). The FRUs are grouped into individual listings for each system board. FRUs available for the optional LCD Customer Display are included as well.

Chapter 2 provides technical descriptions of the original Workstation 5 System Board with emphasis on the Point of Sale Interfaces such as IDN and Customer Display and Mag Stripe Reader ports. Also included are descriptions of the LCD and Backlight Interfaces, Super IO, and the system board power control and voltage regulators.

Chapter 3 covers Workstation 5 troubleshooting. The Chapter starts off with a detailed start up description for each supported operating system, provides voltage test points for the internal power supply and system board voltage regulators.

Chapter 4 contains the FRU remove the replace procedures specific to the Workstation 5.

Appendix A includes pin-out diagrams for Workstation 5 connectors and related hook-up cables.
**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 - Adobe FrameMaker V6.0
Digital Images - Nikon Coolpix 990 / Canon PowerShot A80
Image Processing - JASC Paint Shop Pro, Adobe Photoshop
Line Drawings - CorelDraw.
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Chapter 1

What is The Workstation 5?

This chapter introduces the Workstation 5 and optional accessories, then goes on to describe the memory and storage architecture and power management support.

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The System

The following section describes the hardware and software features of the Workstation 5.

The MICROS Workstation 5 is a diskless Windows Embedded CE 6.0 client, based on a highly integrated AMD LX800 Processor and TFT LCD Controller. Windows Embedded For Point of Service (WEPOS) is also supported. Figure 1-1 illustrates out the primary external features.

![Figure 1-1: The Workstation 5 - Operating Features](image)

Standard features include a 15 inch TFT LCD, internal speakers, 5-wire resistive touchscreen, and 3-Track Mag Stripe Reader.

Casework

The WS5 case is a low profile design that consists of a base to house the system board, internal power supply, LCD Touchscreen Assembly and Mag Stripe Reader.

Operator LCD and Touchscreen

The Operator LCD consists of 15” TFT LCD, runs at a fixed resolution of 1024x768 and is capable of supporting up to 262K colors. Placed over the LCD is a 5-wire resistive touchscreen. An optional capacitive touchscreen is available.
**Magnetic Card Reader**
The 3-Track Mag Card Reader is slim low profile design.

**Finger Print Reader**
An optional integrated or remove fingerprint reader is available that mounts to the top cover.

**Operator LED**
The Workstation 5 Operator LED is blue. It blinks two times per second as the unit starts-up and performs the Power On Self Test (POST). After the operating system starts and loads the Workstation 5 specific platform files, the Operator LED turns solid Blue.

**Operator Power Button**
The power button is recessed and located at the lower right corner of the unit. It is used to power the workstation on or off.

**Internal Speakers**
The Workstation 5 features audio support in both the Windows Embedded CE 6.0 and WEPOS through built-in speakers. The IO panel includes a ‘Line Out’ jack for driving external powered speakers.

**Compact Flash (CF) Personality Card**
Figure 1-2 shows an underside view of the workstation featuring the I/O Connectors, integral VESA 100 compatible hole centers, and Compact Flash access slot. More information about the I/O Panel Connectors can be found in Chapter 3.

*Figure 1-2: Workstation 5 Underside View*
What is The Workstation 5?
The System

The CF card is secured behind a removable bracket. For Windows Embedded CE 6.0 configurations, 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. The WEPOS configuration does require a CF card, but one can be added for additional storage.

**Mini-PCI Socket**

The System Board Mini-PCI socket can accommodate one of two available options, listed below.

- **802.11 b/g Wireless Card**
  
  The Wireless Card is available as a factory option or as a field installed kit. The wireless option includes a pair internal printed circuit antennae that provide adequate coverage in most situations. If an external antenna is required, a panel mount SMA type connector is available.

- **Graphics Adapter**
  
  The Graphics Adapter provides two-display capability to the Workstation 5 by providing a second VGA output. Running two displays is not supported in Windows Embedded CE 6.0.
Workstation Mounting Options

A number of mounting options are available for the Workstation 5, as shown in the following pages.

**The Workstation 5 Adjustable Stand**

The Adjustable Stand converts the low profile WS5 into an adjustable display design. The stand has a weighted base for stable operation, generous cable area, printer power supply compartment and locking hinges to allow the workstation to be positioned in the range of between 25 and 70 degrees.

![The Workstation 5 Adjustable Stand](image)

*Figure 1-3: The Workstation 5 Adjustable Stand*

The rear of the stand includes a pair of knobs that are used to secure the workstation to the stand. The base includes a knock-out for a custom bracket that supports third party peripherals. MICROS will publish the specifications for using this mounting bracket.
**Power Supply Compartment**

Figure 1-4, below shows a view of the stand base plate and the compartment for housing an optional PS180 Printer Power Supply. AC power is connected to a receptacle in the throat of the stand using a low profile angled connector. An internal ‘Y’ cable distributes power to both the workstation and printer power supply compartment.

*Figure 1-4: WS5 Adjustable Stand - Power Supply Compartment*
LCD Customer Display Options

Integrated, Pole and Adjustable Stand Mounted LCD Customer Display options are available. The Workstation 5 features two customer display outputs - integrated and pole - located on the IO Panel. The LCD Customer Display is based on a 240x64 monochrome STN LCD and companion LCD control board. The LCD Customer Display is capable of emulating the 2x20 VFD Customer Display. Part numbers and pricing can be found in the Workstation 5 PMA.

Integrated LCD Customer Display

Figure 1-5 displays several views of the Workstation 5 Integrated LCD Customer Display.

As shown at lower right corner of the illustration, the Integrated LCD Customer Display receives power and data through a connector located on the IO Panel. No need to remove the cover to install or service the display.

Figure 1-5: The Integrated LCD Customer Display
What is The Workstation 5?

The System

**LCD Pole Mount Customer Display**

Figure 1-6 below, is an example of the Pole Mount LCD Customer Display. This display receives power and data from an IO panel Mini-DIN connector and can be placed on a counter surface up to four feet from the workstation. A 2x20 VFD Pole Display is also available.

![Pole Mount LCD Customer Display](image)

*Figure 1-6: Pole Mount LCD Customer Display*

**Workstation 5 Adjustable Stand Pole Display**

This version of the LCD Customer Display is mounted to the Adjustable Stand with a custom bracket and six inch pole. The base plate includes hole centers for mounting the bracket to the left, right, or rear of the workstation. This display receives power and data from an IO panel Mini-DIN connector, also used for the Pole Display.

![Adjustable Stand Pole Mount Display](image)

*Figure 1-7: The Adjustable Stand Pole Mount Display*
Software Platform

The WS5 Software Platform is composed of the Operating System and a collection of platform specific drivers, configuration files, and system utilities. These components are pre-installed on each unit to create a foundation upon which POS applications are later installed.

General Software Embedded BIOS 2000

General Software is leading provider of pre-boot 32-bit x86 embedded systems BIOS (Basic Input Output System). The modular architecture offers a high degree of configuration.

The modular BIOS consists of 32-bit core and a collection of modules chosen to match the system board processor, chip set and board architecture.

The BIOS supports a custom POST, CMOS Configuration Screens and USB mass storage support. Perhaps the greatest feature of Embedded BIOS 2000 is Firmbase, detailed below.

Firmbase®

Firmbase is General Software’s optional firmware operating environment that runs Portable Execution Firmware Applications in the pre-boot environment. The Firmbase environment runs inside the protective envelope of the System Management Mode (SMM). The General Software Embedded BIOS 2000 uses SMM in a patented way to implement the firmware environment that permits custom firmware applications to execute.

A Firmware Application is General Software’s term for a custom 32-bit Portable Execution program, stored in the workstation’s BIOS ROM and executed in the Firmbase environment. Firmware Applications perform functions coded in assembly, using the CPU, Chip Set, and SMM programming techniques.

The ability to execute custom firmware applications before the operating system boots is a powerful feature, and gives the ability to check the CF card for a copy of the BIOS or the Windows Embedded CE 6.0 binary image file and update as required.

Operating Systems

The supported Operating Systems are Windows Embedded CE 6.0, and Windows Embedded for Point of Service (WEPOS). Windows Embedded CE 6.0 and is a modular operating system that includes only the software components and drivers required to support the Workstation 5 and its applications. WEPOS is derived from Windows XP Professional, and tailored for the retail point of service environment.

The supported operating system configurations are handled through unique BIOS configurations. See Chapter 2 for more information.
Workstation 5 Drivers and Configuration Files

This section includes files specific to the WS5 hardware. Examples include the WS5 API, power button driver, and other platform related drivers. Configuration files with the .INF extension include information about hardware such as the LCD as well as information about the platform files and the CAL configuration.

Utilities

Utilities included with the Workstation 5 platform include the Client Application Loader (CAL), a DiagUtility for testing the unit, a screensaver/backlight utility, and a remote support and management utility.

POS Application

The Workstation 5 is a hardware platform and shipped without a POS application. It can run one of several MICROS POS Applications or 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 with the exception of 8700. Refer to the Workstation 5 PMA for specific application version requirements.

- CAL Server Version 14 - included with the applications below.
- RES - 3700 Client V3.2, HF6 or V4.1, HF3
- Simphony Client V1.0 SP1
- 9700 - V3.1 SP5 or V3.2 SP
- e7 - Restaurant Management System V2.6.
**Memory and Storage Architecture**

This section highlights the key features of the WS5 mass-storage architecture and defines where each of the various software components are stored, based on the Operating System installed.

**BIOS**

Figure 1-8, below displays the contents of the BIOS EEPROM in general terms.

<table>
<thead>
<tr>
<th>BIOS Core and Component Modules</th>
<th>Hardware Initialization and POST</th>
<th>Firmware Applications (WS5 Specific Code)</th>
</tr>
</thead>
</table>

**Figure 1-8: WS5 BIOS EEPROM Contents**

- The modular General Software Embedded BIOS 2000 consists of a core and a series of component modules that support the Processor, Chip Set, and other system board hardware.
- At power-up, the BIOS performs system board component initialization then conducts a Power On Self Test (POST) of critical components.
- The General Software Firmbase environment provides the ability to execute custom firmware applications *before the Operating System starts*. These custom firmware applications perform such tasks as moving the NK.BIN from the CF card to the USB Flash Drive as part of a Windows CE OS or application upgrade, or upgrading the BIOS itself.

**USB Flash Drive**

The USB Flash Drive is installed on a 2x5 system board header. The device size and number of partitions depend on the Operating System. For the Windows Embedded CE 6.0 configuration, the USB Flash Drive size will be 128M or 256M. It is divided into three partitions of equal size, two of which are ‘hidden.’ This is shown in Figure 1-9, below.

<table>
<thead>
<tr>
<th>Partition 1 (Hidden)</th>
<th>Partition 2 (Hidden)</th>
<th>Partition 3 (\text{DOC})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows Embedded CE 6.0 Boot Image</td>
<td>Factory Recovery Files</td>
<td>CAL Client</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W55 API and Drivers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DiagUtility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Screen Saver and Backlight Utility</td>
</tr>
</tbody>
</table>

**Figure 1-9: WS5 USB Flash Drive - Windows Embedded CE 6.0 Contents**

- Starting at the left of the illustration, Partition 1 contains the operating system image. The WS5 boots to the Windows Embedded CE 6.0 image stored in this partition.
Partition 2 contains the files used by the Windows CE Factory Recovery feature. The partition includes a copy of the CE image binary file and all platform files and folders. See Chapter 2 for more information.

Partition 3 is visible in ‘My Device’ as ‘\DOC’ It contains the WS5 platform drivers, utilities and configuration files used on a day-to-day basis.

- The \DOC partition contains the WS5 API, platform drivers, and configuration files. The API file is UWS4.DLL. The API allows POS Applications to access hardware such as the cash drawers, mag stripe reader, and the customer display options. Other DLLs support the Operator LED, Power Button, and system board EEPROM.
- The \DOC\McrsCAL folder contains a copy of the MICROS CAL (Client Application Loader). Through a registry setting, the CAL starts each time the WS5 starts in order to download and manage applications and platform files.
- The \DOC\Scrsaver folder contains the Screen Saver and Backlight Control utility. See Chapter 4 for more information on how to use the Screen Saver and Backlight utility.
- The \DOC\Utilities folder contains the WS5 DiagUtility and Wipe Compact Flash (WCF) utility. See Chapter 5 for more information about the Diagnostics Utility.

Figure 1-10 is a representation of the USB Flash Drive for WEPOS. Currently, a 4GB USB Flash Drive with a single partition is used. A Compact Flash Card is not supplied, but can be added for auxiliary storage.

In other words, the USB Flash Drive contains all of the software components - the Operating System, Platform files, the Registry and POS application. The WinCE Factory Restore feature is not available. Currently, the WS5 WEPOS recovery image is contained on a CD-ROM disk.

<table>
<thead>
<tr>
<th>WEPOS Files and Registry</th>
<th>POS Application</th>
<th>WS5 Platform Files</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CAL32 Client</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W55 API and Drivers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DiagUtility</td>
</tr>
</tbody>
</table>

*Figure 1-10: USB Flash Drive - WEPOS Configuration*
Compact Flash (CF) Card

The Compact Flash Card is required for the Windows Embedded CE 6.0 configuration, but is optional for WEPOS.

In a unit running Windows Embedded CE 6.0, the CF Card represents the removable component of the WS5 mass storage solution. Accessed from the IO panel, the device is factory installed but contains no data. A 256M device is currently used.

Windows Embedded CE 6.0 views the card as a FAT file system, appearing in ‘My Computer;’ as ‘CF.’ Figure 1-11 displays the contents of the device in a Windows Embedded CE 6.0 configuration after an application has been installed.

<table>
<thead>
<tr>
<th>Update Files</th>
<th>Persistent Registry</th>
<th>Application and Support Files</th>
<th>Optional SAR Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>NK.BIN for OS Updates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRNBLT.BIN for BIOS Updates</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1-11: WS5 CF Card Contents - Windows Embedded CE 6.0 Configuration

Working from left to right of the illustration.

- The OS update image (NK.BIN) or BIOS update image (GRNBLT.BIN) will be present only if placed there by the CAL during a platform update.

  When the OS update image is present on the CF at boot time, a custom firmware application in the BIOS copies it over the existing OS image on Partition 1 of the USB Flash Drive. If the BIOS image is present, it displays the appropriate prompts and updates the BIOS.

- The CF Card contains the persistent registry. A driver periodically copies the working registry from RAM to the CF card. This ensures that any changes made to the working 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. Applications such as E7 can be installed or updated from a USB thumb drive connected an IO panel USB port and running a modified CAL installation script.

- POS Application software that supports SAR will use a portion of the CF card to store off-line transaction totals.
**What is The Workstation 5?**

**Memory and Storage Architecture**

---

**DDR SDRAM - Working System RAM**

System or ‘working’ RAM is contained in a pair of 184-Pin DDR 333 DIMM sockets. A generalized view of the contents are shown in Figure 1-12, below.

![Figure 1-12: WS5 System RAM Contents](image)

- As the workstation operates, the RAM holds the runtime requirements of Operating System and POS Application code.
- The working copy of the registry is located in system RAM.
- Workstations running Windows Embedded CE 6.0 use 256M of RAM.
- Workstations running Windows WEPOS use 512M or 1G of RAM.

**Summary**

For Windows Embedded CE 6.0 configurations, the USB Flash Drive provides a permanent means of storing the operating system image (and factory recovery files) as well as associated platform device drivers, system utilities such as the CAL, and the WS5 DiagUtility. The CF card contains the POS application and support files, a current copy of the registry, and optional 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 WS5 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 5 is diskless in the classical sense, the combination of the USB Flash Drive and CF card provide a mass storage solution that preserves application and registry settings across system reboots. Through the CAL, updates to the OS and applications are staged on the POS server and automatically propagated to each client.

A WS5 with WEPOS does not require the CF card, but one can be installed for additional storage. This means that all software components - the OS, POS application, SAR totals, persistent registry, platform files and utilities reside on the USB Flash Drive.
Introduction
This section introduces the Workstation 5 power management states in both the Windows Embedded CE 6.0 and WEPOS configurations.

References to power management states are specified in bold capital letters, e.g., NOPOWER, and ON. See chapter 3 for more information about operating the WS5.

UNPLUGGED
- The AC power cord is not connected to a wall outlet. Also referred to as ‘mechanical off’. The workstation can be disassembled when in this state.
- The Operator LED is Off.
- The Operator LCD is blank.

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.
- The Operator LCD is Blank.

This mode is similar to the ACPI G2/S5 ‘soft-off’ mode where the unit consumes minimal power but several key circuits remained powered in order to detect a power-button event or Wake-On-Lan Ethernet packet. It is not safe to disassemble the workstation when in this state.

ON
- The Operating System and POS application are operating. RAM contents are maintained.
- The Operator LED is solid Blue.

The Standby Mode is not supported by the Workstation 5. The ACPI standby mode in WEPOS is currently not supported.

Last Power State Retention
The WS5 retains the power state (ON or NOPOWER) in an on-board EEPROM that can be read by the WS5 BIOS. In BIOS Setup, the Special Configuration Screen field named ‘Last Power State’ determines how the unit behaves when AC power to the unit fails and then returns.

The default setting of ‘Last State’ means that 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. See Chapter 3 for more information.
### WS5 Power Management State Table

<table>
<thead>
<tr>
<th>Fig 1-11</th>
<th>Current State</th>
<th>Event Source</th>
<th>Scenario</th>
<th>New State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UNPLUGGED</td>
<td>AC Power</td>
<td>AC Power becomes available and the last recorded state was not the ON state.</td>
<td>NOPOWER</td>
</tr>
<tr>
<td>2</td>
<td>NOPOWER</td>
<td>Operator</td>
<td>The operator presses the power button for less than 1 seconds.</td>
<td>ON</td>
</tr>
<tr>
<td>3</td>
<td>NOPOWER</td>
<td>Operator</td>
<td>The operator presses the power button for more than 4 seconds.</td>
<td>ON</td>
</tr>
<tr>
<td>4</td>
<td>NOPOWER</td>
<td>Server Application</td>
<td>A server application sends a ‘Wake On LAN’ command.</td>
<td>ON</td>
</tr>
<tr>
<td>5</td>
<td>ON</td>
<td>Operator</td>
<td>The operator presses the power button for more than 4 seconds.</td>
<td>NOPOWER</td>
</tr>
<tr>
<td>7</td>
<td>ON</td>
<td>Application</td>
<td>The application shuts down the workstation.</td>
<td>NOPOWER</td>
</tr>
<tr>
<td>13</td>
<td>ON</td>
<td>Server Application</td>
<td>A server application sends a “Wake On LAN” command.</td>
<td>ON</td>
</tr>
<tr>
<td>14</td>
<td>ON</td>
<td>Application</td>
<td>Warm boot is called by the CAL.</td>
<td>NOPOWER then ON</td>
</tr>
<tr>
<td>15</td>
<td>NOPOWER</td>
<td>AC Power Failure</td>
<td>AC Power fails and restored</td>
<td>NOPOWER</td>
</tr>
<tr>
<td>17</td>
<td>ON</td>
<td>AC Power Failure</td>
<td>AC Power fails and is restored</td>
<td>ON</td>
</tr>
</tbody>
</table>

*Figure 1-13: WS5 Power Management States*
Specifications

The Workstation 5 conforms to the following specifications.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>AMD Geode LX800</td>
</tr>
<tr>
<td>Display</td>
<td>15” TFT LCD (1024x768) 262K Colors Max.</td>
</tr>
<tr>
<td>Touchscreen</td>
<td>EloTouchSystems Five-wire resistive, 100 thousand points-per-inch resolution rated at a screen life of over 35 million touches.</td>
</tr>
<tr>
<td>Backlight(s)</td>
<td>Two CCFL backlights with three intensity settings programmable through the WS5 API.</td>
</tr>
<tr>
<td>Real Time Clock</td>
<td>100-year calendar with alarm features and century roll-over, includes 242 bytes of battery backed CMOS RAM.</td>
</tr>
<tr>
<td>Memory</td>
<td>Max 2 GB DDR 333 SDRAM</td>
</tr>
<tr>
<td>Mag Stripe Reader</td>
<td>3-Track ABA compatible, operates in MAGTEK and Special modes.</td>
</tr>
<tr>
<td>Optional Customer Displays</td>
<td>240x64 STN graphics based LCD available in both integrated and pole mount configurations.</td>
</tr>
<tr>
<td>USB Ports</td>
<td>Six USB 2.0 ports. (Four on the I/O Panel, 2 Internal, 1 available).</td>
</tr>
<tr>
<td>LAN Interface</td>
<td>10/100/1000 Ethernet - Modular RJ45</td>
</tr>
<tr>
<td>Serial Ports</td>
<td>1 DB9 RS232 Serial /w handshake, 2 Modular TX/RX RS232 Serial, no handshake.</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>Universal Input - 85 to 264VAC, 47 to 63Hz.</td>
</tr>
<tr>
<td>Input Power</td>
<td>32 - 35W Typical</td>
</tr>
<tr>
<td>BTU/Hour</td>
<td>104 Typical, 290 Maximum</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-25°C (-13°F) to 80°C (176°F)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0°C (32°F) to 45°C (113°F), 90% relative humidity max</td>
</tr>
<tr>
<td>Weight</td>
<td>10.5 lbs. (4.7 kg) / Shipping weight 14.0 lbs. (6.35 kg)</td>
</tr>
<tr>
<td>Case Material</td>
<td>PC-ABS Plastic</td>
</tr>
<tr>
<td>Physical Dimensions</td>
<td>See Appendix A</td>
</tr>
</tbody>
</table>
What is The Workstation 5?

Approvals

The Workstation 5 meets the following safety and environmental certifications.

<table>
<thead>
<tr>
<th>Directive</th>
<th>Specification</th>
<th>Year</th>
<th>Expiration Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY :</td>
<td>EN 60950-1 +A11</td>
<td>2001</td>
<td>Current</td>
<td></td>
</tr>
<tr>
<td>EMC :</td>
<td>EN 55022+A1+A2</td>
<td>1998</td>
<td>Current</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EN 55024+A1+A2</td>
<td>1998</td>
<td>Current</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EN 61000-3-2</td>
<td>2000</td>
<td>Current</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EN 61000-3-3+A1</td>
<td>1995</td>
<td>Current</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 2

Workstation 5 BIOS

This chapter describes the Workstation 5 BIOS and all configuration fields, then discusses BIOS Updates and the Windows CE Factory Restore Feature.

In this chapter

Starting BIOS Setup ........................................... 2-2
Basic CMOS Configuration .................................. 2-3
BIOS Features Configuration .............................. 2-7
Custom Configuration ...................................... 2-9
Special Configuration ....................................... 2-13
Plug-n-Play Configuration ................................. 2-15
**Starting BIOS Setup**

The Workstation 5 BIOS is based on the General Software Embedded 2000 BIOS.

**Starting BIOS Setup**

1. Connect a USB Keyboard to one of the USB ports located on the IO panel.
2. Power-up the unit.
3. When the BIOS Splash screen with MICROS logo appears, press the [DEL] key.

**Setup Screens**

The WS5 Setup screen is shown in Figure 2-1 below.

![Figure 2-1: BIOS Main Screen](image)

To navigate the Setup selections, use the arrow keys, Enter, or the Tab or Shift-Tab keys.
Basic CMOS Configuration

The Basic Setup Screen lets you set the system time and date, define the USB Flash Drive and CF card configuration to match the operating system, and POST optimization. Figure 2-2 displays an example of this screen using WINCE default settings from the Main Menu.

![Basic CMOS Configuration Screen (Windows Embedded CE 6.0)](image)

Figure 2-2: Basic CMOS Configuration Screen (Windows Embedded CE 6.0)

Figure 2-2 displays Basic Configuration screen but with the WINXPE default settings. This configuration supports WEPOS.

![Basic CMOS Configuration Screen (WEPOS)](image)

Figure 2-3: Basic CMOS Configuration Screen (WEPOS)

Note: If the default settings do not match the hardware configuration, the unit may fail to boot. See Page 2-19 for more information.
Drive Assignment Order:

This section contains a list of drive letters that can be mapped to a physical device and file system. The ‘Reset CMOS to WINCE defaults’ or ‘Reset CMOS to WINXPE defaults’ selections from the Main Menu automatically adjust the settings for this field to match the operating system installed.

Drive A: is assigned to the optional USB Floppy Diskette.
Drive C: is assigned to the USB Flash Drive, the primary boot device in Windows Embedded CE 6.0 or WEPOS configurations.
Drive D: is assigned to the IDE0, the CF Card. The CF Card is required for Windows Embedded CE 6.0 configurations and optional for WEPOS.

Boot Method - Selections: Boot Sector/Windows CE

This field is automatically selected, based on the Operating System installed.

The ‘Windows CE’ setting enables the CE Ready™ feature of the BIOS and boots from the NK.BIN image file stored on the USB Flash Drive.
For WEPOS, this field is set to ‘Boot Sector.’

Floppy Drive Types:

The WS5 supports an optional external USB Floppy Drive. Legacy Floppy Drives are not supported. However, when the optional USB drive is installed, it appears in the Floppy 0: field as “1.44, 3.5”

Time and Date Configuration:

The Date and Time settings are found at the top center of the Basic CMOS Configuration screen.

To change the Date or Time fields, use the up-down arrows to scroll to the appropriate field then use the PageUp, or PageDown keys to increment each value. Be sure to use the ‘Write to CMOS and Exit’ field to save any changes to the Real Time Clock settings.

Numlock state enabled/disabled (Default = Disabled)

The Numlock field determines if the Num Lock is enabled at power-up (If a keyboard is connected).
**Boot Order:**

Boot Order consists of six fields, ‘Boot 1st’ through ‘Boot 6th.’ Each field includes a set of pre-defined actions that can be associated with it.

Figure 2-2 displays the default boot order configuration for the WS5 running Windows Embedded CE 6.0. After the POST completes, the BIOS starts with ‘Boot 1st’ field, then proceeds to ‘Boot 2nd’ field and so on until the OS is found.

The Windows CE 6.0 configuration assigns the ‘Boot 1st’ field to the optional USB Floppy Diskette Drive, the ‘Boot 2nd’ field to the USB Flash Drive, the primary boot device. The ‘Boot 3rd’ field is assigned to Drive D, the Compact Flash Card.

For WEPOS configurations (Figure 2-3) assign the ‘Boot 1st’ field to the optional USB Floppy Diskette Drive, and the ‘Boot 2nd’ field to the USB Flash Drive, the primary boot device. The CF card is optional in the WEPOS configuration - the ‘Boot 3rd’ field may be ‘(None)’

**ATA DRV Assignments:**

Conventional rotating media ATA hard disks are currently not supported. When a compact flash card is installed in the Ide 0 slot, it does not appear in this display because it is an IDE Mass Storage Device.

ATA DRV ASSIGNMENT: Sect Hds Cyls

<table>
<thead>
<tr>
<th>Ide 0: 3</th>
<th>AUTOCONFIG, LBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ide 1: 3</td>
<td>AUTOCONFIG, LBA</td>
</tr>
<tr>
<td>Ide 2: 3</td>
<td>AUTOCONFIG, LBA</td>
</tr>
<tr>
<td>Ide 3: 4</td>
<td>AUTOCONFIG, LBA</td>
</tr>
</tbody>
</table>

**Basic CMOS Configuration - Upper Right Column**

Typematic Delay: Disabled, 250ms, 500ms, 750ms, 1000ms (Default = 250ms).

Typematic Rate: 6/8/10/12/15/20/24/30 characters per second. (Default = 30).

Seek at Boot: None/Both/Ide/Floppy (Default = None)

Refers to a Legacy Floppy, not supported in the WS5.

Show ‘Hit Del’: Enable/Disable (Default = Enabled)

When set to enabled, the message “Press Del key to enter BIOS Setup Menu” appears on the BIOS Splash screen.
**Config Box : Enabled/Disabled (Default = Enabled)**

The Config Box appears after the BIOS splash screen as the OS image loads. It displays information about the system processor, chip set, serial port configuration, BIOS build date, and other hardware information.

**F1 Error Wait : Enabled/Disabled (Default = Enabled)**

Should a non-fatal POST error occur at start-up, the screen will prompt: “Halt on Error, Press F1 to continue.”

**Parity checking : (Default = Unused)**

Parity checking is not supported by the LX800 processor memory controller.

**Memory Test Tick : Enabled/Disabled (Default = Enabled)**

As the High and Low memory test icons display on the BIOS splash screens, the system board beeper emits a ‘Click’ sound.

**Debug Breakpoints : Enabled/Disabled (Default = Enabled)**

Embedded BIOS 2000 Debugger configuration setting.

**Debugger Hex Case : Lower/Upper (Default = Upper)**

Embedded BIOS 2000 Debugger configuration setting.

**Memory Test : (Default = StdLo FastHi)**

Selections include FullHi/FastLo, StdHi/FastLo, FastHi/FullLo, FullHi/FullLo, StdHi/FullLo, FastHi/StdLo, FullHi/StdLo, StdHi/StdLo, FastHi.

System memory is divided into two region; ‘Lo’ (less than 1MB) and ‘Hi’ (greater than 1 MB). For each memory region, one of three POST memory tests can be executed.

- The ‘Std’ selection provides RAM sizing with no testing.
- The ‘Fast’ selection provides some level of testing, but takes a little more time.
- The ‘Full’ selection provides an exhaustive test that checks every bit, but takes a great deal of time.

The default selection of ‘StdLo’ and ‘FastHi’ provides the fastest possible boot time while providing some level of testing above 1MB.

The Standard Diagnostics Routines includes a more rigorous test of system memory.
**BIOS Features Configuration**

This screen features two columns of IDE, USB configurations as well as access to the custom Windows CE Factory Restore feature. A sample of this screen is shown in Figure 2-4, below.

<table>
<thead>
<tr>
<th>Features Configuration Screen - Left Column</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACPI 2.0</strong>: Enable/Disable (Default = Enabled)</td>
</tr>
<tr>
<td>When enabled, the BIOS builds a collection of data structures (tables) that describe the hardware resources and power management capabilities to an ACPI compliant operating system.</td>
</tr>
<tr>
<td><strong>POST Memory Manager</strong>: Enable/Disable (Default = Disabled)</td>
</tr>
<tr>
<td>This field enables or disables the POST Memory Manager (PMM). PMM support is required by the Pre-boot Execution Environment (PXE) option ROMs, to enable a PXE Network Boot.</td>
</tr>
<tr>
<td><strong>System Management BIOS</strong>: Enable/Disable (Default = Enabled)</td>
</tr>
<tr>
<td>Must be enabled for the System Management Mode BIOS to function.</td>
</tr>
<tr>
<td><strong>Quick Boot</strong>: Enable/Disable (Default = Disabled)</td>
</tr>
<tr>
<td>The Quick Boot field, when Enabled, allows the POST to skip certain tests in order to speed boot time. However, due to the custom POST codes added to support the CF card and or USB Flash Drive, setting this field to Enabled does not speed up the POST.</td>
</tr>
<tr>
<td><strong>Secondary IDE UDMA</strong>: Enable/Disable (Default = Disabled)</td>
</tr>
<tr>
<td>Secondary IDE bus not supported. No connector.</td>
</tr>
</tbody>
</table>
**USB Mass Storage : Enabled/Disabled (Default = Enabled)**

- Enables BIOS support for USB storage devices including USB Floppy Disks, USB Thumb Drives, USB Hard Drives, Disks, and USB CD-DVD Drives.

**Platform Update Facility : Enabled/Disabled (Default = Disabled)**

- Enables the Remote Platform Update Facility feature of the BIOS, currently not implemented. Do not change this setting.

**Network : Enabled/Disabled (Default = Disabled)**

- Enables a remote support feature of the BIOS, currently not implemented. Do not change this setting. *If Enabled, the network may not function when the operating system starts.*

**WIN_CE_FACTORY_RESTORE : Enabled/Disabled (Default = Disabled)**

- See the Factory Restore procedure located at the end of this chapter.

---

**Features Configuration Screen - Right Column**

**System Management Mode : Enable/Disabled (Default = Enabled)**

- Must be set to ‘Enabled’ to support pre-boot firmware applications.

**Graphical/Audio POST : Enabled/Disabled (Default = Enabled)**

- This selection enables the BIOS splash screen with MICROS logo prior to booting.

**Firmbase Instrumentation : Enabled/Disabled (Default = Disabled)**

- This selection is for development purposes only. Do not change this setting.

**Primary IDE UDMA : Enabled/Disabled (Default = Enabled)**

- Supports Ultra DMA operation of the IDE port, but does not apply to the CF Card.

**Firmbase Debug Console : None/Custom/2f8h/3f8h (Default = 2f8h)**

- This field is for development purposes only. Do not change this setting.

**AtaMassStorage : Enabled / Disabled (Default = Enabled)**

- AtaMassStorage refers to storage devices on the IDE bus such as the CF Card.

**User : Enabled/Disabled (Default = Enabled)**

- This field enables pre-boot firmbase applications such as the Platform Update Facility in the firmbase environment. This field must be set to enabled.

**Shell : Enabled/Disabled (Default = Enabled)**

- This field is for development purposes only. It is used in conjunction with the ‘Firmbase Instrumentation’ and ‘Firmbase Debug Console’ field.
**Custom Configuration**

The Custom Configuration BIOS screen is composed of two columns that provide configuration settings for PCI Interrupt assignments, COM port resource assignments, video settings, IDE and USB fields and Processor/Memory Bus Speed (CPU/GLIU speed). The PCI Interrupt and COM Port assignments are factory configured and should not be changed.

The lower section of the screen contains display fields that indicate the CPU temperature and core speed, memory and PCI bus speeds, plus the AMD Geode LX800 and CS5536 revisions.

A sample of this screen is shown in Figure 2-5, below.

---

<table>
<thead>
<tr>
<th>System BIOS Setup - Custom Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C) 2005 General Software, Inc. All rights reserved</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI INT A Assignment</td>
<td>IRQ 10</td>
</tr>
<tr>
<td>PCI INT C Assignment</td>
<td>IRQ 10</td>
</tr>
<tr>
<td>COM 1 (3E8/IRQ 6)</td>
<td>Winbond UART1</td>
</tr>
<tr>
<td>COM 3 (3E8/IRQ 4)</td>
<td>GX UART2</td>
</tr>
<tr>
<td>Primary video device</td>
<td>IIX Graphics</td>
</tr>
<tr>
<td>Video mode</td>
<td>1024x768</td>
</tr>
<tr>
<td>Video data width</td>
<td>1 pix/clk</td>
</tr>
<tr>
<td>Memory timings</td>
<td>Optimal</td>
</tr>
<tr>
<td>IDE cable type</td>
<td>40-Pin</td>
</tr>
<tr>
<td>USB Device Controller</td>
<td>Disabled</td>
</tr>
<tr>
<td>USB Port 4 Function</td>
<td>Host</td>
</tr>
<tr>
<td>CPU temp</td>
<td>54°C</td>
</tr>
<tr>
<td>Core CPU Frequency</td>
<td>588 MHz</td>
</tr>
<tr>
<td>Memory Frequency</td>
<td>333 MHz DDR</td>
</tr>
<tr>
<td>CAS Latency</td>
<td>2.5 CLRS</td>
</tr>
<tr>
<td>PCI INT B Assignment</td>
<td>IRQ 10</td>
</tr>
<tr>
<td>PCI INT D Assignment</td>
<td>IRQ 10</td>
</tr>
<tr>
<td>COM 2 (3E8/IRQ 11)</td>
<td>Winbond2 COM1</td>
</tr>
<tr>
<td>COM 4 (3E8/IRQ 3)</td>
<td>GX UART1</td>
</tr>
<tr>
<td>LPT1 (LPT)</td>
<td>Winbond LPT</td>
</tr>
<tr>
<td>Display speed</td>
<td>80 Hz</td>
</tr>
<tr>
<td>Video panel type</td>
<td>LVDS</td>
</tr>
<tr>
<td>Legacy USB Support</td>
<td>Enabled</td>
</tr>
<tr>
<td>Floppy controller</td>
<td>Disabled</td>
</tr>
<tr>
<td>CRT/MLVU speed</td>
<td>508/333 MHz</td>
</tr>
</tbody>
</table>

1/+-/<CR>/<Tab> to select or <PgUp>/<PgDn>/+- to modify <Esc> to return to main menu

---

**Figure 2-5: Custom Configuration BIOS Setup Screen**

---

**Custom Configuration Screen - Left Column**

- **PCI INT A Assignment**: IRQ5/IRQ10/IRQ11/AUTO (Default = 10)
- **PCI INT C Assignment**: IRQ5/IRQ10/IRQ11/AUTO (Default = 10)

  PCI interrupt assignments are factory configured and should not be modified.

- **COM 1 (238/IRQ 6)**: Winbond UART1
- **COM 3 (3E8/IRQ 4)**: GX UART2

  COM Port assignments are factory configured to function with current MICROs applications and should not be modified.

- **IDRA**: Enabled/Disabled (Default = Disabled)

  IRDA is not supported.
Primary video device : None/PCI VGA card/LX Graphics/Auto (Default = LXGraphics)

The WS5 primary video device is the TFT graphics controller in the LX800 processor. This setting ensures that when the optional Mini-PCI Graphics Card is installed the BIOS Splash screen will always appear on the Workstation 5 LCD.

Video device mode : Disabled/320x240/640x480/800x600/1024x768/1152x864/1280x1024/1600x1200 (Default = 1024x768)

The LX800 Graphics controller drives the 15” LCD with a fixed resolution of 1024x768. This setting is locked and cannot be changed. This field has no effect on the Mini-PCI Graphics Card screen resolution, if installed.

Video data width 1 pix/clk 2 pix/clk : (Default = 1 pix/clk)

This setting is locked and cannot be modified.

Memory Timings Conservative/Optimal : (Default = Optimal)

This setting is factory configured and should not be modified.

IDE cable type 40-Wire/80-Wire : (Default = 40-wire)

The IDE Cable Type field is associated with IDE Hard drives, not supported in the Workstation 5.

USB Device Controller : Enabled/Disabled (Default = Disabled)

Refers to the ‘USB On the Go’ feature of the of the AMD CS5536 Companion Device. This setting is locked and cannot be modified.

USB Port 4 Function : Disabled/Device/Host (Default = Host)

This setting is locked and cannot be modified.

---

Custom Configuration Screen - Left Column Display Fields

These fields display the LX800 processor internal temperature, processor core frequency, and memory bus frequency.

CPU Temperature : 64°C

This field displays the internal temperature of the LX800 Processor. Temperature is measured by an on-die thermal diode and processed by the hardware monitor in Super IO#1, U8.

Core CPU Frequency : 500 MHz

This field displays the Processor core frequency. It will always be 500 Mhz, the rated core speed of the AMD Geode LX800.

Memory Frequency : 333 MHz DDR

This field displays the current memory bus frequency. Starting with BIOS Version 1024b, or later, the Memory Frequency setting is locked to 333 MHz. If a DDR400 DIMM is installed, it will run at 333 MHz.
CAS Latency : 2.5 CLKS

CAS is an abbreviation for Column Address Strobe and refers to a physical memory location in an array comprised of rows and columns of capacitors that form a dynamic random access memory module. CAS latency is defined as the number of clock cycles, (in this case 2.5), that occur between the memory controller sending a request to read a memory location and the data appearing at the output pins of the DIMM.

Custom Configuration Screen - Right Column

PCI INT B Assignment : IRQ5/IRQ10/IRQ11/AUTO (Default = 10)
PCI INT D Assignment : IRQ5/IRQ10/IRQ11/AUTO (Default = 10)

The PCI INT B and INT D assignments are factory configured and should not be modified.

COM 2 (338/IRQ 11) : Winbond2 COM1
COM 4 (2E8/IRQ 3) : GX UART1

COM Port assignments are factory configured and should not be modified.

LPT1 : (3BC) Disabled/Winbond LPT (Default = Winbond LPT)

This setting is factory configured and should not be modified.

Geode LX graphics : Disabled/2 MB/4 MB/8 MB/16 MB (Default = 16 MB)

This field determines the amount of system memory dedicated to the Graphics frame buffer during boot, and while the operating system runs.

Video refresh rate : 60 Hz/70 Hz/75 Hz/85 Hz/100 Hz (Default = 60 Hz)

This setting is factory configured and should not be modified.

Video panel type : TFT/LVDS (Default = LVDS)

This setting is factory configured and should not be modified.

Legacy USB support : Auto/Enabled/Disabled (Default = Enabled)

This selection enables basic USB Keyboard/Mouse support.

Floppy controller : Selection locked to ‘Disabled’

Refers to a legacy floppy controller, not supported by the WS5.

CPU/GLIU speed : (Selection Locked to = 500/333) - w/ BIOS Version G1024b or later.

The CPU/GLIU speed setting corresponds to the CPU Core Speed/GeodeLink Interface Unit Speed. The GLIU speed is similar to the FSB or ‘memory bus’ speed used with some system architectures.

The ‘Core CPU Frequency’ field displays the processor core speed in MHz. This is fixed at 500 Mhz.
The ‘Memory Frequency’ field at the lower left column displays the current GLIU speed setting. Starting with BIOS Version G1024b the memory bus speed is locked to default of 333MHz to avoid problems experienced with some DDR 400 DIMMs.

Custom Configuration Screen - Right Column Display Fields

These display fields show the PCI bus frequency, LX800 and companion chip revisions and the System Board hardware revision.

**PCI Bus Frequency : 66MHz**

Displays the default PCI bus frequency.

**LX Rev. Number : C0**

This field displays the Revision or Stepping of the AMD Geode LX800 silicon.

**CS5536 Rev. Number : B1**

This field displays the Revision or Stepping of the AMD Geode CS5536 Companion Device.

**Board Revision : Rev E or F**

This field reports the WS5 System Board hardware revision. A Revision G System Board will be released in the middle of 2008.

A summary of the Workstation 5 COM port resource assignments can be found in the table below.

<table>
<thead>
<tr>
<th>PORT</th>
<th>I/O Addr</th>
<th>IRQ</th>
<th>Physical Port</th>
<th>Connector/ Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM1</td>
<td>238h</td>
<td>12</td>
<td>SIO#1 - A</td>
<td>CN5 - RS232 DB9</td>
</tr>
<tr>
<td>COM2</td>
<td>338h</td>
<td>11</td>
<td>SIO#2 - A</td>
<td>CN14 - RJ45 Mag Stripe Reader</td>
</tr>
<tr>
<td>COM3</td>
<td>3E8h</td>
<td>4</td>
<td>CS5536 - 2</td>
<td>CN4 and J2 - Customer Display</td>
</tr>
<tr>
<td>COM4</td>
<td>2E8h</td>
<td>3</td>
<td>CS5536 - 1</td>
<td>CN7B - IDN Printers</td>
</tr>
<tr>
<td>COM5</td>
<td>220h</td>
<td>7</td>
<td>SIO#1 - B</td>
<td>CN7A - RJ45-RS232</td>
</tr>
<tr>
<td>COM6</td>
<td>208h</td>
<td>5</td>
<td>SIO#2 - B</td>
<td>J4 (Internal) Touchscreen</td>
</tr>
</tbody>
</table>
Special Configuration

The Special Configuration BIOS screen contains several configuration settings unique to the WS5 system board. Figure 2-6 displays an example of this screen. Expect additions/removals before release.

**PXE Boot : Enabled/Disabled (Default = Disabled)**

A PXE Boot can be accomplished in one of two ways. Setting this field to ‘Enabled’ causes the WS5 to attempt PXE boot each time it is powered up. Pressing the Hot key combination ‘Alt - P’ when the BIOS splash screen appears causes the unit to attempt a PXE boot one time.

**Boot Test Image : Alternate/Normal (Default = Normal)**

The ‘Normal’ setting causes the unit to boot from the System Board USB Flash Drive. If the Windows Embedded CE 6.0 NK.BIN file is located on the CF card, it is copied to the USB Flash Drive before the unit boots.

The ‘Alternate’ setting provides the ability to boot from a USB thumb drive attached to the IO Panel for test or data recovery purposes. It does this by disabling the USB Flash Drive so that the BIOS can boot from an NK.BIN file located on the external USB Thumb Drive. If an NK.BIN file is located on the CF card, it is not copied to the USB Flash Drive.
Last Power State : Last State/Power On/Power Off (Default = Last State)

This selection determines how the WS5 recovers from a power failure.

The default selection of [Last State] causes the workstation to return to the
power state before power failed. For example, if the WS5 is on and AC
power fails, it will automatically restart when AC power returns.

Conversely, if AC power is restored, but the unit was in the NOPOWER
state when AC power fails, it remains in the NOPOWER state when AC
power returns.

The [Power Off] selection, if enabled, requires the user to press the power
button to restart the unit after a power failure.

The [Power On] selection causes the unit to automatically power-up when
the AC power cable is connected to the unit.

COM 6 (208/IRQ5) : Disabled/GX UART1/GX UART2/Winbond
UART1/Winbond UART 2 (Default = Winbond2 COM2)

COM Port assignments are factory configured and should not be modified.

Special Configuration Screen - Right Column Fields

Cash Drawer voltage : 12V/24V (Default = 12V)

This selection determines the Cash Drawer Solenoid voltage. The default
selection of 12V is suitable for all MICROS cash drawers.

Personality Module : USBFlashDrive/CF (CE Default = CF, WEPOS Default
= USBFlashDrive)

This field determines the location of the persisted registry, either the
Compact Flash Card or the USB Flash Drive. The ‘Reset CMOS to
WINCE defaults’ or ‘Reset CMOS to WINXPE defaults’ selections from
the Main Menu automatically set this field to match the operating system
installed.

The Windows Embedded CE 6.0 configuration uses the CF card as the
location for the system registry and the POS application files. The CF Card
is required.

The WEPOS configuration uses the USB Flash Drive to store the persistent
registry and application files. A CF card is not required, but can be
installed to provide additional storage.

COM 5 (220/IRQ 7) : Disabled/GX UART1/GX UART2/Winbond
UART1/Winbond UART 2 (Default = Winbond UART2)

COM Port assignments are factory configured and should not be modified.
Plug-n-Play Configuration

Embedded BIOS 2000 provides Plug and Play (PnP) functionally compatible with PnP Specification Version 1.0a. Highlights from the Plug and Play specification include eliminating resource conflicts during POST and supporting Plug and Play ISA cards.

With the advent of the Advanced Configuration and Power Interface (ACPI) Specification, the importance of plug and play has diminished.

The illustration below displays a sample of the WS5 Plug and Play Configuration Screen. We recommend that you do not change any of the fields on this screen.

```
<table>
<thead>
<tr>
<th>Enable PnP Support</th>
<th>: Enabled</th>
<th>Enable PnP O/S</th>
<th>: Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assign IRQ0 to PnP</td>
<td>: Disabled</td>
<td>Assign IRQ8 to PnP</td>
<td>: Disabled</td>
</tr>
<tr>
<td>Assign IRQ1 to PnP</td>
<td>: Enabled</td>
<td>Assign IRQ9 to PnP</td>
<td>: Disabled</td>
</tr>
<tr>
<td>Assign IRQ2 to PnP</td>
<td>: Enabled</td>
<td>Assign IRQ10 to PnP</td>
<td>: Disabled</td>
</tr>
<tr>
<td>Assign IRQ3 to PnP</td>
<td>: Enabled</td>
<td>Assign IRQ11 to PnP</td>
<td>: Enabled</td>
</tr>
<tr>
<td>Assign IRQ4 to PnP</td>
<td>: Disabled</td>
<td>Assign IRQ12 to PnP</td>
<td>: Enabled</td>
</tr>
<tr>
<td>Assign IRQ5 to PnP</td>
<td>: Enabled</td>
<td>Assign IRQ13 to PnP</td>
<td>: Enabled</td>
</tr>
<tr>
<td>Assign IRQ6 to PnP</td>
<td>: Disabled</td>
<td>Assign IRQ14 to PnP</td>
<td>: Enabled</td>
</tr>
<tr>
<td>Assign IRQ7 to PnP</td>
<td>: Disabled</td>
<td>Assign IRQ15 to PnP</td>
<td>: Enabled</td>
</tr>
<tr>
<td>Assign DMA0 to PnP</td>
<td>: Disabled</td>
<td>Assign DMA4 to PnP</td>
<td>: Enabled</td>
</tr>
<tr>
<td>Assign DMA1 to PnP</td>
<td>: Disabled</td>
<td>Assign DMA5 to PnP</td>
<td>: Enabled</td>
</tr>
<tr>
<td>Assign DMA2 to PnP</td>
<td>: Disabled</td>
<td>Assign DMA6 to PnP</td>
<td>: Disabled</td>
</tr>
<tr>
<td>Assign DMA3 to PnP</td>
<td>: Enabled</td>
<td>Assign DMA7 to PnP</td>
<td>: Enabled</td>
</tr>
</tbody>
</table>
```

Figure 2-7: WS5 Plug and Play Configuration Screen
Shadow/Cache Configuration

Shadowing is the ability to move the contents of slower ROM devices to faster DDR memory in order to improve performance.

Embedded BIOS 2000 allows selective enabling or disabling of shadowing in 16KB sections, with the exception of the top 64KB which is reserved for the entire BIOS EPROM.

By default shadowing is enabled at C400 to enhance the VGA ROM BIOS performance, and from E000 - F000 to maximize system ROM BIOS performance. This configuration is shown in Figure 2-8. We recommend that you do not change any fields in the Shadow/Cache Configuration Screen.

Figure 2-8: Shadow/Cache Configuration Screen
Set Password

The Set Password screen can be used to change the default system password if required. The system password is required to change the default password or to use Window CE Factory Restore feature. The Figure below displays a sample of this screen.

![Set Password Screen](image)

**Figure 2-9: Password Configuration Screen**

To change the default password, see the following procedure:

1. From the System BIOS Setup screen, scroll to the Password Configuration selection and press [Enter].
   - The Enter Password’ prompt appears.
2. Enter the default password “Grnbelt” (case sensitive) and press Enter.
   - If the unit beeps twice and the prompt ‘Incorrect Password - Enter Password or hit ESC to reboot’ appears, this indicates the password is incorrect.
3. In the ‘User Password’ field, type the new password. Note: Passwords are case sensitive.
4. Press the [Tab] key to move to the ‘User Confirm’ and re-enter the password.
   - If the User Password and User Confirm fields do not agree, an error prompt will appear.
5. Press [ESC], then ‘Y’ to return to the System BIOS Setup Screen, then scroll down to the ‘Write to CMOS and Exit’ field and press enter. Press ‘Y’ to save changes and restart the unit. The new password does not take affect until you complete this step.

The password can be reset to the ‘Grnbelt’ default by using the CMOS Reset Jumper, J15. See Page 3-9 for more information.
Standard Diagnostics Routines

The Standard Diagnostics Routines are part of the default Burn-In Diagnostics included with the General Software BIOS.

An example of the Burn-In Diagnostics screen is shown in Figure 2-10.

By default, all tests are disabled. Each test provides the option to run once or continuously.

For example, to run a continuous memory test, navigate to the ‘Low Memory’ and ‘High Memory’ fields, setting each to [Enabled]. Then select the ‘Continuous Testing’ and ‘Tests Begin on ESC?’ fields then hit [ESC] to start the test.

A counter appears, testing each byte of memory installed until terminated by an error or the user. Press any key to stop the test and return to the main menu.
Resetting CMOS to WINCE or WINXP Defaults

The Workstation 5 currently supports both the Windows Embedded CE 6.0 and Windows Embedded for Point of Service (WEPOS) Operating Systems. Each uses a slightly different hardware configuration, handled by setting the WINCE or WINXPE defaults. When the unit leaves the factory, the defaults are set correctly, but may need to be reset if the BIOS is updated or the CMOS memory cleared.

Windows Embedded CE 6.0

The current Windows Embedded CE 6.0 configuration uses a 256M CF Card, 256M USB Flash Drive, and a 256M DDR 333 DIMM. The WINCE defaults populate the ‘ASSIGNMENT ORDER’ and ‘BOOT ORDER’ fields in the Basic Configuration Screen with the CF Card. The ‘Personality Module’ field in the Special Configuration screen is set to ‘CF’ to specify the location of the system registry. The ‘Boot Method’ field is set to ‘Windows CE.’

- For example, if the unit is configured to run Windows Embedded CE 6.0, but the defaults are not set properly, the unit may fail to boot because the ‘Personality Module’ and ‘Boot Method’ fields are set incorrectly.

WEPOS

The WEPOS Configuration currently uses a 4GB USB Flash Drive, and 512M or 1GB of DDR 333 RAM. A CF Card is not required, but can be installed for additional storage.

Setting the WINXPE defaults removes the CF Card from the ‘DRIVE ASSIGNMENT ORDER’ and ‘BOOT ORDER’ fields in the Basic Configuration screen and sets the ‘Personality Module’ field in the Special Configuration Screen to ‘USB Flash Drive.’ This causes the BIOS to skip the custom CF card POST, but does not prevent the device from appearing as a removable disk drive after WEPOS starts. The Boot Method field is set to ‘Boot Sector.’

- If the unit is configured to run WEPOS, but the defaults are set to WINCE, the unit will fail POST if a CF card is not installed.

Setting the WINCE or WINXPE Defaults

1. Start the unit with a keyboard attached and when the Blue splash screen appears, press the [Del] key.
   - The CMOS Main Menu appears.
2. Scroll down to the ‘Reset CMOS to WINCE or WINXPE defaults’ selection as appropriate and press enter. Select ‘Y’ and the unit restarts.
Upgrading the WS5 BIOS

A pre-boot firmware application called Platform Update Facility (PUF) provides the ability to perform BIOS upgrades by simply placing the binary image and several configurations files on the Compact Flash Card, a standard component for the Windows Embedded CE 6.0.

Windows Embedded CE 6.0

For units running Windows Embedded CE 6.0, a BIOS upgrade is handled by the CAL through a Platform Update. Refer to FB07-003 for more information about obtaining updates. The Platform Update places the BIOS image and support files in the appropriate CAL server folders, allowing it to distribute the required files to the CF card of each workstation.

A typical BIOS update consists of the files GRNBELT.BIN, GRNBELT.LOG, GCHKSUM.LOG, and optionally, DEFAULTS.LOG. The CAL places these files on the CF card and restarts the unit.

When the unit restarts, the pre-boot application called Platform Update Facility (PUF) detects the BIN file, performs a file size check, then generates a 9-digit checksum against the binary image. This generated checksum is compared to the value stored in the GCHKSUM.LOG file. If they match, the BIOS update proceeds and unit displays the screen shown on the next page. The update takes about one minute.

After the BIOS update is complete, the unit restarts. To prevent the PUF from flashing the BIOS again, it created a file called BFLASH.LOG just before flashing the BIOS the first time. BFLASH.LOG is a text file that contains the current date in the format mm/dd/yyyy. The PUF compares the bin file date with the date stored in the BFLASH.LOG file. If the dates match, the flash is not performed and the unit boots. When the operating system starts, the CAL resumes and removes all files related to the BIOS upgrade from the CF Card.

If the checksum values do not match, the error messages:

‘BIOS File Chksum Failure!’
‘BIOS Not Updated’

will appear on the LCD. A file called GBIOS_ERR.LOG is created on the CF card and GRNBELT.BIN is deleted from the CF card. This is an indication that the BIOS binary file is corrupt.

Reset CMOS to WINCE Defaults

Resetting the CMOS to Factory Defaults is required if a new BIOS field is added or a change occurs to an existing default. In addition, the WS5 BIOS has two defaults - one for Windows Embedded CE and one for WEPOS - to handle the unique storage requirements of each operating system configuration.
This step is normally performed by the technician just after flashing the BIOS.

The DEFAULTS.CFG file automates this process. If the file contains the line DEFAULTS = 1, the Platform Update Facility performs the ‘Reset CMOS to WINCE defaults’ automatically. If the file is not present, or contains the line DEFAULTS = 0, a reset is not performed.

**BIOS Update in Progress**

A sample of the BIOS Update screen is shown in Figure 2-11, below.

![BIOS Update in Progress](image)

*Figure 2-11: BIOS Update in Progress - Do Not Remove Power*

---

**WARNING**

When the screen shown above is visible, pressing the power button or removing AC Power from the unit could result in a corrupt BIOS chip.
WEPOS

Since a CF card is not required on the WEPOS configuration, upgrading the BIOS requires a USB Floppy Disk.

To perform the upgrade the following items are required.

- USB Floppy Drive
- USB Keyboard
- BIOS Upgrade Floppy Disk.

1. Obtain the BIOS upgrade file - posted to the HSG Portal as a ZIP file, currently named WS5_Gxxxx (xxxx = the BIOS Version).
2. Place the BIOS upgrade file on a computer with a Floppy Diskette Drive.
3. Insert a floppy diskette and double click the .EXE file.
   - The WinImage Self Extractor window appears.
4. Select a floppy drive (usually the A: drive) and press [OK] to start.
   - This creates the bootable BIOS Upgrade Floppy Disk.
5. Power off the Workstation 5 and connect a USB Floppy Diskette and Keyboard. Insert the Workstation 5 BIOS diskette and power-up.
   - The WS5 should boot from the Floppy disk, and automatically flash the BIOS. When the process is complete, the screen displays the A:> prompt.
6. Remove the USB Floppy Disk Drive and restart the unit.
7. When the Blue Splash screen appears, press the [Del] key to enter CMOS Setup.
   - The upper left corner of the BIOS Splash screen displays the current BIOS version.
8. Scroll down to the ‘Reset CMOS to WINXPE defaults’ selection and press enter. Select ‘Y’ and the unit restarts. The BIOS update is complete.
   - If you do not reset CMOS to WINXPE defaults, the unit may not boot.
Win CE Factory Restore

For Windows Embedded CE 6.0 a custom pre-boot firmware application we call Win CE Factory Restore is available. This is a new tool designed to ease depot maintenance. Should the OS Image or platform files become corrupt or otherwise unusable, Factory Restore replaces all files on the USB flash drive and erases the CF card, returning the unit to the ‘out-of-box’ or factory condition.

To understand how Factory Restore works, let’s examine the USB Flash Drive partitions, as shown in Figure 2-12 below. Two of the three partitions are hidden and not available in ‘My Device.’

Partition 1 is the hidden boot partition, containing the OS image in a file called NK.BIN. Partition 2 is also hidden and contains the factory restore files. This includes a duplicate set of platform files, configuration files and folders, utilities, and the NK.BIN file. Partition 3 is visible and appears as ‘\DOC’ in ‘My Devices.’

Figure 2-12: USB Flash Drive Partitions

Figure 2-13 illustrates how Factory Restore copies the image file and platform files to the correct partitions.

Figure 2-13: Windows CE Factory Restore Operation

The OS image, NK.BIN is copied from Partition 2 to Partition 1, the boot partition. The platform files and folders are copied from Partition 2 to Partition 3, the visible \DOC partition. Finally, a Wipe CF is performed to remove all files from the Compact Flash card.

Included with the Platform Files is a file called FACRECOV.DAT. This text file resides in the \DOC folder and contains information about the Factory Recovery feature. It can be examined from the WS5DiagUtility System Information screen by touching the [Recovery Image Info] button. See Chapter 5 for more information.
The procedure to initiate the Factory Restore feature can be found below.

**WARNING:**
Factory Restore formats the CF Card. If required, take steps to preserve files on the CF card before running Factory Restore.
If the CF Card is not formatted as FAT16 with a partition type of 0x06, the CF format may not function.

1. Remove any USB thumb or flash drives from the IO panel connectors, attach a USB keyboard and power-up.
2. When the Blue splash screen appears, press the key combination [ALT-M].
   Note: some keyboards may not initialize in time to detect this key combination. Alternately you can press the [DEL] button at power up to enter BIOS Setup, select the Features Configuration menu and set the WIN_CE_FACTORY_RESTORE field to ‘Enabled’. Press [ESC] to continue.
   - The screen prompts “Remove ALL external USB Storage Devices, Press Enter to Continue.”
   - The screen prompts for the system password.
3. If you have not changed the default system password, enter ‘Grnbelt’ (case sensitive) and press Enter. Press ‘Y’ to confirm.
   - After successfully entering the system password, the screen returns to the BIOS Setup Main Menu.
4. From the Main Menu select ‘Write to CMOS and Exit’ and press Enter, then ‘Y’ to save changes and exit.
   - The unit restarts and prompts ‘Factory Restore in Progress - Please Wait.’
   - After Factory Restore copies the platform files as described above, it formats the CF Card.
5. When the process is complete, the unit restarts.
   The workstation is now running the CE image and platform files placed in the factory restore partition when the unit was manufactured. After the unit is placed in the field, Platform Updates may occur. The operating system image and platform files received during a Platform Update are not copied to the Recovery Partition. Therefore it is possible that some files including the OS image will eventually become out of date.

However, since the primary purpose of Factory Restore is to repair a workstation that previously did not boot due to a corrupt NK.BIN file, the unit can now be pointed to an application server with the current platform files and receive them through a Platform Update.
Chapter 3

What’s Inside?

This Chapter describes how to open the unit and how to remove and replace several components.

In this chapter

- Disassembling the Workstation 5 .......................................................... 3-2
- System Board Components .................................................................. 3-6
- LCD/Touchscreen Assembly ............................................................... 3-14
- Hardware Updates .............................................................................. 3-17
- Reassembling the Workstation 5 ......................................................... 3-32
Disassembling the Workstation 5

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

1. Remove all cables from the 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. If an option such as the Finger Print Reader is attached to the front cover, take care not to rest the unit on the casing.
   - The WS5 cover is held in place by a pair of captive screws accessible from the underside of the unit as shown in Figure 3-1. A pair of hinges are located at the rear of the base.

3. Loosen the two captive screws from the under side of the unit as shown the upper half of Figure 3-1. Return the unit to the normal operating position. Remove the top cover from the base by lifting at the front of the cover as shown in the lower half of Figure 3-1.

![Figure 3-1: Removing the WS5 Top Cover](image-url)
4. Remove the screw that fastens the LCD and Touchscreen assembly to the base as shown at the Figure below. Lift the assembly out of the base and place to the right side as shown. If you encounter resistance when lifting the LCD assembly, this could be a cable snagged under the Mini-PCI connector.

![Figure 3-2: Removing the LCD/T Touchscreen Assembly](image)

5. If a Finger Print reader or other option is installed in the Top Cover, remove the interface cable from J10, located at the front of the chassis.

6. With the LCD/T Touchscreen positioned to the right of the base, remove the following cables as described on the next page.
What's Inside?
Disassembling the Workstation 5

- A unit with the standard resistive touchscreen is shown at the left of the illustration. Remove the LCD cable from J8, the backlight inverter cable from J3 and the resistive touchscreen ribbon cable from J6.

![Figure 3-3: Removing the LCD/Touchscreen Cables](image)

- The optional capacitive touchscreen configuration is shown on the right side the illustration. Remove the LCD Data Cable from J8, the backlight inverter cable from J3, and the Capacitive Interface Board cable from J5.
Figure 3-4, below shows the base unit with the LCD/Toucshcreen removed and points out some of the major components.

Figure 3-4: Workstation 5 with LCD/Toucshcreen Assembly Removed
System Board Components

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

System Board Components

Figure 3-5 shows the major integrated circuits located on the Workstation 5 system board.

Figure 3-5: WS5 System Board Revision G - Primary Components
System Board Connectors

Figure 3-6 shows the Workstation 5 System Board connectors.

Figure 3-6: WS5 System Board Revision G - Connectors
System Board Jumpers and Switches

Figure 3-7 points out the system board jumpers and switches.

Figure 3-7: WS5 System Board Revision G - Jumpers, Switches and LEDs
System Board Jumper Configuration

The Workstation 5 System Board includes several jumpers, detailed in the following pages.

**J4 - Touch Screen Select**

J4 is actually a pair of jumpers that switch a serial interface between either the resistive or optional capacitive touchscreen interface. The default setting is for a resistive touchscreen. The jumper settings are shown in on Page 3-33.

**J15 - CMOS Reset**

J15, when used properly, clears the CMOS memory and resets the system password and the date/time. After resetting CMOS, the BIOS time and date must be programmed and the WINCE or WEPOS defaults defined.

- Remove the AC power cable from the unit.
- Move the jumper from pins 1-2 to pins 3-2 for several seconds, then move the jumper back to the 1-2 position.
- Connect a Keyboard to and AC Power cable to the unit. Press the power button to start the unit and clear the CMOS memory. When the Blue splash screen appears, press [Del] to enter the System BIOS Setup Main Menu. Select ‘Basic CMOS Configuration’ and program the current time and date.
- From the Main Menu, select the WINCE or WEPOS default as appropriate and press ‘Y’ to restart the unit.

![Figure 3-8: CMOS Reset Jumper](image)

**J17 - TFT Panel Mode**

J17, in combination with a pair of jumpers located on the Backlight Inverter Board determine the LCD Panel type. See Page 3-15 for more information about LCD Panel jumper configurations.

**J20 - PCI Bus Speed Select**

The default setting for J20 is Open to select a PCI Bus Speed of 66Mhz.
System Board Block Diagram

Figure 3-9 shows a block diagram of the Workstation 5, including the System Board, internal power supply, resistive touchscreen, backlight inverter, and Sharp LCD.

![Figure 3-9: Workstation 5 Block Diagram (5-Wire Resistive Touchscreen)]
System Board Description

This section contains a technical description of the Workstation 5 System Board block diagram shown in Figure 3-9.

**AMD Geode LX800 Processor**

U40 is the AMD Geode Family LX800 Processor. The LX800 incorporates a 64-bit DDR SDRAM Memory Controller, 2D Video Processor and TFT Controller, and the GeodeLink Architecture.
Processor speed - 500Mhz.
Cache - Based on a split Instruction/Data/TLB (Translation Look-Aside Buffer).
- 64KB Instruction
- 64KB Data
- 128KB L2 cache configured as Instruction or Data or both.

**Memory**

The WS5 System Board includes a pair of 184-pin DDR compatible memory sockets, and is capable of supporting up to 2GB of system memory using MICROs approved DDR devices.

**AMD Geode CS5536AD Companion Device**

U29, the Geode CS5536 Companion Device is an IO expansion device specifically designed for use with the LX800, a processor with an integrated memory controller. The LX800 and CS5536 companion chip are connected through a dedicated 66Mhz PCI Bus Interface.

The Geode Companion Device supports many System Board IO functions, highlighted below.

**Serial Ports**

The CS5536 includes two high-speed industry standard serial ports, COM 4 and COM 5. The UARTS are both 16550 and 16450 software compliant and support baud rates up to 115.2 kbps.

**USB Ports**

The CS5536 Companion Device includes four Universal Serial Bus (USB) 2.0 compliant ports, supporting low speed, full speed, and high-speed connections. On the WS5 system board, the four ports are assigned as follows:

- USB Port 0 - Assigned to CN8B.
- USB Port 1 - Assigned to J9 USB Flash Drive Socket.
What’s Inside?
System Board Description

- USB Port 2 - Assigned to the SMC2503 USB Hub Chip U21.
- USB Port 3 - Assigned to J10 - Right Angle 2x5 USB connector for optional integrated fingerprint reader or other device.

The USB Hub chip U21 provides three additional USB ports assigned as follows. Two ports are assigned to IO connector CN6. Port number three is assigned to the CN8 ‘B’ pins or bottom USB connector. All ports support wake-up events, and feature over-current and power control support.

**ATA Controller**

The Geode companion device ATA controller is compliant with the ATA-5 specification, often referred to as ATA/66. This includes a fully buffered UDMA 0-4 mode IDE Interface.

The IDE Interface is a single channel supporting two devices that can operate in PIO modes 1 to 4, MDMA (Multi-DMA) modes 0 to 2, or UDMA modes 0 to 4, at speeds up to 66 MB/s. The ATA controller pins are multiplexed with an industry standard Flash interface, but this feature is not used. The WS5 System Board utilizes the IDE channel for the Compact Flash Card.

**Low Pin Count (LPC) Interface**

The Low Pin Count Port (LPC) provides an industry standard interface compatible with the Intel LPC Interface Specification Version 1.0. The LPC interface supports memory, IO, DMA, and Intel’s Firmware Hub Interfaces.

On the WS5 board, several devices reside on the LPC bus. The BIOS EEPROM U36, Super IO devices U8 and U35, along with debug connector J14. The Companion chip is configured through strapping options to boot from the BIOS EEPROM.

**Real Time Clock (RTC) and CMOS RAM**

The companion device includes a real time clock for system timekeeping. Powered by a system board battery BAT1, the clock maintains timekeeping when system power is not available. The RTC maintains registers for seconds, minutes, hours, days (day of the week and day of the month), months and years. The timing reference is provided by crystal Y4.

The CMOS RAM, also maintained by BAT1, consists of 242 bytes of static CMOS RAM, used to store non-volatile system parameters from the CMOS Setup Utility.
System Management Bus (SMB)

The SMB is a two-wire synchronous serial interface compatible with the System Management Bus physical layer. It is designed to support a number of devices such as EEPROMs, Super I/Os, and DIMMs.

For example, at start-up, the BIOS uses the SMB to read the contents of the SPD EEPROM on the DIMM to determine the size of the device and memory bus speed.

General Purpose IO (GPIO)

The GPIO pins consists of up to 28 pins that can be independently dedicated to input or output functions as required by the needs of the system board circuitry. For example, GPIO pins on the companion chip are assigned to power button, and control pins for the IDN port.

Power Management Controller (PMC)

The PMC controls all aspects of power management including the power button and establishes the Working power domains on the system board.

Ethernet Port

The WS5 System Board uses a RealTek RTL8110SC 10/100/1000 Ethernet Controller coupled to an industry standard 8-pin modular connector.

BIOS

The BIOS is provided by the General Software Embedded 2000 BIOS. A more detailed discussion of the BIOS and supported operating systems can be found in Chapter 1. Using BIOS Setup is covered in Chapter 2.
**LCD/Touchscreen Assembly**

The LCD/Touchscreen Assembly is mounted to the top cover, but is placed on top of the base chassis. The only component associated with the top cover is the gasket seal.

The LCD/Touchscreen assembly is shown in Figure 3-10, below.

---

**Figure 3-10: The LCD/Touchscreen Assembly /w Resistive Touchscreen**

A resistive or capacitive touch panel is mounted to the top of the LCD Bracket, held in place by clips. The 15” LCD fits inside the LCD Bracket which in turn is fastened to the LCD Plate with four captive screws. The LCD is a 250 nit panel that operates at a fixed resolution of 1024x768.
**Backlight Inverter Board**

The Backlight Inverter Board is mounted to the back of the LCD Plate as shown in Figure 3-11, below.

The inverter includes J4 and J5, used to determine the LCD panel type. The jumper settings are routed through the interface cable to a pair of system board GPIO ports. At start-up, the WS5 API reads the GPIO ports to determine the type of panel installed. A third jumper, J17 is located on the system board and shown directly below J4 and J5.

The Sharp LG45 panel is used for initial production, but will change over to the AUO XG03 in mid-2008.

*Figure 3-11: The Workstation 5 Backlight Inverter Board*
Optional Capacitive Touchscreen

Figure 3-12 below, shows the future optional Capacitive Interface Board and Interface Cable added to the LCD Plate. The touchscreen ribbon cable is connected directly to the Capacitive Interface Board. The interface cable runs between the Capacitive Interface Board and the System Board. A System Board jumper, J4 is used to switch between the resistive and capacitive touchscreens. See Page 3-33 for jumper settings.

Figure 3-12: Optional Capacitive Touchscreen Configuration
Hardware Updates

This section includes procedures for removing and replacing the Workstation 5 internal components and optional add-ons.

Magnetic Card Reader

The Workstation 5 Mag Card Reader is a ‘slim line’ design mounted in a plastic channel located along the right side of the workstation base. Figure 3-13 illustrates the MSR.

Remove the MSR

1. Remove the LCD/Touchscreen assembly and system board cables as previously described.
2. Remove the MSR channel from the base. Figure 3-13.
3. Press on the tab of the modular connector to remove it from CN14. Pull the cable out of the cut-out in the side of the chassis.

Figure 3-13: Remove/Replace the Mag Card Reader
Replace the MSR

1. Figure 3-14. Feed the modular connector through the opening in the chassis, and use a screw driver blade to guide the connector into the system board connector.

![Figure 3-14: Installing the Magnetic Card Reader](image)

- Use Screwdriver to Guide MSR Connector to CN14

2. Insert the MSR channel into the slots along the side of the base.

3. Replace the LCD/Touchscreen Assembly and Cover. A procedure can be found at end of this Chapter.
USB Flash Drive

This procedure describes how to remove and replace a USB Flash Drive.

Remove the USB Flash Drive

1. Remove the LCD/Touchscreen assembly as previously described.
2. Refer to Figure 3-15, below. Use a pair of needle nose pliers to pinch the stand-off and remove the USB Flash Drive.

![Figure 3-15: Removing the USB Flash Drive](image)

Installation

1. Figure 3-16 points the location of J9, the USB Flash Drive socket. The missing pin on J9 serves as a key when installing a device. It is possible to offset the pins, resulting in a POST failure.

![Figure 3-16: Installing the USB Flash Drive](image)

2. Before continuing, make sure the USB Flash Drive is seated properly on J9.
What's Inside?
Hardware Updates

DDR Memory

The Workstation 5 system board includes a pair of DIMM sockets, CN12 and CN13. This section specifies the approved memory devices and describes how to remove and replace them. DDR400 DIMMs are currently not approved for use in the Workstation 5.

Approved DIMMs for the Workstation 5 System Board

Figure 3-17 lists the DDR333 DIMMs currently approved for use on the Workstation 5 System Board.

<table>
<thead>
<tr>
<th>Size</th>
<th>MICRO P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>256M</td>
<td>700502-175</td>
<td>Wintec WD1UN256X808-333B-PH</td>
</tr>
<tr>
<td>512M</td>
<td>700502-173</td>
<td>Wintec WD1UN512X808-333B-QC</td>
</tr>
<tr>
<td>1G</td>
<td>700502-174</td>
<td>Wintec WD1UN01GX816-333C-QC</td>
</tr>
</tbody>
</table>

*Figure 3-17: Workstation 5 System Board Approved DIMMs*

Figure 3-18 displays typical DIMM configurations for the Windows CE and WEPOS operating systems using MICROS approved devices.

<table>
<thead>
<tr>
<th>CN12</th>
<th>CN13</th>
<th>Total</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>256MB</td>
<td>--</td>
<td>256M</td>
<td>Windows Embedded CE 6.0</td>
</tr>
<tr>
<td>512MB</td>
<td>--</td>
<td>512M</td>
<td>WEPOS</td>
</tr>
<tr>
<td>1G</td>
<td>--</td>
<td>1G</td>
<td>WEPOS</td>
</tr>
</tbody>
</table>

*Figure 3-18: DIMM Configuration Table*

See the next page for more information about removing and replacing DIMMs.
Installing DIMMs

**STATIC SENSITIVE DEVICES**
Always follow ESD procedures when installing or removing DIMMs.

1. Make sure each retention clip is in the open position. Figure 3-19. The notch on the DIMM must line up with a corresponding land in the socket. Place the DIMM in the socket. Press down on each side of the DIMM to lock the retention clips in place.

![Figure 3-19: Lining up the DIMM with the Socket](image)

Remove a DIMM

1. Rotate each retention clip away from the socket. As you do this, the DIMM will lift out of the socket. See Figure 3-20.

![Figure 3-20: Removing a DIMM](image)

2. Replace the LCD/Touchscreen Assembly and Cover. A procedure can be found at end of this Chapter.
Mini-PCI Wireless Card

The Workstation 5 wireless card is available as a factory installed option or can be purchased as a kit for later installation. The Wireless card is one of two options that can be installed in the System Board Mini-PCI socket. The following procedure describes how to install the wireless card and the included printed circuit antennae.

Installing the Wireless Card

The system board Mini-PCI connector accepts the 802.11 b/g wireless card. The kit includes the wireless card and two printed circuit antennae installed in the WS5 Base.

1. Remove the LCD/Touchscreen assembly as previously described.
2. Locate the Mini-PCI connector near the center of the system board and install the wireless card. Refer to Figure 3-21, below.

Insert Card at 30° Angle

o Begin by inserting the card at a 30 degree angle relative to the socket as shown at the left of Figure 3-21.

o When the card is fully seated, rotate it downward until the side rails of the socket lock the card in place, as shown at the right of Figure 3-21.

3. To install the internal printed circuit antennae, continue with Step 4 below. To install the optional panel mount SMA connector for use with an external antenna provided by the installer, see Step 7. The Panel Mount SMA connector is included in the loose parts kit of the Workstation 5 factory equipped with the wireless card.
The Workstation 5 base includes mount points for the printed circuit antennae, located behind each speaker.

4. Refer to Figure 3-22. Orient the antenna as shown and slide it into the notches provided at the right side of the base. Repeat this step and install the second antenna in the left side of the base.

5. Refer to Figure 3-23. Connect each antenna cable to the wireless card. Place each antenna cable into the same ‘hooks’ used to hold the speaker cables and prevent them from interfering with the LCD/T Touchscreen Assembly.

6. Proceed to Step 9 to reassemble the workstation.
The SMA panel mount connector is intended for use with an external wireless antenna supplied by the installer. One of the internal printed circuit antennae must be disconnected.

7. Insert the SMA connector into the ‘ANT’ cut-out in the IO Panel. Refer to Figure 3-24, and install the lock washer and nut, then fasten securely.

8. Attach the antenna cable to the ‘Main’ terminal on the wireless card.

![Figure 3-24: Installing the IO Panel Mount SMA Connector](image)

9. Replace the LCD/Touchscreen Assembly and Cover. A procedure can be found at end of this Chapter.

**Software Configuration**

The wireless card driver is included with the operating system. When the workstation boots to the operating system, the driver should automatically detect the card and present a configuration window.

Configure the security settings as required to associate the wireless card with the desired Access Point.
Mini-PCI Graphics Adapter

One option available for the Mini-PCI socket is the Mini-PCI Graphics Card. This card provides the Workstation 5 with the ability to drive two independent displays in the WEPOS environment.

The Mini-PCI Graphics Card is supplied with a VGA cable that mounts to the Workstation IO Panel. Video Drivers are included with the image.

1. Remove the LCD/Touchscreen assembly as previously described.

2. Locate the Mini-PCI connector near the center of the system board and install the wireless card. Refer to Figure 3-25, below.
   - Begin by inserting the card at a 30° angle relative to the socket as shown at the left of Figure 3-25.
   - When the card is fully seated, rotate it towards the socket until the side rails lock it in place as shown at the right of Figure 3-25.
   - Attach the interface cable.

*Figure 3-25: Installing the Mini-PCI Graphics Card*
3. Refer to Figure 3-26, and remove knock-out from IO Panel and install VGA adapter cable.

*Figure 3-26: Installing the VGA Cable*

**Configuration**

The Mini-PCI Graphics driver is resident in the Windows XP Professional Embedded Image. After the card is installed the unit powered up, WEPOS detects the card.
Integrated/Rear LCD Customer Display

This procedure describes how to attach the Rear LCD Customer Display to the Workstation 5. The display is provided as a complete assembly, ready to install. The WS5 Integrated Customer Display Bracket is not compatible with the Workstation 4 and Workstation 4 LX.

1. Remove the AC power cable from the unit.
2. Place a towel or soft cloth on your work surface to protect the touch screen glass, then place the workstation face down on this surface.
3. Remove the logo plate from the rear IO door and return the door to the closed position. Figure 3-27.
   o The logo plate can be removed by flexing the center of the IO door outwards from the IO panel and then sliding the logo plate off the IO door.
4. Feed the interface cable through the cut-out then insert the LCD customer display bracket until the side clips snap into place as shown in Figure 3-28.
5. Connect the interface cable to the IO panel ‘Rear Display’ connector as shown in Figure 3-28.

![Figure 3-28: Installing the Integrated Customer Display](image)

6. Return the unit to the normal operating position, connect the AC power cord and press the power button. The Integrated LCD Customer Display is automatically detected and ready for use.

**Testing the Integrated LCD Customer Display**

   - The DiagUtility Main Screen is displayed.

8. Touch the ‘Cust Disp’ tab. Press the [Send] button to send a message to the customer display.
Pole LCD Customer Display

This procedure describes how to install and connect the Pole LCD Customer Display to the Workstation 5. The pole version is provided as a kit consisting of the LCD Display Assembly /w 5 ft. cable, pole, base, extension cable, and nut. Due to the varying thickness and materials used on the counter surface, the installer must provide the base mounting hardware. 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 and base to the counter surface, route the extension cable through the pole and connect it to the LCD assembly cable. Figure 3-29. Mount the LCD assembly to the pole, position the display head in the desired position and use a 1.5 mm hex wrench to lock the display in place.

Figure 3-29: Assembling the LCD Pole Display
3. Figure 3-30 points out the location of the Pole Display connector. Power-off the unit and attach the keyed 4-Pin DIN connector on the cable to the Customer Display Connector on the IO Panel.

![Figure 3-30: Connecting the LCD Pole Display to the WS5](image)

4. Refer to the software requirements section below.

**Software Configuration**

The LCD Pole Display is automatically detected by the WS5 API at power-up.
Workstation 5 Adjustable Stand Pole Display

The Adjustable Stand Pole Display can be used for both the Workstation 4 and Workstation 5 Adjustable Stand. The kit consists of a LCD customer display, 6” Pole, mounting bracket and hardware.

1. Determine the location of the mounting bracket on the base plate. It can be mounted to the left, right, or rear of the Base Plate.

2. Attach the Mounting Bracket to the Base Plate. Be sure to use the spacers included in the kit between the base plate and bracket.

3. Refer to the numbered steps in Figure 3-31 to attach the pole to the bracket, run the interface cable, and attach the LCD to the pole.

4. Rotate the LCD to the desired position and use a 1.5mm hex wrench to tighten the set screw and lock the display in place.

5. Make sure the interface cable is routed up through the stand in order to attach it to the IO Panel. Before placing the WS5 on the Stand, connect the interface cable to Customer Display IO Connector.

Testing the Adjustable Stand Pole Display

The LCD Pole Display is automatically detected by the WS5 API at power-up.

Reassembling the Workstation 5

The following procedure describes how to reassemble the Workstation 5.

1. If no options are installed in the top cover, proceed to Step 2. If the optional Integrated Finger Print Reader is installed on the top cover, it must be connected to the system board before installing the LCD/T touchscreen assembly.

Refer to Figure 3-32, below and connect the interface cable to J10, located at the front of the cage. Make sure the interface cable runs below the top of the chassis lip to ensure it does not interfere with the LCD/T touchscreen assembly. The interface cable can also be placed on the right side of the base if desired. Place the Top Cover directly behind the base as shown in the illustration.

![Figure 3-32: Connecting the Option Cable to J10](image)

2. Place the LCD/T touchscreen Assembly to the right of the base and install the interface cables. Refer to Figure 3-33 on the next page.
Resistive Touchscreen

The standard resistive touchscreen configuration and jumper settings are shown on the left side of Figure 3-33. Connect the LCD Data Cable to J8, the Backlight Inverter Cable to J3, and the resistive touchscreen ribbon cable to J6. If the ribbon cable connector is not keyed, be sure to install the connector with pin-1 facing towards the front of the unit. The lower section of the photo shows the correct setting for J4, the touchscreen interface select jumper.

Capacitive Touchscreen

The future optional capacitive touchscreen configuration and jumper settings are shown on the right of Figure 3-33. Connect the LCD Data Cable to J8, the Backlight Inverter Cable to J3, and the capacitive touchscreen interface board cable to J5. For reference, the lower right section of the photo shows the correct setting for J4, the touchscreen interface select jumper.

Figure 3-33: Connecting the LCD/Touchscreen Cables to the System Board
3. Install the LCD/Touchscreen Assembly in the base. The upper section of Figure 3-34, below shows the tabs at the rear of the assembly and the corresponding slots in the base. Insert the tabs into the base at the angle shown then rotate down. Be sure to install the screw that fastens the LCD/Touchscreen assembly to the base.

![Place Tabs in Slots]

If the LCD/Touchscreen Assembly does not seat on top of the chassis, remove it and check for cable interference. All internal cables must run below the top of the chassis lip.

![Install Screw]

Figure 3-34: Installing the LCD/Touchscreen Assembly
4. Before installing the Top Cover, examine the gasket to ensure it is seated in the groove. Install the cover by attaching to the hooks at the rear of the base first, then rotate downward to snap the front in place.

![Figure 3-35: Installing the Workstation 5 Top Cover](image)

5. Tighten the captive screws to secure the cover. If the fingerprint reader or other option is mounted to the Top Cover, avoid placing the unit on the housing while you fasten the screws.
What's Inside?
Reassembling the Workstation 5
Chapter 4

Installing and Operating the Workstation 5

This chapter describes how to install and the operate the Workstation 5.

In this chapter

- Care and Handling ................................................................. 4-2
- The IO Panel ........................................................................ 4-5
- Installation ............................................................................. 4-9
- Operation ............................................................................. 4-12
- Personality Swap................................................................. 4-20
Care and Handling

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

Equipment Placement

To ensure proper operation of the WS5, 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.

Care and Handling of the Touchscreen

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 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 of 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 MICROSO AC power and communications cables and induced into the equipment. Consequently, no exposed cable dedicated to the MICROSO 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 5 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 MICROSO IDN data cabling should be installed in accordance with the appropriate MICROSO Site Preparation Guide.
Cleaning the Workstation 5 Touchscreen and Cabinet

Instructions for cleaning the cabinet and LCD/Touchscreen are described below.

**SHOCK HAZARD**
Always turn the unit off and remove the AC cable before cleaning or performing 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.

**VERMONT LCD NOTICE**
This product contains mercury and may only be disposed of after the proper removal and disposal of the lamps.

**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 4-1 shows the Workstation 5 I/O Panel.

Figure 4-1: Workstation 5 I/O Connector Panel
This page contains a brief functional description of each port starting at the left of Figure 4-1.

**VGA**

Knock-out for the optional Mini-PCI Graphics card DB-15 VGA connector. This card provides the Workstation 5 with the ability to drive two displays in the WEPOS configuration.

**ANT**

This location is reserved for an SMA type female RF connector. The Workstation 5 wireless configuration uses a pair of internal antennae that provide adequate coverage in most situations. However, the panel mount SMA RF connector can be used to connect an external wireless antenna supplied by the installer. The SMA RF connector is provided in the loose parts kit of the wireless Workstation 5. Installation instructions can be found in Chapter 3.

**IDN**

The single IDN Port is functionally identical to the RS422-A and RS422-B ports on the Workstation 4 and 4LX. The port is configured through application software as either a full-duplex RS422 port capable of supporting MICROs IDN printing devices or a two wire RS232 port capable of supporting peripheral devices. Use cable P/N 300319-102 for RS232 devices, or P/N 300319-001 for IDN devices.

---

**WARNING:**

Do not insert a 6-Pin modular plug into the 8-Pin IDN port. A 6-Pin plug can push some pins out of position where they can short to the connector shell and possibly damage the IDN and/or RS232 Interface components. Always use an 8-Pin modular plug when you connect IDN printers or RS232 peripherals to the workstation.

---

**COM5**

This connector supports an 8-pin modular RS232 Interface. This port is similar in function to the modular COM Port 5&6 (Eclipse) or COM Port 5 on the PCWS 2010. Use RJ45 to RS232 DB9 Adapter Cable, P/N 300319-103.

**PWR 12V OUT**

This knock-out is reserved for a future optional external device.

---

**USB**

The Workstation 5 IO Panel includes four USB ports. Each port is either USB 1.1 compliant, (full speed and low speed) or USB 2.0 (capable of supporting high speed operation).
Ethernet
The WS5 system board includes a Realtek PCI based 10/100/1000 Ethernet Controller with a UTP modular connector. The modular connector features an integrated isolation transformer as well as a link/speed status and network activity indicators. The interface is fully IEEE 802.3 compliant and features Wake On LAN support.

RS232
This industry standard DB9 male connector can be used for serial printer (COM1) if supported by the POS application. The port is supported by a 16550A UART with a 16-byte receive buffer.

Customer Display
This mini-din connector supports either a stand or remote pole Customer Display. See Chapter 1 for more information about supported customer displays.

Cash Drawers #1 and #2
These connectors support MICROS cash drawers with a 4-Pin DIN connector. +24V Cash Drawers are also supported by making a selection in the BIOS Setup.

Compact Flash (CF)
For Windows Embedded CE 6.0 configurations, the Compact Flash Card is factory populated on a daughter card that can be accessed from the IO panel. Blank when shipped, the CF card contains the ‘personality’ of the WS5, storing a copy of the Windows CE registry, as well as the POS application and optionally SAR totals. See the Memory Architecture section in Chapter 1 for more details about how the CF card is utilized in Windows Embedded CE 6.0. The CF card is protected by a bracket fastened to the case with two hex screws.

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

- For Windows Embedded CE 6.0 configurations, a MICROS approved CF Card must be installed in order for the unit to start. See Chapter 5. For WEPOS configurations the unit is shipped without a CF Card installed. However, the CF daughter card is included to allow the user to add a CF card for auxiliary storage.

To install a CF Card in a WEPOS unit, power off and remove the CF card bracket as shown in Figure 4-10. Install the card as shown in Figure 4-12. Re-install the CF Bracket and power up. The CF Card appears in My Computer as a ‘Removable Disk’
Installing and Operating the Workstation 5
The IO Panel

- Never remove or insert a CF card when the unit is ON. The System Board and CF Daughter Card are not provisioned to support ‘hot-swapping.’ Always use the power button to turn the unit off before removing or inserting a CF card.

- The CF card is a keyed device - but it is possible to force the card into the socket the wrong way. See Figure 4-11 to remove or Figure 4-12 to install the CF Card. When properly oriented, very little force is required to insert the card.

Customer Display
This connector supplies power and data to the Integrated LCD Customer Display.

Line Out
The Green Line Out jack is capable of driving external powered speakers. The internal speakers are not disconnected when this output is used.

Mic In
The Microphone input jack allows you to connect a microphone and record sound clips, if supported by the operating system. Windows Embedded CE 6.0 configurations do not include a sound recorder.

AC POWER
The AC Input to the workstation. The workstation includes a low-profile angled connector in the loose parts kit.
Installation

This section discusses the recommended method of cabling the workstation when used with the Workstation 5 Adjustable Stand.

Cabling the Adjustable Stand

This procedure describes how to attach the Workstation 5 to the Adjustable Stand.

1. Install the optional Printer Power Supply, if required. Refer to Figure 4-2. Open the power supply compartment door and attach the AC power connector to the power supply. Close the compartment door.

2. Refer to Figure 4-3, and prepare to mount the workstation on the stand.
   - Connect the AC Power Cable supplied in the Workstation 5 loose parts kit to the AC receptacle in the base of the stand. Use the longer of the two cables for the workstation.
   - Cable the workstation. Several cable tie points are provided in the cover, and a pair of re-usable velcro cable ties supplied with the stand can be used to bundle the cables. Figure 4-3 shows two cable ties, but these may not be needed in some situations.
   - Before placing the unit on the stand, make sure the securing latches are in the ‘open position and the I/O door is closed as shown.

Figure 4-2: Installing the Optional Printer Power Supply
Installing and Operating the Workstation 5
Installation

Figure 4-3: Preparing to Attach the Workstation 5 to the Adjustable Stand

3. Mount the cabled workstation by placing the rubber feet into the receptacles on the adjustable stand. Figure 4-4, below.

Figure 4-4: Mounting the Workstation to the Adjustable Stand
4. When the workstation is fully seated on the stand, turn the knobs on the rear of the stand to the ‘Locked’ position as shown in Figure 4-5.

![Figure 4-5: Securing the Workstation to the Adjustable Stand](image)

5. For additional security, a pair of 17mm screws are provided in the Adjustable Stand loose parts kit to secure the knobs in the locked position. Make sure the knobs are in the ‘Locked’ position and use the hex wrench supplied in the workstation loose parts kit to install the screws.

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

7. Connect the AC power cord to an electrical outlet installed in accordance with the appropriate site prep guide. See page 4-13 to start the workstation.
Operation

This section presents operational procedures for the Workstation 5 including how to use the power button to transition the unit between the NOPOWER, and ON power states.

Figure 4-6 points out the location of the Workstation 5 Power Switch, Operator LED, Magnetic Card Reader, and the Operator LCD.

**Figure 4-6: Workstation 5 Operator Features**

**Operator LCD**

The Operator LCD is a 15” Active Matrix Display with a resolution of 1024x768. 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 5 between the NOPOWER and ON states.

**Operator LED**

The Operator LED blinks during start-up and turns solid Blue when the operating system boots.

**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 WS5 is in the NOPOWER state, the Operator LCD will be blank and the Operator LED is off. See Chapter 1 for a description of the supported 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 LCD displays a splash screen similar to that shown in the upper left of Figure 4-7. Note that the BIOS Splash screen displays the BIOS version at the upper left corner of the screen.
   - The Operator LED is flashing.

While the BIOS Splash Screen is displayed, the unit is performing a Power On Self Test (POST) of system board hardware. Once the POST completes, a series of pre-boot firmware applications start executing. These utilities check for the presence of a NK.BIN and or GRNBELT.BIN image file on the CF Card.

![Figure 4-7: Workstation 5 BIOS Splash and Windows CE 6.0 Boot Screen](image)

- In most cases, the NK.BIN or BIOS binary file(s) are not present, and the message ‘NK.BIN not found on CF,’ appears on the first line, directly below the configuration box.
This is not an error message - the pre-boot firmware application (FlashCE) that handles Windows CE operating system upgrades is simply stating that the upgrade file is not present.

If the NK.BIN or GRNBELT.BIN file are present on the CF Card, the pre-boot firmware application displays a message similar to ‘Updating the Operating System - Please Wait’, but you do not see the ‘Black Border’ displayed by the original Workstation 4 during a WINCE update.

- The prompt ‘Loading Windows CE’ appears, followed a series of dots that progress from left to right across the screen as Windows Embedded CE 6.0 starts up.
  - For WEPOS, the screen clears after the BIOS splash screen, remains blank for about 20 seconds, then a progress bar appears. The Desktop appears in about one minute.
- After several seconds, the screen clears, the Operator LED stops blinking and turns solid blue, and the Windows Embedded CE desktop appears.
- If a POS Application is already installed, it should start. If no application is installed, the CAL should look for an application server. Units running WEPOS run the WIN32 version of the CAL known as CAL32.
- If the WS5 boot splash screen does not appear, the beeper sounds more than once, or the operating system does not start, refer to Chapter 5 for troubleshooting information.

**Turning the Workstation from ON to NOPower**

- For Windows Embedded CE 6.0 configurations, press and hold the power button until the Operator LED changes from solid Blue to OFF, then release it. This takes about 4 seconds.
- For WEPOS configurations, when you touch the power button, a ‘Shut Down Windows’ dialog box appears. Press the [OK] button to restart the unit. Another method of shutting down the unit is from the desktop. Touch Start -> Shut Down -> Shut Down, then [OK].

**Starting the Workstation for the First Time**

When a new workstation is powered up for the first time - regardless of the operating system installed, the CAL starts through a registry setting. When the CAL starts, it checks the registry and determines that a POS application is not installed. It presents a 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 5 units. See your application programming documentation.

2. Select your Workstation 5 from the list. Double-click the entry.
   - Each workstation in the database is pre-programmed with a workstation name, IP address, and other application related settings.
   - If the version of the CAL on your workstation is older than the version of CAL on the server, CAL will first update itself and reboot before proceeding to download the application.
   - The Workstation proceeds to download the application 'package' to the CF card, updates the registry and reboots when complete. After restarting, the CAL automatically starts the application.
Using the Windows CE Screen Saver and Backlight Utility

The Workstation 5 includes the same enhanced Windows CE Screen Saver and Backlight Utility as the Workstation 4 LX.

By default, after five minutes of inactivity, the screen saver engages and displays a Workstation 5 logo. If the unit remains inactive another for twenty minutes, the LCD backlights will turn off. The operator LED remains solid Blue. Touching the screen or swiping a mag stripe card restores the LCD backlights. Instructions for modifying the default settings and using a custom logo can be found below.

Procedure:

1. From the desktop, Touch Start -> Control Panel -> Screen Saver.
2. The Screen Saver Properties window appears. An example of this screen, with the default settings, is shown in Figure 4-8, below.

   ![Screen Saver Properties](image)

   **Figure 4-8: The Windows CE Screen Saver and Backlight Controls**

   **Main Screen Saver**

   - To disable the screen saver, remove the check mark from the ‘Enable Screen Saver’ box, touch [Apply] then [OK].
   - To change the elapsed time before the screen saver engages, use the ‘Wait’ field up/down arrows to select the new value, touch [Apply], then [OK].
   - To change the screen saver from the ‘Float’ mode to the ‘Tile’ mode, touch the ‘Tile’ check box, then [Apply] and [OK]. Touch the [Preview] button to see an example of the screen saver.
To use a custom bit map, it should be placed in the \DOC\Scrnsaver folder. To load a custom bitmap, press the [Browse] button, select the file and press [OK]. Touch [Apply], then [OK]. To view your custom bit map, touch [Preview]. Press [OK] to close the screen saver window.

To return all screen saver and backlight utility settings to factory defaults, press the [Restore Defaults] button.

**Backlight Control**

This section controls the LCD backlights to extend the life of the backlight tubes. The default is to turn off the backlights twenty minutes after the screen saver engages.

- To change the elapsed time until the backlights turn off, in the *After ScreenSaver activated for* field, use the up/down arrows to select the new value, then touch [Apply], and [OK].

- To prevent the backlights from turning off (not recommended) use the CE Input Panel or keyboard to type ‘on’ in the *After ScreenSaver activated for* field. Touch the [Apply] button, then touch [OK].

- Press the [Restore Defaults] button to return all screen saver/backlight utility settings to factory defaults.
Using the Magnetic Stripe Card

The Workstation 5 Magnetic Stripe Reader is mounted on the right side of the top cover as shown in Figure 4-9, below. It shows how to orient the mag stripe as the card is inserted into the reader. Insert the card completely into the slot and pull it past the reader head.

![Magnetic Card Reader](image)

Figure 4-9: 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.
Calibrating The Touchscreen

Calibrating the touchscreen is the process of aligning the touchscreen glass with the underlying video display. The Workstation 5 includes a four-point calibration utility accessible from the desktop.

When to Calibrate the Touchscreen

- When installing a new workstation.
- Any time the cursor does not follow the movement of your finger, or does not reach the edges of the touchscreen.
- If the LCD panel or touchscreen glass have been replaced.
- After Performing a workstation 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.

Windows Embedded CE 6.0

1. From the Windows Embedded CE 6.0 desktop, double touch or click the ‘TSHARC Calibration’ icon.

2. To begin, press the target at the center of the screen.
   - The Touchscreen Calibration screen appears. If you do not touch the screen within twenty seconds, the calibration utility will shut down and retain the previous calibration values.

3. Press the target indicated at the center of the screen.

4. Position you fingertip precisely over the target, touch and lift your finger when prompted to do so. Proceed to touch each target at the positions indicated - upper left, upper right, lower right, and lower left.
   - After touching all four targets, you will be prompted to accept the new calibration values or run the calibration procedure again. Press [ACCEPT] to store the new calibration values and return to the desktop.
Personality Swap

For Windows Embedded CE 6.0 configurations, the following procedure describes how to remove the Compact Flash personality card from an inoperative WS5 and install it in a replacement unit. This procedure is provided for reference only, as the CAL can be used to easily configure a replacement workstation, especially in situations where totals files need not be preserved.

Tools Required
- 2.5mm hex wrench. Included with each unit in the loose parts kit.

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 wire cutters to clip them.
   - If the WS5 is mounted to the optional adjustable stand, remove the re-usable tie wraps.
2. Place the inoperative unit face down on a counter surface to access the Personality Card bracket. Figure 4-10.
   - Insert the hex wrench into the bracket screws and turn it counter clock-wise to remove each screw.
   - Remove the bracket. Set the bracket and screws aside for the moment.

   Figure 4-10: Workstation 5 CF Card Location
• Figure 4-11 shows the CF personality card with the bracket removed. Note the keying lip on the bottom of the card and guides that hold it in place.

![Figure 4-11: Removing the Compact Flash Card](image1)

• Remove the CF card from the inoperative unit. Use your thumbnail or pen to catch the lip and remove the card from the socket. Figure 4-12.

• Un-box and remove the packing material from the replacement Workstation 5. 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.

• Install the CF Card removed from the inoperative WS5. Figure 4-12 above denotes the location of a lip that can also assist you in orienting the card as it is installed. Push the card into the socket until only a few millimeters are visible.

![Figure 4-12: Installing the CF Card](image2)
Workstation 5 Diagnostics

This chapter includes basic troubleshooting procedures for the unit and describes how to use the Diagnostics Utilities.

In this chapter

Basic Troubleshooting ................................................................. 5-2
Power On-Self Test (POST) Errors .................................................. 5-4
Workstation 5 Diagnostics Utility ..................................................... 5-6
Basic Troubleshooting

This section provides a brief troubleshooting chart for the Workstation 5.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response to the power button. Operator LED is Off. Operator LCD does not display blue splash screen. Beeper does not sound.</td>
<td>No Power to WS5</td>
<td>Be sure AC power cable is connected to the workstation and surge protector outlet, UPS or wall outlet. If unit is located on the WS5 Stand, make sure power cable is connected to base. Press the power switch for 1 second, then release it to start the unit.</td>
</tr>
<tr>
<td>The unit does not start. The beeper sounds three times. The Operator LCD is blank. The Operator LED blinks four times per second.</td>
<td>Power On Self Test (POST) indicates a Missing or Defective system board DIMM or DDR400 DIMMs are installed.</td>
<td>If DDR400 DIMM(s) are installed, the unit may not start. Install at least one approved DDR 333 DIMM in CN12 or CN13. If a DDR333 DIMM is already installed, remove and re-seat. See Page 3-20 for approved DIMM configurations.</td>
</tr>
<tr>
<td>The unit does not start. The beeper sounds four times. The Operator LCD displays the message ‘NO CF FOUND Press DEL key to enter BIOS Setup Menu’. Operator LED blinks four times per second.</td>
<td>Power On Self Test (POST) Error. CF Card not installed, not recognized or defective. or Incorrect boot configuration. BIOS Defaults must be set to match the operating system configuration.</td>
<td>For Windows CE, make sure a MICROS approved CF card is fully seated in the Daughter Card Socket. Connect a USB Keyboard, start the unit and press the [DEL] key to enter BIOS Setup. Select either ‘Reset CMOS to WINCE or WEPOS defaults’ and restart.</td>
</tr>
<tr>
<td>The unit does not start. The beeper sounds five times. The Operator LCD displays the message ‘No USB Flash Drive Found Press Delete key to enter BIOS Setup Menu’. Operator LED is blinking four times per second.</td>
<td>Power On Self Test (POST) Error. USB Flash Drive not installed or defective.</td>
<td>Make sure USB Flash Disk is properly installed. See Chapter 3.</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>----------</td>
</tr>
<tr>
<td>The Beeper Sounds once. Operator LCD displays BIOS splash screen and boots to the Operating System, but Operator LED flashes four times a second. The POS application may report errors or not start. If the Operator LED continues to flash after the OS starts, this indicates that WS5 API did not load properly.</td>
<td>The USB Flash Drive is not configured properly, corrupt, or defective. Or External USB Thumb Drive is connected the IO Panel, and the ‘Boot Test Image’ field in the Special Configuration screen of BIOS Setup is set to ‘Alternate’</td>
<td>Replace the USB Flash Drive. Or Remove external USB Thumb Drive. Connect a USB Keyboard, start the unit and press the [DEL] key to enter BIOS Setup. Select either ‘Reset CMOS to WINCE or WEPOS defaults’ and restart.</td>
</tr>
<tr>
<td>WS5 starts and operates normally, but appears to turn-off after about 25 minutes and inactivity. The Operator LED is solid Blue.</td>
<td>The Enhanced Screen Saver and Backlight Utility automatically turns-off the backlights by default.</td>
<td>Touch the screen or swipe a mag stripe card through the reader to restore the screen.</td>
</tr>
<tr>
<td>WS5 does not connect to LAN.</td>
<td>Network Patch cable not connected.</td>
<td>Install appropriate patch cable between workstation and wall jack.</td>
</tr>
<tr>
<td>WS5 cannot read mag cards.</td>
<td>Mag card read head dirty or contaminated. Mag card reader defective.</td>
<td>Use mag card cleaning kit on reader. Replace mag stripe reader.</td>
</tr>
</tbody>
</table>
**Power On-Self Test (POST) Errors**

At power up, the WS5 System Board runs the Windows Embedded BIOS 2000 BIOS POST, followed by a custom POST test to check for the presence of a CF Card and USB Flash Drive. The CF Card and USB Flash Drive POST tests execute after the main POST. For units configured to run WEPOS, the CF card is not tested.

<table>
<thead>
<tr>
<th>Error</th>
<th>Beeps</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST_BEEP_REFRESH</td>
<td>1</td>
<td>Memory refresh not working.</td>
</tr>
<tr>
<td>POST_BEEP_PARITY</td>
<td>2</td>
<td>Parity error in 1st 64kb.</td>
</tr>
<tr>
<td>POST_BEEP_BASE64KB</td>
<td>3^1</td>
<td>Memory failure in 1st 64kb.</td>
</tr>
<tr>
<td>POST_BEEP_TIMER</td>
<td>4</td>
<td>Timer T1 not operational</td>
</tr>
<tr>
<td>POST_BEEP_CPU</td>
<td>5^2</td>
<td>CPU test failed (or CF Card)</td>
</tr>
<tr>
<td>POST_BEEP_GATE20</td>
<td>6^2</td>
<td>Gate A20 failure (or USB Flash Drive)</td>
</tr>
<tr>
<td>POST_BEEP_DMA</td>
<td>7</td>
<td>DMA page/base registers.</td>
</tr>
<tr>
<td>POST_BEEP_VIDEO</td>
<td>8</td>
<td>Video error (non-fatal).</td>
</tr>
<tr>
<td>POST_BEEP_KEYBOARD</td>
<td>9</td>
<td>Keyboard failure.</td>
</tr>
<tr>
<td>POST_BEEP_SHUTDOWN</td>
<td>10</td>
<td>CMOS shutdown register failed.</td>
</tr>
<tr>
<td>POST_BEEP_CACHE</td>
<td>11</td>
<td>External cache not working.</td>
</tr>
<tr>
<td>POST_BEEP_BOARD</td>
<td>12</td>
<td>Board initialization failure.</td>
</tr>
<tr>
<td>POST_BEEP_LOWMEM</td>
<td>13</td>
<td>Exhaustive low memory test.</td>
</tr>
<tr>
<td>POST_BEEP_EXTMEM</td>
<td>14</td>
<td>Exhaustive extended memory test.</td>
</tr>
<tr>
<td>POST_BEEP_CMOs</td>
<td>15</td>
<td>CMOS restart byte failed.</td>
</tr>
<tr>
<td>POST_BEEP_ADDRESS_LINE</td>
<td>16</td>
<td>Address line failed.</td>
</tr>
<tr>
<td>POST_BEEP_DATA_LINE</td>
<td>17</td>
<td>Data line test failed.</td>
</tr>
<tr>
<td>POST_BEEP_INTERRUPT</td>
<td>18</td>
<td>Interrupt controller failure.</td>
</tr>
<tr>
<td>POST_BEEP_HUGEMEM</td>
<td>19</td>
<td>Exhaustive huge memory test.</td>
</tr>
<tr>
<td>POST_BEEP_EBDA_LOC</td>
<td>20</td>
<td>Address manager failed to reloc EBDA.</td>
</tr>
<tr>
<td>POST_BEEP_ADDR_MGR</td>
<td>21</td>
<td>Address manager failed to initialize.</td>
</tr>
</tbody>
</table>
| POST_BEEP_ADSYNC       | 22    | Address manager failed to sync memory parameters.
**Note 1**

Three beeps with a blank LCD and solid Blue Operator Display indicates the System Board DIMM(s) are not installed, not seated properly, or defective.

**Note 2**

The shaded POST_BEEP_CPU and GATE A20 failure fields are part of the General Software Embedded BIOS POST. The CF card and USB Flash Drive tests are firmbase applications that execute after the main POST completes, but report the same number of error beeps if a failure occurs. However, if a failure occurs with the CF or USB Flash Drive, an error message is also displayed on the LCD in addition to the beep codes.
Workstation 5 Diagnostics Utility

Windows Embedded CE 6.0 based units use the WS5DiagUtility, and WEPOS based systems use an updated version of the PCWS Utility. WS5DiagUtility is based on the Diagnostics Utility found in the Workstation 4 LX, it provides a great deal of information about the software platform and includes comprehensive tests of the internal hardware and supported peripherals.

Running the WS5 Diagnostics Utility (Windows CE)

For Windows Embedded CE 6.0 configurations, the utility is located in the \DOC\Utilities folder.

1. From the Desktop, touch My Device, then touch ‘DOC’
2. Touch the Utilities Folder, then select ‘WS5DiagUtility.’

System Information Screen (Windows Embedded CE 6.0)

When the WS5DiagUtility starts, it displays the System Information Screen, as shown below.

![Figure 5-1: The WS5 System Information Screen (Windows Embedded CE 6.0)](image)

The System Information screen combines many of the WS5 hardware and platform software components in a central location. A brief description of each field and button follows.
**Diagnostics Version**  
This field displays the WS5 Diagnostics Utility Software version.

**Workstation Model**  
This new field displays the workstation model to distinguish it from the Workstation 4 and the Workstation 4 LX.

**Hardware Revision**  
This field displays the Workstation 5 System Board hardware revision.

**WinCE Version**  
Reports Windows Embedded CE 6.0 Version Information.

**MICROS Build Version**  
The MICROS Build Version represents the combination of the Windows Embedded CE 6.0 image components and internal drivers. An internal driver is not accessible in the same manner as the WS5 platform drivers available on the \DOC, but are included in the image by the Windows CE Platform Builder. Should an internal driver be changed, added or removed, or a new component added or removed from the Windows CE image, a new build is generated and the MICROS ‘Build Version’ increments.

Note the ‘G’ designates ‘Greenbelt’ - the internal project name for the Workstation 5.

**RAM Space Available**  
This field displays the amount of available RAM.

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

**DHCP Server Address**  
This field displays the DHCP Server Address when the workstation operates in DHCP based network.

**IP Address (Dynamic)**  
This field displays the IP Address when the workstation operates in DHCP or Static IP mode.

**Motherboard Serial**  
This field displays the Workstation 5 System Board Serial Number.
**USB Flash Drive Size**
This field displays the USB Flash Drive size. In Windows Embedded CE 6.0 configurations the device contains three partitions of roughly equal size. However, since only the \DOC partition is visible in Windows CE, this field reports about 1/3 of the total size. For example, if a 256M USB Flash Drive is installed, this field displays roughly 80M - one third of the total size.

The WEPOS configuration uses a 4GB USB Flash Drive with a single partition.

**CF Size**
This field displays the total size of CF Card in bytes. Units running Windows Embedded CE 6.0 ship with a 256M CF Card.

**CAL Version**
Displays the current Client Application Loader (CAL) Version.

**LXBEEP.DLL Version**
This driver allows POS applications to access the system board beeper. At boot time, the BIOS controls the beeper in order to report POST codes failures should they occur.

**LXPOWER.DLL Version**
This driver helps manage the power button while the operating system is running. In addition, applications such as the CAL call on this driver to force a restart of the workstation during application downloads platform or upgrades.

**UWS4.DLL Version**
This file contains the workstation API, or Application Programming Interface. POS Applications use the API to access POS hardware such as the cash drawer interface, Mag Stripe Reader, and IDN Ports.

**LED.DLL Version**
This driver controls the Operator LED blink rate when the operating system is running. At start-up, the LED blinks, then turns solid Blue as the operating system starts and loads this driver.

**E2PROM.DLL Version**
This driver provides access to a system board serial EEPROM that is used to store information such as the serial number reported in the System Information screen of the Diagnostics Utility.
Activity Counters, Dump Sys Info and Recovery Image Info

Located at the lower left side of the System Information screen are the [View Counters], [Dump Sys Info], and [Recovery Image Info] buttons. Descriptions of each button can be found below.

[View Counters]

The Diagnostics Utility maintains a set of counters that track the number of times an MSR swipe occurs and the number of times each cash drawer is opened. Press the [View Counters] button to view the counters. All counters are stored in the registry and lost if the CF card is wiped or formatted.

[Dump Sys Info]

When you press this button, a file called WS5dump.txt is created on \CF. This text file contains all of the fields and counters reported by the System Information screen in a comma separated ASCII text format. The text file can be retrieved from the CF card and examined for troubleshooting or purposes.

[Recovery Image Info]

Touch this button to determine the version of the factory restore files and the number of times the feature has been activated. The information is contained in file called FACRECOV.DAT, located in the \DOC folder. The Figure below shows an example of this screen, but may contain pre-release software versions. Each field is explained in more detail below.

![Figure 5-2: Displaying the Factory Restore Information Screen](image)

The ‘Image Version’ fields displays the version of the restore files. The restore files are contained in a hidden partition on the USB Flash Drive.
The ‘Recovery Image Counter’ field displays the number of times the WinCE Factory Restore feature has been used.

The ‘Summary’ field includes a text box that displays the version of the restore files and a date/time stamp listing each time the recovery feature is used. In this case, the WinCE Factory Restore feature has been activated one time. Note the date format is DD/MM/YYYY.

**Testing Cash Drawers**

To test cash drawers, press the Cash Drawer tab. The screen displays the prompt below.

![Figure 5-3: Testing Cash Drawers](image)

Accessing the Cash Drawer test requires a Password. Apply the following formula to the six-digit number that appears in the ‘Key’ field.

\[ \text{Digit 1} \times \text{Digit 2} + \text{Digit 4} + \text{Digit 6} = \text{Password} \]

For example, if the Key is 374236, the Password would equal 29. (3 x 7 + 2 + 6 = 29).
Running the WS5 Diagnostics Utility (WEPOS)

From the Desktop, touch the ‘diagnostics.exe’ icon twice.

System Information Screen (WEPOS PCWS Utility)

The Figure below displays a sample of the WIN32 version of the PCWS Diag Utility.

Figure 5-4: PCWS Utility Main Screen

The PCWS Utility is derived from the PCWS 2010, and will continue to receive updates.
Wipe Compact Flash (WCF) Utility

In addition to the Diagnostics Utility, the \DOC\Utilities folder also contains WCF.EXE, the Wipe Compact Flash utility. Originally developed for the WS4 production line, we feel it has use as a service tool. WCF is not available for WEPOS configurations.

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 WS5 and can be removed before installation.

When you start WCF.EXE, it displays three options, listed below. After the selection of any option, the unit enters the NOPOWER mode.

- **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 removes all files from the CF card including the persistent registry folder, the POS application and SAR totals, if present.

- **Format Compact Flash?**
  This selection formats the CF Card, erasing all files and removes corruption if present, by reprogramming the File Allocation Table (FAT).

Press the power button to start the unit. Clearing the registry files or formatting the card clears the registry to its default settings. The default registry starts the CAL client, and after pointing it to a properly configured POS application server, a new application can be obtained in minutes.
The following is glossary of terms used throughout this manual.

ACPI

Abbreviation for Advanced Configuration and Power Interface. ACPI provides control, configuration (PnP) and power management functions to Operating Systems that support it.

ACPI support starts with compliance at the hardware level including the CPU, chip set, and Super I/O components, etc. The BIOS continues this by building and placing a number of ACPI descriptor tables in memory for access by the operating system. Finally, the OS references the data contained in the ACPI tables, using it to provide device configuration and power management as required.

The LX800 and CS5536 Processor/Companion Chip support ACPI through power management registers. Embedded BIOS 2000 also provides full ACPI 2.0 support.
API
Abbreviation for Application Programming Interface (API). The WS5 API is a descendant of the original WS4 API that resides between an application and the hardware, providing a set of hardware services that the application programmer can call upon to access POS features. Over time these services have been extended to encompass new hardware such as the LCD Customer Display.

With each new hardware platform release, the API is updated to match the underlying hardware changes.

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 to open the drawer. Changes to a register or General Purpose IO (GPIO) port address, or a new system board is handled by the API and therefore transparent to the application program.

Backlight
A Backlight consists of one or more Cold Cathode Fluorescent (CCFL) tubes usually located at the top and bottom or along the sides of the LCD panel housing. CCFLs provide the basic illumination for the panel, to make the background brighter and its contents sharper, especially under dim lighting.

The WS5 API provides three levels of backlight brightness, Bright, Normal and Dim. The brightness settings can be accessed by the POS application or tested with the WS5DiagUtility.

BIOS
Abbreviation for Basic Input Output System. The BIOS is more complex and sophisticated than the Boot loader used in the original WS4.

The WS4 LX and WS5 System Boards run General Software’s Embedded BIOS 2000. General Software provides a modular pre-boot 32-bit x86 embedded systems BIOS. The modular BIOS consists of a processor independent core and a collection of personality modules that match the processor, chip set, super IO, and other board features.

See Also: Firmbase.
CAL

Abbreviation for Client Application Loader. The MICROS CAL is a software utility that assists in the installation of the Workstation 5 POS application software, then manages the ongoing maintenance of the operating system, application software, and platform files. The CAL consists of two parts, one part resides on the client and the second part resides on the system server.

First introduced with the original Workstation 4, the MICROS CAL has been updated to operate on a variety of hardware platforms including the PCWS 2010 (WIN32 CAL) and Hand Held Terminals such as the MC50 and MC70 (CAL Mobile).

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 WS5 and build it with only the selected components appropriate to the platform.

CF Card

Abbreviation for Compact Flash Card. Compact Flash is an older 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 the 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 from many vendors in sizes ranging from 8M to 4G. The Workstation 5 will use a 256MB device in the Windows Embedded CE 6.0 configuration. The CF Card must be installed in order for these configurations to start. However, Workstation 5s running WEPOS do not require the CF card to start, but could be added for additional storage.

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 provides the user interface and may perform some or all of the application processing depending on which POS application software is in use.
CMOS Memory

A small amount of non-volatile memory address space associated with the Real Time Clock. The BIOS uses CMOS memory to store equipment configuration and user options associated with the operation of the BIOS, and the BIOS Setup Screen. The CMOS Memory and Real Time Clock are located in the AMD CS5536 Companion Device and connected to a battery to maintain configuration settings and time keeping.

See Also: RTC.

COM Port

A type of IO Port 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.

Customer Display

A display that shows the customer information about the transaction being performed on the workstation. A customer display may be mounted directly to the terminal or mounted at eye level on a pole located near the workstation. Two types of Customer Displays are available for the WS5. The LCD Customer Display is graphics based and is available in integrated, pole mount and adjustable stand pole mount versions. This display is capable of graphics or can emulate the 2x20 character format of the VFD Customer Display.

The VFD Customer Display is a pole mount version which displays alpha-numeric character in a 2x20 format. Only the pole version is supported this display cannot be used at the same time as the LCD Customer Display.

DIMM

Abbreviation for Dual In Line Memory Module. DIMMs appear in many sizes and pin configurations. The WS5 System Board uses 184-pin DDR 333 or 400 DIMMs.

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 Mini-PCI cards.
Abbreviation for Disk On Chip. See USB Flash Drive.

**Firmbase**

One of Embedded BIOS 2000s greatest strengths lies in the optional pre-boot environment known as Firmbase. Firmbase is General Software’s term for a custom 32-bit portable execution program stored in the system board BIOS ROM.

Firmbase applications run inside System Management Mode (SMM). Embedded BIOS 2000 uses SMM in a patented way to implement the firmware environment that permits custom firmware application to execute. Firmbase applications perform such operations as image file manipulation or BIOS updates and factory recovery.

**Firmware Application**

Firmware Application is General Software’s term for a custom 32-bit Portable Execution program, stored in the LX system board’s BIOS ROM that executes before the Operating System in the Firmbase pre-boot environment. The WS5 includes several pre-boot Firmware applications. Firmware applications can be used to integrate crash protection and recovery, remote administration, custom thermal management, and other solutions that run from software stored directly in the BIOS chip.

See Also: Platform Update Facility and System Management Mode.

**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 Printers connected in a multi-drop or daisy chain configuration. IDN devices primarily consist of thermal and dot matrix based roll printers.

The Workstation 5 includes a single RS422 port, labelled ‘IDN’
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 Differential Signalling.

MSR

Abbreviation for Magnetic Stripe Reader. An MSR used in the WS5 contains a transducer that reads the data from multiple tracks on a mag stripe card and converts the information to a serial format. The Workstation 5 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 API converts MSR track data into a series of numeric keystrokes that can be directed into the window that has focus in the operating system.

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

See Also: Special Mode.
Mini-PCI Interface

Mini-PCI is an adaptation of the Peripheral Component Interconnect (PCI) bus found in many desktop computers, but intended for laptop, tablet PCs and other small computer systems. Three Mini-PCI form factors are available, Type I, Type II and Type III. The WS5 system board includes a 124-pin Type IIIB card edge connector to accommodate a 802.11a/b/g Wireless Card Kit or a graphics card that can add two-display capability to the workstation.

The Mini-PCI bus is functionally the same as PCI version 2.2. In other words, it is a 32-bit 33 or 66 MHz bus with powered (+3.3V) connectors and support for bus mastering and Direct Memory Access (DMA).

Operator LED

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

The Workstation 5 Operator LED is Blue in color. The Operator LED blinks when the unit is booting or encounters a POST error and turns solid Blue as the operating system starts.

Operator Power Button

The WS5 Power Button is located on base, on the lower right front. The Operator Power Button is used to transition the unit between the ON and NOPOWER states.

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 embedded operating systems include Microsoft Windows Embedded CE 6.0, and Windows Embedded for Point Of Service (WEPOS), or Microsoft Windows XP Professional Embedded (XPE).
Workstation 5 Glossary

Platform Update

A generic term for updating the Workstation 5 platform files that ship with each unit. Once the unit is deployed, Platform Updates are used to update the operating system, WS5 drivers, the CAL utility, and the system BIOS in any combination.

When a Platform Update is released, it is posted as an executable file on the Workstation 5 page of the MICROSHSG Portal. The Platform Update file is downloaded, placed on the application server and executed. It stops the CAL service, copies the platform files to the appropriate CAL folders then restarts the service. Once the service restarts, the updated files are distributed to each client.

Platform Update Facility (PUF)

The Platform Update Facility is pre-boot firmware supplied by General Software that runs inside Firmbase environment. The WS5 uses it to perform BIOS updates. As part of a Platform Update, the CAL places the BIOS binary file along with several support files on the CF card and restarts the unit. The PUF detects the BIN file on the CF card and after performing a check to ensure the binary file is not corrupt, updates the BIOS and restarts the unit. When the CAL restarts, it removes all files related to the BIOS update from the CF Card.

See also: Firmbase.

Poly Switch

Like a traditional fuse, a Poly switch fuse or equivalent 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 WS5 system board uses poly switches on the remote customer display, backlight inverter, cash drawer outputs, and USB ports.

POST

Abbreviation for Power On Self Test. The POST is part of the BIOS, executing each time the workstation is powered up. It checks for the presence of the USB Flash Drive and Compact Flash Card, checks several key hardware circuits. If these devices are missing or defective, the POST sounds the beeper in a predefined fashion to report the error.
Power Management

In general terms, power management provides mechanisms in both software and hardware to minimize system power consumption, and manage thermal limits. Power management involves trade-offs among system speed, noise, processing speed and AC power consumption.

Registry

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

When Windows starts up, it loads the registry in RAM so it can be quickly accessed. A driver periodically copies the working registry in RAM to the Compact Flash card where it becomes the Persistent registry. This protects the registry contained in RAM, which will be lost if AC power fails.

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.

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 by the CAL or application programs, or by changing settings in the Control Panel.

RJ-11 Connector

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

RJ-45 Connector

An eight-pin modular telephone connector. The typical 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 5 has a total of 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 5 to drive IDN printing devices.

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. See Also: CMOS Memory.

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 fail. Transaction data is stored locally on the CF Card until the network connection or server is restored. When the network connection or server is restored, system totals are automatically balanced, allowing a smooth return to normal operations.

Special Mode
A Magnetic Stripe Reader input mode in which the API buffers each track without removing any information and notifies the application that track data is available. The application can then retrieve the track data for credit card authorization. See Also: MAGTEK Mode.

System Board
The motherboard or main board of the Workstation 5. The System Board contains the majority of the workstation circuitry including the CPU, Chip set, memory, USB Flash Drive, Compact Flash Card, Display Interface, and Input/Output Ports.
System Management Mode (SMM)

In addition to the real and protected modes of operation, processors since the 80486 have incorporated a third operating mode called System Management Mode. SMM was created to transparently run power management code such as APM in the background without causing interference to foreground operating systems and applications. ACPI is now the standard power management standard, replacing APM and freeing SMM for other uses. The General Software Embedded BIOS 2000 uses System Management Mode in a patented way to allow firmware applications to run before the operating system starts or along side an operating system that is running, crashed or not even installed.

See Also: Firmbase and Platform Update Utility.

TCP/IP

Abbreviation for Transport Control Protocol/Internet Protocol. Windows Embedded CE 6.0 is supplied with a TCP/IP stack and is the only network transport protocol supported.

UPS

Abbreviation for Un-interruptible Power Supply. A backup power supply that provides power to the workstation when the line voltage fails or drops to unacceptable levels. 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. USB is an asymmetric bus design, consisting of a host controller connected to multiple daisy chained peripheral devices. The addition of one or more USB hubs to the chain allows branching into a tree structure with no more than 5 levels of branching per controller and a maximum of 127 devices including controllers.

USB standards are developed by the Device Working Group of the USB Implementers Forum and currently supports three data rates:

- A Low Speed data rate, at speeds up to 1.5 Mbit/s. Generally used for Human Interface Devices (HID) such as mice, keyboards and joysticks. USB 1.1.
- A Full Speed data rate, at speeds up to 12 Mbit/s. USB 1.5.
- A Hi-Speed rate of up to 480 Mbit/s. USB 2.0.
**Detection and enumeration**

When a USB device is attached, the host detects and enumerates the device, then loads a specific device class driver. Each device class defines an expected behavior in terms of functionality so the same driver may be used for any device of the same class.

Some typical device classes include Human Interface Devices (input devices such as mice, keyboards, touch pads etc), Printers, USB hubs, and removable mass storage devices.

Removable mass storage devices appear in many forms including flash drives, portable hard drives, portable CD/DVD-RW drives, and digital media players. Since each of these unique devices conform to the removable mass storage device class, a single driver can support all of them.

**USB Flash Drive**

Generic term for a flash memory based hard disk with USB interface. Currently there are several providers of such devices and each uses a unique trade name, hence the generic term ‘USB Flash Drive’ used throughout this manual.

The original Workstation 4 used a device from M-Systems Inc, called a ‘Disk On Chip that resided on the legacy ISA bus. The Workstation 4 LX and Workstation 5 use a USB based device that may be called depending on the supplier, a ‘uDOC’ (M-Systems, Inc.), ‘Embedded USB Hard Drive’ (Smart Modular Technologies), or ‘USB Flash Disk Module’ (SimpleTech), in addition to other suppliers.

The USB interface provides a considerable increase in transfer speeds over the ISA based Disk On Chip, resulting in faster boot times and file copy speeds.

Physically, a typical USB Flash Drive is a small rectangular shaped circuit board with a 2x5 header that mounts to a matching connector on the system board.

Capacities range from 128M to 4GB and beyond; however, 256M is adequate for the Windows Embedded CE 6.0 configuration. WEPOS configurations use a 4GB USB Flash Drive.

Internally, a typical USB Flash Drive consists of a controller and USB 2.0 interface, coupled to one or more large flash memory chips. The processor executes firmware that emulates the Windows fat file system while at the same time mapping file data to and from the flash memory devices. All devices implement some form of wear leveling to maximize flash life expectancy. Data integrity is guaranteed by using error detection (EDC) and error correction (ECC) methods.
Appendix A

Equipment Dimensions

In this appendix

- Workstation 5 Low Profile ................................................................. A-2
- WS5 on Adjustable Stand with Rear LCD Customer Display ................ A-3
- Workstation 5 on Adjustable Stand /w 6” LCD Pole Display ................. A-4
- LCD Pole Display ............................................................................. A-5
- Cash Drawers .................................................................................. A-6
**Workstation 5 Low Profile**

**NOTES:**
1. Cables from 10 Panel exit through bottom of unit.
2. Leave one unit on each side of unit.
3. Orient unit to avoid glare on touchscreen from overhead lights.
4. Cash drawers located at front of unit.
5. 77mm hole required under unit.

Optional Display Rotates Approximately 90°

Internal Speakers (Each Side)

Optional Fingerprint Reader

Magnetic Card Slot

Power Button

- 325mm (12.80’’)
- 390mm (15.40’’)
- 400mm (15.75’’)
- 130mm (5.12’’)
- 180mm (7.10’’)

Equipment Dimensions

Workstation 5 Low Profile
WS5 on Adjustable Stand with Rear LCD Customer Display

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. Touch screen located at front of display can be activated with overhead lights.
4. Cash Drawer located at customer’s discretion.
5. Seven mm hole required under unit if Cash Drawer mounted under counter.

Display Rotates Approximately 112°
Internal Speakers (Each Side)
Unit Rotates between 25° and 70°
392mm (15.4’’)
240mm (9.44’’)
380mm (15.0’’)
180mm (7.10’’)
220mm (8.60’’)
420mm (16.53’’)

Workstation 5 Setup Guide
Equipment Dimensions
Workstation 5 on Adjustable Stand /w 6" LCD Pole Display

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. Cables from IO Panel routed through cable slot to exit stand
5. 77mm hole required under unit if Cash Drawer mounted under counter.

Workstation 5 on Adjustable Stand /w 6" LCD Pole Display
**LCD Pole Display**

![Diagram of LCD Pole Display with dimensions and annotations]
Cash Drawers

<table>
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<th>D</th>
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<td>330 mm</td>
<td>13.0&quot;</td>
<td>16.7&quot;</td>
<td>4.17&quot;</td>
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</table>

Pole Display Mount Locations

W

D
Connector and Cable Diagrams

On the pages that follow, you will find diagrams of the Workstation 5 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 ................................................................. B-2
System Board Connectors ............................................................. B-6
Hook-up Cables ........................................................................ B-7
**IO Panel Connectors**

The following connectors are located on the Workstation 5 IO Panel.

**IDN Port**

The IDN connector is a combination RS422/RS232 port associated with COM4. This port is functionally equivalent to the RS422-A and RS422-B ports on the WS4 or WS4 LX. Two configurations are detailed in the following pages, configured through the POS application.

---

**WARNING:**

Do not insert a 6-Pin modular plug into the 8-Pin IDN Port. 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 - use cable P/N 300319-001.

---

**IDN Port - Driving IDN Printers**

The most popular configuration of the IDN Port is the RS422 based IDN(+) mode configured as COM4. Figure B-1 shows the pin-out for this configuration. Use cable P/N 300319-001 to drive IDN Printers.

*Figure B-1: IDN Connector Configured for RD422 IDN*
**IDN - RS232 Peripheral**

Figure B-2 shows the IDN port configuration for a basic RS232 interface. Use cable P/N 300319-102 to convert this port to a DB9 connector.

![IDN Port Configured for RS232](image)

**COM5**

The COM5 connector is a full-featured RS232 modular COM port similar to that found on the PCWS Eclipse and 2010. Use cable P/N 300319-103 to convert this port to a DB9 connector.

![COM5 Modular RS232 Connector](image)
RS232 Connector

A single DB9F RS232 connector assigned to COM1 is provided. The pin-out is shown below.

![DB9 RS232 Connector Diagram](image)

*Figure B-4: DB9 RS232 Connector Diagram*

Cash Drawer 1 and 2 Connectors

![Cash Drawer Connector Diagram](image)

*Figure B-5: Cash Drawer Connector Diagram*
Remote Customer Display Connector

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

![Customer Display Connector Diagram](image)

*Figure B-6: Customer Display Connector Diagram*
System Board Connectors

This section details connectors located on the Workstation 5 system board.

Magnetic Stripe Interface

The internal magnetic card reader connector is CN14, located on the system board. The pin-outs for this connector are shown in Figure B-7,

![Diagram of CN14 connector]

*Figure B-7: Workstation 5 System Board MSR Connector*
**Hook-up Cables**

The following pages show wiring diagrams of various hook-up cables that may be used with the Workstation 5.

### IDN Port RS232 Cables

Figure B-8 displays a cable that includes the RS232 signals from the IDN Port to a DB9 male connector. This cable is available from MICROS by ordering P/N 300319-102.

![Diagram of IDN Port to RS232 DB9 Male Connector](image)

**Figure B-8: IDN Port to RS232 DB9 Male Connector**

Figure B-9 shows a cable diagram that adapts the IDN port to a DB25 connector.

![Diagram of IDN Port to RS232 DB25 Connector](image)

**Figure B-9: IDN Port to RS232 DB25 Connector**
COM5 RS232 Cables

Figure B-10 displays a diagram of an extension cable that brings all RS232 signals from the COM5 port to a DB9 connector.

![Diagram of COM5 RS232 Extension Cable (DB9M)](image)

Figure B-10: COM5 RS232 Extension Cable (DB9M)

LCD Customer Display Cables

The LCD based Customer Display includes two cable assemblies. The function of each cable is detailed in the following pages.

**LCD Customer Display Housing Interface Cable**

The LCD Customer Display Housing consists of the LCD Panel, Interface Board, mounting bracket and interface cable. A diagram of this interface cable is shown in Figure B-11.

When the LCD Customer Display is attached directly to the Workstation 5, this cable plugs into the ‘Rear Display’ IO Panel connector shown in Figure B-13.

![Diagram of LCD Customer Display Housing Cable](image)

Figure B-11: LCD Customer Display Housing Cable
Remote Pole LCD Customer Display

The cable shown in Figure B-12 is supplied with the Pole LCD Customer Display or Adjustable Stand Pole Display kit. It attaches between the 4-pin Mini-DIN connector on the Workstation 5 I/O panel, through the pole to mate with the cable from the LCD Customer Display Housing Cable shown in Figure B-11.

![Figure B-12: Remote Pole LCD Customer Display Assembly](image)

IO Panel Customer Display Connector

The Workstation 5 places the integrated or rear customer display connector on the IO Panel. A diagram of this connector is shown below.

![Figure B-13: IO Panel Integrated LCD Connector](image)
Figure B-14 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-14: EIA/TIA-568-A Cat 5 Ethernet Hook-up Cable Diagram*
Cross-over Pinning

Figure B-15 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.

![Diagram of Cat 5 Ethernet Hook-up Cable (cross-over)](image)

*Figure B-15: 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 IDN port connector to a 6-pin wall plate connector or directly to the IDN connector on the printing device.

Figure B-16: 8-Pin to 6-Pin IDN Hook-up Cable Diagram
Connector and Cable Diagrams
Hook-up Cables


Appendix C

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'émet 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.

Attention:

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