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PowerStation

PA Series User Guide

CTC Parker Automation
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Phone:513-831-2340
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A3-06692-100

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Product Warranty Information

CTC Parker Automation provides top quality products through rigid testing and the highest quality control standards. However, should a problem occur with your hardware or with the software protection key, CTC's standard product warranty covers these items for 15 months from the date of shipment from CTC. Exceptions appear below:

- PowerStation backlight bulbs have a 90-day warranty.
- Third-party products, such as bus cards, carry the manufacturer's specified warranty.
- For all displays, image retention (burn-in) is not covered by warranty.
- Software revisions that occur within 60 days after purchase are available under warranty upon request. Please review the Interact License Agreement for additional software warranty information.

Should you have any questions about your application or need technical assistance, please call CTC's Product Technical Support department at 513-248-1714, 8:00 a.m. to 5:00 p.m., Eastern Time. You may call this same number after hours for emergency assistance. See *Customer Support Services* on page 5 of this manual for more information about CTC's support products and services.

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Chapter 1

Manual Overview and Support Services

Thank you for purchasing a PA PowerStation. The PA PowerStation is a rugged, compact PC that is designed to be used as an industrial operator interface.

The PA PowerStation is available in five display configurations: 5", 6", 7.7", 8", and 10". It also has an all-in-one PC board with a Serial port and an Ethernet port. The PA PowerStation's PC architecture allows you to run CTC's MachineShop software.

Please take time to review this manual and the other documentation included with the PA PowerStation before operating the unit.

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Using this Manual

This manual is designed to help you set up and use your PA PowerStation. The manual lists the PowerStation's specifications and describes its replacement and optional components. It also explains how to install the unit, how to maintain the unit in good condition, and how to solve common problems that may occur in operation.

This manual is divided into the following chapters:

Chapter 1 — Manual Overview and Support Services: Presents an overview of this manual, the other documentation and software provided with the PA PowerStation, and the steps necessary to get your PowerStation up and running. This chapter also describes CTC's customer support services.

Chapter 2 — Introducing the PA PowerStation: Describes the PA PowerStation's specifications and the ports available to connect the PowerStation to other devices and to a power source. This chapter also describes the PowerStation's drive definitions and the unit's replacement and optional components.

Chapter 3 — Installing the PA PowerStation: Explains how to install the PA PowerStation in a control enclosure and how to start up the unit.

Chapter 4 — Maintaining and Troubleshooting the PA PowerStation: Explains how to install replacement parts, how to maintain the PA PowerStation, and how to solve problems that may occur during operation.

Appendix A—System Configuration Files: This section includes a complete listing of the CONFIG.SYS and AUTOEXEC.BAT files.

Documentation Components

The PA PowerStation documentation set contains all the information you need to configure, install, and use the PA PowerStation. The PA PowerStation documentation set is described below.

Release Notes - This document is provided whenever there is important information about the PA PowerStation that does not appear in this manual. Be sure to read any available release notes before installing or operating the unit.

PowerStation PA Series User Guide - This is the document you are reading. It provides detailed information about the PA PowerStation and describes how to configure, install, and use the unit. Please read this manual in its entirety before operating the unit.

PA PowerStation Template - This document is a full-size template of the PA PowerStation that you can use to prepare the location where you want to install the unit.

Software Components

CTC pre-loads each PA PowerStation with Datalight's ROM-DOS operating system, the MachineShop Shell, and necessary utilities so that you can run the PowerStation immediately upon its arrival at your facility. CTC also provides backup copies of PowerStation and MachineShop software on the MachineShop Installation CD shipped with the PowerStation.

Getting Started

Now that you have opened the PA PowerStation package, you are ready to unpack the unit, develop an application, and install the PowerStation in a permanent location. This section provides an overview of these activities. Additional information is available in the remaining chapters of this manual.

Before You Begin

Before you begin operating the PA PowerStation, please complete the following steps:

1. Unpack the PowerStation, and verify that you have received all the components you ordered.
2. Fill out the product registration card, and return it to CTC.
3. Backup the CTC software that was pre-installed on your unit using the Windows File Manager/Explorer or the ROM-DOS Diskcopy command.

Installing the PowerStation

When you finish unpacking the PowerStation and developing an application, you are ready to install the unit in a permanent location. See *Chapter 3 Installing the PA PowerStation* on page 33 for complete installation instructions.

Downloading Applications and Projects

The PA PowerStation is a runtime-only system, which means that you must develop your applications and projects on a development PC and download the application to the PowerStation.

Note Throughout this manual, all references to "development PC" or "development system" refer to the computer you use to develop applications.

See the documentation that came with your development software for information about how to develop your applications or projects and download them to the PowerStation.

Documentation Standards

As you read this manual, you will notice that it uses the following documentation standards:

1. Important terms are shown in **bold**.
2. Text to be entered from the keyboard is shown in `Courier` font.
3. Buttons, menu titles, and keyboard keys are shown in Initial Caps.
4. Indented paragraphs denote one of the following:
   - **Note** - Describes alternative approaches or issues you should be aware of while using a particular function.
   - **Important** - Contains information that you need to pay particular attention to while reading. Follow this information to save development time and minimize problems.
   - **Warning** - Contains information on safety issues. Follow this information to prevent equipment damage or personal injury.

ISO Symbols



This symbol is the International Standards Organization (ISO) symbol for Caution (ISO 3864 No. B.3.1). This symbol denotes information that could affect operation of the PowerStation if the information is not properly followed.



This symbol is the ISO symbol for Caution—risk of electrical shock (ISO 3864 No B.3.6). This symbol denotes information that could cause personal injury from electrical shock or damage to equipment if the information is not properly followed.

Customer Support Services

CTC welcomes your thoughts and suggestions on our products and services. You can contact CTC by telephone, email, or fax. You can also visit CTC on the World Wide Web to learn the latest about our hardware, software, and customer support services.

- Telephone: 513-831-2340
- Fax: 513-831-5042
- E-mail: sales@ctcusa.com or support@ctcusa.com
- World Wide Web: http://www.ctcusa.com

CTC recognizes that every customer and every application has different support needs, so CTC offers a variety of support services designed to meet these needs. CTC offers two types of customer support services:

- Product Technical Support
- Technical Training

Product Technical Support

The Product Technical Support department welcomes any question that might arise as you develop or run your applications. We offer complimentary support for all customers, including end users, original equipment manufacturers (OEM), system integrators, or distributors.

If you have a question about the PA PowerStation, be sure to complete the following steps:

1. Check any release notes shipped with the unit. These notes provide important information about the PowerStation.
2. Consult the PowerStation documentation and other printed materials included with the PowerStation.

3. Review Chapter 4 of this manual, *Maintaining and Troubleshooting the PA PowerStation* on page 39.

If you cannot find a solution using one of the above sources, contact our Product Technical Support department at 513-248-1714, 8:00 a.m. to 5:00 p.m., Eastern Time. You can call this same number after hours for emergency assistance.

Technical Training

CTC offers training on all of our products, either at CTC in our state-of-the-art training facility, or at your site.

You can contact the Training Coordinator by telephone or e-mail:

- Telephone: 1-800-233-3329
- E-mail: training@ctcusa.com

You can view a current technical training schedule at our website, http://www.ctcusa.com

Chapter 2

Introducing the PA PowerStation

The PA PowerStation is designed to give you an operator interface solution that is powerful, cost-effective, and very easy to use.

In this chapter, you will learn about the PA PowerStation's specifications, available connectors, and its drive definitions and memory. The chapter also describes the PowerStation's replacement and optional components.

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Drive Definition and Memory 24
Replacement Components 25
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Specifications

This section describes important specifications for the PA PowerStation. Please familiarize yourself with these specifications before operating the unit.

Display Specifications

Display specifications include the type of monitor, size, resolution, and other display properties. These specifications are shown in the following tables. There is one table for each display size: 5", 6", 8", and 10".

PA05S 5" Color

Property	Description
Type	Passive Color STN
Display Diagonal Size	4.7”
Resolution	QVGA (320 x 240)
Brightness	160 NITS
Viewing Angle	U/D = 20/30 deg L/R = 50/50 deg
Bulb Life	54,000 hours
Adjustments	External Rear Contrast

Table 2-1: 5" Color Display

PA06S 6" Color

Property	Description
Type	Passive Color STN
Display Diagonal Size	5.7"
Resolution	QVGA (320 x 240)
Brightness	350 NITS
Viewing Angle	U/D = 20-35 deg L/R = 50/50 deg
Bulb Life	75,000 hours
Adjustments	External Rear Contrast

Table 2-2: 6" Color Display

PA08S & PA08T 8" Color

Property	PA08S Description	PA08T Description
Type	Passive Color STN	Active Color TFT
Display Diagonal Size	7.7"	8.0"
Resolution	VGA (640 x 480)	VGA (640 x 480)
Brightness	120 NITS	285 NITS
Viewing Angle	U/D = 30/50 deg L/R = 50/50 deg	U/D = 65/55 deg L/R = 65/65 deg
Bulb Life	40,000 hours	20,000 hours
Adjustments	External Rear Contrast	n/a

Table 2-3: 8" Color Display

PA10T 10" Color

Property	Description
Type	Active Color TFT
Display Diagonal Size	10.4"
Resolution	VGA (640 x 480)
Brightness	200 NITS
Viewing Angle	U/D = 40/70 deg L/R = 45/45 deg
Bulb Life	50,000 hours
Adjustments	n/a

Table 2-4: 10" Color Display

Physical Specifications

Physical specifications include the PowerStation's CPU, memory specifications, display types, storage capacity, and other physical characteristics. These specifications are shown in Physical

Specifications.

Category	Specifications
Operating System	Datalight ROM-DOS
CPU	200 MHz X86 instruction set compatible processor
Memory	32MB PC100/PC133 SDRAM 144 Pin SODIMM Socket
BIOS	Award 256KB Flash
Storage	32MB CompactFlash, Type 2 Socket

I/O Ports	• 2 9-pin serial ports (16550 compatible)
	  • 1 9-pin RS232
	  • 1 9-pin RS232/422/485 (configurable)
	• 1 RJ45 Ethernet connector; Intel 82551ER 10/100 Base-T controller

Dimensions H x W x D	For the 5” and 6”: • 6.0”H x 7.4”W x 2.3”D For the 8”: • 7.6”H x 10.2”W x 2.2”D For the 10”: • 11.0”H x 13.8”W x 3.2”D
Weight	For the 5” and 6”: • 2.1 lbs For the 8”: • 4.1 lbs For the 10”: • 8.4 lbs.
Keyboard	1 PS/2 miniDIN
Mouse	1 PS/2 miniDIN
Touchscreen	Analog Resistive
Audible	Piezoelectric Beeper

Table 2-5: Physical Specifications

Environmental Specifications

Even though the PA PowerStation is built to withstand harsh environments, limit the PowerStation’s exposure to adverse conditions such as dust, oil, moisture, and corrosive vapors to minimize maintenance and repair costs.

Remember that the temperature within a protective enclosure is generally higher than the external temperature. Thus, if the PA PowerStation is operating inside an enclosure at temperature levels above its rated ambient temperature, you must cool the enclosure.The PowerStation conforms to the environmental specifications listed in Environmental Specifications Chart.

Category	Specifications
Operating Temperature	32 to 122°F (0 to 50°C) ambient (air temp. outside of backshell)
Storage Temperature	-4 to 140°F (-20 to 60°C)
Relative Humidity	0% to 95% non-condensing
Shock Rating	• 10g peak; 11ms (operating) • 30g peak; 11ms (non-operating)
Operating Vibration	• 5-500Hz: 1G RMS random
Faceplate Design	NEMA 4/4X Environment **Warning:** The PowerStation is rated NEMA 4 only if it is installed in a NEMA 4-rated enclosure.

Table 2-6: Environmental Specifications Chart

Electrical Specifications

The PA PowerStation's power supply automatically detects the input voltage level and adjusts accordingly. However, always use reliable sources of power, and isolate all communication cables from AC power lines to enhance noise immunity.

If possible, locate the PA PowerStation away from machinery that produces intense electrical noise (arc welders, etc.). Otherwise, isolate the input power to the PowerStation from the equipment generating electrical noise.

The PA PowerStation's electrical specifications appear in Electrical

Specifications Chart.



Category	Specifications
Input voltage	12/24 VDC @ 18W (Range: min 11 VDC, max 28 VDC)

Table 2-7: Electrical Specifications Chart

Caution Do not apply AC power to the unit or damage may occur.

Testing Specifications

The PA PowerStation conforms to the testing specifications listed in Testing Specifications Chart.

Test	Specification
Showering arc	NEMA showering arc
Surge withstanding capacitance	EN61000-4-5
ESD requirements	EN61000-4-2
Operating temperature	IEC 68-2-1
Electrical fast transient	EN61000-4-4
Operating vibration	IEC 68-2-6
Mechanical shock	IEC 68-2-27
Random vibration	MIL-STD-8100

Table 2-8: Testing Specifications Chart

Faceplate Chemical Resistance

The touchscreen of the PA PowerStation is resistant to the chemicals listed in Chemical Resistance Chart.

Touchscreen Chemical Resistance		
Acetone	Sulfuric Acid 10%	Motor oil
MEK	Hydrochloric Acid 10%	Gasoline
Toluene	Acetic Acid 10%	Machine oil
Methylene Chloride	Phosphoric Acid	Salad oil
Isopropyl Alcohol	Sodium Hydroxide 10%	Silicone
Xylene	Carbon Tetrachloride	Silicone grease G31
Hexane	Potassium Hydroxide	Kerosene
Butyl Cellosolve	Ammonia Water 10%	Gas oil
Cyclohexanone	Sodium Chloride 26%	Silicone oil
Trichloroethylene	Zinc Chloride 81%	Engine oil
Ethanol	Cottonseed Oil	Cleanser
Methanol	Glycerin	
Nitric Acid 10%	Grease	

Table 2-9: Chemical Resistance Chart

Important Sustained exposure to brake fluid or Gunk® brand degreaser can cause damage to monitor materials.

All PA PowerStation surfaces exposed outside your enclosure are resistive to the following chemicals:

- Commercial glass cleaners
- Motor oil
- Ammonia (10% dilute solution)
- Diesel fuel
- Gasoline (leaded, unleaded)
- Silicone based lubricant
- Alcohol (ethyl, methyl)
- Automatic transmission fluid
- Hydraulic fluid

Available Connectors

All PA PowerStations have two serial ports, two PS/2 keyboard/mouse ports, an Ethernet port, and a Compact Flash connector. See the PA PowerStation CD for dimensional drawings and a diagram to locate the components.

Serial Ports

The PA PowerStation has two serial ports that you can use to communicate with external devices at baud rates of up to 115 Kbaud.

The COM1 port supports RS-232, while COM2 supports RS-232, RS-422, and RS-485 communication standards.

The communication standard you select for COM2 depends upon the distance between the PA PowerStation and the controller, as well as the communication standards that the controller supports. Use a standard DB9 connector for communicating with this port.

> **Note** If you are using RS-232 communications, the length of the serial cable should not exceed 50 feet (15 meters).

RS-422 and RS-485 communications offer greater noise immunity than RS-232. These standards increase the maximum cable length to 4,000 feet (1,200 meters).

RS-422 communications are full-duplex (send and receive simultaneously), while RS-485 communications are half-duplex (send or receive).

For either configuration, be careful not to connect any wires to unused connector pins. If you are using CTC's MachineShop software, information on the specific connection required for the Interact drivers you will use is located in the Help file associated with the driver.

Settings and Pinouts for COM1 and COM2

If you need to make a cable for communicating with COM1, COM1 Pinouts shows the pinouts and signal information for this port.

Pin#	Signal
1	DCD, data carrier detect
2	RXD, received data
3	TXD, transmitted data
4	DTR, data terminal ready
5	Signal ground
6	DSR
7	RTS, request to send
8	CTS, clear to send
9	RI

Table 2-10: COM1 Pinouts

If you need to make a cable for communicating with COM2, COM2 Pinouts shows the pinouts and signal information for this port.

Pin#	RS-232 Signal	RS-422 Signal	RS-485 Signal
1	DCD, data carrier detect	TXD-, transmitted data -	TXD-, transmitted data -
2	RXD, received data	TXD+, transmitted data +	TXD+, transmitted data +
3	TXD, transmitted data	RXD+, received data +	RXD+, received data +
4	DTR, data terminal ready	RXD-, received data -	RXD-, received data -
5	Signal ground	Signal ground	Signal ground
6	DSR, data set ready	DSR, data set ready	DSR, data set ready
7	RTS, request to send	RTS, request to send	RTS, request to send
8	CTS, clear to send	CTS, clear to send	CTS, clear to send
9	RI	RI	RI

Table 2-11: COM2 Pinouts

If you need to make a cable for communicating with COM2, you may need to set the DIP switch settings.

COM2 is set to the RS-485 protocol by default. To change COM2 to the RS-232 or RS-422 protocol, you must change the COM2 DIP switch settings.

The DIP switch for COM2 is located on the side of the PA

PowerStation Unit, as shown in *Figure 3-1*.

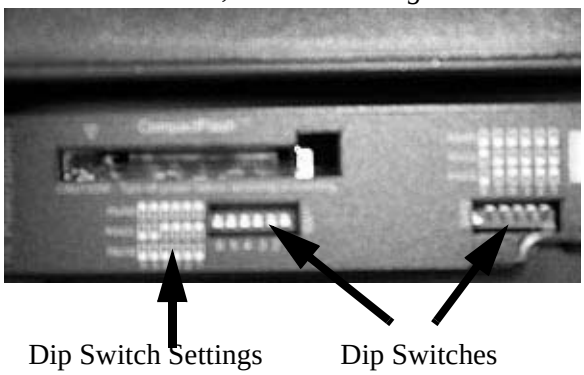
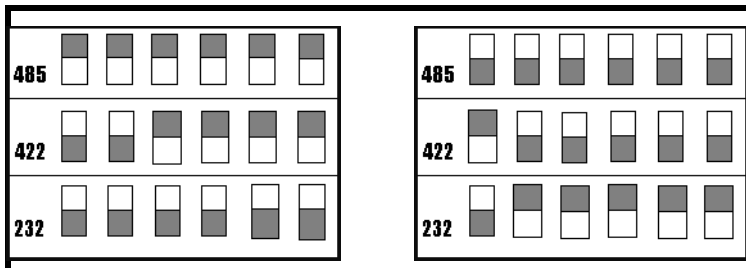


Figure 3-1COM2 Dip Switch Cutout and Settings

Figure 3-2 displays the settings for the COM2 port. A similar diagram is located on the side of the PA PowerStation next to the DIP switch cutout.



Switch SW1 **Switch SW3**

- The gray boxes represent the tip of the switch.
- The upper half of the switch is the on position, and the lower half of the switch is the off position.

Figure 3-2Dip Switch Settings

To change the DIP switch settings, complete the following steps:

1. Choose the appropriate DIP switch settings from the diagram displayed on the back of the PA PowerStation or from *Figure 3-2*.
2. Using a pointed instrument such as a pen or pencil, flip the

switches to the appropriate settings through the viewing window.

Figure 3-3 displays the pinouts and cable settings required for communicating with COM1 or COM2 using the RS-232, RS-422 or the RS-485 protocol.

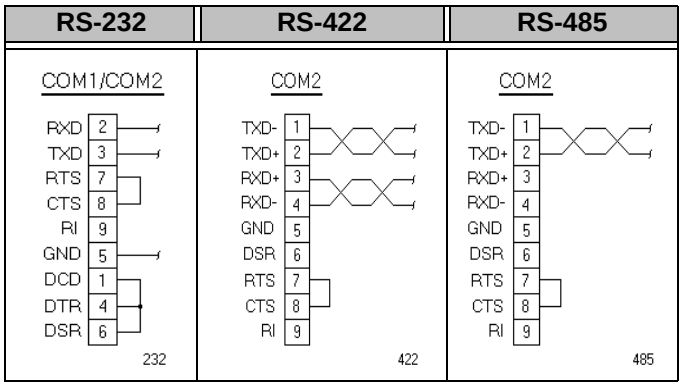


Figure 3-3Pinouts and Cable Settings

Important Be careful not to connect any wires to unused connector pins.

Transferring Files from a PC to the PA PowerStation

You can transfer files from a PC to the PA PowerStation in one of three ways—through the Ethernet, the Compact Flash, or a Serial Transfer. If you plan to use a Serial Transfer, you will need a null modem cable. To construct your own cables, refer to *Figure 3-4* for the appropriate settings. Then continue with step 1 below:

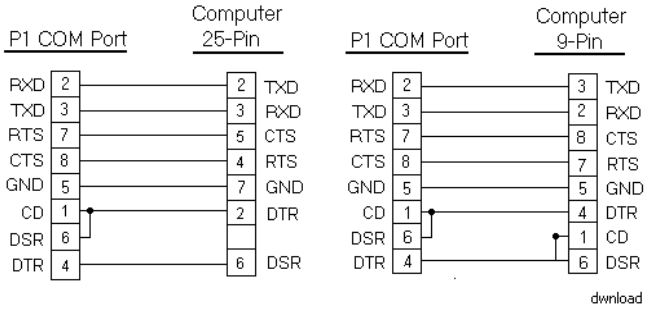


Figure 3-4Serial Transfer Cable Diagram

1. Connect a null modem serial cable to an available serial port on the IBM-PC.
2. Connect the other end of the cable to the serial port on the PA PowerStation.

Connecting a Serial Mouse

If you need to connect a serial mouse to the serial port on the PA PowerStation, you must check the settings to ensure that a COM port is not already configured as a Download only port. If the COM port that you want to use for the mouse is already assigned for Download, complete the following steps:

1. Select Settings from the MachineShop Shell Main Menu.
2. Select Direct Serial from the Settings menu.
3. Select Port.
4. Select the COM port that you want to use as the Download port. Or, you can select Disable to prevent any COM port from being used as a COM port.
5. If the Serial Mouse is not already connected to the PA PowerStation, connect it now.
6. Reboot the workstation.

Connecting to a Serial Printer

When connecting a serial printer to the PA PowerStation, you will need to prepare the serial port for the printer. First you will need to adjust the mode settings to the settings on the printer. See *To Adjust the Mode Settings*below.

If you plan to print to a serial port that was configured for downloading, you will need to reconfigure the serial port. See *To Print to a Port Configured for Downloading* on page 21.

To Adjust the Mode Settings

To connect a serial printer to the PA PowerStation, you must change the mode settings for one of the serial ports to match those of your printer. The easiest way to change these settings is to use MODE.COM. MODE.COM can modify the following options:

baud: 110, 150, 300, 600, 1200, 2400, 4800, 9600

parity: N - none, O - odd, E - even

databits: either 7 or 8

stopbits: either 1 or 2

CTC includes MODE.COM on the PA PowerStation's Compact Flash card and the ROM-DOS installation CD shipped with your PowerStation.

Figure 3-5 illustrates the appropriate settings for the PA PowerStation COM Port and the Serial Printer Connector with hardware handshaking and without hardware handshaking.

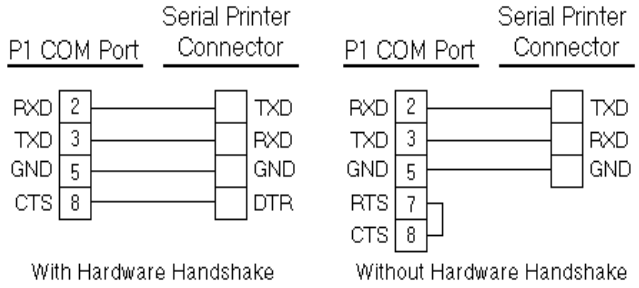


Figure 3-5Serial Printer Cable Diagram

Use *Figure 3-5* as a reference when connecting a serial printer to the PA PowerStation. Then complete the following steps:

1. From the Windows desktop, open the Startup directory within Interact project:

   C:\Machshop\Projects\Interact*Project Name*\Startup\

Important Be sure to replace the pound sign with the appropriate port number when completing the next step.

2. Within the Startup folder, create a new AUTOEXEC.BAT file with the following line.

   MODE COM#:baud,parity,databits,stopbits

Example If you are communicating at 9600, NONE, 8, and 1, use:

MODE COM1: 9600,N,8,1

3. Launch the MachineShop Toolbar.

Note When you download the project containing AUTOEXEC.BAT and MODE.COM from your development system to the PowerStation, MachineShop transfers the AUTOEXEC.BAT file you created in step 2 and MODE.COM into the \STARTUP directory specified by the INTERACT_STARTUP environment variable. This environment variable resides in the PowerStation's AUTOEXEC.BAT file.

4. Download the project.

Note When MachineShop finishes the download, a prompt will display asking whether you want to restart the computer.

When you restart, MODE.COM will configure the COM port to the required baud rate.

5. Restart the PowerStation.

To Print to a Port Configured for Downloading

If you plan to print to a port that is configured for downloading, you will need to reconfigure the port before you can print to it. To reconfigure the port, complete the following steps:

1. Disable downloading for that port.

2. Restart the PA PowerStation.

   Note Restarting the PowerStation allows MODE.COM to reset the communication settings for that port.

3. Select Settings from the Main Menu.
4. Choose TCP/IP from the selections displayed.
5. Select Net Setup from the menu.

Important The configuration may already be set to Download Only. If not, continue with step 6. Otherwise, skip to step 8.

6. Depending on how your PA PowerStation is configured, select the appropriate Net (Net 1, Net 2, or Net 3).
7. Choose Download Only from the options displayed.
8. Continue to Back out until you reach a prompt that indicates the TCP/IP configuration has changed and asks whether you want to Reboot.
9. Choose Yes to reboot the PA PowerStation. This will save your changes.

Keyboard/Mouse Port

The PA PowerStation's CPU board includes a keyboard port that accepts any IBM AT-compatible keyboard, including 84-key standard keyboards and 101-key enhanced keyboards.

Connecting a PS/2 Mouse

If you prefer to use a mouse instead of the touchscreen, CTC recommends that you only use a Microsoft PS/2-style mouse, specifically an 802.3 Microsoft-compatible mouse.

CTC has found that some Microsoft-compatible PS/2 mice do not work correctly with the PA PowerStation. In addition, connecting any mouse directly to the keyboard port will cause the mouse to malfunction.

Ethernet Port

The PA PowerStation has an Ethernet RJ45 port with an Intel 82551ER 10/100 Mbps base-T controller that allows you to connect the PowerStation to a Local Area Network.

See Ethernet Pinouts.

Pin#	Signal
1	TX+
2	TX-
3	RX+
4	N/C
5	N/C
6	RX-
7	N/C
8	N/C

Table 2-12: Ethernet Pinouts

CompactFlash

The PA PowerStation comes with a Compact Flash (CF) card. The CF is used as a removable hard drive that is recognized as drive C and provides non-volatile memory storage. A CF is frequently used to supplement or replace a hard drive because of its durability. The CF is well-suited for rugged environments where the PowerStation may vibrate or shake. Although the CF is removable, it is used as an IDE drive, which means you cannot remove it while the PowerStation is switched on.

CTC recommends that you purchase at least one additional CF card to serve as a backup for your primary CF card. You may decide to own several cards to store different projects. You can purchase additional CF cards through CTC.



Caution Do not remove or insert the CF card when the unit is powered on or data on the card could be corrupted.

Drive Definition and Memory

The PA PowerStation has one drive, C, which is a Compact Flash Card (Read/Write) of size 32MB. This drive is the system start drive and Project disk. It stores the project, system files, MachineShop, and applications. Download files to this drive.

Memory Guidelines

If you are using MachineShop to develop your HMI applications, refer to these memory guidelines when you develop projects. There are two memory storage types, System SDRAM and Compact Flash. The capacity and use of the System SDRAM is 32MB.

The capacity and use of the Compact Flash is 32MB flash memory. Of this 8MB can store APM, PTM, and AMM, as well as four additional runtime models, two drivers, and approximately 30 screens. Extra modules require more storage (four modules/MB).

Replacement Components

The PA PowerStation is designed to be a simple yet reliable unit to maintain. However, if you need to purchase replacement components for the PowerStation, CTC carries a complete line of replacement components.

CompactFlash Card

If you need additional storage capacity for the PA PowerStation, you can purchase additional Compact Flash cards from CTC. CTC recommends that you purchase at least one additional flash card to serve as a backup for your primary CF. See *Using the Compact Flash Card on page 47* for instructions on how to replace and reformat CF cards.

SDRAM

If you need to upgrade or replace the PA PowerStation's SDRAM, CTC carries replacement SDRAM (SODIMM). The PA PowerStation comes with a 32MB 144-pin SODIMM for SDRAM, but you can replace that module with a 64MB or 128MB 144-pin SDRAM for greater capacity. To replace the SDRAM, see *Replacing the SDRAM* on page 61.

> **Note** 16M of the SDRAM is used for video memory. The amount of memory reported is the size of the SDRAM minus 16M. For example, if you have 32M of SDRAM, only 16M is reported.

Both PC100 and PC133 speeds are supported. A jumper must be set to match the speed of the version that you purchased.

Touchscreen

Occasionally, you may find that you need to replace the PA PowerStation's touchscreen, depending upon the environment in which you are operating the PowerStation. Replacement kits for the 10" model are available through CTC. The 10" model is the only model that has a field-replaceable Touchscreen kit. See *Customer Support Services* on page 5 to order the kit.

Backlight Bulb

You may replace the backlight bulb on the 7.7" and 10" PA PowerStation monitors. You cannot replace the backlight bulb on the 5", 6", and 8" monitors.

You can also send the PowerStation to CTC's repair center. See *Customer Support Services* on page 5.

Replaceable Fuse

The PA PowerStation has a protective fuse that can be replaced by qualified personnel. See *Replacing the Fuse on page 41* for complete instructions.

Optional Components

CTC has an optional component that you may want to purchase for the PA PowerStation—an AC Power Supply.

AC Power Supply

The PA PowerStation uses DC power to save space and limit the amount of heat generated by the unit. However, if you require the PowerStation to use AC power, you can purchase an AC Power Supply kit that includes an AC Power Supply and a power cord.

You can also purchase mounting brackets for the Power Supply. See *Preparing a Location for the AC Power Supply on page 32* for instructions on how to mount the AC Power Supply.



Caution Do not apply AC power to the unit or damage could occur.

Chapter 3

Installing the PA PowerStation

You are now ready to install the PA PowerStation in a permanent location. This chapter will help you select an appropriate location for the unit. It also provides instructions for creating a cutout for the unit, and describes how to install and start up the unit.

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Selecting a Location

The first step when installing the PA PowerStation is to select an appropriate location for the unit. This is the most important aspect of the installation process because the location you select can affect the PowerStation's performance, ease-of-use, and life-expectancy. This section provides some guidelines that you should follow when selecting a location for the PowerStation.

Class I, Division 2 Guidelines

If you purchased a Class I, Division 2-compliant PA PowerStation, you must always follow these guidelines to maintain a safe operating environment:

1. Suitable for use in Class I, Division 2, Groups A, B, C, and D hazardous locations only.



2. **Warning: Explosion Hazard—**DO NOT connect or disconnect cables while power is applied unless area is known to be nonhazardous. Keyboard and Mouse Ports are for system set-up and diagnostics and are NOT intended for permanent connection.



3. **Warning: Explosion Hazard—**CLASS 1 DIV 2 approval requires Power Switch restraints in hazardous environments. Nonincendive for CLASS 1, GROUPS A, B, C, and D hazardous locations. Temperature code: T5.
4. Make sure that the PA PowerStation's on/off switch is secured in the on position using the supplied bracket.
5. When performing field wiring, always use copper wire with 60C or 60/75C insulation and a tightening torque of 7.0 lb./in. (0.79 N-m).

Environmental Guidelines

The environment is the area where the PA PowerStation will be located. In general, you should select a place that limits the unit's exposure to adverse conditions such as dust, oil, moisture, and corrosive vapors.

Touchscreen Considerations

The PA PowerStation's touchscreen is designed to meet the NEMA 4 rating. You should mount the PowerStation in an enclosure that supports this rating in order to provide further protection.

The PA PowerStation's touchscreen is resistant to a variety of chemicals. See *Faceplate Chemical Resistance on page 13* for a list of these chemicals. Make sure that the touchscreen is not exposed to

chemicals other than those listed in *Faceplate Chemical Resistance* on page 13.

Electrical Guidelines

To minimize unwanted electrical interference, select a location away from machinery that produces intense electrical noise. If you cannot do this, isolate input power to the unit and separate all data communication cables used with the unit from AC power lines.

See *Electrical Specifications on page 11* for a list of the PA PowerStation's electrical specifications. Make sure that your power source is compatible with the PowerStation before starting the unit.

Field Terminal Wiring Requirements

In order to comply with UL 508 and 1604 requirements, use copper wire with 60C or 60/75C insulation and a tightening torque of 7.0 lb/in. (0.79 N-m) when connecting field terminal wiring to the PowerStation.

Temperature Guidelines

You can safely operate the PA PowerStation within the temperature range specified in *Environmental Specifications* on page 10. However, if you are using a protective enclosure, remember that the temperature within an enclosure is generally higher than the external temperature. If the PowerStation is operating inside an enclosure at temperature levels above its rated ambient temperature, you must cool the enclosure.

Enclosure Guidelines

Select an enclosure that is large enough to allow free airflow in and around the unit. You should allow a minimum of 2 inches between the enclosure and the top, bottom, and sides of the PA PowerStation.

Also, make sure that the surface of the enclosure on which the PA PowerStation is mounted is flat and free of raised or depressed areas.

AC Power Guidelines

You will need to read the AC Power Guidelines only if you intend to operate the PA PowerStation using AC power. If you intend to operate the PowerStation using DC power, skip to *Preparing for Installation* on page 31.

The PA PowerStation ordinarily uses DC power. However, you can operate the PowerStation with AC power by using an optional AC Power Supply available from CTC. If you purchased the optional AC Power Supply, you must select a location that provides protection from dust, oil, moisture, and corrosive vapors. If your enclosure is

large enough, you can mount the Power Supply in the enclosure with the unit.



Caution Do not apply AC power to the unit or damage may occur.

Preparing for Installation

Once you select a location for the PA PowerStation, you will need to create a cutout for the unit.

If you plan to operate the PA PowerStation using AC power, and you purchased CTC's optional AC Power Supply, you will need to prepare a location for the Power Supply also.

Procedures for creating the cutout and preparing a location for the AC Power Supply are described below. If you already have an appropriate cutout and are using DC power, continue with *Installing the PA PowerStation* on page 33.

Creating the Cutout

The PA PowerStation comes with a template that is designed to simplify the task of creating a cutout for the unit. Be sure to follow the cutout dimensions on the template precisely so that the PowerStation will properly seal in its enclosure.

Create a Cutout

To create the cutout, complete the following steps:

1. Attach the template securely to the mounting surface.
2. Cut out the shaded area on the template referred to as the "Panel Cutout Area." To maintain the flatness of the mounting surface, CTC recommends that if you punch out the mounting hole, you should maintain proper surface flatness and edge quality.

The cutout dimensions for the PA PowerStation are shown in the following table:

PA Model	Cutout Height	Cutout Width
PA05S PA06S	4.91"	6.20"
PA08S PA08T	6.08"	8.67"
PA10T	9.86"	12.60"

3. Debur the edges of the cutout area, removing dirt and debris that might come in contact with the unit.
4. More information is available on the CD that comes with the PA PowerStation. Be sure to refer to the dimensional drawings found on the CD when creating your cutout.

Preparing a Location for the AC Power Supply

You will need to read *Preparing a Location for the AC Power Supply* only if you intend to operate the PA PowerStation using AC power. If you plan to use DC power, proceed to *Installing the PA PowerStation* on page 33.

If you plan to operate the PA PowerStation with AC power, and you purchased CTC's optional AC Power Supply and the mounting kit, use the template that came with the mounting kit to prepare a location for the power supply. You can prepare a location for the power supply inside or outside the enclosure where the PowerStation is installed.

> **Note** If you decide to mount the Power Supply in an enclosure, mount it on the bottom or the side of the enclosure to provide the best convection cooling.

Prepare the Power Supply Mounting Surface

To prepare the mounting surface, complete the following steps:

1. Securely attach the template to the mounting surface.
2. Drill and debur four 0.17" (4.3mm) holes.

Installing the PA PowerStation

Once you prepared the location for the PA PowerStation, you can install the unit. Installation will involve mounting the PowerStation and if you are using CTC's optional AC Power Supply, mounting the power supply. Both procedures are described below.

Mounting the PA PowerStation

The PA PowerStation is designed to be mounted using 4 - 6 screws. These screws are secured to the unit with metal clips. For your convenience, CTC includes all necessary mounting hardware with the unit.

Mount the PowerStation

Note Necessary mounting clamps and screws are shipped with your system.

To mount the unit, complete the following steps:

1. Prepare the power source for the unit by sliding the positive and negative wires into the appropriate slots on the power connector. See *Figure 3-6*.

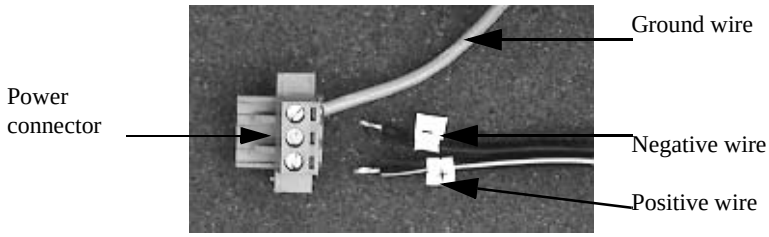
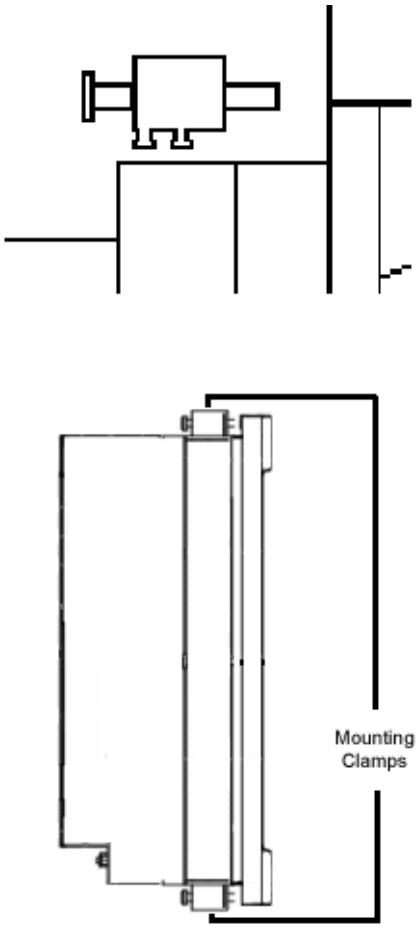


Figure 3-6 Power Connector and Positive/Negative wires

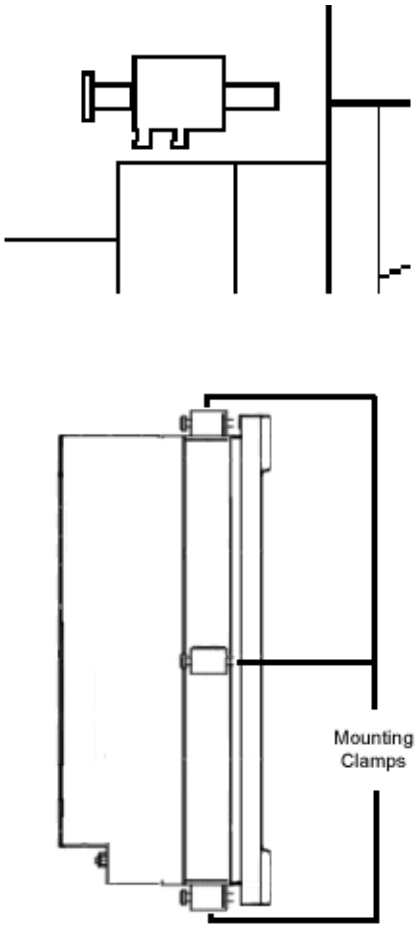
2. Connect the ground cable from the power connector to an earth ground.
3. Gently insert the PA PowerStation into the cutout from the front.
4. Attach the 4-6 mounting clamps, with their screws, to the back of the unit in the spaces provided.

Note The number of clamps depends on the model. The shape of the prongs at the bottom of each clamp also depends on the model. The 5", 6", and 8" models use a T-shape clamp, and the 10" models use an L-shape clamp.

Clamp shape and location on the 5" and 6" units:



Clamp shape and location on the 10" units:



5. Insert the slamps into the larger portion of the slots, and then slide them toward the outside of the unit.
6. Tighten each of the mounting screws against the front of the enclosure using a torque of 6 lb/in for 5" and 6" units. Use 7 lb/in for the 8" units.

Important Tighten the nuts in a crosswise sequence to ensure a good seal and to prevent damage to the unit.

7. Attach the power connector that you prepared in steps 1 and 2 to the back of the unit.



Caution Over-tightening the screw/clamp assemblies may damage the PA PowerStation. Under-tightening may not guarantee a NEMA 4 seal.

Note Tightening the screw/clamp assemblies may not insure that the gasket seal is totally depressed by the bezel. It may be possible to see a small edge of the gasket between the bezel and the enclosure.

Starting Up the PA PowerStation



Once the PA PowerStation has been mounted, you are ready to start up the unit. This procedure is described below.

Before connecting a power cord to your unit, make sure that you have read and understood *Environmental Specifications* on page 10 and the *Testing Specifications* on page 12 of this manual. Also, be sure to follow the guidelines listed below:

- For **permanently connected equipment**, incorporate a readily accessible disconnect device in the fixed wiring.

Important Proper installation of this PowerStation model for use in European Union countries requires the use of a harmonized power cord (the power cord must be identified with the <HAR> symbol). Make sure that the PowerStation is connected to the main supply only with a harmonized power cord.

1. Ensure the power on/off switch is in the off position.
2. Connect the power cord to your voltage source. Voltage input to the unit should be within the range specified in the *Environmental Specifications* on page 10.

   Note Be sure to make DC connections.

3. Connect the power cord plug to the PA PowerStation.
4. Turn the PA PowerStation on.

   The PowerStation will automatically load the MachineShop Shell or an Interact application, if the Shell is configured to start Interact automatically.

You are now ready to download a project to the PA PowerStation. If you're using MachineShop software, refer to the *MachineShop Getting Started Guide* for information about downloading projects.

Chapter 4

Maintaining and Troubleshooting the PA PowerStation

The PA PowerStation is designed to provide years of trouble-free operation even in the harshest environments. However, you may occasionally need to perform routine maintenance on some of the PowerStation's components.

This chapter provides instructions on PA PowerStation maintenance, as well as steps for troubleshooting problems that may occur in operation.

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Installing and Replacing Parts

This section includes instructions for performing internal maintenance on the PA PowerStation. To prevent injury to yourself or damage to the PowerStation, you will need to carefully read and understand the procedures described in this section. This section will show you how to perform the following operation:

- *Replacing the Fuse* on page 41

Before you begin, this section describes electrostatic discharge (ESD) precautions that you should take whenever you work inside the PA PowerStation.



Warning For safety reasons, only qualified service personnel should open the PowerStation.

Electrostatic Discharge Precautions

Modern integrated electronic devices, especially CPUs and memory chips, are extremely sensitive to electrostatic discharges (ESD) and fields. Before you disassemble the PA PowerStation, follow these simple precautions to protect you and the PowerStation from harmful ESD.



- To avoid electric shock, always disconnect power from the PowerStation before opening or disassembling the unit. **Do not** touch any components on the CPU card or other cards while the PowerStation is on.
- Disconnect power before making any hardware configuration changes. A sudden static discharge as you connect a jumper or touch any internal parts may damage sensitive electronic components.
- Only handle internal components in an ESD-safe location, using appropriate grounding methods.
- Wear a grounding wrist strap for continuous protection.
- Always ground yourself to remove any static charge before you touch the CPU card.
- Be particularly careful not to touch the chip connectors.
- Keep any card or SDRAM module in its anti-static packaging when it is not installed in the PowerStation. Place it on a static dissipative mat when you are working on it.

Once you have read and understand the ESD safety precautions, you are ready to continue with the appropriate instructions.

Replacing the Fuse

The PA PowerStation has a protective fuse that you can replace by opening up the back cover. An ohm meter is required to see whether the fuse is open or closed.

To replace the fuse, complete the following steps:

1. Turn off the PA PowerStation.
2. Disconnect the PowerStation from its power source.
3. Remove the back cover of the unit.
4. Locate the fuse on the board according to the picture below.

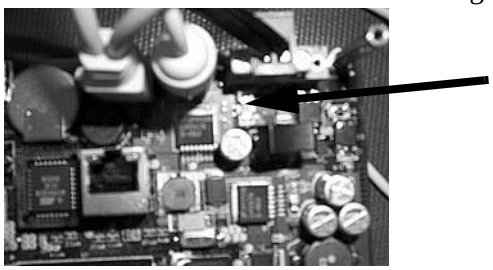


Figure 4-1 Replaceable Fuse

5. Use an ohm meter to see if the fuse is open or closed.
   a. If open, use a pair of needlenose pliers to lift the fuse from the fuse holder.
   b. If closed, the fuse is okay and there is no need to replace it.
6. To replace the fuse, use a Littelfuse Nano SMF Very Fast-Acting Type fuse. The part number is R451 002.

Note This is a 2 amp fuse.



Caution Using a fuse that is rated differently than indicated here can cause damage or fire to occur.

7. Insert the new fuse into the fuse holder and reassemble the unit.

BIOS Setup

The PA PowerStation is limited in BIOS configuration changes that the user can perform. The BIOS setup window lets you remove the CTC splash screen only. If you want to reset this BIOS setting, press the Delete key while the system is starting up to display the BIOS setup window.

Note Accessing the BIOS settings requires a keyboard.

To access the BIOS settings, complete the following steps:

1. Shut down the system.
2. Connect a keyboard to the system.
3. Restart the system.
4. While the system is starting, press the Delete key on the keyboard.
5. The BIOS Setup Utility screen appears.

Removing the CTC Splash Screen

To remove the CTC splash screen, complete the following steps:

1. Press the Page Up key to toggle the Boot-time Diagnostic Screen setting to [Disabled].
2. Press the Right arrow key to highlight Exit and then press Enter.
3. Press Enter again to save your changes and exit.

Maintaining the Touchscreen

The touchscreen for the PA PowerStation is durable and able to operate smoothly in harsh environments where strong chemicals exist.

However, from time to time you may need to perform general maintenance on the touchscreen. This section provides step by step instructions on how to complete the the following tasks:

Cleaning the Touchscreen

Occasionally, you may wish to clean the PA PowerStation's touchscreen. Clean the touchscreen using warm, soapy water and a cloth. You may also use a **non-abrasive** cleaner. See *Faceplate Chemical Resistance* on page 13 for a list of substances the screen can resist with no visible effect.

Do not use any harsh material or powder, such as steel wool or abrasive cleansers, to clean the touchscreen surface. The surface is sensitive to scraping, sharp blows, and punctures. Therefore, keep screwdrivers or other sharp objects away from the touchscreen surface.

Warning **Do not** clean the touchscreen while Interact is in Run mode. Clean the unit when it is switched off to avoid inadvertently activating an Interact device (button, slide, etc.).

Calibrating the Touchscreen

The PA PowerStation's touchscreen is calibrated before leaving CTC. However, you may need to calibrate the touchscreen for one of several reasons:

- when you use the PA PowerStation for the first time
- when you replace the touchscreen
- when the position of the cursor does not match the location where the user touches the screen

Using the MachineShop Shell Calibration Utility

The MachineShop Shell comes with a calibration utility that allows you to calibrate the touchscreen in DOS mode.

Enter the Calibration Mode

In the following steps, you will enter the calibration utility in MachineShop Shell. To enter the calibration utility, complete the following steps:

1. On the MachineShop Shell Main Menu, press the Settings button. See *Figure 4-2*.

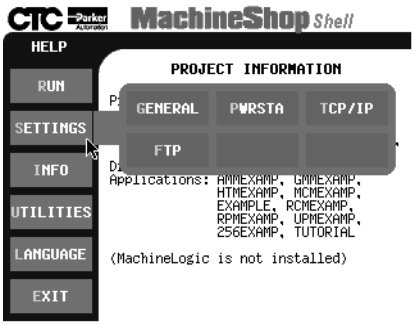


Figure 4-2 Settings Submenu

2. On the Settings submenu, press the PWRSTA button. The PowerStation Settings menu will appear as shown in *Figure 4-3*.

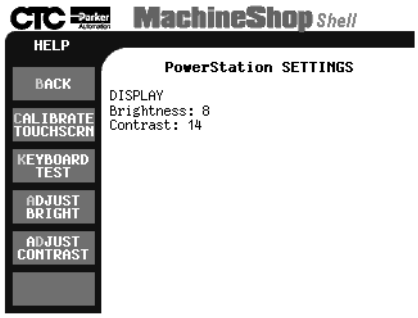
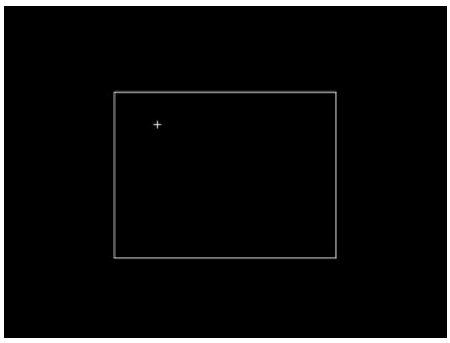


Figure 4-3 PowerStation Settings Menu

3. Press Calibrate Touchscreen.

The calibration routine will run automatically.

4. Use your finger to touch the + on the screen.



5. Repeat the previous step two more times. Each time you touch the + you will hear a faint beep to indicate that the touch has been accepted.

   After the third time, your touchscreen will be calibrated.

Important If you calibrated the touchscreen and the cursor moves vertically when your finger moves horizontally on the screen or vice versa, the touchscreen cable may not be connected to the motherboard properly. Call a CTC customer support representative. See *Customer Support Services* on page 5.

Adjusting the Contrast

You may adjust the contrast on the PA PowerStation. The contrast is a property of the LCD.

Note The Brightness property is fixed and cannot be adjusted.

This property can be adjusted on the STN display only. So before you begin, you will need to determine whether you own an STN or a TFT display. To distinguish between the two types of displays, locate the model number on the back of the PA PowerStation unit and compare the third digit in the model number with the third digit in *Table 4-1: Display Type* to determine the type of display you own.

Model No.	View Size
PA-05S/06S/08S-1XX	STN Display - Quarter VGA

Table 4-1: Display Type

Model No.	View Size
PA-08T/10T-1XX	TFT Display - Full VGA

Table 4-1: Display Type

- If your PA Series has an STN display, continue with *Adjusting the Contrast (For STN Units Only)*.
- If you have a TFT display, you cannot adjust the contrast.

Adjusting the Contrast (For STN Units Only)

To adjust the contrast on an STN display, complete the following steps:

1. Find the contrast adjustment on the back of the PowerStation. See *Figure 4-4*.

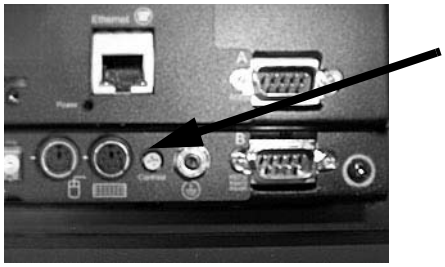


Figure 4-4 Contrast Adjustment

2. Using a Phillips screwdriver, turn the screw to adjust the contrast to the desired level. This is a very small adjustment.

Using the Compact Flash Card

The PA PowerStation uses a removable Compact Flash (CF) card for storage purposes. You can remove the CF card, update the application files on the CF card from a PC, and then reinstall the CF card in the PowerStation.

CTC recommends that you purchase at least one additional CF card to serve as a backup for your primary CF card. You may wish to have several cards to store different projects. You can purchase additional CF cards from CTC.

Replacing the Compact Flash

At some point, you will probably need to remove the CF card from the PA PowerStation flash socket for one reason or another. To do so, complete the following steps:

1. Turn off the PA PowerStation.

Caution The PowerStation must be turned off when inserting or removing the CF card to avoid corrupting data.

2. Locate the ejector next to the CF socket.

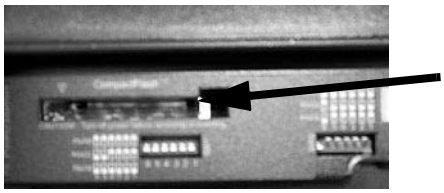


Figure 4-5 Compact Flash Ejector

3. Push the ejector button to pop the CF card out.
4. Remove the CF card.
5. Carefully insert the new card with the connector on the card aligning with the pins inside the socket.
6. Push the CF into the slot until the card is securely seated in the socket. Do not force!

Important The CompactFlash has an arrow near one edge that always lines up with a matching arrow on the label of the PA PowerStation. Insert the CompactFlash so the arrows line up and the card seats properly. **Do not** force the CompactFlash in the wrong way.

Reinstalling the PowerStation Utilities

The PA PowerStation is shipped with the operating system and software, which is installed on the CompactFlash card that comes with your system.

Backup copies of your software are provided on the PA PowerStation CD that ships with your system. If any of the software on your system becomes lost or corrupted, you can reinstall it from this distribution disk.

Restoring a CompactFlash Card

Because you use a CompactFlash (CF) card as the startup drive in a PA PowerStation, you should create a bootable CF card for the system from a blank or used card. This procedure will fix a ROM-DOS Shell CompactFlash card and let you do the following:

- Reinstall the PowerStation Utilities onto a CF card
- Prepare a new CF card for use

You can easily reformat a CompactFlash card by using CTC's Flashback Utility, which restores the ROM-DOS operating system and PA PowerStation operating files to a CF card in one operation.

When you use Flashback, the following software will be replaced on your CompactFlash card:

- Operating system
- System drivers
- MachineShop Shell

Writing to the CompactFlash Card

To write to the CompactFlash card, you will need one of the following:

- A personal computer running Windows with a CD-ROM drive and a SanDisk ImageMate or any CompactFlash card PC reader/writer. A SanDisk ImageMate is a CompactFlash reader/writer that connects to the personal computer through a USB port. You can order a SanDisk ImageMate (model number IMG-2000) from your local Parker distributor.
- A laptop computer running Windows with a CD-ROM drive and a PCMCIA-to-CompactFlash adapter. The PCMCIA-to-CompactFlash adapter lets you read from or write to a CompactFlash card through your laptop's PCMCIA slot. You can

order a PCMCIA-to-CompactFlash adapter (model number FLH-ADPT-2000) from your local Parker distributor.

Reformatting the CompactFlash Card

Warning Manually formatting a CompactFlash card in Windows NT and 2000 before using Flashback could possibly make the CF card unusable.

Warning Removing the CompactFlash card: During a disk transfer procedure, **do not** remove the CF card before issuing a Stop or shutting down the USB port service. Otherwise the last part of the data will not transfer to the CF card.

To reformat a CF card for a PA PowerStation, complete the following steps on a personal computer or laptop:

1. Insert the CompactFlash card into the CompactFlash card PC reader/writer or the PCMCIA slot.
2. Insert the PA PowerStation CD into the CD-ROM drive.
3. Use Windows Explorer to locate the file FlashUtil.exe from the Utilities directory on the CD-ROM drive.
4. Double-click FlashUtil.exe.

   The Flashback Utility dialog box appears. (The NTe version is shown below.)



Note Make sure that you are using at least revision 104 of the Flashback Utility, which allows the formatting of the CF card even if the boot sector of the CF card is unreadable to ROM-DOS.

Reformatting a CompactFlash card using Flashback will erase your projects from the CF card. You will need to download your projects to the CF card again. After using Flashback, you may also need to recalibrate your PA PowerStation display. For instructions, see *Calibrating the Touchscreen* on page 43.

5. Click the down arrow for the destination drive and choose the correct drive letter that was assigned to the CF.
6. Press the Restore Image button.

Note The Flashback Utility will first format the compact flash, and then copy ROM-DOS, the Shell, and the utilities to the compact flash.

Modifying the AUTOEXEC.BAT File

The lines shown in the following table must appear in the PA PowerStation's AUTOEXEC.BAT file for the unit to operate properly. The AUTOEXEC.BAT file that CTC supplies includes these lines and is located in the \CTC directory on the PowerStation's Compact Flash card in a file called AUTOEXEC.CTC.

Please make sure that the AUTOEXEC.BAT file on your PA PowerStation's CF card includes the command lines shown in the left-hand column of AUTOEXEC.BAT File.

Command Line Parameters	Description
PATH C: \; C: \DOS; C: \CTC	Sets up the default DOS path.
LH C:\CTC\BIOSTSR	Loads special functions.
C:\CTC\PACTRL -A -S IF ERRORLEVEL 108 GO TO ERROR	Verifies this CompactFlash is running on a PowerStation.
CD \CTC IF EXIST C: \CTC\MOUSE.INI DEL C: \CTC\MOUSE.INI	Required for the MachineShop Shell to detect a mouse in some situations.
LH C: \CTC\MOUSE :ITSA	If a mouse is connected, installs the mouse and creates a new MOUSE.INI file.
SET TOUCH_PATH=C: \HAMMOUSE CALL %TOUCH_PATH% \TS.BAT	Initializes the touchscreen drivers.
*SET INTERACT=C: \INTERACT	Sets the Interact path.
*SET INTERACT_FILES=C: \INTERACT\APPFILES	Sets the application path for Interact.
*SET INTERACT_STARTUP= C: \STARTUP	Sets up Interact startup variables.
CD \NET LH C: \NET\TCPIP	Loads network drivers --Novell and/or TCPIP stack.
IF NOT EXIST C: \STARTUP\NUL.EXT MD C: \STARTUP CD \STARTUP IF EXIST C: \STARTUP\ AUTOEXEC.BAT CALL C: \STARTUP\AUTOEXEC.BAT	Calls the second AUTOEXECBAT file if the line is contained within a project file.

Table 4-2: AUTOEXEC.BAT File

Command Line Parameters	Description
CD \CTC PSU	Starts the MachineShop Shell.

Table 4-2: AUTOEXEC.BAT File

* Denotes a command line that is unnecessary on units without Interact.

For a complete listing of the AUTOEXEC.BAT file, see *Appendix A*.

Configuring the Ethernet Interface

The \NET directory of the PA PowerStation's CompactFlash contains a configuration utility and all drivers necessary to configure the Ethernet interface on the PowerStation. Backup copies of these files are included on the MachineShop Shell Installation Disk. A list of the files appears in \NET Directory Files.

Note The MachineShop Shell Installation Disk is part of the Runtime Workstation Disk Set, which you can create from the MachineShop Installation CD shipped with your PowerStation. See the *MachineShop Installation Booklet* for instructions on how to create this disk.

File Name	Description
NET.BAT	A sample batch file you can use to run NetBIOS.
NET.CFG	Stores the interrupts and memory for the network drivers. The default PowerStation configuration reserves the following interrupts and I/O addresses. You cannot use these for the Ethernet interface. • COM1: Int 4, I/O 3F8 • COM2: Int 3, I/O 2F8 • Touchscreen: Int 11, I/O 3E8
NETX.EXE	The Novell Netware shell program that makes the final connection with the server.
*LSL.COM	A Novell driver that enables the workstation to communicate with different protocols.
*IPXODI.COM	A Novell driver that supports the IPX protocol and other protocols over the same network.
Plug and Play Pro 100	The Plug and Play interface: 82557
E100BODI	This driver allows the PowerStation to communicate over a local area network.
*NETBIOS.EXE	Used by Interact to communicate over a network.
RSET8019.EXE	Configures interrupts and I/O addresses for the network.
TCPIP.EXE	Used by the PowerStation for TCP/IP communications.

Table 4-3: \NET Directory Files

File Name	Description
TCPIP.INI	Stores settings for TCP/IP communications.

Table 4-3: \NET Directory Files

* Denotes files that can be downloaded from Novell's FTP site.

Interact will also communicate over any network or operating system that supports NetBIOS protocols. Examples include Lantastic, TCP/IP, Microsoft, and IBM.

If you need assistance with NetBIOS and networking, consult your network administrator or a certified network technician.

Resolving Problems

This section provides some basic troubleshooting steps to help you identify and correct problems you may have with the PA PowerStation. Each problem is described and followed with one or more possible solutions. Begin with the first solution and continue until you have solved the problem or tried all of the solutions.

If the problem persists, look through the other problems listed in this section to determine if additional symptoms exist that might require action. If you cannot solve the problem, or if you encounter a problem that is not documented in this section, contact your CTC equipment supplier or CTC Product Technical Support department at (513) 248-1714.

Use *Table 4-4: Troubleshooting Guide* to find resolutions to basic problems that may occur.

General Problem	Specific Issue	Page
Resolving Problems when Starting Up	The LED Power indicator on the back of the unit does not light	56
	The startup halts with the Award (System Info) screen displayed	57
	The AUTOEXEC.BAT file and/ or CONFIG.SYS file does not execute properly	57
Resolving Problems with the Touchscreen	After startup, the touchscreen doesn't work properly, the calibration is incorrect, or the touchscreen makes a chirping noise	57
	After calibrating the touchscreen, either the touchscreen doesn't work properly or the cursor doesn't follow your finger	58
Resolving Problems after Start Up	The display appears to be blank or very dim	58
	The ROM-DOS prompt "C:\" is displayed instead of the MachineShop Shell Main Menu	59
	A PS/2 mouse doesn't work	59
	A serial mouse doesn't work	60
	A keyboard doesn't work	60
	The Ethernet port doesn't work	60

Table 4-4: Troubleshooting Guide

Resolving Problems when Starting Up

Some of the most common problems that users encounter with PCs occur when they start up their systems. This section describes some problems that may occur in the PA PowerStation during startup and solutions for these problems.

The LED Power indicator on the back of the unit does not light

1. Check to see whether the power switch is in the On position, and the PA PowerStation is operating correctly.
    a. If the PA PowerStation appears to be operating properly, the LED indicator may be defective. Contact your CTC equipment supplier or CTC's Product Technical Support department for assistance.
    b. If the PA PowerStation does not appear to be operating properly, restart the PowerStation.
2. Check the DC power line to determine whether the DC voltage is either 12VDC or 24VDC.
3. Check the power connector to determine whether the leads are properly connected and not reversed. The positive line should connect to the positive terminal, the negative lead should connect to the negative terminal, and the ground lead should connect to the ground terminal.
4. Check to see if you have a blown fuse. To replace the fuse, see *Replacing the Fuse* on page 41.

The startup halts with the Award (System Info) screen displayed

1. Check for a loose CF card.

   Restart the PA PowerStation.

The AUTOEXEC.BAT file and/or CONFIG.SYS file does not execute properly

Some startup problems are caused by a corrupted or modified AUTOEXEC.BAT or CONFIG.SYS file. CTC includes backup copies of these files in the \CTC directory on your PowerStation's CompactFlash Disk and on the PowerStation Start Disk. These files are called AUTOEXEC.CTC and CONFIG.CTC.

For a complete listing of the AUTOEXEC.BAT and the CONFIG.SYS files, see *Appendix A*.

If you suspect a problem with either the PA PowerStation's AUTOEXEC.BAT or CONFIG.SYS files, use the ROM-DOS Copy command to create a backup copy of your current file and overwrite the suspect file with the appropriate backup file. For example, if the AUTOEXEC.BAT file becomes suspect, type the following commands at the ROM-DOS prompt:

```
copy autoexec.bat autoexec.old
copy \ctc\autoexec.ctc autoexec.bat
```

1. Press Exit on the MachineShop Shell menu.
2. Run ROM-DOS Edit by typing NED and then the file name that you want to edit.

Important You cannot load the touchscreen driver and a serial mouse driver such as MOUSE.COM simultaneously. The PA PowerStation will only load the driver that is specified first in the AUTOEXEC.BAT file.

Resolving Problems with the Touchscreen

This section describes the problems that may occur with the touchscreen and the subsequent solutions to these problems.

After startup, the touchscreen doesn't work properly, the calibration is incorrect, or the touchscreen makes a chirping noise

1. If the PA PowerStation is operating correctly otherwise, restart the unit.

2. The touchscreen calibration might be in error. See *Calibrating the Touchscreen* on page 43 of this manual for instructions on how to calibrate the touchscreen.
3. Check the AUTOEXEC.BAT file. See the AUTOEXEC.BAT section of this chapter for information about the command lines that should appear in the AUTOEXEC.BAT file.
    a. Verify that the touchscreen drivers are loaded. Look for the following lines in the AUTOEXEC.BAT file:

        ```
        SET TOUCH_PATH=C: \HAMMOUSE
        CALL %TOUCH_PATH% \TS.BAT
        ```

    b. Verify that a serial mouse driver such as MOUSE.COM is not loading before the touchscreen driver. Look for the following line in the AUTOEXEC.BAT file:

        ```
        C:\MOUSE.COM
        ```

    c. Remove the line if it is found anywhere other than where it is shown in the default AUTOEXEC.CTC listing. See *Appendix A*.

After calibrating the touchscreen, either the touchscreen doesn't work properly or the cursor doesn't follow your finger

1. If using a serial mouse, make sure the serial port (COM2 only) is configured for RS-232.
2. The internal touchscreen cable connection may be loose, disconnected, or improperly connected. Call customer service. See *Customer Support Services* on page 5 of this manual.
3. If all of the above remedies do not work, you may need to replace the touchscreen. Replacement Touchscreen kits are available through CTC.

Resolving Problems after Start Up

This section describes problems that may occur after startup and details the solutions to these problems.

The display appears to be blank or very dim

1. Check to see if the power switch is in the on position, and the LED Power indicator on the back of the PA PowerStation is lit.
    a. If you have an STN display and the PA PowerStation is operating properly, adjust the contrast on the display. See

Adjusting the Contrast on page 45.

b. If the PA PowerStation is not operating properly, restart the unit.

2. If the screen still appears to be blank or very dim, and the unit has been in operation continuously for a long time, replace the backlight bulb. Replacement backlight bulb kits are available through CTC for the 7.7" and 10" models. You may not replace the backlight bulb on the 5", 6", and 8" models.

The ROM-DOS prompt "C:\" is displayed instead of the MachineShop Shell Main Menu

1. If the PA PowerStation appears to be operating correctly otherwise, restart the unit.
2. Make sure that the MachineShop Shell software is being loaded.
   a. Verify that the following lines appear in the AUTOEXEC.BAT file.
   b. Verify that the lines do **not** have the word “REM” in front of them:

```
CD \CTC
PSU
```

3. The AUTOEXEC.BAT file may be corrupted or may have been modified. See *Appendix A* for information about the command lines that should appear in the AUTOEXEC.BAT file.

A PS/2 mouse doesn’t work

Make sure that you are using a Microsoft PS/2 mouse, specifically an 802.3 Microsoft-compatible mouse. Some PS/2-style mice that claim to be Microsoft compatible will not work correctly with the PA PowerStation. Do not use a serial mouse with a serial-to-PS/2 port adapter.

A serial mouse doesn't work

See *Connecting a Serial Mouse* on page 19 for instructions on how to configure the PowerStation to accept a serial mouse.

A keyboard doesn't work

1. Check the keyboard. Make sure that you are using an AT or a PS/2 style keyboard, not an XT-style.
2. If you are using a PS/2 style keyboard, the keyboard should be plugged into the keyboard port.
3. If you are using an AT style keyboard, make sure the Y cable is attached to the keyboard port.
4. Try using a new Y adapter cable.
5. Try using a new keyboard.

The Ethernet port doesn't work

1. Make sure the Ethernet cable is plugged in.
2. Make sure that the networking software is loading properly. Verify that the following lines appear in the AUTOEXEC.BAT file and at least one of the two lines do **not** have the word "REM" in front of it as appropriate:

   ```
   CALL C:\NET\NET.BAT
   LH C:\NET\TCPIP.EXE
   ```

   See *Appendix A* for information about the command lines that should appear in the AUTOEXEC.BAT file.
3. Make sure that you properly configured the networking software. See *Configuring the Ethernet Interface* on page 53 of this manual for a list of the drivers that configure your Ethernet interface.

Replacing the SDRAM

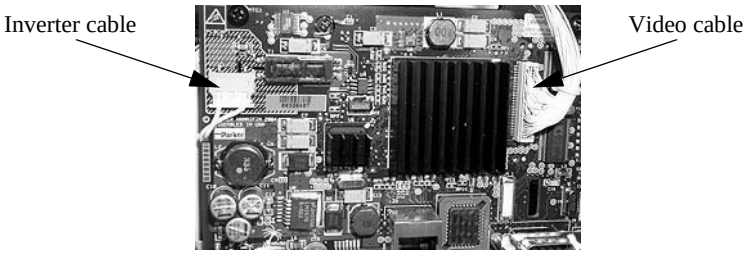
To replace the SDRAM, complete the following steps. This procedure requires opening up the back of the unit as well as removing the circuit board. Be sure to follow the standard Electro-Static Discharge (ESD) precautions.



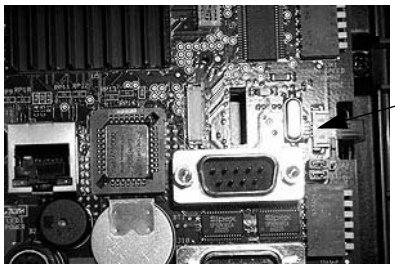
Before you begin, turn off the power to the unit. Disconnect all cables. Eject the CompactFlash card. Take off the clamps. And finally, place the unit face down on an ESD mat.

Now you are ready to begin disassembling the unit.

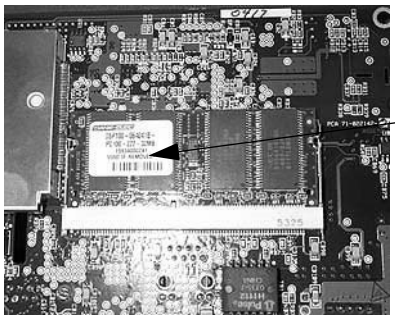
1. Remove the screws from the back of the unit.
   - For the 5" and 6" units, remove the 4 Phillips screws.
   - For the 8" unit, remove the 6 Phillips screws.
   - For the 10" unit, remove 6 Phillips screws. There are two on each side and two on the bottom.
2. Disconnect the inverter cable and the video cable. See the following picture.



3. To disconnect the inverter cable, slide it free of its connector.
4. To disconnect the video cable, lift it free of its connector.
5. Disconnect the ribbon connector. See the following picture.



6. To disconnect the ribbon, put your thumbs on the drawer tabs on each side of the connector and slide the tabs out. In the above picture, the tabs slide out to the right.
7. Remove the circuit board.
   - For the 5" and 6", remove 4 stand-offs on the board.
   - For the 8" and 10", remove 4 Phillips screws.
8. Lift the circuit board and turn it over to reveal the SDRAM. See the following picture.



9. Push the ears out that hold the SDRAM in place.
10. With the bottom edge of the SDRAM still attached to the board, lift the top edge of the SDRAM up to a 45 degree angle.
11. Slide it free.
12. Slide the new SDRAM into place at a 45 degree angle.
13. Press it down against the board, pushing the top edge of the SDRAM until you hear the ears click into place.

14. Reattach the circuit board.
15. Reconnect the ribbon and push the drawer tabs back into place.
16. Reconnect the video cable and push the ears on the connector back into place.
17. Reconnect the inverter cable.
18. Reattach the back of the unit.
19. Power on the unit.

Appendix A

System Configuration Files

Appendix A specifies the contents of two configuration files, CONFIG.CTC and AUTOEXEC.CTC. Use this information to modify or correct the files CONFIG.SYS and AUTOEXEC.BAT on the PA PowerStation.

Chapter Contents

System Configuration Files *66*

System Configuration Files

CTC Parker includes backup copies of the *CONFIG.SYS File* and *AUTOEXEC.BAT File* in the \CTC directory on your PowerStation's Compact Flash disk and on the PowerStation Start disk. These files are called CONFIG.CTC and AUTOEXEC.CTC.

CONFIG.SYS File

```
SHELL=C:\COMMAND.COM /E:1024 /P
FILES=30
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH,UMB

REM
REM                          !!! NOTE !!!
REM EMM386 can be used to free up more conventional memory for use by
REM Interact, by allowing TSRs to be loaded high. Just remove the word
REM 'REM' in front of the appropriate command, and adjust the
REM parameters as required for your system's configuration.
REM
REM DEVICE=C:\DOS\EMM386.EXE NOEMS
REM
REM IMPORTANT: Always include the NOEMS switch when using
REM EMM386 with Interact.
REM
```

AUTOEXEC.BAT File

```
@ECHO OFF
REM ************************************************************************
REM PA PowerStation Autoexec.bat
REM MachineShop Suite 1.05
REM Copyright (c) 2004 CTC Parker Automation
REM ************************************************************************
PROMPT $p$g
PATH C:\;C:\DOS;C:\CTC
SET TEMP=C:\DOS

REM ************************************************************************
REM Touchscreen configuration options
REM ************************************************************************
SET TOUCH_ADDR=3E8
SET TOUCH_IRQ=11

REM ************************************************************************
REM Set up Interact environment variables for MS Shell.
REM ************************************************************************
SET INTERACT=C:\INTERACT
SET INTERACT_FILES=C:\INTERACT\APPFILES
SET INTERACT_STARTUP=C:\STARTUP

REM ************************************************************************
REM Install PowerStation Special Functions
REM ************************************************************************
LH C:\CTC\BIOSTSR

REM ************************************************************************
REM Verify running on a PA PowerStation
REM ************************************************************************
C:\CTC\PACTRL -A -S
IF ERRORLEVEL 108 GOTO ERROR

REM ************************************************************************
REM If an external mouse is connected, MOUSE will install successfully
REM and create a new MOUSE.INI file.
REM ************************************************************************
CD \CTC
IF EXIST C:\CTC\MOUSE.INI DEL C:\CTC\MOUSE.INI
LH C:\CTC\MOUSE

REM ************************************************************************
REM Initialize touchscreen drivers.
REM ************************************************************************
SET TOUCH_PATH=C:\HAMMOUSE
CALL %TOUCH_PATH%\TS.BAT

REM ************************************************************************
REM Load NETWORK drivers -- NOVELL
REM Remove REM on the CALL statement to load NOVELL network batch file.
REM If used, this must be called BEFORE loading TCPIP.
REM ************************************************************************
CD \NET
REM CALL C:\NET\NET.BAT
```

```
REM ************************************************************************
REM Load TCP/IP Stack
REM ************************************************************************
LH C:\NET\TCPIP

REM ************************************************************************
REM Load scroll feature on quarter VGA system.
REM ************************************************************************
C:\CTC\PACTRL -T -S
IF ERRORLEVEL 3 LH C:\CTC\SCROLL

REM ************************************************************************
REM Call AUTOEXEC.BAT file contained in project, if it exists.
REM ************************************************************************
IF NOT EXIST C:\STARTUP\NUL.EXT MD C:\STARTUP
CD \STARTUP
IF EXIST C:\STARTUP\AUTOEXEC.BAT CALL C:\STARTUP\AUTOEXEC.BAT

REM ************************************************************************
REM Start the MachineShop Shell.
REM ************************************************************************
CD \CTC
PSU

GOTO END


:ERROR
CLS
ECHO.
ECHO  This CompactFlash is programmed
ECHO  for a PA PowerStation and is not
ECHO  compatible with this system.
ECHO.
ECHO  The startup process has been
ECHO  halted.
ECHO.

:END
```

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