EMBEDDED WINDOWS NT 4.0 PRODUCT NOTES

Introduction

This document describes setup requirements and setup options of Embedded Windows NT 4.0 (ENT), as well as a recovery strategy should the original CompactFlash card become corrupted.

Important	Use of the software on the included media or installed on the system is subject to the terms of the End User License Agreement (see *Appendix A*). You should not use the software program until you have read the End User License Agreement. By using the software you signify that you have read the End User License Agreement and that you accept its terms.

When Embedded Windows NT is ordered, the following are included:

- A CD-ROM entitled **Microsoft Embedded Windows NT 4.0 Recovery Disk** (KA-83441)

Important	Use the Recovery Disk to recover preinstalled software **only** in the event of corruption or accidental erasure. CTC is solely responsible for the performance of this recovery image.

- A CompactFlash™ card (or other media ordered such as a hard drive) with an 96 Mbyte operating system image containing the following:

    - Embedded Windows NT operating system

        - Class 2 Embedded Windows NT

        - Service Pack 5 (NT Service Pack 6 is not compatible with Embedded Windows)

        - high encryption (128-bit)

        - networking

        - video support

        - NT utilities also included:

            - Internet Explorer 2 (IE5.5 SP2 can be downloaded from Microsoft website)

            - Command shell

            - text editing

            - Windows Explorer

            - MMC

            - network configuration utilities

            - Windows Help engine

            - task scheduling

    - PowerSmart

    - UPDD Touchscreen driver

- The Microsoft License Agreement

- These instructions

Notes	On a 128 Mbyte CompactFlash card, the Embedded Windows NT image of approximately 96 Mbytes leaves 25 Megabytes of *usable* space on the flashcard. The remainder is the boot sector.
	On a 512 Mbyte CompactFlash card, the Embedded Windows NT image of approximately 96 Mbytes leaves 392 Megabytes of *usable* space on the flashcard. The remainder is the boot sector.

ENT Note	Embedded Windows NT does not include the full WinNT options. For example, NT screen savers, desktop themes, calculator, and hyperterminal options are not available in ENT.

Overview

Windows NT Embedded 4.0 (ENT) is designed for devices requiring the richness, security, and power of Windows NT. This scalable operating system provides manageability and sophisticated networking capabilities for even the most demanding applications and services. ENT takes advantage of the PC architecture and the full breadth of Windows NT 4.0 services.

To ensure seamless hardware and software compatibility, ENT uses unmodified Windows NT 4.0 binaries and the PC architecture. There is no need to port or recompile your NT 4.0 applications, device drivers, and service to run them on ENT. Moreover, hardware that supports Windows NT 4.0 also supports ENT.

ENT takes advantage of proven Windows NT technology for your embedded devices and considerably reduce time-to-market and development costs. One of the key reasons for this reduction in development costs is the ability to use existing Windows NT applications, drivers, and services. In addition, ENT lets you use off-the-shelf hardware and software, saving you the time and money that you would otherwise need to invest in building and developing software to support your devices.

A Note Regarding Licensing

A per-system End User License is required and shipped with the hardware that contains the operating system. There is a Microsoft Windows NT Embedded 4.0 license label affixed inside the PowerStation. Please refer to the terms of the End User License Agreement (EULA) in *Appendix A* at the end of this document.

Features of ENT

This section lists the hardware and networking features of ENT as well as system requirements and system resources. It includes descriptions for supported items as well as a list of all of the various items supported within each category, from networking protocols to management tools.

Embedded Enabling Features and Tools

- **Flash memory support** is used for diskless operation. Use ENT with Compact Flash (128MB minimum) or a hard drive.

- **Flexible page file support** includes support for "No page file." Page files are also known as swap files or virtual memory.

- **CD-ROM boot support** is used for external boot-up support.

- **Headless operation** is used for systems without display, keyboard, and mouse.

- **Enhanced error support** is used for auto-handling and the logging of error dialog boxes.

- **Applications and Device Drivers:** Broad availability. Supports applications and drivers that run on Windows NT 4.0.

- **Networking and Interoperability (Protocols):** TCP/IP, IPX/SPX, and NetBEUI.

System Requirements

CTC Parker recommends you have at least **64 MB** of DRAM for satisfactory system performance.

System Resources

This build of the operating system includes CTC Parker's PowerSmart system diagnostic utility and the Window's UPDD touchscreen driver. A keyboard or display is not required to use the operating system.

If you do not use a keyboard, you must configure your system so that the user login and authentication are not required. You must also configure your system to automatically start your application by including it in the Startup Directory. See the *Setup Options* section for instructions.

Differences between ENT and NT Desktop

Windows NT Embedded 4.0 uses unmodified Windows NT 4.0 binaries and the PC architecture. In general ENT is compatible with Windows NT 4.0. There is no need to port or recompile your NT 4.0 applications, device drivers, and service to run them on ENT.

Some differences are listed below.

Hardware

There are some important hardware differences. ENT...

- Uses the smallest possible operating system footprint, which lets you run ENT from solid state disk drives such as Compact Flash.

  Only the drivers required to support the PowerStation hardware are included. Alternative hardware drivers for different displays, printers, network adapter cards, and so on do not ship with ENT.

  If you require drivers for add-on cards or devices, you must install the driver with its respective card or device. See *Adding Devices and Installing Additional Software*.

- Does not include installation files or an install CD with the operating system deliverables.

- Improves the Compact Flash drive life by not requiring a page file.

- Includes limited administrative tools.

- Includes service pack 5. You cannot install service pack 6.

- Does not include a Windows Product Identification (PID) number with the operating system. The product is registered and traceable to CTC Parker Automation.

- Does not support JAVA Virtual Machine.

Software

ENT takes advantage of the PC architecture and the full breadth of Windows NT 4.0 services. If your application works with NT 4.0 desktop, it will likely run on ENT.

However, if your application will not run on ENT if it requires

- Windows NT 6.

- IE 6.0 or greater.

The latest version of Microsoft Internet Explorer that ENT supports is IE 5.5. ENT does not support IE 6.0 or greater.

Note	IE Version 2.0 is included with this build. You can upgrade to IE 5.5 by downloading it from Microsoft's website, by installing it from a network, or by installing it from a distribution CD.

Also, the following CTC software comes with ENT:

- CTC Parker's PowerSmart system diagnostic utility, which presents power supply voltages, system temperature, hours in use, and other diagnostic information.

- Window's UPDD touchscreen driver, which lets you run ENT without a mouse and keyboard.

Adding Devices and Installing Additional Software

You can add devices, their corresponding drivers, and additional software in one of two ways, depending on whether a CD-ROM or floppy drive is part of the PowerStation hardware system.

If a CD-ROM or floppy drive is available, load the driver or software on the PowerStation using the manufacturers CD or floppy disk.

If a CD-ROM or floppy drive is not available, load the driver or software on a laptop that has a Compact Flash card reader/writer. Copy the driver or software onto the flash, and then transfer the flash into the PowerStation to complete the installation.

Supported PowerStations

The PC10/12/15 versions of the PowerStation are the only versions configured to support ENT at this time.

The P1P and P9 PowerStation family are not currently supported.

Setting Up ENT

ENT is shipped pre-loaded on a CompactFlash card (CF) or hard drive. You can install the CompactFlash card either in the workstation's internal flashcard socket or in the external flashcard socket.

Caution	If you are running Windows NT from the flash card installed in the **external flash card socket**, do not power up the system without the WinNT flash card in the external socket. ENT is the workstation operating system. The system will not run without its operating system.

ENT drive must be C:

Important	The workstation will not boot from ENT unless the drive from which it is running is designated the **C:** drive.

You must implement the correct master/slave settings on all the system drives (hard drive, internal and external card readers, CD-ROM) to ensure that the Windows NT drive receives the **C:** designation from the BIOS.

How the Drives Are Assigned

The drives acquire their designation labels (**C:**, **D:**) from the BIOS, based on their position in the Primary and Secondary IDE channels. The first drive found is assigned the **C:** label and the second is designated **D:**.

The Primary IDE channel covers the hard drive and the Internal Card Socket. The BIOS first checks the Primary IDE channel master (which could be either the hard drive or the internal card socket, depending on the master/slave jumper settings). If there is no Primary master, the BIOS checks the Primary slave.

If there is nothing on the Primary IDE channel (no hard drive or internal CompactFlash card), the BIOS checks the Secondary IDE channel. The Secondary IDE channel covers the CD-ROM drive and the External Card Socket. The BIOS checks the Secondary IDE channel master first. If there is no Secondary master, the BIOS checks the Secondary slave.

In summary, the BIOS assigns the C: drive to the first device that it finds. It looks for devices in the following order:

1. Primary master (Internal CF or Hard drive, depending on the master/slave settings)

2. Primary slave (Internal CF or Hard drive, depending on the master/slave settings)

3. Secondary master (External CF or CD-ROM drive, depending on the master/slave settings)

4. Secondary slave (External CF or CD-ROM drive, depending on the master/slave settings)

Settings for ENT Running on the Hard Drive

To run ENT from the hard drive, change the Internal CF master/slave jumper setting to Slave.

The hard drive is shipped with the jumper settings on Master. The WinNT hard drive will then automatically be designated as **C:**.

Note	Instructions on opening the workstation and changing the master/slave jumpers can be found in the *PS Series PowerStation User Guide*. Instructions on installing the ENT hard drive are included with the hard drive.

Settings for ENT Flash Card in Internal CF

To run Embedded Windows NT from the Internal CF, change the Internal CF master/slave jumper setting to Master. If the workstation has a hard drive, also change the hard drive master/slave jumper settings to Slave.

Note	Instructions on opening the workstation and changing the master/slave jumpers can be found in the *PS Series PowerStation User Guide*.

Settings for ENT Flash Card in External CF

Important	CTC does not recommend running ENT from the External CF. The setup is more complex, and it would be too easy to remove the card and therefore disable the workstation.
Important	If the workstation has a hard drive or a card in the Internal CF reader, the ENT flashcard **cannot be installed on the External CF**. It must be installed in the **Internal CF** (see above). When a hard drive or a card in the Internal CF is present, the External CF would never be designated **C:**, and the workstation cannot boot NT from another drive.

To run ENT from the External CF (no hard drive on the system), change the External CF master/slave jumper setting to Master. If the workstation has a CD-ROM drive, also change the CD-ROM drive master/slave jumper settings to Slave.

Note	Instructions on opening the workstation and changing the master/slave jumpers can be found in the *PS Series PowerStation User Guide*.

Login Password

When the system boots, it prompts for a user name and password. The default user name is **administrator**. The password for the default user is **administrator**. The user name and password are case sensitive so you must use lower case for each.

Note	You can bypass the login screen. See below.

Setup Options

You can change certain ENT options through both the registry editor and the Control Panel. The following instructions explain how to skip the login screen, set automatic reboot, change the swap file size, and turn off the network connection check.

Warning	Using Registry Editor incorrectly can cause serious problems that may require you to reinstall your operating system. Before you edit the registry, make sure you understand how to restore it if a problem occurs. For information about how to do this, view the "Restoring the Registry" Help topic in Regedit.exe. **Use Registry Editor at your own risk.**

Skip the Login Screen

Windows ships with the login screen demanding manual input after boot. To increase boot speed, you can skip the login screen by following the steps below:

1. Run the Registry Editor by running the **Regedit** program under **My Computer ►C: ►Windows NT**.

2. Navigate to **HKEY_LOCAL_MACHINE\software\microsoft\Windows nt\currentversion\winlogon**.

3. Add a new string to bypass the password:

   a. Select **Edit ►New ►String Value**.

   b. Type **DefaultPassword**.

   c. Double-click **DefaultPassword**.

   d. In the **Value data** field, enter **Administrator**.

   e. Click **OK**.

4. Add another new string to bypass the login:

   a. Select **Edit ►New ►String Value**.

   b. Enter **AutoAdminLogon**. (This label is case and space sensitive. Type exactly as shown.)

   c. Double-click **AutoAdminLogon**.

   d. In the **Value data** field, enter **1** to turn autologon ON. Enter **0** to force a manual logon (default).

   e. Click **OK**.

5. Exit Regedit.

6. Reboot.

Set an Automatic Reboot after Shutdown

The Windows default setting is to stay off after shutdown. You can change Windows to reboot automatically after shutdown by following the steps below:

1. Run Registry Editor by running the Regedit program under **My Computer ►C: ►Windows NT**.

2. Navigate to **HKEY_LOCAL_MACHINE\software\microsoft\Windows nt\currentversion\winlogon**.

3. Double-click **PowerDownAfterShutdown**.

4. In the **Value data** field, change the **0** to **1**. This forces the workstation to automatically reboot after shutdown without displaying a confirmation message.

Change the Page File Size

You can change the page file size. Windows is shipped with the page file set to 0, which means no page file is in use. Because flash memory has a limited number of writes, disabling the page file can increase the life of your flash. However, CTC recommends you then add more system memory so that your performance speed is not affected.

By the same token, if you increase the page file size, you could decrease the life of your flash memory.

Note	Once you change the page file size, you can never reset it to 0. The minimum page file that NT allows after a change is 2 Mbytes.

To change the page file size, complete the following steps:

1. Select **My Computer** ▶**Control Panel** ▶**System** ▶**Performance tab**.

2. In the **Virtual Memory** field, click **Change**.

3. Enter the Initial size and Maximum size for the swap file.

4. Click **Set**.

Notes	If you are running from a 128 Mbyte Flashcard, the maximum available space for swap on the flashcard is 25 Mbytes.

Turn Off the Network Connection Check

Windows automatically checks for a network connection at boot. To increase boot speed when a network connection is not required, you can turn off the network connection check by following the steps below:

1. Select **My Computer** ▶**Control Panel** ▶**System** ▶**Hardware Profiles tab** ▶**Properties button**.

2. Select the **Network** tab.

3. Check the box labeled **Network - disabled hardware profile**.

4. Click **OK**.

ENT Recovery

Use the CD labeled **Microsoft Embedded Windows NT 4.0 Recovery Disk** to recreate the operating system image on a CompactFlash card.

I. Formatting the CompactFlash Card

Important   You can only format the Flashcard on an NT system, not on any other Windows system.

Format the Flashcard (minimum size 128 Mbytes) on any Windows NT system with a flashcard reader (laptop, desktop, or PowerStation) by following the steps below:

1. Double click the **My Computer** icon.

2. Right click the CompactFlash card drive and select **Format**.

3. In the **File System** options, select **FAT**.

4. Click **Start** to format the CompactFlash card.

II. Recreate the Operating System Image

Note   Once you format the card on an NT system, you can transfer the operating system to the formatted card using any Windows operating system with a flashcard reader and a CD-ROM drive.

To recreate the operating system image on the formatted card, complete the following steps:

1. Insert the formatted flashcard into the flashcard reader.

2. Insert the CD labeled **Microsoft Embedded Windows NT 4.0 Recovery Disk** into the CD drive.

3. Double click on the file **winnte.exe** on the CD.

4. When the WinZip Self Extraction window appears, be sure to **Unzip to Folder.**

5. Click **Browse** and select the flashcard drive.

6. Click **OK**.

7. Click **Unzip**. The operating system image unzips and copies onto the flashcard.

Appendix A

End User License Agreement for
Microsoft Embedded Windows NT 4.0

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Appendix B

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