Intermec
Technologies Corporation

6110 Hand-Held Computer

TECHNICAL REFERENCE

PN: 977-054-009
Revision F
September 1999

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WARNING: ***The lithium ion battery may explode if replaced incorrectly. Replace only with the same or equivalent type.***

ADVERTISSEMENT: ***La batterie au lithium peut exploser si elle est replacée de manière incorrecte. Elle ne doit être remplacée que par une batterie identique ou similaire.***

WARNING: ***Lithium ion batteries may explode or catch fire if overcharged due to improper dock installation.***

ADVERTISSEMENT: ***Les batteries au lithium peuvent exploser ou prendre feu si elles sont trop changées à cause d'une mauvaise installation de la station d'accueil.***

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Section 1
Introduction

Throughout this section, there are references to viewing additional information. If you have a DOS version of the 6110 Computer, you can use EDIT.COM or transfer the files to your PC and use the available PC-based viewing or editing tools. However, for Windows 95, there is additional documentation available on the 6110 Win95 Toolkit CD that can be viewed using the following methods:

- The **View Technical Documentation** feature of the 6110 Windows 95 Installation program, described in the **6110 Windows 95 Toolkit** section of this publication, provides easy access to documentation on the CD.
- From the Windows desktop, you can access the CD-ROM drive by either double-clicking in **Windows Explorer** or **My Computer**. Right-click the 6110 Toolkit CD-ROM drive, then select **Open** from the popup menu for a list of folders. Double-click on the appropriate folder to find desired files.

NOTE: *Be careful when clicking on the icon for the CD-ROM drive. Double-clicking causes the Installation program to run.*

Scope

This publication contains information to assist you in developing applications for your PEN*KEY^{E} 6110 Hand-Held Computer, from Intermec Technologies Corporation.

Level of Expertise Needed

The majority of this book has been written for experienced application programmers. However, developing applications for this computer should be similar to developing applications for any standard PC with the same operating system. Exceptions are noted below in the *Introduction to the 6110 Computer* paragraph.

For the New User

If you need assistance in developing applications for your 6110 Computer, or merely a better understanding of any feature, consider the available resources.

The *Open Systems Publications* section lists several publications that could be useful for additional research.

Intermec provides training and support for purchasers of our products. Refer to the *Support Available* paragraph, later in this section.

Related Publications

The publications listed below contain additional information relating to your 6110 Computer.

- *6110 Hand-Held Computer User's Guide*; P/N: 961-028-102
- *6100 Series Docks Installation Instructions*; P/N: 962-020-003
- *6820 Printer User's Guide*; P/N: 961-019-013
- *6820 Printer Technical Reference*; P/N: 977-019-001
- *NRInet Communications 32-bit Client User's Guide*; P/N: 961-055-002

Introduction to the 6110 Computer

The 6110 Computer has a number of features that are useful in the mobile systems marketplace, such as:

- Fast data processing
- Large data and program storage
- Signature capture
- Touch screen display
- Backlit display and keys

Both Figure 1-1 and Figure 1-2 identify locations of various components.

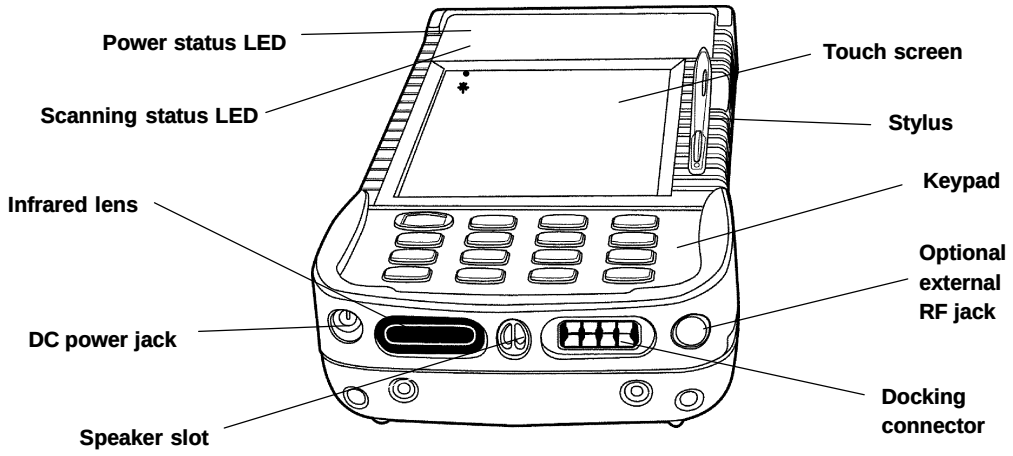


Figure 1-1
Location of Components (front, bottom)

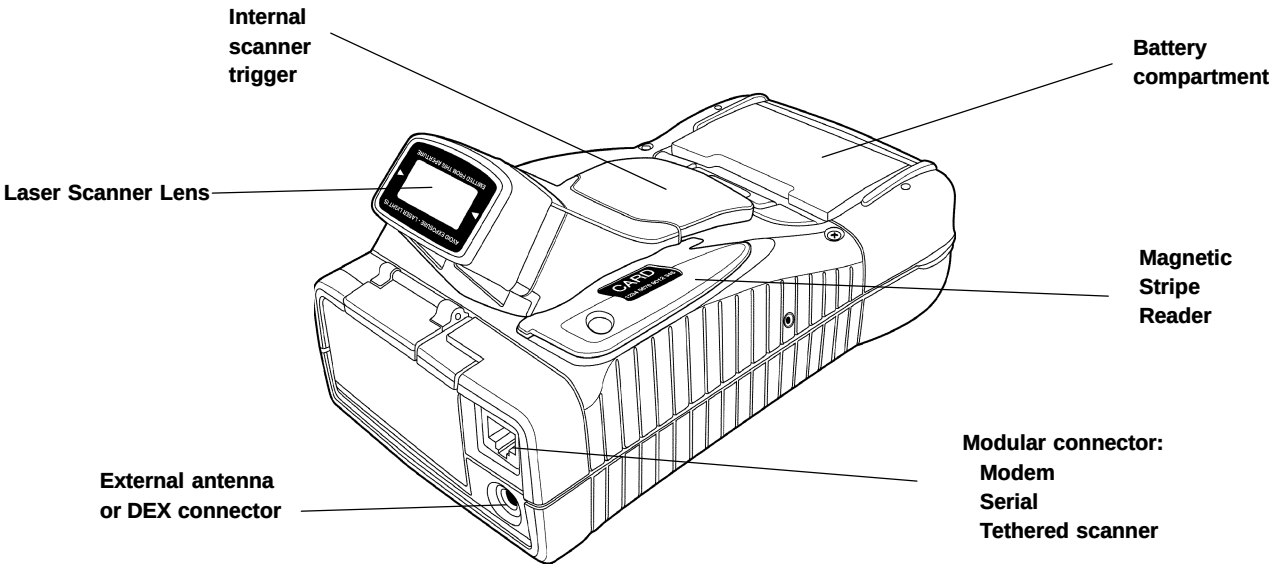


Figure 1-2
Location of Components (rear, top)

From the viewpoint of an application, the 6110 Computer is like other PC compatibles, with very few exceptions, as described on the following pages.

Open System Environment

One of the major benefits of an open-system approach is that you can acquire development equipment and software from many different vendors, including Intermec. This provides you with wide latitude in selecting the equipment and software tools that are best suited to your particular development needs. The challenge lies in finding pieces that work well together, especially when you are working in communications and interfaces.

Refer to *\docs\6110dvtp.htm* on the Win95 Toolkit CD for recommended development tips.

Processor

The 6110 Computer is based on the ÉlanSC400 Processor operating at a maximum speed of 99 MHz. This processor is based on the AMD Am486 CPU and contains an 8K write-back cache, integrated memory controller, PC/AT system logic, PC Card controller, LCD graphics controller, IrDA infrared port, and power management features in one integrated package. The integrated LCD controller is CGA register set compatible.

Reset

There is no hardware reset button. To reset the computer, refer to the *Reset Keys* paragraph later in this section.

Batteries

B CAUTION: **This computer has ONE primary power source, the MAIN Battery. The only function of the Backup Battery is to maintain power to RAM while changing Main Batteries. At all times during operation and while stored (overnight, long periods of time, and during suspend), the unit must have its Main Battery installed.**

Battery status is reported by an LED indicator on the front of the unit as well as on the battery pack itself.

For additional information about batteries, refer to the *Operation* section in the *6110 Hand-Held Computer User's Guide*, An electronic file, 6110UG.PDF, can be viewed in the *\docs\pdf* folder on the *Win95 Toolkit* CD.

Main Battery

The main battery is a 1350 mAH lithium ion power pack, and has a useful life of 500 charge/discharge cycles. The battery pack contains a smart processor for the system software to report battery status.

This battery supplies power to the 6110 Computer. In suspend mode, it maintains RAM, RTC, and CMOS settings. When the computer is off charge, the main battery also supplies any needed charge to the backup battery. The main battery must always be installed, except when replacing batteries.

Be sure your batteries are fully charged before leaving them off charge for long periods of time. Whereas a unit, with fully charged main and backup batteries, can be left off charge overnight or for a long weekend. However, if your 6110 Computer goes into shutdown mode, as a result of a low main battery, your data remains protected by the backup battery.

One method of checking battery capacity is to touch two contacts at the same time, as shown in the *Troubleshooting* section of the *6110 Hand-Held Computer User's Guide*. Another method is to use a software fuel gauge based on the APM 1.1 specification. This requires application development.

Backup Battery

The backup battery is for emergencies only. It is unable to maintain DRAM contents for an extended time, with the expectation of supporting the system without a main battery. If the main battery is drained completely or is not reinstalled, data stored in DRAM is lost. The entire DRAM is protected against loss by two 3.0 volt vanadium-lithium "coin" cells, which can survive 2000 charge/discharge cycles.

The backup battery has a capacity of 100 mAH. When fully charged, it retains data in the 8 and 16 MB sizes of DRAM for approximately 24 hours; whereas the 32 MB of DRAM is only rated for 16 hours. However, the backup battery is on trickle-charge whenever the unit is powered from the main battery or when connected to a charger.

" NOTE: *A discharged backup battery takes 14 hours to recharge. A discharged main battery takes two hours to recharge. When charging the batteries in the 6110 Computer, maintain the charge for a full 14 hours to ensure that both the backup battery and the main battery pack are fully charged.*

Chargers and Docks

To charge the batteries in your 6110 Computer, place the computer into a 6110 Dock or connect it to a charger.

COM1 provides RS-232 and RS-485 communications to the dock. The RS-232 interface on the dock supports RXD, TXD, RTS, CTS, and GND signals.

" NOTE: ***The DCD, DTR, DSR, and RI signals are not supported on COM1.***

RS-485 communication is enabled by hardware in the dock and a special cable attached to the dock, with a maximum speed of 115.2 KB.

On all docks, there is an indicator on the front of each dock or docking position that indicates the status of charge on the computer in the dock. This indicator does not turn on unless a computer is installed.

Refer to *6110 Hand-Held Computer User's Guide* for information about charger usage. Refer to the *Operation* section, in the *6110 Hand-Held Computer User's Guide*, for information about using chargers. An electronic version of the user's guide, 6110UG.PDF, can be viewed in the *\docs\pdf* folder on the *Win95 Toolkit* CD.

There are several docks available for the 6110 Computer:

- **Single Dock** — Integrated AC power supply, two RS-232 ports, cable options to enable one RS-485 output, charge indicator for quick status.
- **Multidock** — Integrated AC power supply, holds up to eight 6110 Computers, wall or table mount, secure storage, status indicator.
- **Vehicle Dock** — Two RS-232 ports, various mounting options**.**
- **Vehicle Docking Station** — A vehicle dock, with stand and keyboard tray, as shown in Figure 1-3 below.

The 6110 dock interface has an eight-contact connector which provides main battery charging (+ power, – power, and two control signals) and COM A serial port signals (SIN, SOUT, RTS, CTS). The IR serial interface on the 6110 Computer can also be a "wireless" connection into any dock that contains an IrDA to RS-232 translation circuit, providing a half-duplex RS-232 serial port on the dock (with no control lines).

Connectors

The ***top end*** of the 6110 computer contains the following connectors:

- Modular connector — can be used for a tethered scanner, a modem, as well as a variety of serial devices.
- External antenna, or DEX connector —

The ***bottom end*** of the 6110 computer contains the following connectors:

- AC power jack — used to power the 6110 Computer from AC and to charge the batteries.
- Docking connector — mates up with a dock unit for the purpose of charging or providing power for long periods of time and for serial communications.
- Optional external RF jack — used for radio antenna with PC Card radio.

The ***port replicator*** attachment contains the following connectors:

- AC power jack — can be plugged into a wall charger or cigarette lighter (with associated cable), and is used to keep the 6110 Computer powered up over long periods of time.
- Serial port — this is a 9-pin D-sub serial connector.
- RF antenna connector — used for radio antenna with PC Card radio.
- Keyboard connector — for external keyboard.

Display

The 6110 Computer features a backlit, touch-sensitive, liquid crystal display (LCD) with a resolution of 240 by 320 pixels. The default display mode is landscape, but through system software it is rotated into portrait mode.

You can use either a stylus or your finger on the touch screen. Application software can operate the display in either portrait or landscape mode and receive touch inputs as standard mouse messages.

Backlight

The backlight is useful in darkened conditions. However, use the backlight only as needed, since it reduces the battery life.

The amount of time the backlight stays on before shutting itself off is controlled through the Configuration Program, SC400CFG.COM. For more information, refer to the *Configuration Utility: SC400CFG.COM* paragraph, in the *DOS Device Drivers* section on page 4-39.

Refer to the the *6110 Hand-Held Computer User's Guide*, for information about adjusting the backlight with the PEN*KEY Utilities. An electronic version of the user's guide, 6110UG.PDF, can be viewed electronically in the *\docs\pdf* folder on the *Win95 Toolkit* CD.

Contrast

Refer to the the *6110 Hand-Held Computer User's Guide*, for information about adjusting the contrast with the PEN*KEY Utilities.

Touch Screen

This is an overlay resistive analog touch screen, and is controlled by a single chip touch screen controller. The touch screen controller provides x,y point information to the CPU whenever a touch is detected on the screen.

Keyboard Tray

While the 6110 Computer is docked, you can attach an external keyboard tray with a full keyboard.

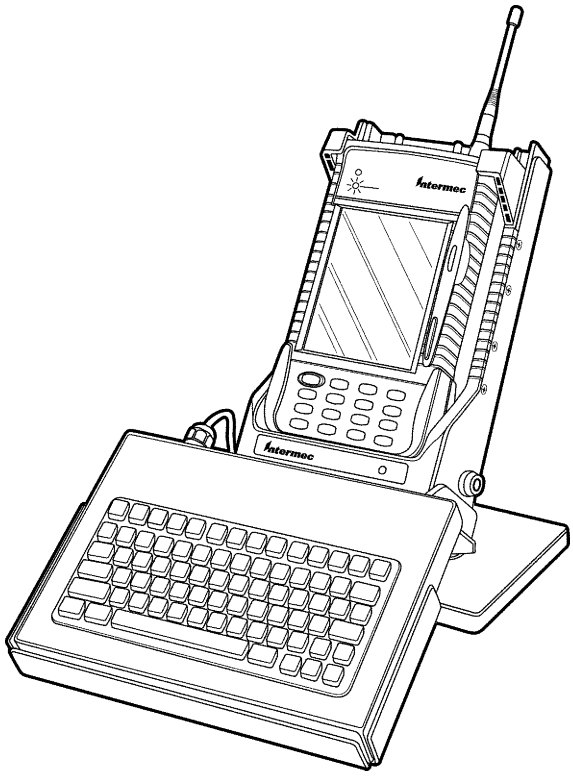


Figure 1-3
6110 Computer in Vehicle Docking Station (with keyboard tray)

Keypad

The 6110 Computer has a built-in 16-key backlit keypad. The keycodes sent to applications are programmable. They are generated by a PC compatible 8042 controller emulator and presented to application software through the standard software interfaces.

For information about programming these keys, refer to the *Configuration Utility* paragraph in the *DOS Device Driver Support* section on page 4-39.

Refer to the the *6110 Hand-Held Computer User's Guide*, for detailed instructions on the use of the keys. An electronic version of the user's guide, 6110UG.PDF, can be viewed in the *\docs\pdf* folder on the *Win95 Toolkit* CD.

Right Mouse Click

This standard PC function is also available on the 6110 Computer. Hold the **GOLD** shift key down while tapping the screen provides the same results as a right mouse click.

Suspend / Resume Key

To suspend the terminal, press and hold the suspend/resume (**I/O**) key for about three seconds. To resume operation, press and release the same key.

The 6110 Computer automatically suspends when there is no activity for a time, which conserves power, thereby protecting against loss of data while replacing the main battery or leaving the unit unattended. This time is determined by the configuration program (refer to the *Device Support* section, on page 4-39, for additional information).

Reset Keys

Always attempt to shut down Windows before resetting the 6110 Computer. Refer to the *Windows 95 Tips* paragraph in the *Windows 95 Support* section for hints on shutting down Windows. Keep in mind, there is no hardware reset.

Figure 1-4 shows the positions of the reset keys. To reset the terminal, hold down the **GOLD** shift key, press the **Esc** key and the **[0]** key, so all three keys are pressed. Continue to hold them down until the Power Status LED illuminates, then release all three keys.

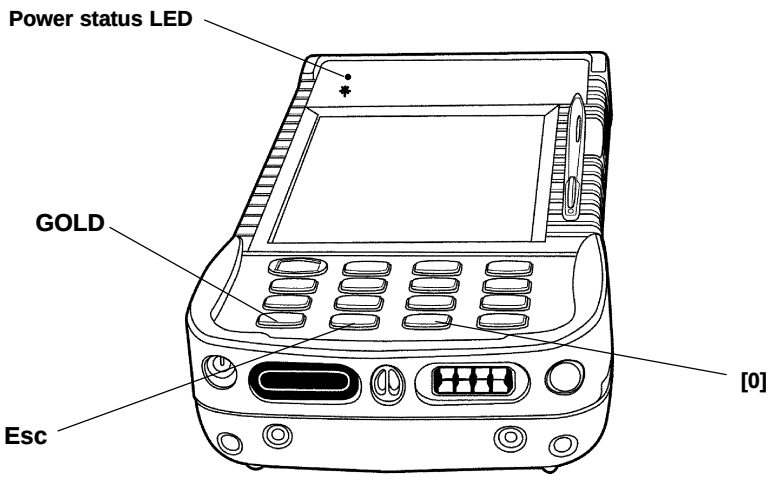


Figure 1-4
Reset Keys on Keypad

Keypad Remapping

All the keys on the keypad can be remapped, including the shifted and unshifted keys, with the exception of the **I/O** key (suspend/resume) and the **GOLD** shift key. Use SC400CFG.COM to remap the keypad, as described in the *Configuration Utility: SC400CFG.COM* paragraph, on page 4-39.

For examples of configuration setup, refer to the SC400CFG.INI file by viewing the 6110SC40.HTM file in the *\docs* folder on the *Win95 Toolkit* CD. A sample SC400CFG.INI file also resides in the *\config\sc400cfg* folder, on the Win95 Toolkit CD.

Memory

The following types of memory are available with this computer:

- System memory (DRAM)
- Flash ROM
- PC Cards

System Memory (DRAM)

The 6110 Computer supports 8, 16 or 32 MB of DRAM memory. You can upgrade to a larger memory size by having your Customer Support Center install a new memory board. However the 8 MB configuration cannot be ordered for a Windows 95 system.

Flash ROM

System BIOS is stored in the 512 KB of field-programmable flash memory, containing BIOS and BIOS extensions. There is no room for any additional system software in flash memory. Use a removable ATA PC Card for additional software. This includes Windows 95 operating system and any drivers needed for operating.

System BIOS is an implementation of the PC compatible BIOS with added features specific to Intermec® hand-held computers. The 6110 BIOS performs power-on tests, system configuration (including elements of Plug and Play), low-level power management, and run-time real-mode interrupt service handling.

During the power-on sequence, the 6110 BIOS performs a Power On Self Test (POST) that checks all system components and configures them in preparation for booting the operating system. The system then boots the operating system from an installed ATA card.

PC Cards

Your computer is equipped with three PC card slots. Use these slots with memory cards for storing data, much like a hard drive on a PC. Memory cards are available in a variety of sizes and types. You can use different brands of PC cards in your hand-held computer. Modems, radios, spinning media, and other options are also supported as they become available. Check with your Intermec sales representative for available options.

Two Type II and one ATA card slots are provided. The slot closest to the screen is reserved for the ATA card. All three card slots have guides, but the empty bay at the back does not. There is no blockage between any of the slots, so any pair of Type II bays can accommodate a Type III card.

Refer to the *6110 Hand-Held Computer User's Guide* for additional information about installing, using, and removing PC Cards at *\docs\pdf\6110ug.pdf* on the *Win95 Toolkit* CD.

ATA is the only media from which the 6110 Computer can boot.

" NOTE: *To boot to the 6110 Computer, you must have an ATA card in slot C.*

Figure 1-5 shows a top view of the 6110 Computer, with the display facing down. Note the available PC Card slots. The card should face away from the screen when inserted into the slot.

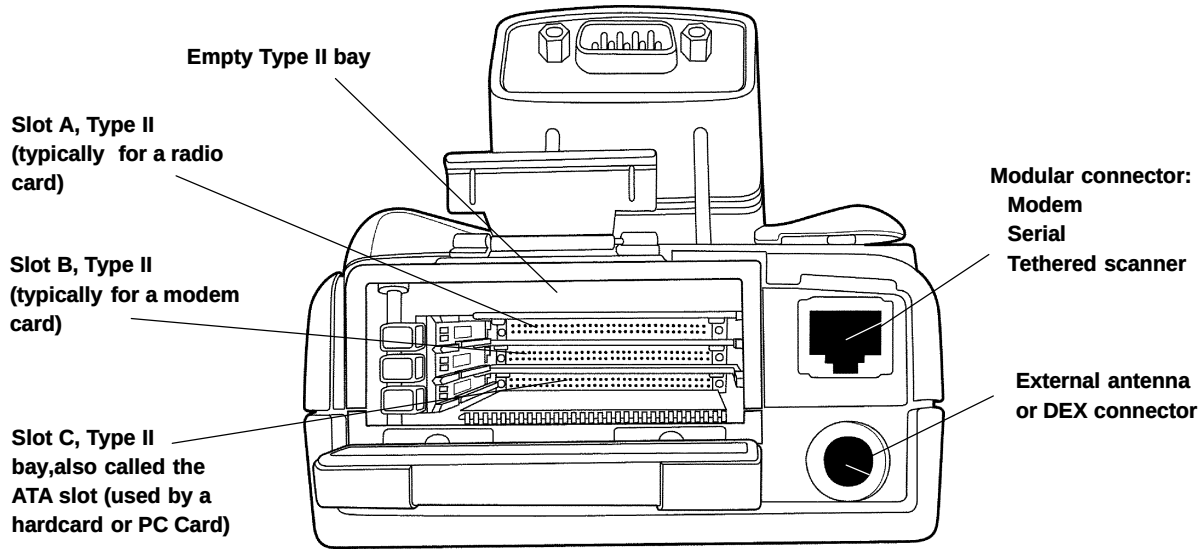


Figure 1-5
Location of PC Card Drives

" NOTE: *Cards that conform to the PC Card interface standard (the new standard), or the PCMCIA interface standard (the old standard), are commonly referred to as: "PC Card", or "PC Card xxxxx" (where xxxxx consists of "modem," "drive," or other device type). This is because "PC Card" is rapidly becoming the accepted industry term for a storage medium that conforms to these standards.*

Hardware Ports

The 6110 Computer contains a variety of ports:

- A serial port, making connection through the dock, using CMOS logic levels.
- A serial radio, dedicated for use with a card that is the same form factor as a PC Card but does not use the PC Card interface.
- An Infrared port for wireless communication with peripherals.

Some are compatible with the PC Card standard, as PC Card slots.

Refer to the 6110PORT.HTM file, in the *\docs* folder on the Win95 Toolkit CD, for additional information.

Port Replicator

In addition to the standard ports located on this computer, the port replicator is an optional attachment you can purchase. It plugs into the bottom of the hand-held computer, greatly increasing the functionality and providing the capability to develop applications more easily. The following connections are provided:

- **Power jack**
  Allows connection of wall charger to power unit
- **PS/2 keyboard connector**
  Standard connection for PS/2 style keyboard and PS/2 mouse
- **DB-9 serial port**
  An RS-232 port addressed as COM1, supporting the RXD, TXD, RTS, CTS, and GND signals; DTR is looped back to DSR and DCD; RI is not connected
- **Wireless antenna connection**
  A standard TNC connector that connects a remote antenna to the integrated radio of the 6110 Computer.
- **Pass through Industry standard IrDA interface**
  Infrared signals are not obstructed; they pass through the port replicator.

The Port Replicator slides onto the computer as shown in Figure 1-6.

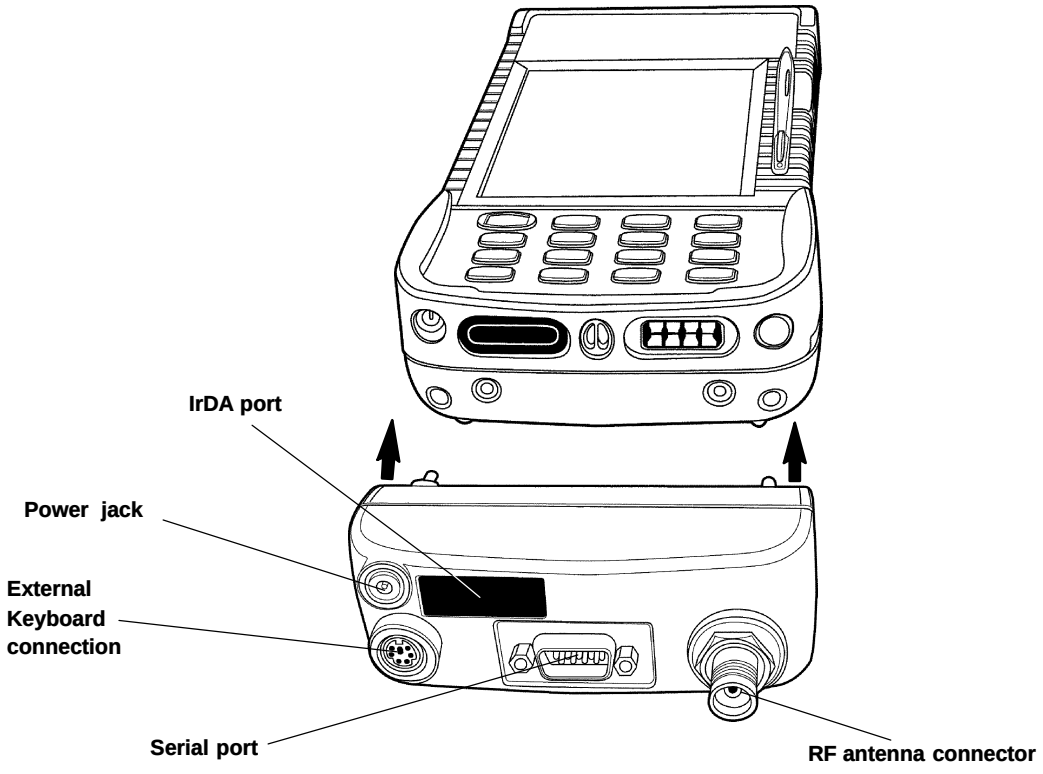


Figure 1-6
Port Replicator

Printers

The 6110 Computer supports tethered and IrDA printing. NORAND® Portable Communications Protocol (NPCP) printing is supported only if you use our NPCP printing toolkit. For detailed information about installing and printing with the 6110 Computer, refer to the *Windows 95 Support* section and the *DOS Device Driver Support* section of this publication.

Scanners

The 6110 Computer supports a variety of optional scanning methods:

- Internal scanning
- Serial pod for external scanning
- Magnetic Stripe Reader (MSR)

The figures on the following pages show the locations of each of the scanners and where they connect to the 6110 Computer. For example, refer to Figure 1-8, page 1-3, for the serial pod. Figure 1-9, page 1-15 shows the location of the Magnetic Stripe Reader.

Refer to the *6110 Hand-Held Computer User's Guide*, which can be viewed in the *\docs\pdf\6110ug.pdf* folder, on the *Win95 Toolkit* CD for additional information about scanning.

Internal Scanner

The 6110 Computer supports an optional internal laser scanner. This high performance scanner uses a laser diode operating at nominal wavelength of 670 nm, resulting in a visible red beam to aid in aiming the unit.

WARNING: ***Do not point the scanner at someone's eyes or look directly into it when scanning.***

AVERTISSEMENT: Ne regardez pas la fenêtre du scanner lorsque vous effectuez une scannérisation. Ne pointez jamais le rayon laser vers les yeux de quelqu'un.

The scanner's 16-bit microprocessor delivers quick decoding of the following symbologies:

- UPC/EAN
- Interleaved 2 of 5
- Discrete 2 of 5
- Codabar
- UCC/EAN 128
- TriOptic Code 39
- Code 39
- Code 93
- USS-128
- MSI
- ISBT-128

Intermec provides scanner device drivers for all supported operating systems.

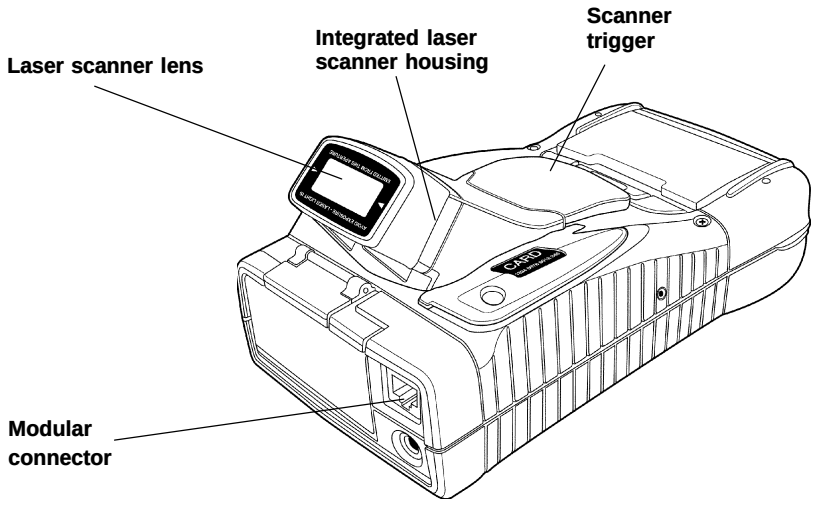


Figure 1-7
Integrated Scanner Pod

Serial Pod

The serial pod provides a standard 9-pin serial port on a standard D-sub PC style connector. As a software configuration option, +5 volts of power can be provided on pin 9 (the Ring Indicator pin). This option powers external devices. However, the tethered scanners connects into the modular connector.

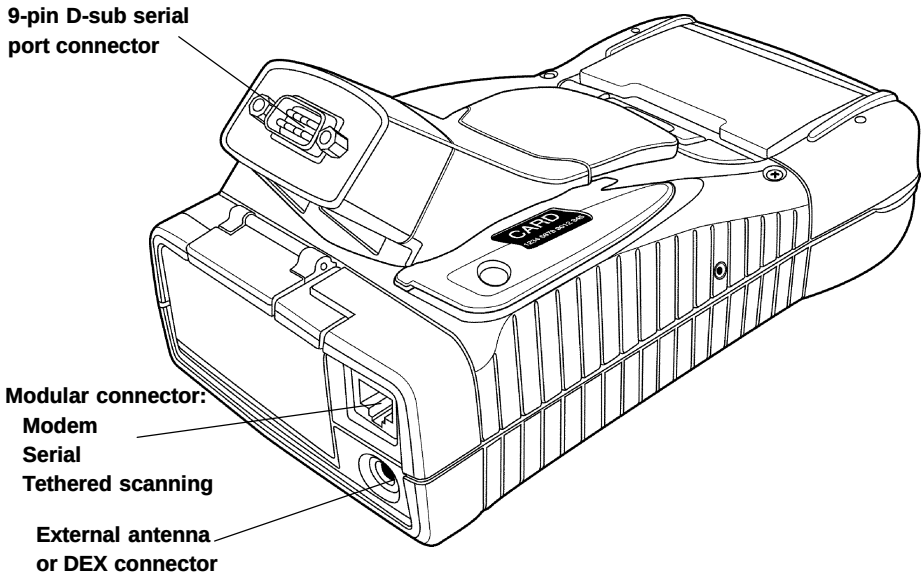


Figure 1-8
Serial Pod

B CAUTION: Pin 9 on the D-sub serial port connector is a power output pin from the 6110 Computer. Some devices may use pin 9 as a ring indicator signal and could be damaged by the power output on that pin. Before connecting any device to this connector, make certain the device is modified appropriately, thus preventing damage to the device.

Magnetic Stripe Reader

The Magnetic Stripe Reader (MSR) is an optional attachment for your 6110 Computer. MSR reads debit, credit, and airline formats, and supports bidirectional scanning on all three tracks, as defined by the ANSI standards, the American National Standards Institute x4.16-1983 specification and the International Standards Organization 7811/2-1985 specification.

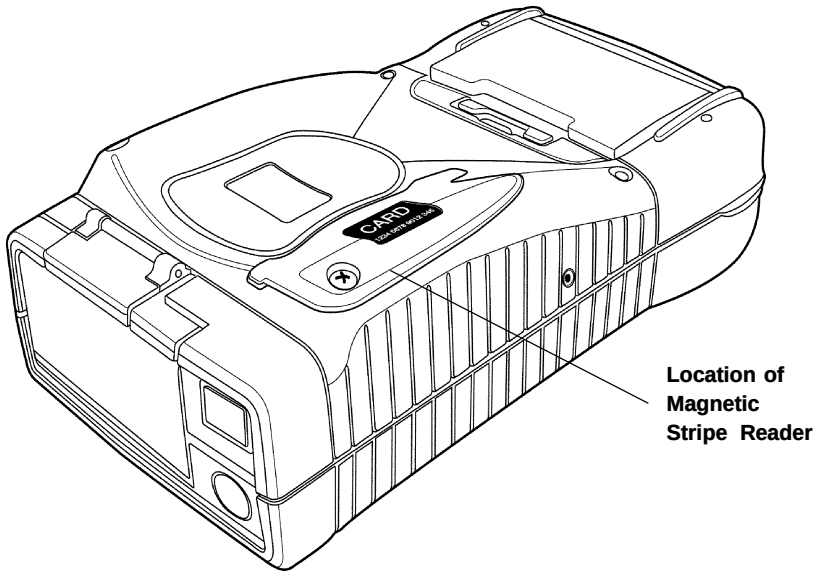


Figure 1-9
Magnetic Stripe Reader

Intermec provides device drivers for all supported operating systems.

Power Management

Advanced Power Management (APM) software is implemented to coordinate power-saving operations between applications and the hardware. The APM code detects periods of inactivity and lowers power consumption by progressively reducing the clock speed of the processor, shutting down unused components, and finally suspending the unit. The APM software is responsible for handling suspend/resume requests by way of the I/O key and notifies the system software when suspend/resume events occur.

The components automatically power-managed include the following:

- Processor
- LCD and Keypad Backlights
- LCD Screen
- PC Cards (*see note on page 1-10*)
- Integrated and Tethered Scanners
- Magnetic Card Stripe Reader
- RS-485 and RS-232 Ports

Device drivers and applications can dynamically modify APM behavior through APM function calls, or you can modify certain configuration files to establish default power management.

System BIOS

Overview

The 6110 BIOS is an implementation of the PC compatible BIOS with added features specific to INTERMEC® hand-held computers. The BIOS performs power-on tests, system configuration (including elements of Plug and Play), low-level power management, and run-time real-mode interrupt service handling.

During the power-on sequence, the 6110 BIOS performs a Power-On Self-Test (POST), which checks all system components and configures them in preparation for booting the operating system. The system then boots from an installed ATA card.

Storage for the system BIOS is provided by 512 KB of flash memory which is field programmable. This flash memory does not store any other system software or application programs.

Updating BIOS

The BIOS may occasionally need updating. Any of the following methods may be used for flash updates:

- PC Card memory (if installed)

  To update the BIOS place the 6110FLSH.EXE file on an ATA card and execute it from DOS.
- Serial interfaces (through dock or pod) RS-232, RS-485
- PC Card radio (if installed)

NOTE: *The 6110 Computer **must be on charge** for the reflash process to begin.*

When the BIOS version is displayed on boot up, it appears similar to the following:

```
AM486 SC400 Rev x.x
6110 PIC Micro Vxx
6110FLSH Vx.xx

Testing XMS Memory
31744 KB Extended
SC400 APM BIOS vx.xx
6110 PnP BIOS vx.xx
```

Refer to *\docs\autoexec.txt* on the *Win95 Toolkit* CD for additional information about BIOS and updating flash.

Support Available

As you pursue your development activity for this computer, you can obtain information and personal assistance from various resources at Intermec.

" NOTE: *Other related information is available from third-party suppliers. Some of these sources are identified in the Open Systems Publications section of this publication.*

Customer Response Center

For additional technical support, contact the Customer Response Center at 1-800-755-5505, if you have direct dial, long distance access to US. Otherwise, (425) 356–1799 provides phone support outside North America (US and Canada).

If you have any questions relating to application development, contact the Customer Response Center (CRC) for personal consultation.

You can also use the following e-mail address to contact the CRC with a problem or question:

crc@norand.com.

Be sure to include the following information in your message:

- Your name
- Your company name
- Your company address
- Phone number and e-mail address, where you (or your customer) can be contacted
- Problem description/question (be as specific as possible)

Also, if the equipment was purchased through a VAR, please include information about that VAR.

Bulletin Board

The Customer Support Bulletin Board, provided by Intermec, is a source for additional software and documentation:

- Phone number: 1-319-369-3515 or 1-319-369-3516.
- Protocol: Full duplex, ANSI or ANSI-BBS; 300 to 14,400 bps; v.32bis; 8 bits, no parity, 1 stop bit. If you are using a high-speed modem, disable XON/XOFF and enable RTS/CTS.
- If you are signing on for the first time, type “New” and follow instructions. The BBS takes you through a new-user sign-up procedure.

This Bulletin Board can also be accessed from the Internet, by pointing your web browser to the following Internet address: **http://norbbs.norand.com/**

This takes you to the Intermec *Technical Support Bulletin Board*. From there, you can choose the *Developer Support Information Center,* and follow instructions to log on.

Worldgroup BBS software also provides a method to access the BBS.

Section 2

6110 Windows 95 Toolkit

Overview

▪ **NOTE:** *Hereafter, the following terms are used in this publication for consistency:*
"CAB files" refers to the files on the cabinet files card (.CAB extension)
"Cabinet Files card" refers to a PC Card containing CAB files)
"PC" refers to your desktop or laptop computer
"PC Card" refers to an ATA flash card
"hardcard" is a common term for a spinning media hard drive card
*Refer to the **Glossary** section of this publication for definitions of these and other terms.*

The Windows 95 Toolkit from Intermec Technologies Corporation supplies Windows 95 operating system components for use on 6110 Computers. The Toolkit, which is provided on a CD-ROM disc, provides a way to install a Windows 95 configuration onto a PC Card. The 6110 Computer will boot the configuration from this card if it is inserted in the unit and the unit is reset. Various Windows 95 configurations are provided by the Toolkit, allowing the use of different sized PC Cards. Larger configurations contain a greater number of Windows 95 components, whereas the smaller configurations contain only the core components. You may customize the configuration by adding or removing components before or during the installation of desired applications.

The following is provided on the 6110 Windows 95 Toolkit CD-ROM:

- A selection of Windows 95 configurations for the 6110 Computer
- Intermec® product-specific device drivers for Windows 95
- Documentation for the 6110 Computer (including the *6110 Hand-Held Computer User's Guide*, this *Technical Reference*, and other documentation). To view this documentation, use either the "Viewing Technical Documentation" feature of the 6110 Windows 95 Installation program (described on page 2-19) or the Windows desktop to access the CD-ROM drive, as follows:

  1. Double-click the **My Computer** or the **Windows Explorer** icon.
  2. Right-click the 6110 Toolkit CD-ROM drive and select **Open** from the popup menu for a list of folders.
     (Be careful when clicking on the CD-ROM drive icon. Double-clicking causes the Installation program to run).
  3. Double-click the appropriate folder to find the desired file.

Minimum Requirements

To Run the Windows 95 Toolkit

You need a PC with one CD-ROM drive and one or more PC Card slots.

- If you DO NOT need to use compression to install Windows 95 onto a PC Card, you can use any version of Windows 95 or Windows 98.
- To install onto a compressed PC Card, you need either: Windows 95 OSR1 (original OS, version 4.00.950a) and Microsoft Plus!
  or, Windows 95 OSR2, Version 4.00.950b, or later.

NOTE: *Currently, the only operating system supported at the initial release is OSR2.*

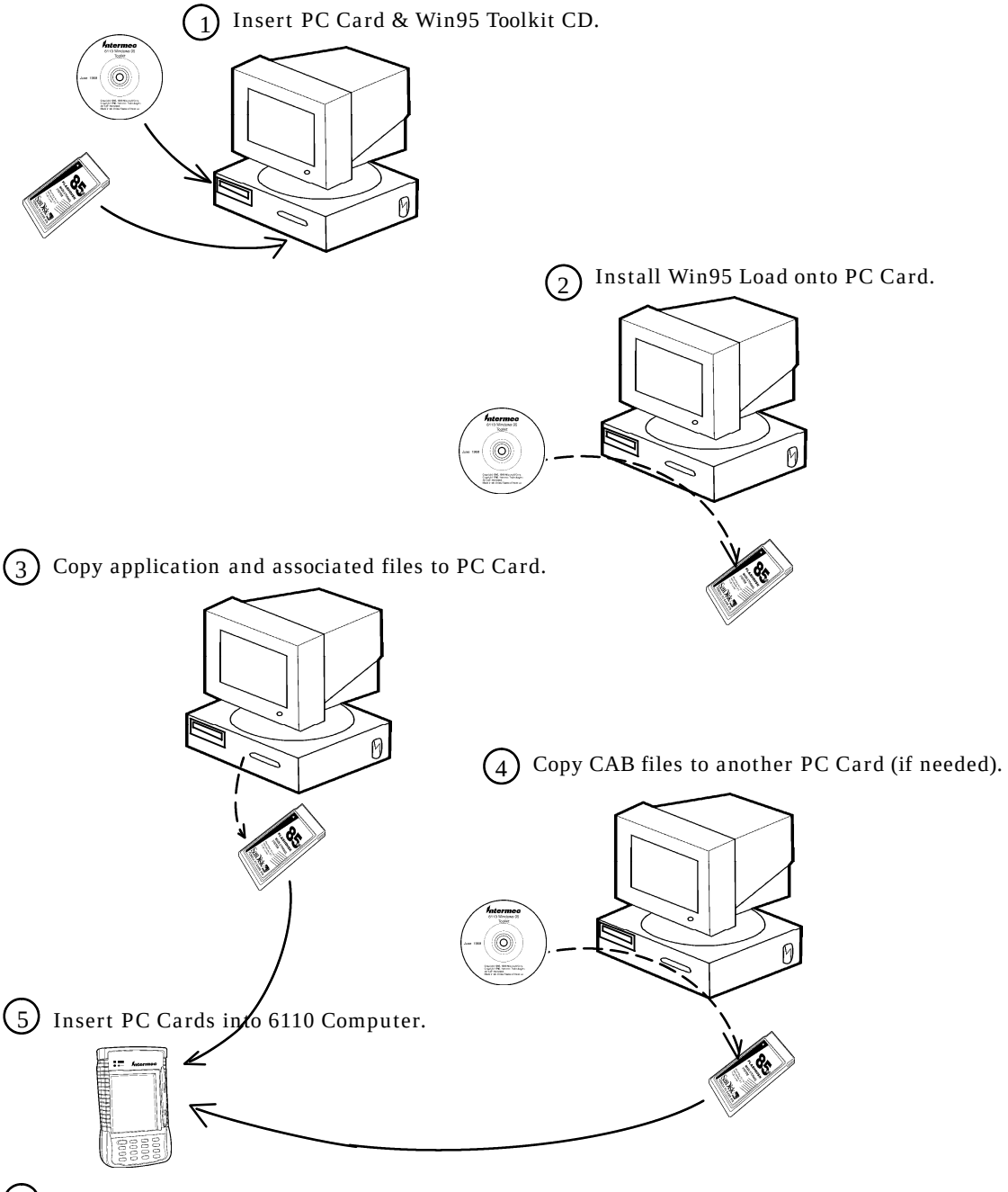
To Install Windows 95 onto the 6110 Computer

The basic requirements for installing Windows 95 are as follows:

- At least one 6110 Computer.
- One PC Card (per computer) that holds the Windows 95 operating system, your application, and all other desired accessory files.
- One PC Card to hold the Windows 95 CAB files and all files used to install the application on the 6110 Computer.

Creating Windows 95 Image for 6110

Overview



6 Reset the 6110 Computer, begin installing your application, setup Windows 95, and install any additional devices (as described below).

7 Remove CAB files, since they are no longer needed.

Step-by-Step Installation (Win95 to 6110 Computer)

The following steps are required to install Windows 95 onto your 6110 Computer using the Win95 Toolkit. Additional details are provided later in this section, including hints concerning the safe removal of PC Cards.

1. Insert a PC Card into the PC Card drive on your PC (to become 6110 boot card). Then insert the Win95 Toolkit CD into the first CD-ROM drive on your PC. The toolkit should autorun.

" NOTE: *If your auto-install feature is not activated, double-click the 6110 Toolkit CD-ROM icon using **My Computer**, or use **Windows Explorer** and double-click **AUTORUN.EXE** on the 6110 Toolkit CD-ROM drive.*

2. Install a preconfigured Windows 95 configuration to the PC Card, using the Win95 Toolkit.
3. Copy your application and all associated files to the PC Card.
4. If you chose a smaller than Full load (which means you might need additional Win95 files), then copy the CAB files to your PC Card (or to another PC Card) using the toolkit.
5. Remove both PC Cards from your PC (the PC no longer needs to be involved with the installation). Insert the 6110 boot card into the PC Card slot in your 6110 Computer.

" NOTE: *We recommend using a dock with a keyboard to navigate around the 6110 Computer.*

6. Reset the 6110 Computer to boot up to the Win95 PC Card and enter the Win95 license information. Begin installing your application using the setup instructions for your application.
7. Install any additional Windows 95 features such as: dial-up networking, using **Start → Settings → Control Panel → Add/Remove Programs**.
8. Insert any required PC Card devices such as a radio or modem, then allow Windows 95 to auto-detect it and install the appropriate drivers.
9. Remove the PC Card containing the application setup files.

" NOTE: *If you are asked to insert the Windows 95 CD during the installation to your 6110 Computer, insert the CAB files PC Card and supply the path to the CAB folder on your PC Card. When complete, if the CAB files are on the 6110 boot card, you can delete the CAB files to provide extra working space for the application.*

If you are installing two PC Card devices (such as a radio and GPS), you need a Lite or Full Win95 configuration and the CAB files on one PC Card.

" NOTE: *To put a Windows 95 configuration and the CAB files (approximately 47 MB) on the same PC Card, you must first install the desired Win95 configuration, then manually copy the CAB files to your PC Card. Use **My Computer** or **Windows Explorer** to locate the CAB files in the* \Win95\cabs *folder on the Win95 CD-ROM drive.*

Windows 95 Configurations

Overview

The Windows 95 Toolkit provides different configurations of the Windows 95 operating system and utilizes different sizes of hardcard and PC Card storage media. Smaller configurations contain the same core components necessary to boot the operating system as the larger configurations, but many of the optional utilities and drivers are removed to reduce the required storage space. When you write applications that use these optional components, you may need to add them to a configuration at the expense of increasing the required storage space. The application itself with a corresponding database, along with that needed for running Windows 95, adds to the storage needed. When determining the proper size of the storage media, you must account for all the above requirements.

In some cases, the storage required exceeds the space available on the chosen storage media. Rewriting the application to utilize space more efficiently and reducing the information in the database are effective means of reducing storage requirements. Applications may use code libraries or contain a large amount of graphics resulting in large file sizes. When programming for size, it is better to minimize the use of higher-level libraries, graphical controls, redundant data records and the like, unless absolutely necessary.

A typical full Windows 95 configuration consumes approximately 120 MB of disk space. Hardcards of sizes greater than 240 MB are very usable in the 6110 Computer, but some may fail to meet the rugged requirements of a portable hand-held computer. An alternative to the somewhat fragile hardcard storage is the solid state PC Card. These cards are compact and durable. If the storage sizes you want to work with are far less than that required for the full Windows 95 configuration, there are other options. PC Cards, available from Intermec, can be used uncompressed for smaller configurations, but hold almost double that if compressed. Refer to the *Media Types* paragraph below, for details.

" NOTE: *Some PC Cards require Microsoft Drivespace 3 disk compression for the Windows 95 image to fit onto the card.*

Media Types

The 6110 Windows 95 Toolkit installation provides several preconfigured Windows 95 configurations that can be transferred to PC Cards for the 6110 Computer. Or you can purchase preloaded media types from Intermec containing preconfigured Windows 95 configurations.

" NOTE: *Regardless of the Windows 95 configurations and media listed in this publication, Intermec reserves the right to add, remove, or make changes to the availability and contents of these items, at any future release.*

SanDisk PC Cards

Table 2-1 lists the Windows 95 configurations that can be transferred to PC Cards or hardcards, using the 6110 Windows 95 Toolkit.

Table 2-1
Toolkit Preconfigured Loads for PC Cards

Win95 Configuration	20 MB	40 MB	85 MB	110 MB	175 MB	160-500 MB
Minimal	C or Ub	C	C	U or C	U or C	U
Lite		C	C	U or C	U or C	U
CAB Files			U	U	U	U
Full				C	U or C	U

Note: *"U" = Uncompressed; "C" = Compressed; blank = Not Available*
"b" = Baseload only

Table 2-2 lists the pre-loaded Windows 95 configurations that are available on PC Cards, by ordering from Intermec.

Table 2-2
Factory Preconfigued PC Card Loads

Win95 Configuration	20 MB	40 MB	85 MB
Lite		C	C
CAB Files			U
Full			

Note: *"U" = Uncompressed; "C" = Compressed; blank = Not Available*

Hardcard (Spinning Media)

A full Windows 95 configuration, is available on a hardcard. This is typical for the application development phase for the 6110 Computer. The Full Windows 95 configuration consumes approximately 120 MB of space, leaving ample space for your application and virtual memory (if enabled).

Using the 260 MB hardcard should leave approximately 200 MB of free space after installation of the Windows 95 configuration, and the 340 MB hardcard should leave approximately 220 MB.

Table 2-3 lists the pre-loaded Windows 95 configurations that are available on hardcards, by ordering from Intermec.

Table 2-3
Factory Preconfigued Hardcard Loads

Win95 Configuration	260 MB	340 MB
Full	U	U
CAB Files	U	U

Note: *"U" = Uncompressed*

Available Configurations

Full Windows 95 Configuration

This is everything Microsoft intended in a Windows 95 configuration. When you install a full Windows 95 configuration, use a storage card that is greater than 130 MB (formatted), since the full installation requires at least 120 MB of space. The full Windows 95 configuration contains all the CAB files, so that additional components can be added without the Windows 95 CD. The CAB files are located in the *\WIN95* folder on the Win95 Toolkit CD, and consume almost 40 MB of drive space. Once the system has been configured and your application is running, these files can be deleted. However if deleted, they need to be reinstated for any future modification of your Windows 95 configuration.

Lite Windows 95 Configurations

There are two Lite configurations, which are stripped down versions of the Full load, but provide most of the accessory components needed for applications to install and run, without a substantial application integration effort. Only certain utilities and accessories are omitted. Most third-party Internet software has been removed, as well as Windows 95 accessory applets (such as ISP setup utilities, MS Paint, screen saver images, games, help files, and multimedia files). The main difference between the two Lite configurations is that RS-485 networking has been omitted from Lite I, while it is included in Lite II.

The Windows 95 CAB files are also eliminated from the Lite configurations. Installing other Windows 95 components requires an additional PC Card that contains the CAB files to be inserted into the 6110 Computer. You can create the Cabinet Files card, using the toolkit as described below.

A Lite Windows 95 configuration requires a PC Card with at least 50 MB (formatted), or about half that (with Drivespace 3 compression). You can also use a hardcard.

Be aware that if you choose this configuration, you do not have all the features and software configurations that a standard PC provides. It may be necessary to add additional Windows 95 functionality to the Lite load.

Windows 95 Cabinet Files Card

The Cabinet Files card is not a bootable card for the 6110 Computer, but is a supplemental card for the Lite and Minimal configurations. It contains the cabinet files that are required to install additional Windows 95 components. There are approximately 30 CAB files, which are compressed files containing various application files, text files, drivers, and many other components that make up Windows 95.

When additional components are needed (for example, dial-up networking), the additional files are extracted from the appropriate CAB files. If the CAB files are not found on the system, Windows prompts you to insert the Windows 95 CD-ROM. Instead, you should insert the Cabinet Files card into a 6110 PC card slot. Once the desired features have been installed, the Cabinet Files card can be removed from the unit. This option requires an 85 MB or larger PC Card.

Minimal Windows 95 Configurations

" NOTE: *IMPORTANT: None of the Minimal loads are supported by Intermec. They are supplied as example code only. Use at your own risk. These instructions and utilities should only be used if you are highly skilled in configuring Windows 95 systems. Configuring your system with the minimum Windows 95 utilities is **VERY** effort-intensive.*

The Minimal Windows 95 configurations are smaller because certain optional Windows 95 components are removed. Be aware that if you choose these smaller configurations, you do not have all the features and software configurations that a standard PC provides. Therefore, it may be necessary to add additional Windows 95 functionality to the Minimal or Lite load.

Windows is a fairly complex and intertwined operating system compared to DOS. Reducing its size below 80 MB and making it scalable at that level is an operation that Microsoft never intended. It is expected that if you install an application into a smaller than normal Windows 95 configuration, you will most likely see error messages issued, or your application does not run, all because of missing files. A Minimal load is approximately 23 MB. After removing the INF and CAB files, it is reduced to approximately 16 MB. However, you should consider the Lite load, since it is only slightly larger and provides you with a more practical configuration (see ***Lite Windows 95 Configurations*** above).

Utilities are provided in the Windows 95 Toolkit to assist you with the integration of custom applications into the Minimal Windows 95 configuration. These utilities monitor file accesses while the application is running, then generate lists of files that may be needed from the full Windows 95 installation, for an application to run successfully. Any files found to be missing can then copied into your Minimal configuration from the CAB Files found in the Cabinet Files card.

The instructions to perform a Minimal Windows 95 configuration and to use the toolkit integration utilities are located in ***Appendix B, Advanced Utilities***.

Windows 95 Installation Program

" NOTE: *If you have more than one CD ROM drive on your PC, please insert the Windows 95 Toolkit CD into the CD ROM drive that is alphabetically first, since the Win95 Install program always accesses files on the first CD ROM drive it finds.*

When you insert the Windows 95 Toolkit CD into your CD ROM drive, the Win95 Install program should run automatically. If it does not, then your auto-install feature is most likely disabled.

" NOTE: *If your auto-install feature is not activated, double-click the 6110 Toolkit CD-ROM icon using **My Computer**, or use **Windows Explorer** and double-click **AUTORUN.EXE** on the 6110 Toolkit CD-ROM drive.*

When the following Screen is displayed, it provides these choices:

- **Install Windows 95 onto PC Card** — Refer to the *Starting the Windows 95 Installation* paragraph, on page 2-10, for details.
- **View 6110 Technical Documentation** — Refer to the *Viewing Technical Documentation* paragraph, on page 2-19, for details.
- **Exit** — This terminates the Windows 95 Toolkit Installation.
- **View Release Notes** — A list of issues and notes relating to the preliminary nature of this release.

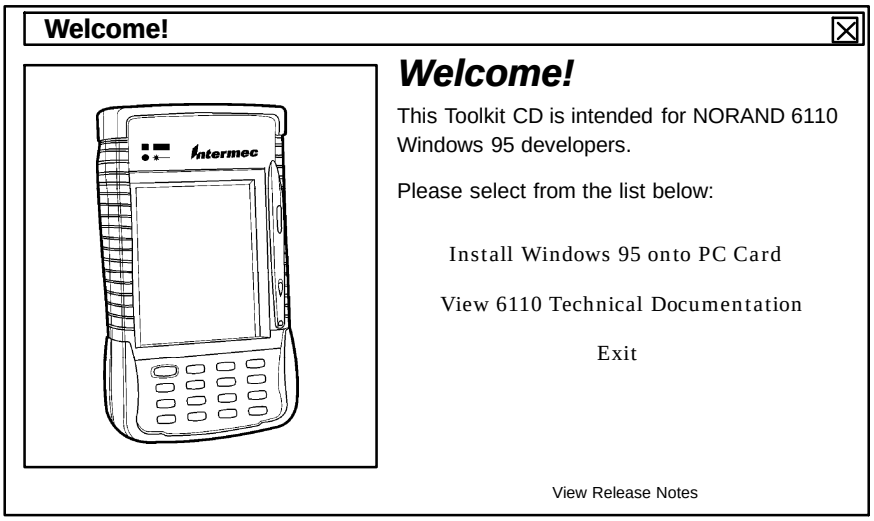


Figure 2-1
Windows 95 Toolkit Welcome screen

The Win95 Install program provides you with options to choose from several Windows 95 configurations.

Starting the Windows 95 Installation

If you select the ***Install Windows 95 onto PC Card*** option from the *Windows 95 Toolkit Welcome* screen above, the following screen (Figure 2-2) should be displayed. However, if you see a small dialog window telling you "*Drivespace 3 was not found in the Windows directory of this PC*" then you need to install that feature as described in the *Windows 95 Support section* on page 3-17.

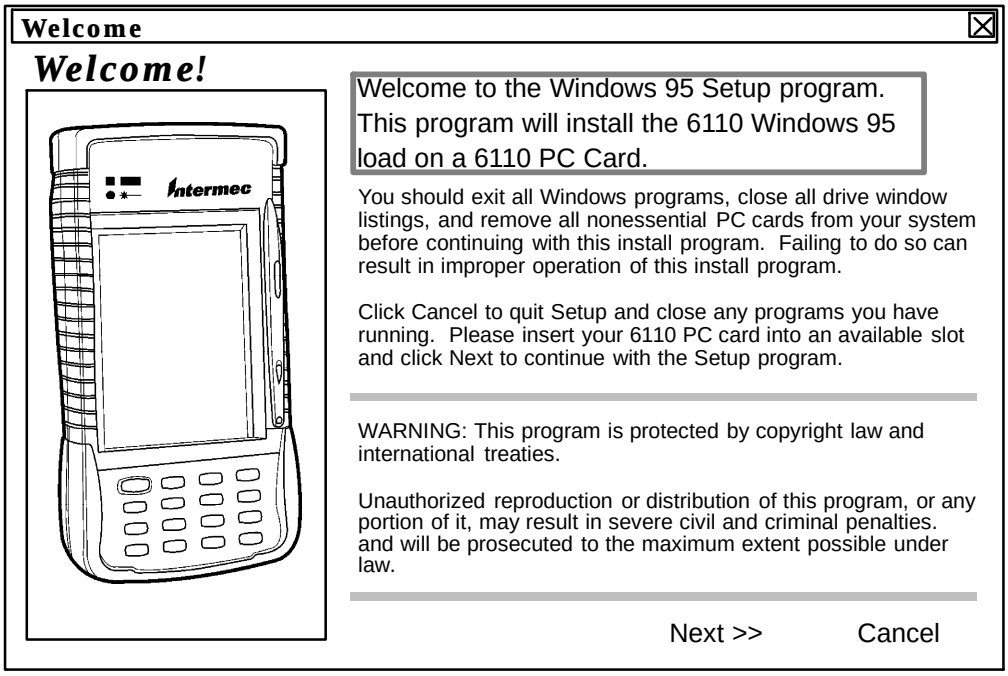


Figure 2-2
Install Windows 95 Information screen

" NOTE: *You should insert the PC Card into the PC before you go to the next screen. Even though the Win95 Install program provides a means for you to insert it at the **No Standard PC Card Detected** screen (Figure 2-4), it results in a few extra steps if you wait until you reach that screen.*

When you are ready to continue with the installation, click the **Next** button.

If you have a network drive mapped (alphabetically) before the PC Card drive, a message box may be displayed informing you that:

- There was a network drive detected. The Windows mapping of PC Card drive letters and network drive letters can cause problems with the Win95 Install program.
- There is a bug in Windows 95 where network mapped drives can prevent your PC Card drives from being formatted through a DOS window.

However, there is a good probability of completing the installation of Windows 95 on your PC Card. Click **OK** to continue. If you are installing to a hardcard you will experience formatting problems. Please use a PC without network drive mapping software installed.

If a hardcard is detected, you are prompted to decide whether to use that PC Card as the destination drive for the Windows 95 installation. If you click the **Yes** button, the next screen displayed is shown in Figure 2-5 on page 2-12.

If a PC Card is installed and the Win95 Install program detects the card, the next screen displayed is similar to Figure 2-3 below, where "xx" is the number of megabytes and "X" is the drive letter. Click **OK** to continue.

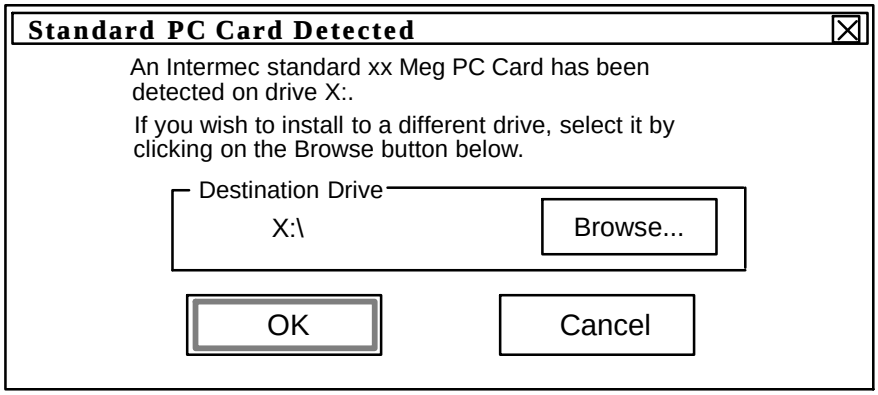


Figure 2-3
Standard PC Card Detected

However, if the setup program does not identify a PC Card in your PC, Figure 2-4 is displayed.

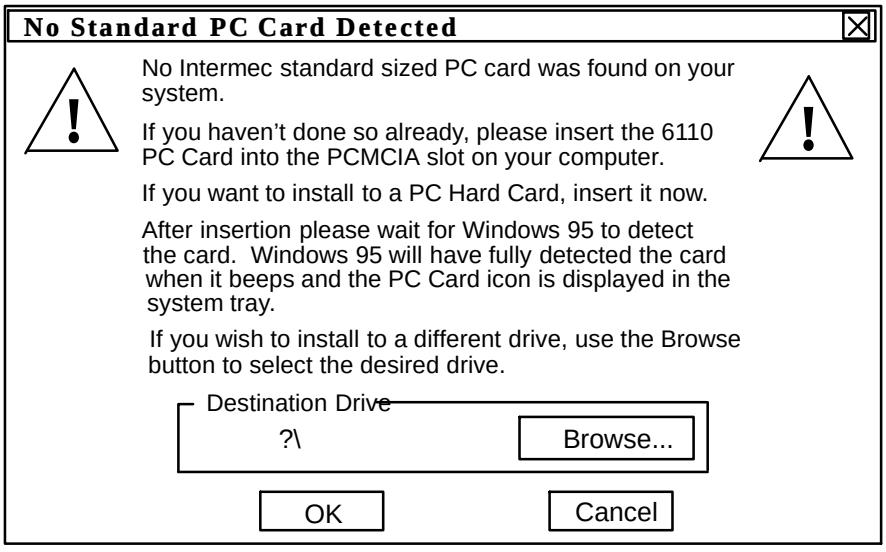


Figure 2-4
No Standard PC Card Detected

If the Win95 Install program did not detect a PC Card, then you need to insert a PC Card into the PC Card drive or click the **Browse** button, then select the appropriate drive. When you are satisfied that the drive you have chosen is appropriate, click the **OK** button.

Choosing the browse option may trigger a response that leads you through a set of screens to initialized that drive. Follow the instructions carefully. The Win95 Install program will use that drive for your Windows 95 installation.

In the screen depicted by Figure 2-5, the "X's" represent parameters for your PC Card. Check to see if the information in the box shown in this screen is correct, then click **Next**.

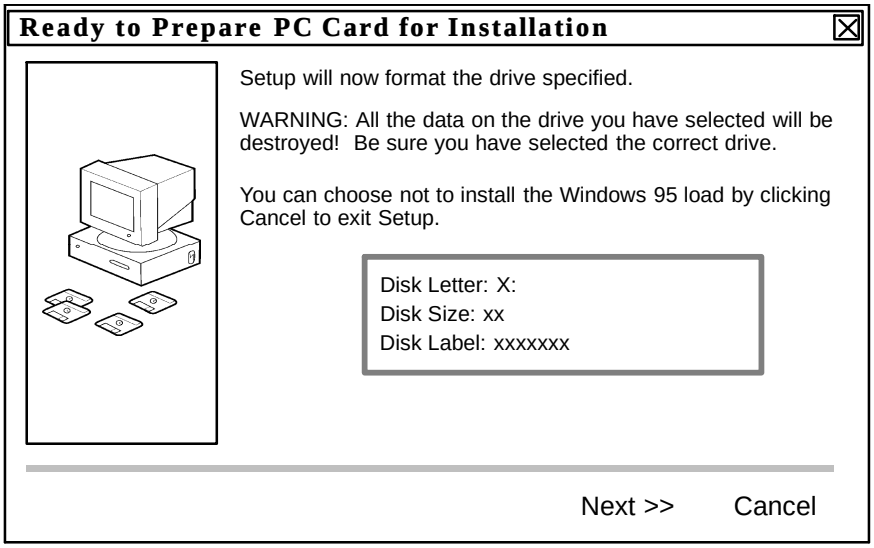


Figure 2-5
Prepare PC Card for Installation

If your PC Card contains a drivespace volume (compressed drive) you are informed that the install program is going to remove that volume. Click **OK**.

After the drivespace volume has been removed, you may be prompted to eject and reinsert the PC Card. Normally, you should "Stop the PC Card" as described on page 2-13. However, since the next operation is a format, you may simply remove and reinsert the PC Card.

" NOTE: *If a "blue screen" error message is displayed after removing the PC Card, just ignore it and press any key to continue. It is an invalid response from Windows 95. Then insert your PC Card again when prompted.*

Next, the Win95 Install program attempts to format your PC Card, using a DOS window. At the completion of this operation, the screen shown in Figure 2-6 is displayed.

If you have a hardcard, the Win95 Install program performs a Windows Format. However, if a network drive resides on your system, it may prohibit proper formatting of your hardcard. The DOS format should run for at least 15 seconds for smaller cards (much longer for larger cards).

" NOTE: *If the program jumps directly to the **6110 Windows Toolkit Images** screen (Figure 2-6) in a very short period of time, then the PC Card has **NOT** been formatted. This is a Microsoft Windows problem.*

If this problem exists, then you must run the Win95 Install program on a PC without a network drive, or close other applications or drive window listings that may be interfering (e.g., *Windows Explorer*).

Selecting a Windows 95 Configuration

When the Win95 Install program completes the PC Card preparation, you are presented with a choice of Windows 95 configurations, as shown in Figure 2-6.

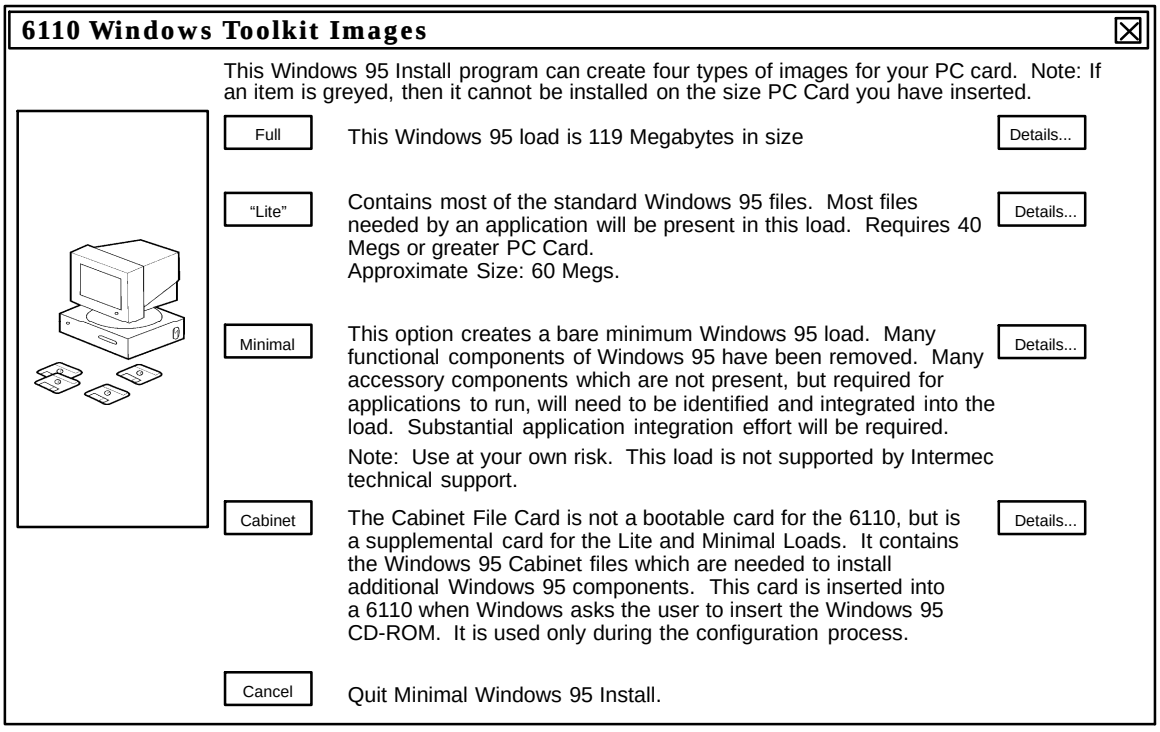


Figure 2-6
Select Windows 95 Configuration

Figure 2-6 provides you with the following choices. Some buttons are grayed-out if your PC Card is too small for certain configurations, indicating that you cannot make those choices. For example, with a 40 MB card, the **Full** and **Cabinet** buttons are grayed-out, therefore not allowing loads of that size.

To create a Windows 95 configuration, click on an active button.

- **Full** — Full Windows 95 Installation (consumes approx. 120 MB)
- **Lite** — Lite Windows 95 Installation (consumes approx. 60 MB)
- **Minimal** — Minimal Windows 95 Installation (consumes approx. 23 MB)
- **Cabinet** — Windows 95 Cabinet Files card Installation
- **Cancel** — Cancel Install — returns you to the main Welcome screen shown on page 2-9

The **Details** buttons provide additional information about each configuration.

Refer to the *Available Configurations* paragraph on page 2-7 for brief descriptions, or the *Installing Selected Windows 95 Configurations to PC Card* paragraph on page 2-14 for detailed installation instructions.

B CAUTION: **Whenever you are requested to "Stop the PC Card" you should follow instructions carefully. To stop the PC Card, click on the small PC Card icon (located in the System Tray) then on the message that pops up near that icon. Wait until the dialog box pops up, stating that you can safely remove your PC Card, before continuing (the "System Tray" is a recessed panel containing small icons and is located on the Task Bar at the opposite end from the Start button).**

Installing Selected Windows 95 Configuration to PC Card

Full Win95 Configuration

After selecting the ***Full Windows 95 Installation*** option from the *6110 Windows Toolkit Images* screen (shown on page 2-13), you are ready to install the Full Windows 95 load, as shown in the following screen.

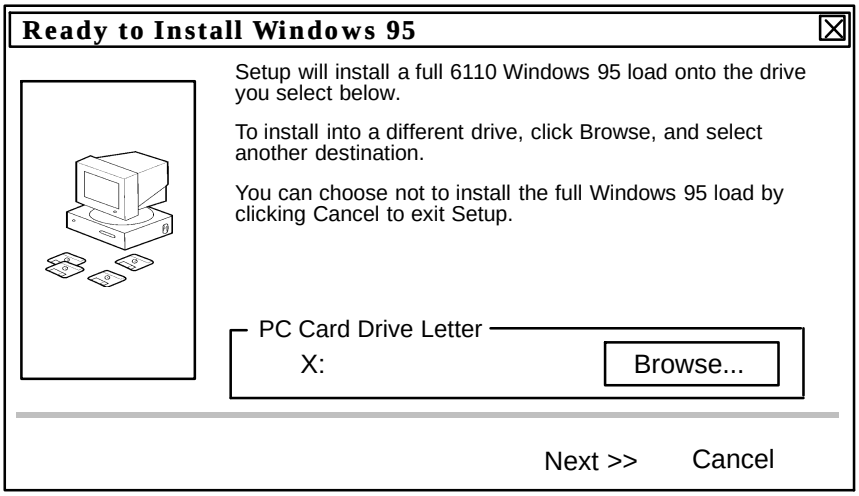


Figure 2-7
Ready to Install Full Win95 Configuration

After clicking the **Next** button, the installation begins. When completed, the screen (shown in Figure 2-8) is displayed telling you to stop the PC Card drive.

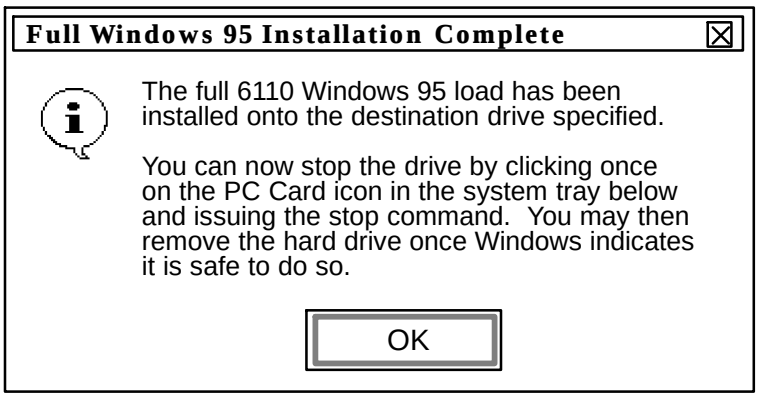


Figure 2-8
Installation Complete (full configuration)

Be sure to follow the instructions carefully. The "System Tray" is located on the Task Bar, at the opposite end from the **Start** button, and contains small icons including the PC Card icon (see page 2-13 for more detailed instructions on stopping the PC Card).

After installing the Full Win95 configuration onto your PC Card, you can reflash the 6110 Computer using the flash version that is on the CD as described on page 3-12, in the *Windows 95 Support* section of this publication.

Lite Win95 Configurations

After selecting the *Lite Windows 95 Installation* option from the *6110 Windows Toolkit Images* screen (shown on page 2-13) the following options screen is displayed.

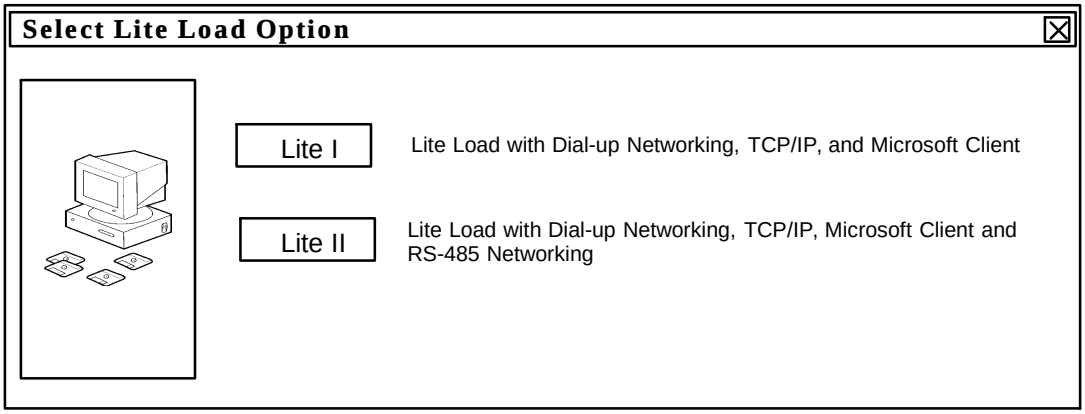


Figure 2-9
Select Lite Load Option

This option provides you with two choices. If you do not want RS-485 Networking, then choose the ***Lite I*** option. If you need RS-485 Networking, then choose the ***Lite II*** option.

If the size of your PC Card is too small (e.g., 40 MB) for this configuration to be installed uncompressed, you are prompted by the following dialog box. Otherwise, the screen shown in Figure 2-11 is displayed.

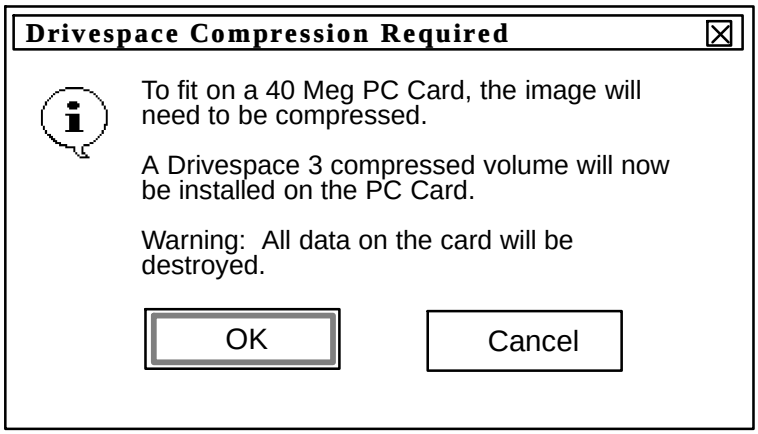


Figure 2-10
Ready to Install Lite Win95 Configuration

Click **OK** to continue. After the compressed volume is created, you are prompted to mount it. Follow the instructions shown below.

B CAUTION: **Do NOT click *Next* (in the following screen) until all the steps listed have been completed and the system recognizes that your PC Card has been reinserted (listen for the second double-beep).**

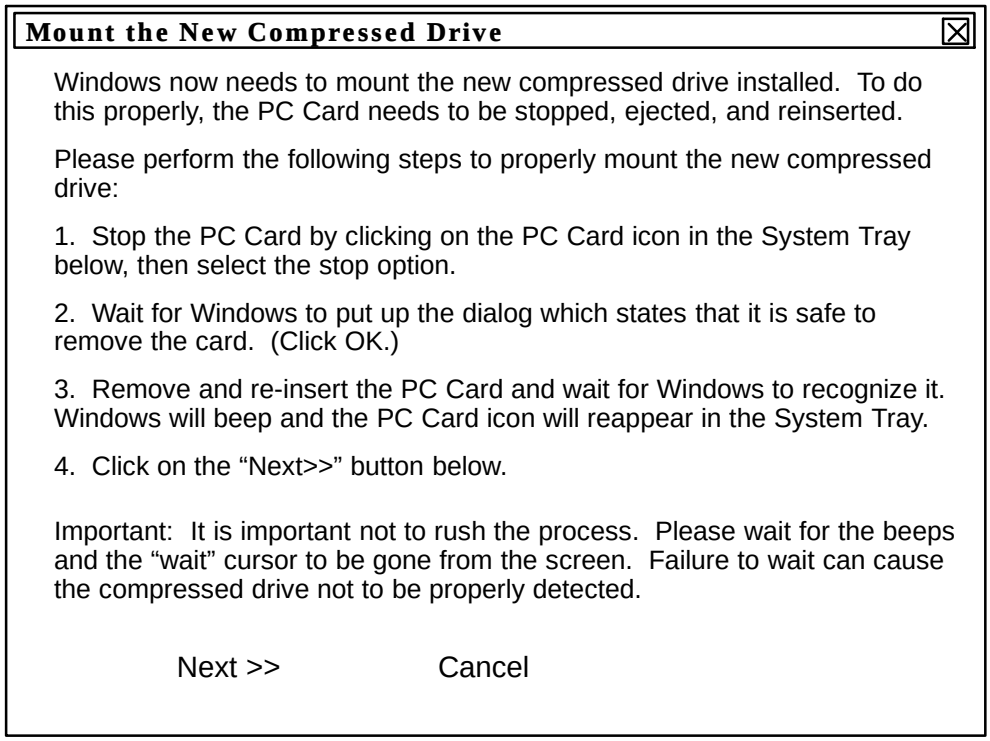


Figure 2-11
Mount the New Compressed Drive

The "System Tray" is a recessed panel containing small icons including the PC Card icon, and it is located on the Task Bar, at the opposite end from the **Start** button.

After stopping, removing, and reinserting the PC Card, click **Next** (see the caution on page 2-13 for more detailed instructions on stopping the PC Card).

After copying the image for the "Lite" load, a screen is displayed with options to install specific drivers.

- Internal Scanner Driver 30 k
- External Scanner Driver 32 k
- IrDA Install Program 1128 k
- Proxim RangeLan2 Install Program 821 k
- Intermec NPCP Printer Install Prog. 223 k
- Intermec 6805 Printer Driver 203 k
- Magnetic Stripe Reader Driver 77 k

Click the checkboxes to the left of each option you want. The *Disk Space Remaining* provides you with advance notice of the available space on your PC Card after copying these files. This number is updated as you select each option. Click **Next** to continue with the installation.

" NOTE: *These drivers are copied to your PC Card, but are not installed. To install them, follow the instructions for each driver, as described in the Windows 95 Support section.*

When complete, a dialog box pops up informing you about the .ALZ file. Click **OK**. The screen (shown below is displayed.

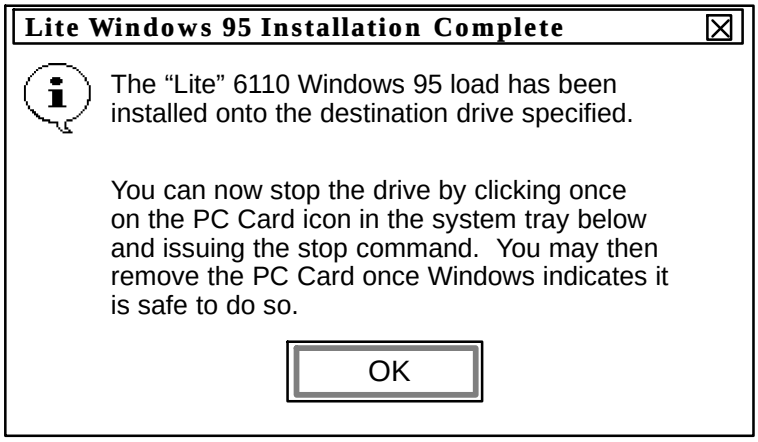


Figure 2-12
Installation Complete (Lite configuration)

Follow the instructions above and click **OK** (see page 2-13 for more detailed instructions on stopping the PC Card). You are then returned to the *Windows 95 Toolkit Welcome* screen, shown on page 2-9.

After installing the Lite configuration onto your PC Card, you can reflash the 6110 Computer using the flash version that is on the CD as described on page 3-12, in the *Windows 95 Support* section of this publication.

Win95 Cabinet Files Card

After selecting the ***Windows 95 Cabinet Files Card Installation*** option from the *Select Windows 95 Configuration* screen (shown on page 2-13), you are prompted with the following dialog box.

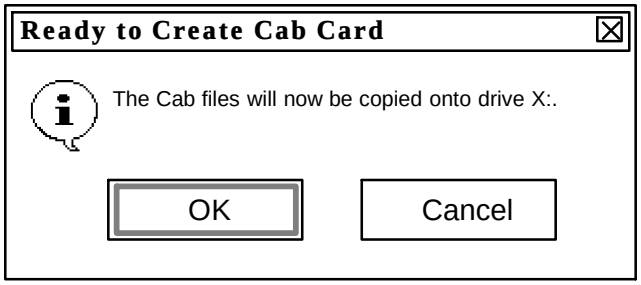


Figure 2-13
Ready to Install Win95 Cabinet Files Card

This option provides the necessary CAB files on an 85 MB PC Card. These files are necessary if you need to install any Windows 95 feature that was not originally included, or you can reinstall existing features.

After clicking **Next**, the screens take you through the installation. When complete, the screen (shown in Figure 2-14) is displayed.

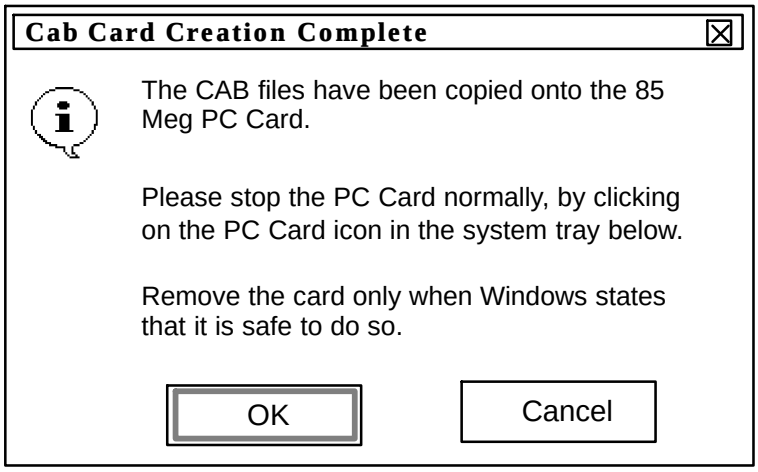


Figure 2-14
Installation Complete (CAB files)

Be sure to follow the instructions carefully. The “System Tray” is located on the Task Bar, at the opposite end from the **Start** button, and contains small icons including the PC Card icon (see page 2-13 for more detailed instructions on stopping the PC Card).

Viewing Technical Documentation

Choosing this option brings up your Internet browser and displays a default page with links to documentation on the Win95 Toolkit CD.

After the default page is displayed, you can view the *6110 User's Guide*, *6110 Technical Reference*, and *6110 Developer Notes* by clicking hot links on that page. If you type *\docs\index.htm* into the "Address" window of your browser, you see other hot links that lead directly to the files listed below:

6110DRVR.HTM	Descriptions of drivers and utilities
6110PORT.HTM	6110 COM port descriptions
6110DVTP.HTM	Development tips, including: what is recommended for development panning (how to use, enable, or disable panning) TCOM (why you might want to reset after TCOM)
6110FAQ.HTM	A collection of frequently asked questions
6110TROU.HTM	A set of helpful troubleshooting hints
6110LINK.HTM	A set of links to more useful information, such as: the Intermec web site the Intermec year 2000 policy (Y2K) the Mobile Systems Division bulletin board the Microsoft web site and other useful links

Even though the following files are available through links from the files listed above, you can view any file listed on this page by typing the filename into the "Address" window of your browser (be sure to preserve the pathname).

6110MISC.HTM	Links to: BIOS and System Software, Memory, Processor, Hardware, Ports, Peripherals, Operating System, PCMCIA, Development Tips, and 6110 FAQ
AUTOEXEC.TXT	A sample of the boot configuration file AUTOEXEC.BAT
6110DIFF.HTM	Differences between the 6100 and 6110 Computers
6110MINI.HTM	Description and example configuration for MINIDISP.DRV
6110PENA.HTM	A description of PENALIGN.EXE and how to use it
6110SC40.HTM	An example configuration file, SC400CFG.INI
6110ISSU.HTM	Outstanding issues for the 6110 Computer

Section 3

Windows 95 Support

This section contains installation and configuration of devices and peripherals, software utilities, and suggestions about Windows 95 and your 6110 Computer.

Topic Summary

" NOTE: *Hereafter, the following terms are used in this publication for consistency:*
"PC" refers to your desktop or laptop computer.
"PC Card" refers to an ATA flash card.
*Refer to the **Glossary** section of this publication for definitions of these and other terms.*

Throughout this section, there may be references to additional information included on the 6110 Win95 Toolkit CD. There are two methods to view this information:

- The **View Technical Documentation** feature of the Win95 Installation program, described in the **6110 Windows 95 Toolkit** section of this publication, provides easy access to documentation on the CD.
- From the Windows desktop, you can double-click on either the **Windows Explorer** or the **My Computer** icon. Right-click the 6110 Toolkit CD-ROM drive, then select **Open** from the popup menu for a list of folders.

" NOTE: ***Do not** double-click the 6110 Toolkit CD-ROM drive. This causes the Installation program to run.*

Pen Alignment: PENALIGN.EXE

The PenAlign application calibrates the pen for a specific hardware unit. This calibration gives the pen driver the information it needs, so that a position on the touch panel corresponds properly with that position on the display. In simple terms, this means the Windows cursor and the tip of the pen are aligned to the same location on the screen.

When the pen alignment process is complete, the calibration values are stored permanently with the hardware unit. Pen alignment should be necessary only once. On any subsequent use of the pointing device, the stored pen calibration values are used.

Starting PenAlign

From the Windows desktop, select **Start → Program → Pen Align** from the list of programs.

Using PenAlign

It is only necessary to run PenAlign the first time. A target (or crosshair) is displayed on the upper-left corner of the screen, as shown in Figure 3-1 below.

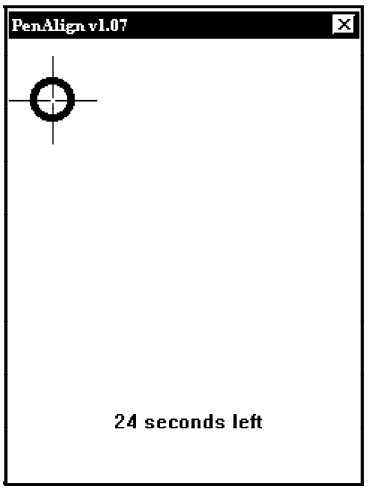


Figure 3-1
PenAlign Opening screen

Tap the pen firmly at the center of this target. You should hear a click and see two sets of x,y coordinate values display on the screen. Tap two more times in this same way at the center of this target.

After three taps on the target, the crosshair moves to the upper-right corner of the screen. Repeat the three taps as described above. Continue this process for the lower-left and lower-right corners of the screen.

After all four targets have been tapped three times, the fine-tune screen is displayed, as shown below.

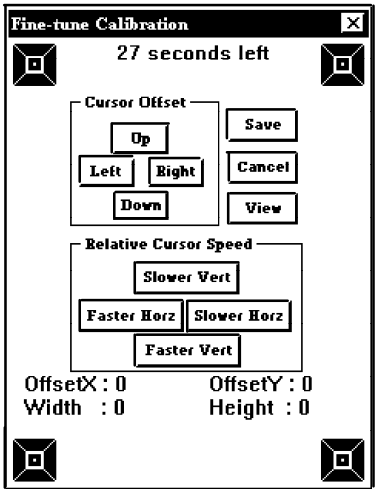


Figure 3-2
PenAlign Fine Tuning screen

Fine-Tuning PenAlign

This screen allows you to see how well the alignment worked, and if necessary, you can fine-tune the calibration. Press the pen on an open area of the screen and see how well the Windows cursor matches the point where the tip of the pen is located.

The following fine-tune operations are available:

Left	Move the cursor to the left with respect to the tip of the pen
Right	Move the cursor to the right with respect to the tip of the pen
Up	Move the cursor up with respect to the tip of the pen
Down	Move the cursor down with respect to the tip of the pen
SlowerVert	Move the cursor more slowly in the vertical direction with respect to the tip of the pen. Use this when the cursor matches well on the top of the screen, but is lower then the pen tip at the bottom of the screen.
FasterVert	Move the cursor more quickly in the vertical direction with respect to the tip of the pen. Use this when the cursor matches well at the top of the screen, but is higher than the pen tip towards the bottom of the screen.
SlowerHorz	Works similar to SlowerVert, except the movement is in the horizontal direction.
FasterHorz	Works similar to FasterVert, except the movement is in the horizontal direction.

When you are finished with the fine-tuning, you may either click the **Save** button to permanently save the new calibration values, or click the **Cancel** button to ignore the new values and continue using the old calibration.

Display Panning

The display software comes preinstalled as part of the Windows 95 configurations. No modifications should be necessary for normal operation. However, as an aid to developers, the following capabilities are provided:

- **User-definable display orientation** — including two portrait and two landscape orientations. For certain resolutions this can be done on-the-fly.
- **User-definable "virtual" screen resolutions** — Although the physical display is limited to 320 x 240, the virtual screen can be much larger (e.g. 640 x 480, or 1024 x 1024). When this occurs, the physical display acts as a viewport into the virtual screen.

Display panning allows you to view different areas of a virtual screen. Panning can be either application-based or display-based (with appropriate pen driver).

Refer to *\docs\6110dvtp.htm* on the Win95 Toolkit CD for additional information.

Panning

Panning is a mechanism, by which you can move the information around within the physical display to view the entire virtual display area. When Windows starts up, the physical display provides visibility into the area located at the upper-left corner of the virtual screen. Pan to the right or downward, or both to see other parts of the virtual display. Pan to the left or upward to get back, as needed.

Pan Border

There is an invisible border that extends inward from the edges of the physical display for a specific distance. Panning occurs only when you put the pen down within this pan border, then drag the cursor toward the center of the screen. Drag panning makes it easier to work inside the pan border without accidentally causing the display to pan.

Auto Panning

There is also an Auto Panning mode that causes the display driver to automatically pan, so the active window remains displayed inside the viewport. This is useful, for example, when dialogs or error messages pop up outside the current viewing area. This is enabled or disabled using the Pan Track option.

Scanner Installation

The scanner drivers are loaded onto your PC Card and automatically become available for use by your applications, when you install a specified Windows 95 load. Other than that, scanners require no installation.

For additional information relating to scanners, use your browser to view .htm files in the *\docs* folder on the Win95 Toolkit CD.

Using Scanner APIs

Within your application, include the path to the scanner driver, so your application can make calls to the API functions.

The available prototypes for this API are defined in a document that is also loaded onto your PC Card (located in the *\Scanners* folder). Refer to specific scanners below for names of document files. You can view these files with ***My Computer*** or ***Windows Explorer***, or any text editor.

Scanners

Pod Scanner

PODSCAN.DRV is the (internal) Pod scanner driver, and it provides a 32-bit Scan Communication Device API for your application. There is also a Windows 95 INF file (PODSCAN.INF) on your PC Card. These files are located in the *\Scanners\Internal* folder on your PC Card.

Scanner API Document

The available prototypes for this API are defined in the (SCAN32.DOC) document.

Initializing the Scanner

Before using this scanner for the first time, it must be initialized by scanning the following configuration bar codes, which can be found in the *Scanner Parameters* section of the *SE-1223 Users Guide*.

RESET TO DEFAULT SETTINGS
SEND PACKETED DECODE DATA

You may then scan any configuration bar codes necessary for your particular application.

Tethered Scanner

W95TSCAN.DRV is the tethered scanner driver, and it provides a 32-bit Scan Communication Device API for your application. There is also a Windows 95 INF file (W95TSCAN.INF) on your PC Card. These files are located in the *\Scanners\Tethered* folder on your PC Card.

Scanner API Document

The available prototypes for this API are defined in the (MSR32.DOC) document.

Magnetic Stripe Reader

" NOTE: *At the time of this release, the MSR files were not included on the Toolkit CD-ROM.*

The file, 6110MAG.DRV, is the Magnetic Stripe Reader (MSR) driver, and it provides a 32-bit MSR Communication Device API for your application. There is also a Windows 95 INF file (6110MAG.INF) on your PC Card. These files are located in the *\Scanners\MSR* folder on your PC Card.

MSR API Document

The available prototypes for this API are defined in the (MSR32.DOC) document.

Printer Installation

There are several printers supported for your 6110 Computer. Follow the instructions below to install the printers.

" NOTE: *Before starting this installation, you must determine the drive letter for your CD-ROM drive.*

Installing NPCP Printer

Printing with the NORAND® Portable Communications Protocol (NPCP) is only supported if you use the Intermec NPCP Printing Toolkit. The following self-extracting files are located in the 6820 Toolkit, which is located on the Win95 CD:

- **DISK1: TK68201.EXE** — A self-extracting archive archive file that creates the *Toolkit* directory and its contents.
- **DISK2: TK68202.EXE** — A self-extracting archive archive file that contains 6820TECH.PDF, the *6820 Printer Technical Reference*, in PDF format.
- **DISK3: TK68203.EXE** — A self-extracting archive archive file that contains 6820UG.PDF, the *6820 Printer User's Guide*, in PDF format.

1. Place the 6110 PC Card and the Win95 Toolkit CD into your PC.

" NOTE: *You cannot run these self-extracting files from Windows Explorer or My Computer, because they will attempt to install onto the CD instead of your PC Card. The self-extraction process copies the extracted files into the current directory on the current drive. You must be in the correct directory for the files to extract to the correct location.*

2. Go to DOS and establish the 6110 boot PC Card drive as the current drive.

   ```
   C:
   ```

   Create a *\Printing* directory on your PC Card, if it does not already exist.

   ```
   md \Printing
   ```

   Create a directory on your PC Card for your 6820 printer toolkit.

   ```
   md \Printing\6820
   ```

   Establish the ***\Printing\6820*** directory as the current directory by changing to that directory, as follows:

   ```
   cd \Printing\6820
   ```

" NOTE: *Use the CD ROM drive letter, as determined above, and substitute for the 'X:' below*.

3. Run the first self-extracting file, as follows. It creates a ***\Toolkit*** directory off the current directory on your boot PC Card. Then it extracts the 6820 toolkit files into the ***\Printing\6820\Toolkit*** directory and associated subdirectories created by the self-extracting file.

   ```
   X:\Drivers\Printing\6820\Disk1\TK68201.exe
   ```

4. Run the second self-extracting file. It extracts the *6820 Printer Technical Reference* into the ***\Printing\6820\Pubs*** directory on your boot PC Card.

   ```
   X:\Drivers\Printing\6820\Disk2\TK68202.exe
   ```

5. Run the third self-extracting file. It extracts the *6820 Printer User's Guide* into the ***\Printing\6820\Pubs*** directory of your boot PC Card.

   ```
   X:\Drivers\Printing\6820\Disk3\TK68203.exe
   ```

6820 Configuration Utility

Now that you have installed the 6820 Printer Toolkit onto your PC, there should be a configuration utility in the ***\Printing\6820\Toolkit*** directory on the boot PC Card. This utility allows you to configure your NORAND 6820 printer to suit your needs. The following files are included.

RPGPCONF.EXE– The executable file, which runs on either Windows 3.1 or Windows 95.

NPCONFIG.DLL– Windows dynamic link library.

RPGPCONF.INI – Program configuration settings.

README.TXT – A description of the files listed here and how to use them.

DEFAULT.PCF – The default printer configuration.

DEFAULT.CFG – The parameters settings associated with the default configuration.

There are detailed instructions on the use of the 6820 configuration program in the file 6820TECH.PDF. See below.

6820 Documentation Files

Information on the use, maintenance, and programming of your 6820 Printer is included in the files located in the *\Printing\6820\Pubs* directory of your PC Card.

- 6820TECH.PDF is the *6820 Printer Technical Reference*.
- 6820UG.PDF is the *6820 Printer User's Guide*.
- README.TXT includes information about downloading and using the Adobe reader, which provides you with the capability to read PDF files.

Other Files

- Font files are located in the *\Printing\6820\Toolkit\6820sys* and the *\Printing\6820\Toolkit\Fonts* directories (on your 6110 boot PC Card). See instructions in the *6820 Printer Technical Reference* to install fonts to your 6820 printer.
- DOS printer drivers:
  - PC4800.SYS is located in the *\Printing\6820\Toolkit\DOS* directory (on your 6110 boot PC Card)
  - NOR4800.DRV in the *\Drivers\Printing\4820* directory (on your Win95 Installation CD).
- The *\Printing\6820\Toolkit\Win95\Samples\NPCP32* directory (on your 6110 boot PC Card) contains files that illustrate the use of character sets. Instructions are included in each sample C program.
- Two other printer drivers are described in documents found in the *\Printing\6820\Toolkit\Win95\Doc* directory (on your 6110 boot PC Card).

Installing IrDA Printer

If you added IrDA printing, using the instructions in Appendix B, Advanced Utilities, then simply follow the numbered steps, below, to install IrDA onto your 6110 Computer. If not, you can add the necessary files now, then perform the numbered steps, below. To add these files, drag the *\Drivers\IrDA* folder from the Win95 Install CD-ROM, using *Windows Explorer* or *My Computer*, and drop a copy of that folder into the *\Printing* folder on your 6110 boot PC Card.

1. Place the PC Card (with Windows 95) into your 6110 Computer and press the **[I/O]** key to boot up.
2. After Windows 95 comes up, double-tap the **My Computer** icon.
3. Double-tap the **Lite95** icon, then double-tap the **IrDA** folder.
4. Double-tap the **setup.exe** icon to run the Setup executable.
5. When asked if you want to install Microsoft Infrared Support, tap the **Yes** button, which takes you to the Add Infrared Device Wizard, which informs you that Microsoft Infrared Support enables you to:
   - Send and receive files.
   - Print files to IrDA compliant printers.
   - Access a network.
6. Tap the **Next** button to continue to the following screen:

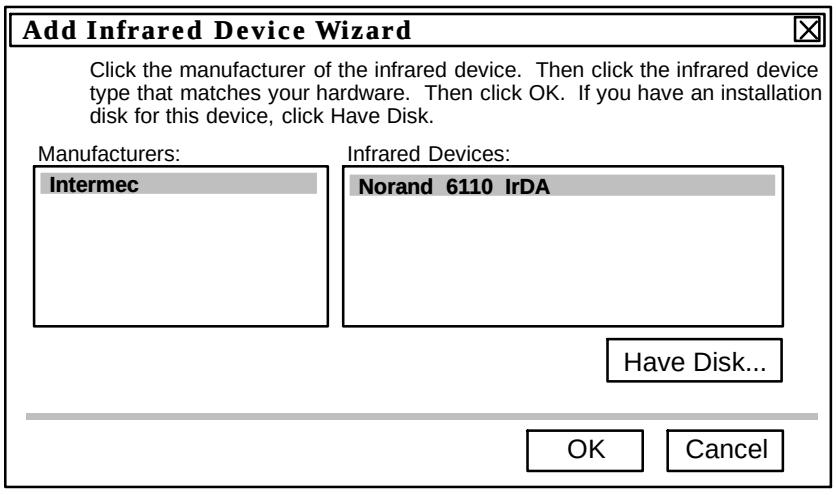


Figure 3-3
Infrared Device Wizard

If the manufacturer and IrDA device (as shown above) are not highlighted, then select them. Finally, tap the **OK** button.

7. The next screen allows you to either use the defaults or change the settings. If you decide to use the defaults, tap the **Next** button.
8. At the next screen, tap the **OK** button to complete the installation of your infrared device.
9. The final screen notifies you that your computer needs to be rebooted. Tap the **OK** button and wait for your system to reboot.
10. After Windows 95 comes up again, exit out of all the screens remaining on your desktop (i.e., IrDA folder, Lite95, My Computer).

Installing Generic (Text-only) IrDA Printer

If you want to install a generic printer (without a printer-specific driver), with the Lite and Minimal configurations, this requires a slightly different installation than the printers described above.

You need two PC Cards, both installed from the toolkit CD-ROM:

- a 6110 boot card (containing a Win95 configuration)
- a Cabinet Files card

Insert both cards into PC Card slots on your 6110 Computer, and wait for it to boot to the desktop. It is also recommended that you use an external keyboard for this operation, at least for the serial number for Windows 95.

1. If you have not done so at a previously time, enter serial numbers and calibrate the pen.
2. Double-tap **My Computer** with your stylus, then on **Printers**, followed by **Add Printer**.
3. Select **Generic** from the ***Manufactures*** list, and select **Generic / Text Only** from the **Printers** list, then tap **Next**.
4. Select **InfraRed Printing Port (LPT)** from the ***Available Ports*** list, then tap **Next**.
5. Alter the ***Printer name*** field as desired, then tap **Next**.
6. Point the IR port (located at the end of the unit nearest the keypad) at the printer you are installing. Make sure the printer is turned on and its battery is fully charged. (Most printers emit a noise when they sense an InfraRed transmitter nearby.
7. When prompted with, “Would you like to print a test page?” tap **Yes**. Then when asked if the IR connection is established tap **Finish**.

Installing 680x Printers

To add a 6805, 6805a, or 6806 Printer to the 6110 Computer, follow these instructions. But first, insert your 6110 boot card into the PC Card slot in your PC. This card should have one of the Win95 configurations (installed from the toolkit CD-ROM). It is also recommended that you use an external keyboard for this operation, at least while entering the serial number for Windows 95.

1. Create a new folder off the root directory of the PC Card and name it *\Printing\680x* (if not existing) and copy all the files from the *\Drivers\Printing\680x* folder (of the toolkit CD-ROM) onto this new folder of your PC Card.
2. Place the 6110 boot card into the 6110 Computer and boot from it. Wait until it boots up to the desktop. If you have not done so at a previously time, enter serial numbers and calibrate the pen.
3. Double-tap **My Computer** with your stylus, then on **Printers**, followed by **Add Printer**.
4. After the ***Add Printer Wizard*** starts, tap **Next** and select **Have Disk**.
5. When the ***Install From Disk*** dialog comes up, select **Browse** and find the *\Printing\680x* folder on the boot drive.
6. You should see the file OEMSETUP.INF in the left scroll window of the ***Open*** dialog box. Tap the **OK** button, then **OK** again. This should take you back to the ***Add Printer Wizard*** screen.
7. There should be several printer drivers listed at the left. Select the appropriate driver for your specific 680x printer:

Model	Driver Name
6804t	O'Neil 2t
6805	O'Neil Microflash 2
6805a	O'Neil Microflash 2
6806	O'Neil Microflash 3

   Then tap **Next**.
8. In the ***Add Printer Wizard*** screen, you are now asked for the printer port. Select the **Infrared Serial (COM)** Port from the list, then tap **Next**.
9. If you want to rename the printer as something other than the "O'Neil ..." do so at this dialog window. Also, if you want this printer to be the default, select **Yes**, then **Next**.

Finally, with the printer installed, ***Add Printer Wizard*** asks if you would like to print a test page. It is recommended that you do so at this point. First, be sure the printer is powered up and lined up with the infrared port at the bottom of the 6110 Computer. Tap **Finish** to send the data to the printer.

Reflashing from PC Card

After preparing your PC Card with a Lite Win95 configuration, you can reflash the 6110 Computer using the flash version that is on the toolkit CD as follows:

1. Exit the install program.

" NOTE: *To copy files from the Win95 Toolkit CD, go to either **Windows Explorer** or **My Computer**. Then, right-click on the CD-ROM drive icon and select **Open** from the popup menu for a list of folders (do not double-click on the CD-ROM drive icon, which would result in running the Win95 Toolkit).*

2. Copy 6110FLSH.EXE from the *\Win95\6110\Images\Full\6110\Flash* folder (on the Win95 Toolkit CD) to the *\6110* folder (on your PC Card).
3. **Do not omit this important step** (this allows 6110FLSH.EXE to be erased after it has programmed the flash, and keeps the system out of an endless loop). Go to the *\6110* folder (on your PC Card) and right-click the 6110FLSH.EXE file, then select properties from the menu. In the properties menu, uncheck the *Read-Only* check box.
4. Remove the PC Card from the PC and place it into the 6110 Computer.
5. Apply external power to the 6110 Computer.
6. Boot to the PC card. Once it has reflashed, the 6110FLSH.EXE file is automatically erased.

Modem Support

There are currently three modem toolkits included on the Win95 Toolkit CD.

- TDK Global Class 2814 (DF2814)
- TDK CyberExpress 5600 (DF5600)
  To install the online user's guide for this modem, go to Windows Explorer and execute HELP.EXE in the \drivers\modems\TDK5600 folder on the Win95 Toolkit CD. Then follow the prompts. Make sure you have no other applications running during this installation.
- TDK Global Freedom 5660 (DF5660)

Release notes include:

- QuickLink III Install patch
- Online Help
- Notes for DOS and INSTALL.EXE
- UltraPort **t**

These modem toolkits are located in the \drivers\modems folder on the Win95 Toolkit CD.

Radio Support

Installing Drivers for RangeLAN2

To install the Proxim RangeLAN2 drivers on your 6110 Computer, follow this procedure carefully, observing the following caution.

Before Installing, Read This

B CAUTION: **In order to properly install the RangeLAN drivers on your system, you MUST NOT insert the Proxim RangeLAN PC Card into the 6110 Computer until directed to do so by the instructions below. Otherwise you will need to uninstall the default drivers as described below, then reinstall according to this procedure.**

If you accidentally installed the default RangeLAN drivers on your system because you inserted the RangeLAN card before the Win95 drivers were properly installed, then uninstall the default drivers as follows:

1. Remove the Proxim card from the 6110 Computer.
2. Make sure your Win95 boot PC Card is inserted into the 6110 Computer and it is booted.
   Then remove all the RangeLAN drivers:
   a. Tap on the ***Start*** button
   b. Choose ***Settings***
   c. Select ***Control Panel***
   d. Choose ***Network***
   e. Select all Proxim RangeLAN Drivers
   f. Click ***Remove***
   g. Click ***OK***
3. Close all open windows.
4. Restart Windows 95:
   a. Tap on the ***Start*** button
   b. Select ***Shut Down***
   c. Check ***Restart the Computer***
   d. Choose ***YES***

Installation and Configuration

The RangeLAN drivers must be loaded onto a freshly created Windows 95 load for the 6110 Computer.

" NOTE: *BE SURE TO REMOVE THE PROXIM RANGELAN PC CARD BEFORE BOOTING FROM THE NEW LOAD.*

Install the drivers for Proxim RangeLAN2 on your 6110 Computer as follows:

1. Create a Windows 95 image for the 6110 Computer using the Toolkit CD. If your 6110 Computer already has a factory preinstalled Windows 95 load, then you do not need to create a load from the Toolkit.
2. Copy the RangeLan.exe file from the CD to the 6110 Windows 95 load. This happens automatically when you check the box for RangeLAN during the Windows 95 Installation process.

- ***If you are creating a new load***, be sure to check the box for ***RangeLAN*** at the end of the Windows 95 Install procedure, then this file is automatically copied your Windows 95 load. Then you may want to copy or move it from the C:\6110\Proxim folder to the C:\Windows\Desktop folder, so it automatically appears on the Windows 95 desktop of the 6110 Computer after it has booted.
- ***If you already have a Windows 95 Load on a PC Card***, without RangeLAN, then you should copy the file from the following folder on your Windows Installation CD:

  \Drivers\Radios\Proxim folder

  to a folder on your 6110 boot PC Card, such as:

  C:\Windows\Desktop

  This way, it automatically appears on the Windows 95 desktop of the 6110 Computer after it has booted.

3. Insert the Win95 boot PC Card into the 6110 Computer and reset the unit and if this is a new Win95 load, enter the registration information.
4. Run the RangeLan.exe program.

   The necessary files are copied to the 6110 Computer.

   When prompted, select ***OK*** to restart the system.
5. Once the unit is rebooted, respond to the following:
   - If the Password screen comes up, either choose ***Cancel*** or enter your password and choose ***OK***.
   - If you see a message about whether to install an NDIS file over the existing one (which is newer), you should answer ***NO*** (the default response).
   - If any windows are still open, close them.
6. Insert the Proxim RangeLAN 2 card in the PC Card slot.

   Windows detects the card and runs through the driver installation. When complete you will be asked to reboot, again.

   As Windows 95 comes up, there is some housecleaning done. The install cleans up after itself. There is also a DHCP warning message. This is normal.
7. Go into the ***Control Panel*** and:
   a. Select ***Networking***.
   b. Select ***TCP/IP***.
   c. Tap ***Properties***.
   d. Select the ***NetBIOS*** tab.
   e. Check the ***I want to enable NetBIOS over TCP/IP*** box.

" NOTE: *IT IS VERY IMPORTANT CHECK TO THIS BOX. IT IS NECESSARY FOR PROPER POWER MANAGEMENT FUNCTIONALITY.*

8. At this point, you should setup any other TCP/IP or RangeLAN properties that your specific site requires.
9. Reboot the 6110 Computer. Once it reboots, the RangeLAN2.exe file can be deleted, if desired.

Installing TCP/IP

To install TCP/IP, follow these steps:

1. Open the Windows Control Panel by choosing **Start → Settings → Control Panel** from the Windows Start Menu. Then open the **Network Control Panel** item.
2. From the **Configuration** tab, click **Add**, then select **protocol** from the list box. Click **Add**.
3. From the **Manufacturer** list, select **Microsoft**.
4. From the **Network Protocol** list, select **TCP/IP**, then click **OK**.
5. Click **OK**, again. If you have not yet installed any network adapter, Windows 95 will ask you to install a network adapter. Select **Microsoft** from the **Manufacturer** list and **Dial-Up Adapter** from the **Network Adapter** list, then click on **OK**.
6. After Windows 95 has installed Microsoft TCP/IP, you are asked to restart your computer. Select **NOW** to restart now, or continue with the NetBIOS installation (as described in the following paragraph).

Installing NetBIOS Over TCP/IP

In order for the RangeLAN2 PC Card to function correctly with Suspend/Resume and Removal/Insertion events, NetBIOS must be enabled over TCP/IP. To do this, perform the following:

1. Open the Windows Control Panel by choosing **Start → Settings → Control Panel** from the Windows Start Menu.
2. Open the **Network Control Panel** item. Then double-click on the **TCP/IP protocol** item in the list, scroll to the right, and click on the **NetBIOS** tab.
3. Click in the **I want to enable NetBIOS over TCP/IP** checkbox to enable that feature.
4. Scroll down to the bottom of the dialog and click **OK**, which puts you back in the *Network* dialog, then scroll down to the bottom and click **OK**.
5. The wizard prompts you to restart your computer. Click **Yes**.

" NOTE: *If a 6110 image/configuration is being built for mass duplication, it might be a good idea to leave the **IP Address** and **Subnet Mask** fields (located under the **IP Address** tab) blank to avoid conflicting IP addresses once the units power-up.*

RS-485

Refer to the *NRInet Communications 32-bit Client User's Guide* for information on RS-485 for NRInet.

Winsock 2

Winsock 2 is installed on your 6110 boot PC Card when you run the Win95 Install CD. However, if you need to reinstall Winsock 2, go to the \Win95\6110\Images\Full\Windows folder on your 6110 boot card and run W95WSE.EXE.

After installation, W2setup.log contains a log of the files that were created and updated during installation, as indicated below.

Files installed in the C:\Windows\System folder:

afvxd.vxd	mswsosp.dll	vtcp.386	wsasrv.exe
icmp.dll	ndis.vxd	vtdi.386	wshtcp.vxd
msafd.dll	rnr20.dll	vudp.386	wsipx.vxd
mstcp.dll	vdhcp.386	ws2_32.dll	wsock.vxd
msvcrt.dll	vip.386	ws2help.dll	wsock2.vxd
mswsock.dll	vnbt.386	ws2thk.dll	wsock32.dll

Files installed in the C:\Windows folder:

arp.exe	netstat.exe	snmpapi.dll	winipcfg.exe
ftp.exe	ping.exe	telnet.exe	
inetmib1.dll	route.exe	telnet.hlp	
nbtstat.exe	snmp.exe	tracert.exe	

Files installed in the C:\Windows\sysbckup folder:

winsock.dll
winsock.dll

Windows 95 Tips

" **NOTE:** *Certain keys, such as the cursor keys, need to be shifted using the **GOLD** shift key. Refer to the **6110 Hand-Held Computer User's Guide**, for details.*

Installing Drivespace 3 on Your PC

To install Drivespace 3 on your PC:

1. Select **Start → Settings → Control Panel**.
2. Double-click **Add/Remove Programs**.
3. Select the **Windows Setup** tab.
4. Select **Disk Tools** and click the **Details** button.
5. Select **Compression Tools** and click **OK**.
6. After returning to the *Add/Remove Programs Properties* window, click **OK**.

Resetting the 6110 Computer

Before attempting to reset the computer, try to shut down any applications that are running, and perform a normal exit from Windows 95, if possible. Here are a few suggestions.

If your application is locked up so that you cannot exit normally, try terminating it with the *Terminating a Task* instructions, below. However, this requires an external keyboard. After shutting down the application, follow one of the *Shut Down Windows* instructions, below. Finally, reset the computer as explained in the *Reset Keys* paragraph, in the *Device Support* section.

If your screen is blank, the touch screen is not responding, or if none of the instructions described below are helpful in shutting down Windows 95, then reset the computer as described in the *Reset Keys* paragraph, in the *Device Support* section.

Terminating a Task

Terminate your application as follows:

Hold down the **[Ctrl]** key, the **[Alt]** key, and the **[Delete]** key at the same time, using your external keyboard (this should bring up the *Close Task* window).

If the Touch Screen is Working

1. Select the name of your application, if found in the list.
2. Tap the **End Task** button.
3. Another window may appear, informing you that Windows cannot automatically shut down your task. If so, tap the **OK** button.

If the Touch Screen is NOT Working

1. Use the **Y** and **B** keys to select your application.
2. Use the **[Tab]** key to highlight the **End Task** button (*you may need to press the **[Tab]** key twice*), then press the **[Enter]** key.
3. Another window may appear, informing you that Windows cannot automatically shut down your task. If so, press the **[Enter]** key again.

Shutting Down Windows Using the Start Button

If your Windows 95 system has a standard configuration, the **Start** button appears at the extreme left of the *Task Bar*.

If the Touch Screen is Working

1. Tap the **Start** button.
2. Select *Shut Down*.
3. When the *Shut Down Windows* menu comes up, make sure the *Shut down the computer* option is selected, then tap the **Yes** button.

If the Touch Screen is NOT Working

1. Hold the **GOLD** shift key down and press the **[Ctrl]** key. While continuing to hold the **[Ctrl]** key down, release the **GOLD** shift key and press the **[Esc]** key, then release both keys (this brings up the *Start* menu).
2. Hold the **GOLD** shift key down and press the **Y** key quickly, then release both buttons to highlight the *Shut Down* entry.
3. Press the **[Enter]** key to bring up the ***Shut Down Windows*** menu.
4. Make sure the ***Shut down the computer*** option is selected, and press the **[Enter]** key.

Shutting Down Windows Using the End Task Menu

Shut down Windows 95, as follows:

Hold down the **[Ctrl]** key, the **[Alt]** key, and the **[Delete]** key at the same time, using your external keyboard (this should bring up the *Close Task* window).

If the Touch Screen is Working

Tap the **Shut Down** button.

If the Touch Screen is NOT Working

Use the **[Tab]** key to highlight to the **Shut Down** button, then press the **[Enter]** key.

Tips for Successful Application Integration on 6110 Computer

Many factors should be considered before target application integration takes place. Ask yourself the following questions:

- **How much space do I need for the application to run?**
  A desktop PC typically has large amounts of disk space, and very often, large installations of physical RAM memory. It is important for software developers to take into consideration the limitations of RAM, virtual memory, and disk availability when using the 6110 system.
- **Am I planning to use virtual memory?**
  Virtual memory can consume large amounts of disk space and use up much of the available free disk space in a Minimal Windows 95 configuration.
  Go to the Control Panel, select System, then click on the Performance tab, and click the **Virtual Memory** button).
  Turning off virtual memory keeps disk space from being used as temporary swap space, but may affect application operation. It may also cause "out of memory" errors, depending on the amount of RAM installed in the 6110 Computer.
- **Will the application still work without virtual memory?**
  Adding more RAM to the system does reduce the Windows 95 disk swap file substantially. The maximum option for the 6110 Computer is 32 KB of RAM.
- **If I use virtual memory, do I want Windows to manage the swap file size, or merely set it to what I want?**
  This requires some experimentation. If an application has memory problems, try it both ways to observe the resulting behavior.
- **Do I expect the application to substantially increase in size in the future?**
  Take care to plan for expansion of the application.
- **Is the language and/or compiler, chosen for the application development, suitable for producing compact executables?**
  If size is an issue, it is important to select an appropriate development environment that can create small and efficient code for the 6110 Computer. It is not a desktop PC, so take into consideration the limited memory and disk resources available to you.
- **Can the compiler be set to generate compact code?**
  Check the options on the compiler, to see if it supports small code generation.
- **To aid integration, do I plan to statically link DLLs into the target application?**
  This creates an application that should run without the need for any additional DLLs, but may also duplicate code that is already part of the Minimal Windows 95 configuration. If size is not an issue, you may want to consider using static linking, so that integration may go smoothly.

- **What if the target application runs on a desktop PC, but does not run on the 6110 Minimal Windows 95 configuration?**
  Before going through the integration process, make sure the application is capable of running on a full Win95 configuration for the 6110 Computer. If the application fails to run with the Full Win95 configuration, there could be a hardware conflict.

- **How can I reduce the Minimal Windows 95 configuration further?**

  Plug and Play / Installation Support (INF files) — Windows 95 comes with INF files to support plug and play software installation for most devices that can be added via the PC Card slot. Unfortunately the files consume approximately 5 MB of data in the Minimal Win95 configuration. Once the configuration for the 6110 Computer has been completed, all the INF files can typically be deleted without affecting the application operation.

  SetupX.DLL — It is only needed to run setup functions, and can be removed later. These files are used by various setup programs and the Windows Control Panel. They consume approximately 500 KB of disk space. Once removed, many parts of Windows 95 configuration cannot be modified. To regain Control Panel operation, copy the files back from the following folder on the Win95 Toolkit CD, *\Win95\6110\Images\Full\Windows\System*.

  Control Panel Files — The CPL files in the *\Windows\System* folder can be deleted; but doing so prohibits further configuration changes to the Windows 95 system. Deleting the CPL files saves approximately 500 KB of space. To restore functionality to the control panel, merely restore the .CPL files from the Win95 Toolkit CD, from the *\Win95\6110\Images\Full\Windows\System* folder.

Section 4

DOS Device Driver Support

This section contains installation and configuration information for DOS device drivers, communications device drivers, and DOS utilities.

DOS Device Drivers

Battery Monitor: DOSGAS.EXE

This program monitors charging and discharging of the main battery pack.

Command Line Switches

DOSGAS has optional parameters. The switch symbol, preceding the parameter, can be either '/' or '–'. Also, the parameter letter can be either upper or lower case. The fields represented by text within brackets (such as <ms>) are numeric values. Do not supply the brackets; only the numeric value.

```
DOSGAS.EXE [<x> <y>] [–U<ms>] [–W] [–P<scan-code>] [–C]
```

where:

–C Change — the battery gauge is only updated when a change in battery level affects the display.

–P<scan-code> Popup display mode — <scan-code> is the value of keystroke that causes the information to display when that key is pressed.

–U<ms> Update — time between updates if not in popup mode, or duration information is displayed if in popup mode. The value of <ms> represents time in milliseconds.

–W Windowed — forces the gauge to display in a VROTATED DOS window; otherwise it is displayed in an absolute screen position.

<x> <y> X,Y coordinates, where the values of <x> and <y> represent the column and row of the location to display the gauge on screen; supply integer values, in base 10, for <x> and <y>.

Four stages of visual and audible low battery warnings should occur according to the following intervals.

Annunciators

The battery annunciators indicate the level of the main battery.

Table 4-1
Low Battery Indications

Low Battery Level	% Capacity	Icons	Beeps
0	76—100%	BBBB	
	51—75%	BBB	
	26—50%	BB	
	21—25%	B	
1	16—20%	LLLL	
2	11—15%	LLL	
3	6—10%	LL	Three beeps on 10% Three beeps on 7%
4	0—5%	L	One 5 second beep on 5%

" NOTE: *The B's in the preceding table are actually displayed on the 6110 Computer as small battery icons.*

When the capacity reaches 20%, the single annunciator icon changes to four L's as shown in the table above.

When unit is charging, the annunciator icons change to C's as shown in the table below.

Table 4-2
Charging Indications

% Capacity	Icons
25%—0%	C
50%—26%	CC
75%—51%	CCC
100%—76%	CCCC

" NOTE: *There may be a delay of one minute for the icons to update when the battery pack is replaced.*

Upper Memory Provider: H2UMP.SYS

H2UMP.SYS is an *upper memory provide*r. Since it is based on the Elan H2 processor, it supports the minimal set of XMS function calls required to provide upper memory to MS-DOS when you have a "DOS=UMB" statement in the CONFIG.SYS file. It does not support the XMS calls that deal with either the deallocation or reallocation of upper memory blocks.

H2UMP supplies up to 128 KB of upper memory block elements, in the range of C000–DFFF. Option ROM blocks are automatically scanned for and reserved (that is, untouched). It can be used with HIMEM.SYS, or as a stand-alone program. If used with HIMEM, H2UMP must be loaded after HIMEM.

H2UMP is similar to EMM386.EXE for loading devices into HMA. Unlike EMM386 with the NOEMS switch, H2UMP supplies DOS with memory from the first megabyte of the system memory. This is memory that would otherwise be available for use as shadow RAM.

H2UMP is much smaller and simpler than EMM386. Since EMM386 is a virtual mode system extension, it also slows down processing somewhat as it handles special exception interrupts that are required when providing virtual memory to DOS. H2UMP uses less system memory, therefore making more memory available to the system, but does not use expanded memory.

A single command line switch is provided to force H2UMP to reserve memory block elements, other than those with option ROM signatures in them. The syntax for this switch is:

```
/X=aaaa[,aaaa]
```

where the addresses specified are hexadecimal starting addresses for each block of memory to be reserved. The H2UMP provides two 64 K blocks of upper memory; one at C000, and the other at D000.

Example configurations:

1.
```
DEVICE=H2UMP.SYS
DOS=UMB
DEVICEHIGH=...
```

2.
```
DEVICE=HIMEM.SYS
DOS=HIGH
DEVICE=H2UMP.SYS
DOS=UMB
DEVICEHIGH=...
```

3.
```
DEVICE=HIMEM.SYS
DOS=HIGH
DEVICE=H2UMP.SYS /X=D000
DOS=UMB
DEVICEHIGH=...
```

The preceding configuration reserves the D000 address range for PC Card support.

PC Card Services: NORMOD.SYS

NORMOD.SYS is a PC Card services client that handles the identification and initialization of serial device PC Cards (such as modems and radios).

Command Line Switches

NORMOD is installed in the CONFIG.SYS file, as follows:

```
DEVICE=NORMOD.SYS [–A] [–Bd] [–Cx] [–Dx x x] [–Ix] [–Nname]
                  [–R] [–S] [–V]
```

where:

–A Suspends requests that are allowed, even if an open session is present. Normally, NORMOD rejects suspend requests whenever an application has an open connection.

–Bd Defines a battery cutoff level, where 'd' is the value in millivolts. If a voltage reading for your main battery is below this level, then *open* requests fails. This protects against loss of data when power fails because of low batteries.

Example: –B610 would set the cut off at 610 millivolts (0.61 volts).

–Cx Overrides the default COM port.
It defaults to the first available comm port; probably COM4 since COM3 is usually taken.

Example: –C4 would designate COM4.

–D x x x

Defines the timeout used for a particular manufacture's code, rather than always using the timeout value. If a modem card has an unreliable ready line, this switch could be used to define a timeout value instead of examining the ready line. The first two hexadecimal numbers must match both the code and the information values returned by a *GetConfigInfo* call before the third value will be used as the timeout value. The timeout value needs to be specified in tics (1/18th of a second).

Example: */D 16b 21 20* sets the timeout to 20h tics, about 1.8 seconds. The *16b 21* identifies the Ericsson PIA radio.

–Ix Changes the interrupt request level that will be used. The *x* parameter should be supplied in hexadecimal.
The default value for *x* is *IRQ 5*.

Example: –I7 would use *IRQ 7* instead of *IRQ 5*.

–Nname

Changes the device name that will be installed.
The default value for *name* is *MODEM*.

Example: –Ncom4 would set the device name to *COM4* instead of *MODEM*. The device name can be any valid eight character filename. Note however, that you should use a name that does not correspond to any files or directories that may exist or may need to exist. Because once you have defined a name as a device name, you will not be able to access any files or directories with the same root name.

–R Using this switch, a card can be left powered on with ring-indicate enabled during suspend. Thus, a ring-indicate will wake the terminal back up.

–S Causes UART registers to be saved when a suspend occurs, and it restores them upon resume.

–V Turns on the 12 volt VPP whenever a modem session is open.

Application Interfaces and Device Behavior

This driver allows applications to power the modem on by application request. This is supported by the following methods.

- DOS OPEN command
- INT 14h, function 0 (SERIAL BIOS INITIALIZE COMMAND)
- INT 14h, function FF01h (4000API PORT POWER ON COMMAND)
- APM function 5307h (SET DEVICE POWER STATE) to the correct serial port and power state

The modem can be turned off by application request. This is supported by the following methods:

- DOS close command
- INT 14h, function FF00h (4000API PORT POWER OFF COMMAND)
- APM function 5307h (SET DEVICE POWER STATE) to the correct serial port and power state.

Once the driver is opened, power is maintained to the PC Card as long as the card is in the slot and battery-low or power-fail events are not detected. On detection of battery-low or power-fail events, power is removed from the card and the application is expected to recover from modem failure by detection of protocol errors.

" NOTE: *To recover properly, applications must always power-down (CLOSE) the modem before modem power-up (OPEN).*

It is not possible to SUSPEND the system, while the modem driver is opened. The modem driver rejects the request to preserve the communications session.

Supported DOS Driver IOCTL Functions

Ioctl Function	Buffer Length	Description
1	12	Return the command line parameters
2	16	Return the manufacturer ID string
3	64	Return the product version 1 information string
4	2	Return the current extended device error

CMD 1: Command Line Parameters

The buffer returned, for the command line parameters, has the following format:

```
struct cmdline {
  unsigned char len;          // length of data returned
  unsigned char devname[8];   // device driver name
  unsigned char socket;       // PC Card socket device to load in
  unsigned char IRQ;          // system IRQ associated with modem
  unsigned int base;          // base i/o address of modems UART
    }
```

CMD 2: Manufacturer ID String

Manufacturer IDs are assigned by the PCMCIA standards committee. Each modem manufacturer is required to provide their ID in the card CIS for examination by software. Consult the PCMCIA specification for the format of the TUPLE string returned by this call.

CMD 3: Product Version 1 Information String

Each PC Card manufacturer is required to provide a Version 1 Information TUPLE in the card CIS for examination by software. Consult the PCMCIA specification for the format of the TUPLE string returned by this call.

CMD 4: Return Extended Error

Status of the modem driver or an extended error can be retrieved via this call.

Status Variable	Value	Meaning
SUCCESS	0x00	
BAD_ADAPTER	0x01	Possibly the device in the slot is not a modem.
BAD_ATTRIBUTE	0x02	Possibly the device in the slot is not a modem.
BAD_BASE	0x03	The requested COM port is already assigned.
BAD_IRQ	0x06	The requested IRQ is already assigned.
BAD_SOCKET	0x0B	The requested Socket is already owned by another device.
BAD_TYPE	0x0D	Possibly the device in the slot is not a modem.
NO_CARD	0x14	No card is present in the socket
IN_USE	0x1E	The requested configuration is already in use.
NO_MORE_ITEMS	0x1F	The requested configuration did not match available configurations.
POWER_ERR	0xF0	The modem power was removed because of a power event.
NOT_INITIALIZED	0xF1	The card was ejected or inserted after the driver was opened.

Device Driver Errors

The following errors are returned to DOS applications:

0x0100 Command OK.
0x8102 Device not ready. Indicates card not in slot.
0x8103 Unknown DOS command.
0x810c General failure; All other errors and power too low to run modem.

Interrupts Supported by NORMOD.SYS

Interrupt 14h

Interrupt 14h interfaces manage modem power and return error codes dealing with the modem power-on sequence. The supported INT 14h functions are intercepted when DX+1 represents the COM port specified on the modem driver line.

The list of INT 14h functions supported by the NORMOD device driver is as follows:

- Initialize Communications Port AH=00h
- Extended Initialize AH=04h
- Get Extended Error AH=FEh
- Port Power Off/On AH=FFh

" NOTE: *The Interrupt 14h interfaces are reserved solely for internal use and application use of these methods may affect application portability. Therefore, applications should not use them.*

Interrupt 15h

APM interfaces manage modem power.

The list of INT 15h functions supported by the NORMOD device driver is as follows:

- Set Power State AX=5307
- Get Power State AX=530C

Pen Driver: 61MOUSE.COM

Overview

The pen driver is actually a DOS mouse driver. It interprets the standard interrupt 33h mouse interface. Most of the standard mouse functions are supported.

For detailed information relating to the standard mouse interface, refer to *Ralf Brown's Interrupt list* (see the *Open Systems Publications* section for ordering information).

Installation

The pen driver installs as a TSR as a result of placing the following statement in the AUTOEXEC.BAT file:

```
61MOUSE.COM
```

If the drive and directory for this driver is not in your path, include that information, as follows:

```
d:\path\61MOUSE.COM
```

where:

d: is the driver
path is the directory path to the driver

After installation, the driver displays the following message:

```
Driver installed
6110 Digitizer enabled
```

Pen Calibration: CALIB.EXE

Overview

CALIB.EXE is the DOS Pen Calibration utility. It performs calibration of the pen interface for your hand-held computer.

Calibration is simply the alignment of the cursor, placing it in the same location where a stylus (or pen or finger) is placed on the touch screen. Your 6110 Computer comes with default settings that are normally acceptable for most applications. However, some applications, such as signature capturing, may require a calibration adjustment to compensate for variations in touch panel alignment and user preferences.

Configuration

Configuration settings are stored in flash. If flash contains invalid information, the program displays the calibration screen, regardless of the existence of the calibrate command-line option.

CALIB.EXE is a DOS application program and can be invoked from the AUTOEXEC.BAT file or from the DOS command line. The appropriate mouse driver must be installed. The driver contains extensions to the standard Mouse API which provides digitizer information, screen resolution, and raw coordinate points, which is required for this implementation of CALIB.EXE.

" **NOTE:** *The pen driver must always be loaded before running the calibration utility.*

Required Calibration Files

```
61MOUSE.COM (pen driver)
CALIB.EXE   (calibration utility)
N6110.BGI   (BGI driver)
```

" **NOTE:** *For information relating to the use of the BGI driver, refer to the **BGI Support** paragraph, on page 4-30.*

Operation

CALIB.EXE begins calibration by placing one of four targets at a fixed location on the screen and waits for the user to press the pen at the center of the target three times. It is important during this process to apply moderate pressure while pressing the target. Lightly tapping or placing too much pressure generates incorrect results. The unit beeps after each successful press of the pen. Therefore, if a beep is not heard when the pen is down, lift and press again. Also use care to NOT allow fingers or any other object to touch the screen. When the program has acquired three good data points for a target, it then displays the next target.

When data for all four targets have been acquired, the program then displays a screen that allows the results of calibration to be checked. Here, it is important to check the match of the cursor with the location of the pen near the four corners of the screen. The best way to do this is to place the pen down near each corner of the display and see if the cursor appears at the location of the pen. If the cursor is offset from the pen location by some fixed amount, adjust it by pressing the appropriate **UP**, **DOWN**, **LEFT**, or **RIGHT** buttons on the screen. (You may prefer to add some amount of offset to place the cursor away from the pen using the same buttons.) If the cursor position varies significantly from the pen location, as the pen is placed at the different corners, the four target calibration process was not successful. Restart the program and pay closer attention to how the pen is pressed against the targets.

When satisfied with the calibration, press the **SAVE** button on the screen to store the results. The results are then available for use by the pen (or mouse) driver. You may choose to NOT save the results by pressing the **CANCEL** button. In either case, the program exits. If for some reason the calibration program is unable to recognize the pen, you can press the **Esc** (Escape) key and the program exits. In this case, the new calibration values are not stored.

Power Management: NORDOSPM.EXE

Overview

NORDOSPM.EXE, which is part of the Advanced Power Management (APM) system, is the DOS power management driver interface between applications and the APM BIOS. The power management driver must be installed as a device driver at system startup time.

This driver implements the following general functions:

- Attempts to determine when the DOS environment is idle and saves power by idling the CPU.
- Polls for APM events and broadcasts them to DOS drivers and applications. Mediates events that can be failed such as suspend, user suspend, standby, and user standby requests.
- Incorporates code that patches around bugs in Systemsoft PC Card drivers.

Figure 4-1, below, is a simplified diagram of Power Management Software.

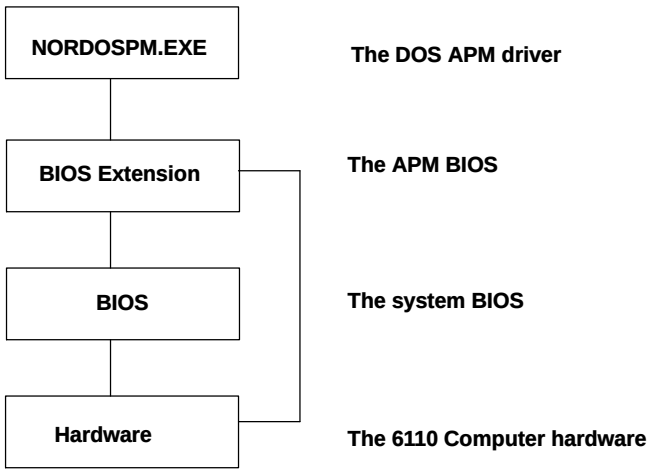


Figure 4-1
Power Management Software

The APM BIOS is a BIOS extension. Both the APM BIOS and the system BIOS are factory installed, and therefore do not require user installation.

Installation

NORDOSPM.EXE, which is installed as a device driver in the CONFIG.SYS file, must be installed before H2PODSCN.EXE and H2THRSCN.EXE.

APM Clock Driver: CLOCK.EXE

CLOCK.EXE is part of the Advanced Power Management system when running under DOS. CLOCK is a device driver that replaces the standard DOS clock driver. It must be installed as a device driver at system startup time.

Besides the normal clock driver functions, CLOCK makes sure that the date and time are maintained during suspends. It does this by forcing a read from the real-time clock upon Resume.

Installing CLOCK.EXE

CLOCK is installed as a device driver in the CONFIG.SYS file. CLOCK should be installed after NORDOSPM.EXE. A typical entry in CONFIG.SYS to install CLOCK would look like this:

```
DEVICE=NORDOSPM.EXE
DEVICE=CLOCK.EXE
```

After installation, CLOCK displays the following message:

```
CLOCK.SYS:  NORAND DOS Clock Driver
Version n.nn
Copyright (c) nnnn by Norand Corporation
All rights reserved.
```

" NOTE: *In future revisions of this product, the name, Intermec Technologies Corporation may appear above in the Copyright line.*

Installation Switches

There are no installation switches or user-programmable parts of CLOCK.EXE.

IrDA Printer: NORIRDA.SYS

Overview

IrDA printing support under DOS consists of the device driver, NORIRDA.SYS, the actual driver handler, link management wrapper, and protocol stack. Together these two software components form the IrDA printer solution, providing a standard DOS character driver to support IrDA printers.

The IrDA printer driver supports the following DOS device driver entry points, compatible with the standard input and output libraries provided by DOS compilers, handling the request as indicated by the summarized processes details:

open	attempts discovery of an IrDA device, and if discovery is successful, establishes an IrLMP connection for a printer with the device discovered.

" **NOTE:** **NOTE:** *Only one open connection is allowed at this time.*

read	returns any data sent by the system. A return count of zero implies that no data is available.
close	The coalescence buffer is sent to the printer and, after having verified that all data is sent to the printer, the IrLMP and IrLAP disconnects are performed (if there is a coalescence buffer being used, refer to the *–n* switch for details).
write	the written character is stored in a local coalescence buffer (with the IrLMP protocol header inserted) until the frame size is reached, at which time the frame is transmitted to the printer. If the –n switch is used, each user write byte count is sent with the IrLMP protocol header inserted without any attempt at local coalescence.
ioctl	This processing is specific to Intermec and is intended to support printing applications. A printing program may hook the DOS INT 24 critical error interrupt and then call the driver's ioctl directly using the information provided by INT 24. The driver responds by setting an extended error code in the application's memory, using a pointer that was passed to it through the ioctl interface.

If an error returns after making an ioctl call, the following list of error codes and descriptions apply:

```
 0  PREADY
    device driver is open – a printer connection is established.
50  IRLAP_DISCONNECT_ERROR
    close failure – a disconnect event state change failure occurred dur-
    ing the disconnect procedure processing.
51  DISCOVERY_FAILURE
    open failure – no devices responded during the discovery procedure.
52  LINK_MANAGEMENT_CONNECT_FAILURE
    open failure – a buffer flushing operation failed during the estab-
    lishment of the link management session with a discovered device.
```

53 TX_BUFFER_DESC_GET_FAILURE
write failure – could not get a transmit buffer descriptor to send the data to the printer.

54 BUFFER_GET_FAILURE
write failure – could not get a transmit buffer to send the data to the printer.

55 BAD_CONNECTION_HANDLE
open, write, or close failure – a defective connection handle was encountered during the flushing of the driver's coalescence buffer.

56 UNKNOWN_TRANSMIT_FAILURE
open, write, or close failure – the link access protocol failed for "unknown" reasons during an attempt to flush the driver's coalescence buffer.

57 WRITE_WITH_PRINTER_NOT_READY
write failure – a write was attempted to the driver while the driver is in an error state.

58 I_QUEUE_FULL
open, write, or close failure – the driver could not get a queue for the transmission of an information frame.

59 CONNECT_FAILURE
open failure – after a successful discover of an IrDA device, a connection could not be established.

60 DRIVER_CLOSED
write, read, ioctl, close failure – an attempt was made to access the driver while the driver was in a closed state.

61 NO_RECURSION
write, read, ioctl, close failure. An attempt was made to recursively access the driver.

62 BAD_LINK_CONTROL_FRAME_SIZE
open failure, link management failure – the system did not receive the correct frame size for a connect confirmation by IrLMP after the IrLAP link session was established with the remote device.

63 LINK_MANAGEMENT_CONTROL_FRAME_EXPECTED
open failure, link management failure – the system did not receive an IrLMP control frame from the remote device after the IrLAP link session was established.

64 NOT_LINK_MANAGEMENT_CONNECT_CONFIRM
open failure, link management failure – the system did not receive an IrLMP connect confirm frame from the remote device after the IrLAP link session was established.

65 RECEIVE_FRAME_FAILURE
open failure, link management failure – the system did not receive the IrLMP connect confirm frame from the remote device that had a successful IrLAP link established.

66 READ_FAILURE_PRINTER_NOT_READY
read failure – an attempt was made to read from the character stream with the connection not in the ready state.

67 READ_FAILURE_PRINTER_IN_NDM
read failure – an attempt was made to read from the character stream with the connection in the normal disconnect mode.

68 READ_FAILURE_BAD_CONNECTION_HANDLE
read failure – an attempt was made to read from the core, and the connection handle used is no longer valid.

69 READ_FAILURE_UNKNOWN_STATUS
read failure – an attempt was made to read from the core that resulted in the core posting an unknown error.

70 WRITE_REQUEST_EXCEEDS_COELESCING_BUFFER
write failure – the user's write buffer is too large to fit in the local coalescing buffer and is being rejected. Present the data to the driver with a buffer size of less than 128 bytes at this time.

Installation and Configuration

Make sure the following file is on the system:

```
NORIRDA.SYS
```

If your system was delivered with an application requiring this file, it should already be in flash. If not, it can most likely be found in the Tool Kit.

Required CONFIG.SYS Entry

The following entry is required in the CONFIG.SYS file:

```
install=d:\pathname\norirda.sys
```

where *d:\pathname* is your specific path to the directory where the printer drivers exist.

Required AUTOEXEC.BAT Entry

There are no required entries in the AUTOEXEC.BAT file for NORIRDA.SYS.

Operational Switches

NORIRDA.SYS has optional parameters.

```
NORIRDA.SYS   [ –? –c –d:n –n:drivername –r:n ]
```

where:

–? Provides information about version, revision level, a command line example, a list of the available switches, and brief descriptions of each

" NOTE: *Use only the switches shown here. This driver is a multi-platform program, providing features for all of the 6000 Series platforms. None of the other switches are intended for the 6110 Computer and could cause a malfunction, if used on this platform.*

–c Indicates the driver should use a local coalescing buffer, rather than present the data to the connected device as it is delivered to the driver.

" NOTE: *Use of this switch creates a situation where the application is no longer assured of the data having been delivered to the connected device when the write returns, as is the case when this switch is omitted.*

–d:n Specifies the disconnect time (in seconds) requested during negotiation, where (n) is one of: 3, 8, 12, 16, 20, 25, 30, or 40. This switch is accumulative and can be used to add any or all of the above disconnect times to the default, which is 3. The two negotiating systems select the largest common value.

–l Specifies that the driver should link on open. This switch causes the driver to behave more like NORIRDA.SYS version 1.0, in that whenever an open is performed the driver initiates an XID, then links to whatever is discovered.

–n:driverName Specifies the new name to which this character device driver should respond. This string must be supplied. The default name for this driver is IRDADRVR.

–r:n Specifies the number of seconds of discovery retries to be performed at the first DOS write command by the driver. The default is 5 seconds.

NPCP Printer: PC4800.SYS

Overview

NPCP printing support under DOS consists of the DOS device driver PC4800.SYS, that allows DOS and PL/N applications written for the 6110 Computer to print to NORAND 4800 and 6800 Series Printers, using the NPCP protocol.

Installation and Configuration

Required CONFIG.SYS Entry

PC4800.SYS is installed as a device driver in the CONFIG.SYS file.

For example:

```
device=pc4800.sys [device name [port number [/Ilpt]]]
```

where:

device name = the name to use for this instance of the device driver. This name opens the device. It can be anything except PRN, and can be up to eight characters long. The default name is NP4800.

port number = the COM port used for output by the driver.
Valid values: 1=COM1, 2=COM2, etc.
Default: COM1

/I = redirects LPT output to the BIOS interrupt 17h API, and is required to support PL/N applications.

lpt = the LPT port to be redirected.
Valid values: 1=LPT1, 2=LPT2, etc.
By default only output directed to the specified device name is captured.

" NOTE: *The order of the command line parameters is important (for example, you must specify a device name if a port number is specified).*

EXAMPLE 1: Redirect LPT2 to COM1: However, do not redirect any LPT2 output at the interrupt 17h (BIOS) interface.

```
device=pc4800.sys LPT2 1
install=4000api.exe ...   { refer to 4000API.EXE for switches }
```

EXAMPLE 2: Redirect all LPT1 output to COM.

```
device=pc4800.sys LPT1 2 /I1
install=4000api.exe ...   { refer to 4000API.EXE for switches }
```

If PC4800.SYS is not in the root directory, be sure to include the path.

The following table lists the meaning for each of the parameters:

" NOTE: *The /i switch is only intended for support of PL/N applications. It should NOT be used for non-PL/N applications. The interface provided is not 100 percent PC-compatible.*

Required AUTOEXEC.BAT Entry

For additional information describing how PC4800.SYS can be loaded, refer to the 4000API documentation in the *Converting Applications* section.

Normally, 4000API.EXE is loaded in CONFIG.SYS using:

```
install=4000API ... {refer to 4000API.EXE for switches}
```

However, if it needs to be loaded high, you must load it in AUTOEXEC.BAT.

Functionality and Usage

Intermec supplies PL/N and C standard printer routines that handle critical errors and the printing of text to NORAND printers. The following information is for those who might want to create their own print routines.

PC4800.SYS must be opened before it can be used. For example, in the C programming language, you can use *fopen()*. Use the correct open call for the language being used that allows writing to the device. Also, the open call used should return an error if the device does not exist. Some open calls will create a file if the device driver is not present.

To write to the device, use any appropriate output function that can be directed to the device (for example, in C programming language, you can use *fprintf()*).

You should install a critical error handler that process errors from the printer. The printer driver returns only "device not ready" errors to DOS for the sake of compatibility with the standard PRINT program supplied with DOS. You can retrieve the extended error by bypassing DOS and calling the driver directly from the error handler.

Ioctl calls (DOS Function AH = 44h, AL = 02h) are supported by the device driver (refer to a DOS reference manual for details). Calls require the printer device handle number in register BX, a data item with the following structure pointed to by DS:DX, and the number of bytes to be read in register CX.

```
struct ioargs {
  far *unsigned char ioctl_cmd;
  far *unsigned char ioctl_buf;
};
```

The following commands may be pointed to by the ioctl_command field for execution by the driver:

```
ONLINE = 2
STATUS = 3
GET DEVICE FEATURES = 4
SELFTEST = 5
RESET  = 6
GET CURRENT CONFIGURATION =7
XTENDED ERROR = 255
```

Data is returned to the buffer pointed to by the ioctl_buf, for the number of bytes specified in register CX when the ioctl call is made. The first byte of the returned data represents any error encountered during the call. If the call was

successful, this byte is set to zero. If the call was unsuccessful, this byte represents the extended error. The format of the rest of the data is described in the documentation for the printer being communicated with.

Notes

The printer driver must be opened and closed for each report transaction with the printer if you want to take advantage of the line-loss detection features of the NPCP protocol. Applications should status (ioctl 3) the printer after the last line of a report or a series of reports are sent to the printer to ensure that all lines were printed successfully by the printer.

The printer driver is multi-tasking. If the application needs to take full advantage of this feature, it must enable time slicing through the appropriate call to INT 15h (refer to the 4000API documentation).

If time-slicing is not activated, the last line buffered by the driver is not sent to the printer until the device is closed or an ioctl status call to the printer is made. You should perform an ioctl status call before all closes to make sure the driver print buffer is sent to the printer successfully, since DOS closes to character devices do not perform output flushes as part of the close operation. The driver flushes the buffer for you upon a close, but no error is returned if the flush is unsuccessful.

PenPrint: PENPRINT.EXE

The PENPRINT.EXE program provides the capability of printing to NORAND printers with appropriate error handling. It is currently shipped with the 6110 DOS Tool Kit.

Installation and Configuration

Command line usage:

PENPRINT [*options*] <*print-file*> <*print-device*>

Where:

print-file = the name of the file that contains the data to be sent to the printer. PenPrint does NOT modify this file in any way. The data is sent "as is" to *print-device*.

print-device = the name of the DOS device driver that provides the interface to the printer (e.g. LPT1).

options:

–a provides a way to cancel the printing of the report when an error message is displayed. If this parameter is not specified, *PenPrint* cancels printing only if a fatal error occurs.

–h displays a help screen.

–m suppresses the "Fix top-of-page" message.

–p disables the use of a pointing device. If this option is not specified, *PenPrint* attempts to auto detect the presence of a touch pad. In some situations it cannot be reliably determined whether such a device is present. In these situations, this option can be used to ensure that the proper prompts are used for error messages (see the *Usage Notes* paragraph below).

–r provides the option to restart the report, after a fatal error has occurred. If you select this option, *PenPrint* does not restart the report itself, but instead returns to the calling application with a return code indicating your choice. It is then up to the calling application to restart the report. This is because a report may consist of a header and trailer, and the calling application may need to make two separate calls to PenPrint to print them, in order to prompt such as "TICKET OKAY?", before printing the trailer. If this parameter is not specified, the only option available after a fatal error occurs, is to cancel the report.

–v<*f*> the name of a file that contains the VOID message. This parameter overrides the default VOID message (see the *Usage Notes* paragraph below) that is sent to the printer when either a fatal error occurs or you cancel the report. PenPrint sends the data in <*f*> to the printer in the same manner that it handles *print-file*, except that error processing is disabled.

If <*f*> is not specified, nothing is sent to the printer after a fatal error. This should only be done if the printer itself prints a VOID message when it detects a fatal error. Otherwise, it is always best to provide an indication that the report is invalid.

Return Codes

0 Report OK; report was not canceled.

2 Report was canceled by the user after a non-fatal printer error.

3 Report was canceled after a fatal printer error.

5 After a fatal printer error, user selected to restart report.

128 An error occurred on a device other than the printer.

253 The print file could not be opened.

254 The display could not be initialized.

255 Invalid parameter or incorrect number of parameters.

Usage Notes

- PenPrint depends upon BGI graphics drivers to implement the graphics needed. Therefore the appropriate BGI driver must reside in the current directory.
- Handling of recoverable errors which require user intervention:
  1. PenPrint displays an error message to the user
  2. PenPrint displays the user's response options: Continue or (optionally) Cancel (refer to –a Parameter)
  3. PenPrint requires the user to select an option
  4. PenPrint restores the display

With ***Continue***, PenPrint continues printing. With ***Cancel***, PenPrint attempts to print a VOID message. If VOID message fails, PenPrint prompts for "Fix-top-of-page". PenPrint then exits with a return code. The calling application provides you the opportunity to change the printer type (optional) or to restart the report (optional).

- Handling of fatal (unrecoverable) errors:
  1. PenPrint displays an error message
  2. PenPrint displays your response options: Cancel and (optionally) Restart Report (refer to –r Parameter)
  3. PenPrint requires you to select an option
  4. PenPrint restores the display
  5. PenPrint attempts to print a VOID message
  6. If VOID message fails, PenPrint prompts for "Fix top-of-page"
  7. PenPrint exits with a return code

8. Restart Report: the calling application restarts the report
9. Cancel: the calling application allows the printer type to be changed (optional) or the report to be restarted (optional)

- If the –v parameter is not specified, the following VOID message is printed by PenPrint (bold double-wide mode):

  VOID * VOID * VOID

This message requires at least a 38-column printer. For printers that have more than 38 columns, the default message is printed at the left margin.

- When printing the VOID message, error handling is disabled (i.e., you see only the error message for the original error). This is because you could be stuck in an infinite loop of error messages in PenPrint, if the original error was a result of a nonfunctional printer.
- If a pointing device is detected and the –p switch is not used, PenPrint displays the choices as buttons/boxes on the screen. The prompts are displayed as “Continue” or “Restart Report” or “Cancel”. Any touch within a box activates that response. If –p is specified, or no pointing device is detected, the prompts display as “[YES] Continue” or “[YES] Restart Report” or “[NO] Cancel”.

Mag Stripe Reader: H2MAGSCN.EXE

Overview

The 6110 Magnetic Stripe Reader (MSR) allows magnetic stripe cards to be read in either direction. When the card is read, the hardware is powered up, then shortly after the read power is removed. Thus very efficient power management is accomplished. The card data is read from the first three tracks and passed to a UART device. The driver interfaces with the UART to control the process of retrieving data.

The 6110 MSR driver controls the hardware to provide the data to the application. The driver can return the data through the keyboard buffer (as usual), keyboard entry, or through the API specified in the SCANBIOS API Interface document.

The hardware may reside at COM port address 0x03E8 with IRQ 6 or 0x0218 with IRQ 11.

Installation and Configuration

Command line options:

Switch	Purpose
–A	Alternate COM port, allows the driver to work with hardware at 0x03E8 (default address is 0x0218).
–E	Permits the scanner to always be enabled to scan or read magnetic stripe cards. When this option is used to re-initialize the driver, the read mode is set to wedge mode again. This is the default mode.
–SCANBIOS	An alternate method of operation (in place of –E). This option permits the enabling and disabling of the scanner under software control (see the *Extended SCANBIOS Interface*). Once the driver is loaded, it can be reinvoked with other command line options to change its behavior.
–Sn	Specifies the Output Field Separator (default API only) for the always enabled mode of operation. The parameter n represents the field separator, where: n = 1 for a carriage return (default) n = 2 for both a carriage return and a line feed n = 3 for a tab character
–RAW	Driver sends data from the card “as is” without parsing.

EXAMPLE: H2MAGSCN –E –S3

Pod Scanner: H2PODSCN.EXE, Tethered Scanner: H2THRSCN.EXE

Overview

Pod Scanner

The program H2PODSCN is the pod scanner. It collects and passes scanned data to an application via the standard DOS type-ahead buffer, where the scanned bar code is available to an application as simple keystrokes. The program also manages power for the scan operations.

H2PODSCN is an internal scanner. Its features are as follows:

- I/O is transferred through the standard DOS type-ahead buffer
- Scanner provides the capability of a fully decoded RS-232 scanner
- Handles SE1223 hardware
- Baud rate: 19200

Tethered Scanner

H2THRSCN is the tethered scanner. Its features are as follows:

- I/O is transferred through the 9-pin D-sub serial port connector
- Scanner provides the capability of a fully decoded RS-232 scanner
- Handles SE1223 hardware.
- Baud rate: 9600

Installation and Configuration

H2PODSCN is generally installed from the AUTOEXEC.BAT file using the following statement:

```
H2PODSCN [–option[value]] ...  (see the Usage paragraph below)
```

This program must be installed after the CardSoft drivers and TSRs are installed (if they are used) and after NORDOSPM.EXE is installed. Also, if CardSoft drivers and TSRs are present in the system, the command line option on NORDOSPM.EXE that “fixes” some CardSoft bugs (/ss:1) must not be used on NORDOSPM.EXE.

Make sure the following files are located in the *C:\Drivers* directory on your 6110 Computer:

```
NORDOSPM.EXE
H2PODSCN.EXE
H2THRSCN.EXE
```

NORDOSPM.EXE should already be in the flash, all other files listed above can be found in the toolkit.

Required CONFIG.SYS Entry

The following entry is required in the CONFIG.SYS file for DOS scanning, because the scanner driver uses features of the APM system:

```
device=nordospm.exe
```

Required AUTOEXEC.BAT Entry

```
h2podscn.exe
h2thrscn.exe
```

Configuration Parameters

The format of the configuration parameters is the same as it is in the SSI protocol in the SE1223 Integration Guide (see the chapter entitled, *Simple Serial Interface*, for the *Param_Send* setting). Even the checksum is included and is used to verify data integrity.

" NOTE: *The default baud rate is 9600, which is determined when Set-all-defaults is scanned. To gain speed, the baud rate is automatically changed to 19,200 (which is the maximum rate), when the H2PODSCN driver is loaded.*

Usage

The pod scanner utilizes command line switches to drive the desired functions. The syntax is as follows:

```
H2PODSCN [<switches>]
```

where <switches> include combinations of the following:

Switches	Description
–?	Either option displays a help screen that briefly describes the various options.
–H	
–C	Appends CR/LF to decoded data.
–E	Enables scanner immediately, and continually, not just when enabled via software API.
–O[n]	Powers off delay, where **n** is the number of seconds from release of the trigger to the time power is removed from the scanner.
–SAVEPARMS	Saves the current configuration parameters to H2PODSCN.PAR.
–SCANBIOS	Uses the SCANBIOS API interface.
–U	Unloads this TSR.

The following is an example command line for the pod scanner:

```
H2PODSCN –E
```

Example Scanner Application

This example scanner testware enables the scanner, displays the DOS keystrokes until the return or newline character is encountered, then it exits.

```
#include <dos.h>
#include <stdio.h>
#include <conio.h>
void main (void) {
  int c;
                  //
  _AH = 0x80;     // collect only one scan, 4500 compatible
                  //
  geninterrupt(0x7a); // thread thru scan tsr
        //
  while ((c != '\n') && (c != '\r')) {
    while (kbhit()){
      c = getch();
      putchar(c);
      if (c == '\n' || c == '\r') break;
    }
  }
}
```

Screen Emulation: 6110RTAT.EXE, FONTSEL.EXE

Overview

6110RTAT.EXE and FONTSEL.EXE are 4000 Series screen emulation programs for the 6110 Computer, in DOS text mode. These programs port applications, written for the 4000 Series platform to the 6110 Computer without modifying the display logic.

6110RTAT is a TSR program that provides screen rotation and FONTSEL switches between fonts which are already loaded, or loads a new user defined font.

6110RTAT and FONTSEL provide 4000 Series screen features, such as:

- Character mapping
- Cursor fixed mode
- Variable font sizes (20, 21, or 16 characters across the screen)

6110RTAT and FONTSEL.EXE work together providing several font selections, as described below.

These programs replace the standard VGA BIOS interface for the 6110 Computer with a 4000 Series compatible video BIOS interface. Since they replace the standard VGA BIOS, standard VGA calls are not available once 6110RTAT and FONTSEL are loaded. The 6110RTAT utility provides a rotate INT 10 interface that rotates the INT 10 calls into a portrait mode. It filters out video BIOS calls.

6110RTAT and FONTSEL work only with the 320x240 pixel display of the 6110 Computer. In the absence of command line switches, the default mode for 6110RTAT and FONTSEL are as follows:

- Cursor chase video mode
- 8x16 bitmap font
- Inverse mode on (characters above 127 are mapped to inverse video characters 0–127 when the high bit is turned off)
- Cursor turned off

Command Line Switches: 6110RTAT.EXE

The format for the 6110RTAT command line is as follows:

```
6110RTAT [x y [width height]] [–Repaint_scroll] [–Nowrap] [–PLN]
        [Disable]
```

The brackets [ ] indicate optional parameters.

Each of the parameters are described the following table:

Parameters	Description
x y	Coordinates of the upper-left corner of the display
width height	Window size and rotated position of the display, under which the INT 10 calls are limited or emulated
–Repaint_scroll	Causes the rotated BIOS to repaint the screen on all scroll operations, which is much slower, but very compatible
–Nowrap	Causes the screen to truncate at the right margin, instead of wrapping to the next line
–PLN	Applies hacks to support the PLN error screen
–Disable	Disables the screen rotation driver, which remains in memory, and can be reenabled by running it again

The –PLN parameter is used for PL/N applications.

Command Line Switches: FONTSEL.EXE

This utility either switches between fonts that are already selected or loads a new defined font. It works in conjunction with 6110RTAT. The command line options are as follows:

```
FONTSEL [<font_number>] | [<font_number>=<[path\]font_file_name>]
```

If the format includes the font_number only, then the current active font is selected, where <font_number> is one of the following:

0	sets up the display for 8x8 pixels per character, resulting in a 40-column, 30-line display
1	sets up the display for 8x16 pixels per character, resulting in a 30-column, 20-line display
2	sets up a user-selectable display

If the file name (and optional path) is included, the font represented by the font number supplied is replaced by that which is defined in the font file, where:

<font_number>	represents the font number
path\	is the DOS path where the font file is located
<font_file_name>	represents name of font to be loaded

" NOTE: *The current default font (and maximum font size) is 12x24.*

If you replace the currently used font, you must also select the font again to cause the new character size to be used. If not trashed, it shows up on the display.

The format of a font file is as follows:

```
Version      dw   1
Char_width   dw   ?
Char_height  dw   ?
Font_data    db   ? dup(?)
```

The 8x8 and 8x16 fonts can only be replaced with an 8x8 and 8x16 font. The user font can be replaced by any size font that meets the following requirements:

- Width must be a multiple of 4.
- Height must be a multiple of 8.
- Total size of the font data cannot exceed 9216 bytes, which is the size of the 12x24 font.

BGI Support

N6110.BGI is a custom Borland Graphics Interface (BGI), and is located in the DOS Toolkit. It develops Borland graphics based applications for this display. One way to use this in a DOS application is to keep the application and the BGI driver separate. This requires loading the driver from your application. The calls for this are documented in the Borland C++ DOS Reference book. Start with *installuserdriver*. This is the method used by CALIB.EXE, described elsewhere in this section.

You will need the following file:

```
N6110.BGI       Real mode PENKEY.BGI driver
```

Using the N6110.BGI Driver

The driver "plugs in" to the Borland BGI graphics library via the *installuserdriver()* function. Mode selection is accomplished through a series of *#define* symbols in the BGIDEMO.C file.

" NOTE: *You may initialize and close the driver as many times as you desire during a program run, but only call installuserdriver( ) once and save the value returned for use in subsequent driver initializations.*

Bitmap Text Output

The standard Borland BGI drivers do not fill the background color when rendering the bitmap font, which means the text must be erased before it can be written over, and erasure requires the use of the *bar( )* function to clear the text area (text cannot be written over with new text or spaces). Most developers find this behavior troublesome.

The N6220.BGI driver fills the background of bitmap text, eliminating tedious text erasure gyrations. This new text mode is set using the BGI setwritemode() function and passing the BGI_NIFTYTEXT constant (defined in N6220.H). To go back to normal BGI text rendering, pass BGI_NORMALTEXT to the setwritemode() function.

BGI Demonstration Files

If you want to copy and modify the demo file, BGIDEMO.C, for your own needs, be sure to copy other files included with *#include* lines found in the demo file.

Refer to *Borland C++ DOS Reference* for additional information.

FTP Software Drivers

TCP/IP communications on the 6110 Computer is accomplished using drivers from FTP software.

Bootstrap Protocol: BOOTP.EXE

BOOTP is an Internet protocol that enables a diskless client computer to determine its own IP address, the IP address of a server host, and the name of a file to be loaded into memory and executed.

Configuration

BOOTP.EXE uses the following command line format:

```
bootp [–nuvw] [–l <seconds>] [–r <number>] [–t <seconds>]
      [ini_file] [–version] [–?]
```

where the items in brackets [ ] represent the following:

–?	Displays help screen including switches and descriptions.
–l <seconds>	Sets requested lease time in seconds.
–n	Specifies that kernel settings are not to be changed.
–r <number>	Sets maximum number of retries.
–t <seconds>	Set maximum timeout in seconds.
–u	Unloads DHCP module.
–v	Sets verbose mode.
–version	Displays the current version.
–w	Writes to PC/TCP configuration file.
inifile	Uses an alternate configuration file, as specified.

BOOTP Protocol

The Bootstrap Protocol (BOOTP) is a UDP/IP-based protocol which allows a booting host to configure itself dynamically and without user supervision. BOOTP provides a means to notify a host of its assigned IP address, the IP address of a boot server host, and the name of a file to be loaded into memory and executed. Other configuration information such as the local subnet mask, the local time offset, the addresses of default routers, and the addresses of various Internet servers can also be communicated to a host using BOOTP.

Dynamic Host Configuration Protocol: DHCP.EXE, DHCPHLPR.EXE

DHCP.EXE and DHCPHLPR.EXE are executables that provide DHCP client support for FTP's DOS kernel, ETHDRV.EXE. These clients also accept replies from BOOTP servers.

Configuration

Both of the executables use the same command line format and parameters as BOOTP.EXE.

ETHDRV.EXE must be loaded first followed by DHCP.EXE. It is not necessary to explicitly load DHCPHLPR.EXE.

DHCP Protocol

The Dynamic Host Configuration Protocol (DHCP) provides a framework for passing configuration information to hosts on a TCP/IP network. DHCP is based on the Bootstrap Protocol (BOOTP), adding the capability of automatic allocation of reusable network addresses and additional configuration options.

From the client's point of view, DHCP is an extension of the BOOTP mechanism. This behavior allows existing BOOTP clients to interoperate with DHCP servers without requiring any change to the clients' initialization software.

IP Address Allocation Mechanisms

DHCP supports three mechanisms for IP address allocation. A particular network may use one or more of these mechanisms.

- Automatic allocation — DHCP assigns a permanent IP address to a client.
- Dynamic allocation — DHCP assigns an IP address to a client (for a limited period of time, or until the client explicitly relinquishes the address).

  This mechanism simplifies network administration because the software keeps track of IP addresses rather than requiring an administrator to manage that task. This means that a new computer can be added to a network without the hassle of manually assigning it a unique IP address.

  This is the only one of the three mechanisms that allows automatic reuse of an address that is no longer needed by the client to which it was assigned.
- Manual allocation — a network administrator assigns a client's IP address, and DHCP is used simply to convey the assigned address to the client.

DHCP Message Format

The format of DHCP messages is based on the format of BOOTP messages, to capture the BOOTP relay agent behavior described as part of the BOOTP specification and to allow interoperability of existing BOOTP clients with DHCP servers. Using BOOTP relay agents eliminates the necessity of having a DHCP server on each physical network segment.

DOS TCP/IP TSR Kernel: ETHDRV.EXE

Description

ETHDRV.EXE is the DOS TCP/IP TSR kernel from FTP. It generates Ethernet II frame types. It can be unloaded from memory using 'inet unload'. It expects to find an environment variable like 'PCTCP=c:\pctcp.ini' where it can find a configuration file. This is the unprotected, unserialized version of the kernel, so the usual serial number and authentication key pair are not required.

Configuration

ETHDRV.EXE uses the following command line format:

```
ethdrv [–?] | [–version]
```

or

```
ethdrv [–Bm] [–b <address>] [–i <number>]
       [–p <lg_pkt_count>] [–s <sm_pkt_count]
       [ t <maxtcpconn>] [–u <maxudpconn>]
```

where the vertical bar represents an 'exclusive or' function (one item only) and the items in brackets [ ] are optional and represent the following:

–?	displays the help screen including these switches and their descriptions
–version	displays the current version
–B	uses BSD-style urgent pointers
–m	enables use-emm option
–b <address>	sets non-standard IP broadcast address
–i <number>	sets interrupt number
–p <lg_pkt_count>	sets the large packet count
–s <sm_pkt_count>	sets the small packet count
–t <maxtcpconn>	sets maximum number of simultaneous TCP connections
–u <maxudpconn>	sets maximum number of simultaneous UDP connections

Display Configurations, etc.: INET.EXE

Description

INET.EXE is part of the FTP. It displays configurations, statistics, IP routing table, and active TCP connections. It can also unload the PC/TCP kernel from memory.

Configuration

It uses the following command line format:

```
inet [arguments]
```

Arguments to inet.exe are as follows, where the vertical bar represents an 'exclusive or' function (one item only) and the items in brackets [ ] are optional:

arp	lists the ARP cache
config [advanced | security]	displays the kernel configuration
debug	displays hardware error statistics
help	displays a help screen, including the command line format and these arguments
ipcp [stats | config]	lists IPCP layer statistics or configuration
lpc [stats | config]	lists LPC layer statistics or configuration
pap	lists PAP layer statistics
ppp	lists PPP driver statistics
route	lists IP routing table
slip	lists SLIP driver statistics
stats	displays network statistics
tcp	lists active TCP connections
unload	unloads the PC/TCP kernel
version	displays version numbers of PC/TCP kernel

ODI Packet Driver: ODIPKT.COM

Description

ODIPKT.COM is an ODI Packet Driver for FTP.

Command Line Switches

ODIPKT has the following switches:

```
ODIPKT [?] [unl] [SINT=XX] [MLID=NAME] [FRAME=FRAME-STRING]
```

where:

?	displays command line switches syntax similar to this list
unl	causes ODIPKT to be unloaded
XX	the software interrupt number (Range: Hex 60–80, default: 60)
NAME	an MLID with ETHERNET_II, ETHERNET_SNAP, or TOKEN-RING_SNAP support. Default: ETHERNET_II or TOKEN-RING_SNAP (first found)
FRAME-STRING	the media type (ETHERNET_II, ETHERNET_SNAP, or TOKEN-RING_SNAP)

" **NOTE:** *Name and Frame strings are case sensitive.*

Trivial File Transfer Client/Server: TFTP.EXE

Description

This is the trivial file transfer client/server for FTP. TFTP is generally used at boot time following a BOOTP request to retrieve some kind of start-up file. The response from the BOOTP server generally contains the server IP address and the name of the file to retrieve.

Command Line

TFTP uses the following command line format:

```
TFTP serve

TFTP {get|overwrite|put} <local file> <host> <foreign file>
     [image]
```

where:

serve	starts TFTP server
get	retrieves a file from another machine; a get operation fails if local file already exists
overwrite	retrieves a file from another machine, overwriting local file if it exists
put	transfers a local file to another machine
local file	names file on local machine
host	is IP address of host machine
foreign file	names file on the host machine
image	transfers file in binary mode

LAN Communications: MININET.EXE

Description

MININET.EXE provides communications over Local Area Networks (LANs).

Installation and Configuration

To load MININET, add a command line to the AUTOEXEC.BAT file, according to the following syntax:

```
MININET.EXE  [–s#] [–c#] [–t#]
```

All parameters are optional, as designated by the brackets [ ]. You replace '#' with a value that is appropriate for each parameter, according to the purpose as described below:

–s# sets the speed of communication. The default baud rate is 500 KB, but automatically adjusts to the baud rate of the host. If this switch is not used, the default baud rate is 500 KB, otherwise the speed can be set to any of the following values:

5000 = 500 KB
4608 = 460.8 KB
1152 = 115.2 KB

" NOTE: *The only baud rates currently supported by Intermec/Norand Host code for LAN communications are: 500 KB and 115.2 KB. The 460.8 KB baud rate is reserved for future use.*

–c# sets the default COM port to be used.

" NOTE: *Supplying this switch prohibits an application from selecting a COM port via the NCB CALL used to establish a session. In this way it is possible to force which COM port is to be used.*

–t# sets the secondary baud rate to automatically toggle between the primary and secondary baud rates, depending on the speed of the host. A value of zero indicates that only the default baud rate is used (set with –s switch). Any of the baud rate values listed above are valid for this switch.

RS485 Communications: RS485ATT.COM

Overview

RS485ATT provides communications over Local Area Networks (LANs).

is the RS-485 version of OWLATTCH.COM that was originally developed for Proxim radio enabled handheld computers. RS485ATT.COM sends periodic OWL protocol 'attach' messages to refresh their route table entries in the Access Point (AP). RS485ATT.COM must receive an attach response before it accepts the fact that it is successfully attached to the AP. RS485ATT.COM also passively determines the host's IP address and includes this information in the attach message. The AP then uses this information to provide the so-called Proxy ARP services.

RS485ATT.COM performs the task of a protocol driver in the ODI specification from Novell.

The RS485ATT.COM module attempts to attach to an AP, looking for a response. If no response is received it will retry up to 10 times (in 3 sec intervals). After completing 10 retries, it waits for 3.5 minutes before attempting it again. If an attach response is received then RS485ATT remains silent for 3.5 minutes, at which time it attempts to attach again.

If a TCP/IP protocol driver is present and active, RS485ATT.COM attempts to determine the host's IP address and puts the address in the attach message so the AP can become aware of it and use Proxy ARP services on the RS-485 LAN. RS485ATT.COM determines the IP address by "sniffing" ARP requests as the TCP/IP driver sends them. If the TCP/IP driver changes its IP address (via BOOTP or DHCP) and the RS485ATT.COM module becomes aware of the change, the module will immediately send an attach message to the AP with the updated IP address in it. The RS485ATT module also detects whether or not AC power is present. If it is present, that is an indicator that the 6110 Computer is in the dock and able to participate in RS-485 communications; RS485ATT attempts to send attach messages. If AC power is not present, the RS485ATT holds itself in a reset state and attempts an attach as soon as AC power is applied.

The first attach message is sent 3 seconds after the module is loaded or after AC power is applied. If the IP address changes, an attach message is sent 1 second after the address change is detected.

ODI Layer Interface

RS485ODI.COM provides a standard ODI layer interface to an RS-485 based network. It autoselects either COM1 or COM2, based upon the terminal type.

DOS Utilities

Configuration Utility: SC400CFG.COM

This utility provides configuration for timers, activity monitors, keypad, and features such as: standby/radio, powerfail, enable/disable suspend key, processor slowdown percent, system clock slowdown rate. The SC400CFG.INI file is located in your Windows 95 configuration, under the *\6110\SC400CFG* folder on your boot PC Card, or on the Win95 Toolkit in the *\Config\Sc400cfg* folder.

For additional information, refer to *\Config\Sc400cfg\6110sc40.htm* on the Win95 Toolkit CD.

Remapping Keypad

You can remap all keys on the keypad, including the shifted and unshifted keys, with the exception of the **[I/O]** key (suspend/resume) or the **GOLD** shift key.

" NOTE: *Before reprogramming certain keys, consider the affect it might have on other operations. For example, remapping the **[1]** and **[2]** keys would lose the contrast adjustment.*

Configuring Power Management

Advanced Power Management (APM) software is implemented to coordinate power-saving operations between applications and the hardware.

Using SC400CFG

Overview

You can use this configuration utility to reconfigure any part of your system, such as the keypad or power management. First, make a copy of the example SC400CFG.INI file (from Toolkit CD). You can also change the name of your copy of the INI file.

The example SC400CFG.INI file lists all the parameters that can be reconfigured. Your copy should include only those parameters that you intend to change. Delete all others.

After modifying your configuration file, add the following line to your AUTOEXEC.BAT file on the PC Card, then reboot.

```
sc400cfg.com [options]
```

If your configuration file has a different name, be sure to specify that name in the command line, as described below in the *Command Line Switches* paragraph. If an INI file is NOT specified, SC400CFG.INI is used, if available. Also refer to that paragraph for other details concerning the [options].

" NOTE: *SC400CFG.COM is a DOS utility, which means the only way you can execute it is from the AUTOEXEC.BAT file before Windows 95 is run. It cannot be executed from a DOS window under Windows 95.*

Command Line Switches

Usage:

```
SC400CFG.COM <options>
```

where <options> include the following:

–?	(displays a help list similar to that shown here)
–F:<filename>	(specifies file with setting changes) DEFAULT = SC400CFG.INI
–S:<section>	(specifies section in file to use)

Example:

```
SC400CFG  –F:MyConfig.ini  –S:NewConfigs
```

where *MyConfig.ini* is the name of your configuration file and the [*NewConfigs*] section of the configuration file contains the applicable settings.

Omitting the –F parameter defaults to the default configuration filename, SC400CFG.INI.

Omitting the –S parameter tells SC400CFG.COM to use the [Default] section of the configuration file.

Create Download Include File: IPLFMT.EXE

Description

Given a list of files, IPLFMT.EXE creates a download include file by concatenating a list of the initial program files to be loaded onto a 6110 Computer, prefixing each file with an appropriate DOSFIL header. Refer to the *PL/N File Descriptor for Binary Files* paragraph in the *Communications* section, for a description of these headers.

Configuration

To create a network download file, use the following format:

```
iplfmt.exe <list file> <include file>
```

where:

list file is the name of the file that contains a list of files to include

include file is the name of the download include file, such as DOWNLOAD.INC (this file is created by IPLFMT.EXE)

IPLFMT.EXE also extracts files from a network download file, using the following format:

```
iplfmt.exe –r <include file> [<path>]
```

where:

include file is the name of the download include file, such as DOWNLOAD.INC (this file is read by IPLFMT.EXE)

path is the name of the output directory where the files are to be extracted; this parameter is optional

A download list file contains the names of the files to be sent to your hand-held computer (HHC). Each line in the file specifies one name. The file names may include path information so that all of the files need not be in the same directory on the host. However, the file is transmitted without the source path information, and placed in the current directory of your HHC.

To specify a destination path or to rename a file on your HHC, use a line with the following format:

```
"newname=oldname"
```

This causes the file "oldname" to be read from the PC and transmitted to your hand-held computer with the name "newname". Both "oldname" and "newname" may include path information.

The following is a sample download list file:

```
\App\app.lzh=app.lzh
\config.sys=config.sys
```

Drive Mapping Utility: MAPDRIVE.EXE

This utility works much like SUBST.COM, in that you can assign drive letters to other drives. However, one major difference is that deleting a drive assignment with MAPDRIVE.EXE means the drive letter becomes an invalid drive, whereas deleting a drive assignment with SUBST.COM means that only the drive assignment is invalid.

To assign a path to a drive letter, use the following syntax.

```
mapdrive.exe d=[path]
```

The following example assigns path (E:\temp) to drive A:.

```
mapdrive.exe A=E:\temp
```

To delete an assignment, use the following syntax, where "d" represents the drive letter assignment you want to remove:

```
mapdrive.exe d=
```

You can also perform multiple drive mappings with a single command line. The following example deletes drive assignments for A: and B:.

```
mapdrive.exe A= B=
```

File Integrity Verification Utility: CRC32.EXE

The DOS Toolkit contains a utility, CRC32.EXE, which computes a 32 bit Cyclic Redundancy Check (CRC–32) on a set of files. This check is computed using a complex mathematical equation, resulting in a unique CRC-32 value that guarantees accuracy of file transfer so that even a minor change to a file results in a dramatically different CRC. This CRC value can be used to validate whether files on your system have become corrupt.

To verify the integrity of a file, run CRC32.EXE to calculates the 32-bit CRC value. Then compare that value with the factory CRC value. All factory CRCs are listed in RELNOTES.TXT file in the Tool Kit.

Usage is as follows:

```
CRC32 [@][filename | pathname] [/s]
```

where:

filename is the name of the file on which the CRC is calculated.

pathname is the location of the filename to be processed.

/s indicates that all subdirectories should be searched for matching filenames.

@ is (optionally) included to indicate that *filename* is an argument file, containing names of files to be checked. A valid argument file for CRC32.EXE has the same format as an argument file for the IPLFMT.EXE program.

" NOTE: *Wildcard processing in the filename is only allowed on the command line, but not within the argument file. CRC32.EXE processes directories with any attribute set, such as 'read-only'.*

" NOTE: *CRC32.EXE processes directories with any attribute set, such as read-only, etc.*

One or more files or directories can be processed at one time. For command line help, use the */?* switch.

Multi-Purpose Delay Utility: DELAY.EXE

Overview

Delay.exe serves the following functions:

- Displays a message to the screen (similar to the Echo command)
- Waits for specified amount of time before continuing (similar to the Sleep command or DOS 6 Choice command with a time-out specified)
- Pauses execution of the system until a key is pressed (similar to the Pause command)
- Returns an error level based on which key (if any) was pressed (similar to the DOS 6 Choice command)

The first three of these functions can be performed even when Delay.exe is loaded as a device driver. Since the error level concept does not apply to CONFIG.SYS processing, the fourth function applies only to command line (or batch file) execution.

To perform each of these functions:

1. To display the message *Press any key to continue. . .*, no command line parameters are required. To display one or more different messages, supply the new messages within quotes on the command line. Each quoted text string displays on a separate line. A null message (“”) can be used to display a blank line. To keep the cursor positioned immediately following the last character displayed, do not supply the trailing quote (”). To display a message without waiting for either a timeout or a keypress, specify a delay timeout of zero (/0).
2. To force Delay.exe to exit after a period of time has elapsed, even if no key has been pressed, specify the “/nnnn” switch anywhere on the command line, even within quoted text. The value of nnnn is the decimal value for the number of hundredths of seconds that must elapse before Delay.exe automatically exits. The maximum delay is about 640 seconds (or about 10 minutes).
3. None of the command line parameters are required to cause Delay.exe to wait for a key press. Delay.exe always exits whenever a key is pressed, even if it is waiting for time to elapse. There is one exception. The use of the /K parameter locks the keyboard during execution of Delay.exe.
4. When Delay.exe is executed from a command shell, as opposed to being loaded as a device driver, the error level set (upon return) is based on the key, if any, that was pressed prior to exiting. The return value is specifically geared to make it easy to tell which numeric key was pressed.

Syntax

```
[device=]Delay[.exe] [/nnn [/K]] {"Message(s)"}
```

where:

device= provides a means to load Delay.exe as a device driver.
When loading Delay.exe as a device driver the full pathname for the executable must be specified, as follows:

```
device=c:\utils\delay.exe
```

When executing Delay.exe on the command line, omit "device=" and only include the full pathname for the executable if that path is not in your PATH environment variable.

/nnn forces Delay.exe to timeout, by specifying a timeout period. The timeout period (nnn) is specified in hundredths of a second. Therefore, /100 would cause Delay.exe to timeout after one second. Note that if you are using Delay.exe from a DOS box under Windows, the timeout duration is longer than expected due to the way Windows implements the timeout function.

/K disables the keyboard while pausing, use the /K switch. Note that the /K switch can only be specified after a timeout value is also supplied. Otherwise there would be no way for the delay to terminate. Without this switch, the delay terminates whenever a key is pressed, even if a timeout is specified.

{"Messages(s)" One or more messages can be specified on the command line. Each message starts with a quote (") that is not displayed. If a trailing quote (") is not supplied, then the cursor remains positioned immediately following the message. Otherwise a carriage return and line feed is issued at the end of the message. The default message is "Press any key to continue..."

Errorlevel return values:
When Delay.exe is run as a command, the errorlevel set (at the completion of the delay) can be used to determine which key was pressed, or the fact that a timeout occurred instead of a keypress. The return value is designed to make it easy to tell which numeric key was pressed. Below is a table of the common values for which you might check:

Table 4-3
DELAY.EXE Error Levels

Error Level	Key Pressed
0	'0'
1	'1'
2	'2'
3	'3'
4	'4'
5	'5'
6	'6'
7	'7'
8	'8'
9	'9'
221	The ENTER key
235	The ESC key
12 to 154	The value returned consists of the key value minus 30h.
255	No key was pressed; the time expired first

Simple examples:

Standard PC Function	6110 Command(s) Required to Perform Function
Pause	Delay.exe
Wait for '1' to be pressed	:Loop Delay.exe "Press '1' to continue... if not errorlevel 1 goto Loop if errorlevel 2 goto Loop
Echo "message"	Delay.exe /0 "message"
Sleep 100ms	Delay.exe /10 ""
Echo "Pause for 1 second Sleep 1 second (with keyboard disabled)	Delay.exe /100 /K "Pause for 1 second"
Choice /c:12 "message"	Delay.exe "message" If Errorlevel 3 goto InvalidDigit If Errorlevel 2 goto PressedTwo If Errorlevel 1 goto PressedOne
Echo "message two" Pause	Delay.exe "message two" "Press any key to continue... "

System Reset Utility: RESET.EXE

RESET provides the means for batch files or other software to reset the system.

Section 5
Open Systems Publications

This section contains a list of publications that are referenced from previous sections, or publications that may be good references for application development.

" NOTE: *Order all publications from Intermec Technologies Corporation through your Intermec Sales Representative.*

Software Interface

- ***APM BIOS Interface Specification 1.1***
  Intel Corporation
  Literature Distribution Center
  P.O. Box 7641
  Mt. Prospect, IL 60056-7641
  (800) 548-4725
  Publication Order Number: 241704-001
- ***Handwriter Recognition System for Windows User's Guide***
  Communication Intelligence Corp. (CIC)
  Order through your Intermec Sales Representative
  Intermec P/N: 961-054-001
- ***Handwriter Recognition System for Windows Release Notes***
  Communication Intelligence Corp. (CIC)
  Order through your Intermec Sales Representative
  Intermec P/N: 961-054-002
- ***Handwriting Recognition System, HR-1200, User Manual***
  Synaptics
  Order through your Intermec Sales Representative
  Intermec P/N: 961-054-007
- ***Microsoft Developers CD***
  A technical reference for developers; published quarterly on CD. For information contact:
  Microsoft Developers Network
  One Microsoft Way
  Redmond, WA 98052-6399
- ***PCMCIA Standards Organization***
  Personal Computer Memory Card International Association
  1030 East Duane Avenue, Suite G
  Sunnyvale, CA 94086
  ISBN: 408-720-0107

- ***System BIOS for IBM PC's, Compatibles, and EISA Computers, Second Edition***
  Phoenix Technologies LTD.
  Addison-Wesley Publishing Company
  ISBN: 0-201-57760-7
- ***Windows Internals***
  Matt Pietrek
  Addison-Wesley Publishing Company
  ISBN: 0-201-62217-3
- ***Windows SDK (Microsoft, Borland)***
  Visual Basic Reference
- ***Writing TCOM Modules in PL/N* for the Hand-Held Computers**
  Intermec Technologies Corporation
  P/N: 541-002-523

Hardware Interface

- ***Intel Peripheral Components 1991***
  Intel Literature Sales
  P.0. Box 7641
  Mt. Prospect, IL 60056-7641
  ISBN: 1-55512-127-6
- ***Motorola Microprocessor, Microcontroller, and Peripheral Data Volume II DL139***
  Motorola Literature Distribution
  P.O. Box 20912
  Phoenix, AZ 85036
- ***PCMCIA Controller Data Book***
  CL-PD6710/PD6720 Advanced Data Book
  Cirrus Logic, Inc.
  3100 West Warren Ave.
  Fremont, CA 94538
  ISBN: 510-623-8300

Appendix A
Advanced Utilities

This section includes the process of installing a Minimal Windows 95 configuration to a small PC Card, as well as instructions describing how to configure your 6110 Hand-Held Computer with the missing, but very necessary, files that make it possible for your applications to run correctly.

" NOTE: *This information is intended for Windows 95 configuration experts. The process of installing a Minimal Windows 95 configuration onto your 6110 Computer, is VERY effort intensive.*

Overview of Minimal Windows 95

A Minimal Windows 95 configuration makes it possible for you to include both the Windows 95 configuration and your application on a small PC Card (such as 20 or 40 MB). However, these minimal configurations have extremely limited functionality, and do NOT contain all the necessary files that are needed to run your applications. A very effort intensive activity is required to add those needed files, as described later in this section.

" NOTE: *Intermec does not support the 20 MB load. It is included only for experimental purposes by Windows 95 configuration experts. If you decide to configure your Windows 95 load on a 20 MB card, it is to be done at your own risk.*

" NOTE: *The following terms are used in this publication for consistency:*
"PC" refers to your desktop or laptop computer.
"PC Card" refers to an ATA flash card.
"hardcard" is a common term for a spinning media hard drive card.
*Refer to the **Glossary** section of this publication for definitions of these and other terms.*

Minimal Windows 95 Configurations

Intermec Technologies Corporation currently provides two types of Minimal Windows 95 configurations:

- Base Minimal Windows 95 image, which contains:

  Dial-up Networking
  TCP/IP Network Protocol
  MS Client for Networking
  TDK Modem Driver Installed
  INF Files present on PC Card (for plug and play)

  This version consumes approximately 23 MB of space.

" NOTE: *If you have a 20 MB PC card, the image is installed as a Drivespace 3 compressed image. The actual size of the compressed disk varies, but typically there is about 32 MB of usable disk space.*

The INF files consume approximately 6 MB of disk space and are typically not needed once your configuration is set up. Therefore, when the configuration is complete, the INF files can usually be deleted, thereby reducing the configuration to approximately 16 MB.

- Customizable Minimal Windows 95 configuration.

  This allows you to select from a small subset of Windows 95 options to create a unique minimal configuration.

Using either of these minimal configuration options requires a substantial amount of integration work on the part of the application developer, in order to determine which files (needed by the application) are missing from the configuration. Some tools are provided in this toolkit. But the process can be VERY labor intensive. Use with caution.

SanDisk PC Cards

There are several PC Card sizes you can use for a Minimal Windows 95 configuration, which includes the following:

- **20 MB** — Contains Drivespace 3 compressed Minimal Windows 95 configuration, leaving approximately 8 MB of space available for your application and virtual memory (if enabled).
- **40 MB** — Contains an uncompressed Minimal Windows 95 configuration, leaving approximately 28 MB for your application and virtual memory (if enabled).

A preconfigured 20 MB PC Card with a Minimal Configuration can be ordered from Intermec. Check with your Intermec sales representative for other options.

" NOTE: *Regardless of the Windows 95 configurations and media listed in this publication, Intermec reserves the right to add, remove, or make changes to the availability and contents of these items, at any future release.*

Installation of Minimal Windows 95 Configuration

Starting the *Minimal Windows 95 Installation*

Figure A-1 is displayed when you select the ***Minimal Windows 95 Configurations*** option from the screen shown in Figure 2-6 in the 6110 Windows 95 Toolkit section.

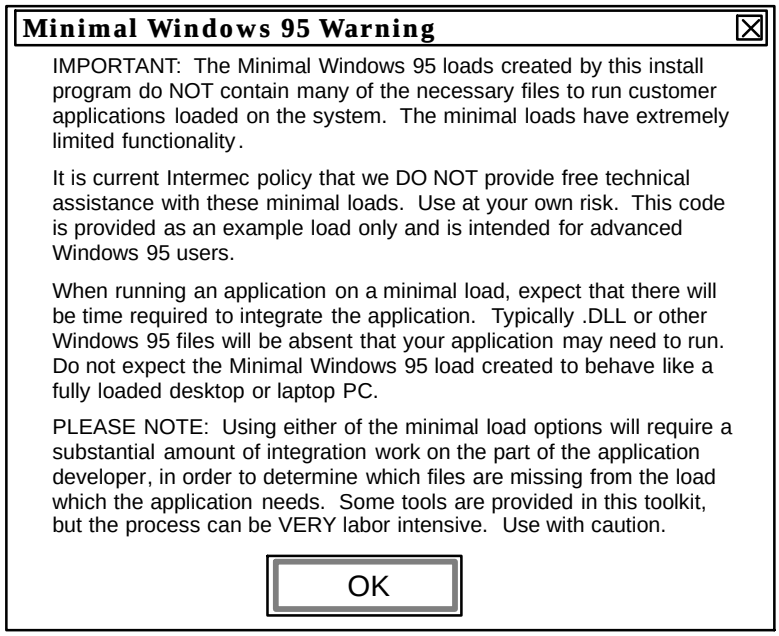


Figure A-1
Minimal Windows 95 Warning

Consider the above warning carefully before continuing. The process of configuring your minimal configuration, from the standpoint of application development, is VERY effort intensive.

Click **OK** to continue, even if you want to cancel the installation of the minimal configuration. Then to abort, click **Cancel Install** in the screen shown in Figure A-2.

Selecting a Minimal Windows 95 Configuration

When Figure A-2 is displayed, you are presented with a choice of Minimal Windows 95 configurations.

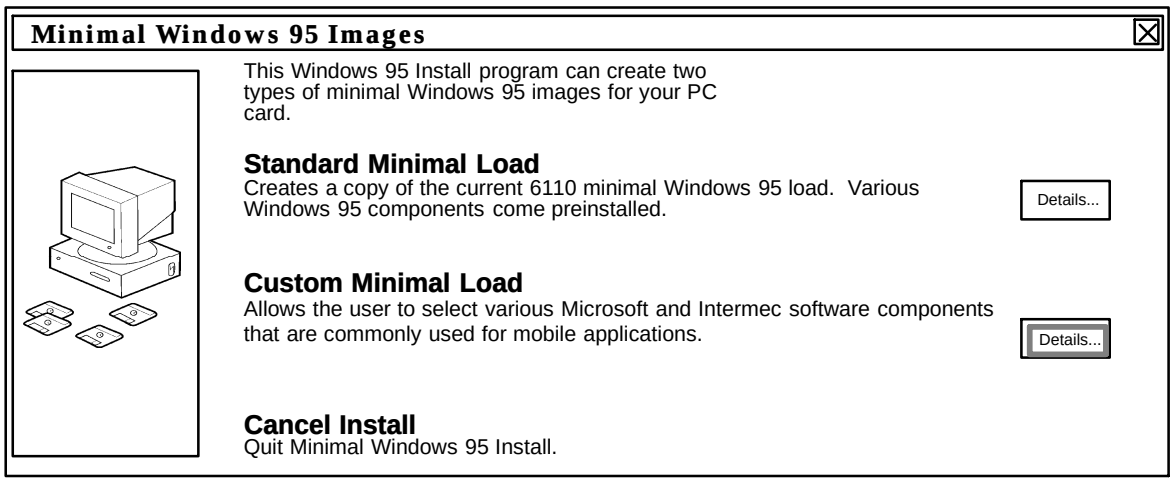


Figure A-2
Select Minimal Windows 95 Configuration

Figure A-2 provides you with a selection of configurations. Click on a highlighted title to create one of the following configurations. A 20 MB PC Card requires Drivespace 3 compression.

- **Standard Minimal Configuration** — This option creates a standard Minimal Windows 95 configuration on a PC Card. This configuration is approximately 30 MB in size.
- **Custom Minimal Configuration** — This option allows you to select only the necessary components needed for a particular Windows 95 configuration. You can install this configuration on a 20, 40, or 85 MB PC Card. The size of the configuration varies depending on the options you choose.
- **Cancel Install** — This option returns you to the main Welcome screen shown on page 2-9.

The instructions for installing these configurations are described on the following pages.

Installing the Selected Minimal Windows 95 Configuration to PC Card

Standard Minimal Windows 95 Configuration

Selecting **Standard Minimal Configuration** from the options above, prepares your PC Card for this minimal configuration. If your PC Card does not contain a compressed volume, you may be prompted to create one.

A screen is then displayed (as shown in Figure A-3) where "XX Meg" would be replaced with the actual size of your PC Card and "X:" would be the drive to which your PC Card is assigned. Make sure the drive letter is correct before continuing.

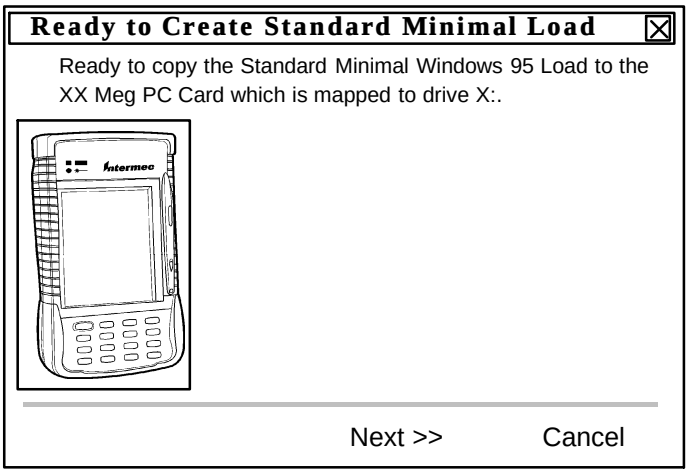


Figure A-3
Ready to Install Minimal Configuration

After clicking **Next**, the Win95 Install program creates an image file for the minimal configuration and copies it to your PC Card. This takes awhile to complete.

After the install program has written the image to your PC Card, a screen is displayed with options to install specific drivers.

- Internal Scanner Driver 30 k
- External Scanner Driver 32 k
- IrDA Install Program 1128 k
- Proxim RangeLan2 Install Program 821 k
- Intermec NPCP Printer Install Prog. 223 k
- Intermec 6805 Printer Driver 203 k
- Magnetic Stripe Reader Driver 77 k

Click the checkboxes to the left of each option you want. The *Disk Space Remaining* provides you with advance notice of the available space on your PC Card after copying these files. This number is updated as you select each option. Click **Next** to continue.

" NOTE: *These drivers are copied to your PC Card, but are not installed. To install them, follow the instructions for each driver, as described in the Windows 95 Support section.*

After copying the additional options to your PC Card, the following figure is displayed.

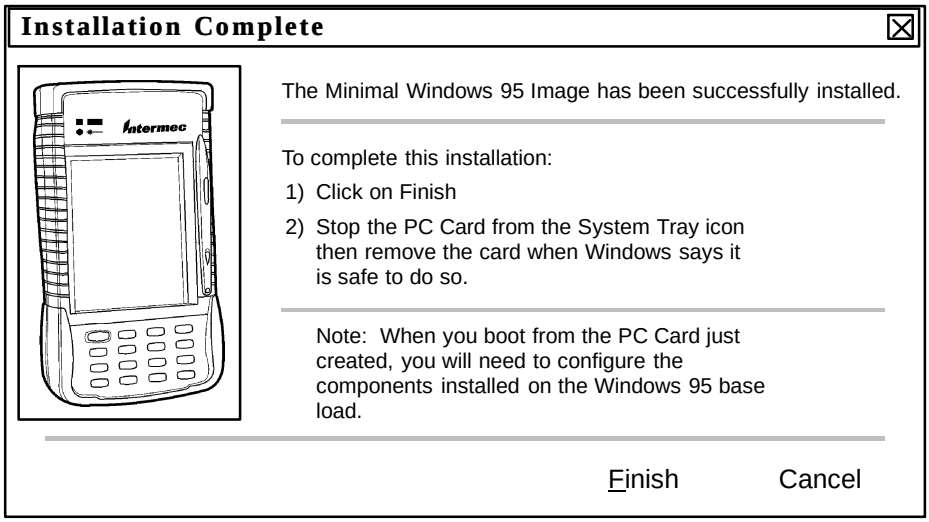


Figure A-4
Installation Complete (minimal configuration)

After you click **Finish**, you are returned to the Win95 Toolkit Welcome screen, shown on page 2-9. However, be sure to stop the PC Card. Follow the instructions carefully.

B CAUTION: **Whenever you are requested to stop the PC Card, follow the instructions carefully. The "System Tray" is a recessed panel containing small icons and is located on the Task Bar at the opposite end from the Start button. To stop the PC Card, click on the small PC Card icon, then on the message that pops up near that icon. Do NOT remove the PC Card until the message pops up, stating that you can safely remove your PC Card, before continuing.**

Custom Minimal Windows 95 Configuration

If you select ***Custom Minimal Configuration*** from the options listed on page A-4, the install program prepares your PC Card for a custom minimal configuration. When complete, a screen (as shown in Figure A-5) is displayed:

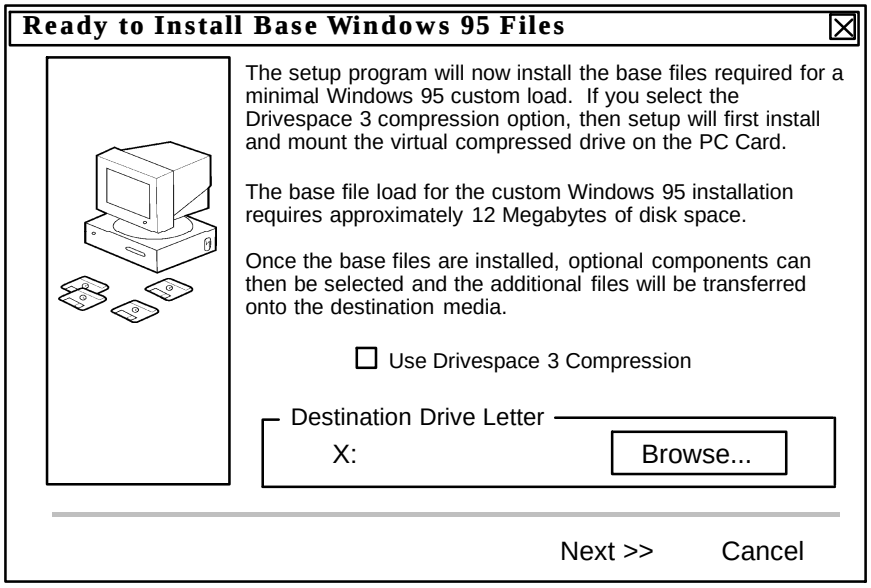


Figure A-5
Ready to Install Custom Minimal Configuration

Be sure to click the Drivespace 3 Compression checkbox if you expect the chosen options to result in a configuration larger than the size of your PC Card. You should always use compression for a 20 MB card. To calculate the size of your configuration, start with the Minimal configuration (mentioned on page A-4), then add the size of each option you want to add (note the additional options and sizes on page A-8). If you are using virtual memory, then add sufficient amount for disk swap file. A minimum of 6 to 7 MB of free disk space for virtual memory swap files is recommended by Intermec.

" NOTE: *Be sure to consider additional space for your applications.*

After clicking **Next** (if you checked the **Use Drivespace 3 Compression** box) the install program creates a compressed drive, then presents you with a screen, which prompts you to follow a few steps to mount that new compressed volume.

Be sure to follow the instructions (as shown in Figure A-6) carefully:

B CAUTION: **Do NOT click *Next* (in the following screen) until all the steps above have been completed and the system recognizes that your PC Card has been reinserted (listen for the second double-beep).**

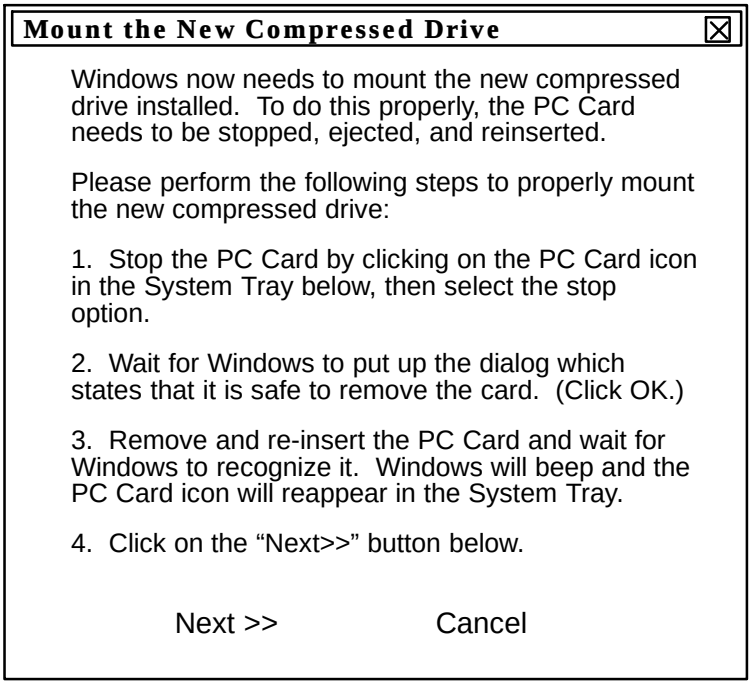


Figure A-6
Mount the New Compressed Drive

The "System Tray" is a recessed panel containing small icons, including the PC Card icon, and is located on the Task Bar at the opposite end from the **Start** button. After following the instructions above, click **Next** to continue.

If a screen is displayed, showing the compressed properties of your PC Card, uncheck the "Hide host drive X:" check box (where X: is your PC Card's drive letter). You should see files being copied to your PC Card in the next screen.

Eventually, a screen is displayed providing the following list of additional options from which to choose:

- Dial-up Networking 2110 k
- TCP-IP Network Protocol 742 k
- Netbeui Network Protocol 276 k
- MS Client for Networking 1075 k
- Plug and Play Support (INF files) 6355 k
- Copy IrDA Install Program 1570 k

Click the checkboxes to the left of the options you want. Then click **Next**. The Install program creates an image file for the Custom Minimal Configuration and copies it to your PC Card. This takes awhile to complete.

After the install program has written the image to your PC Card, you are presented with a screen (as shown in Figure A-7):

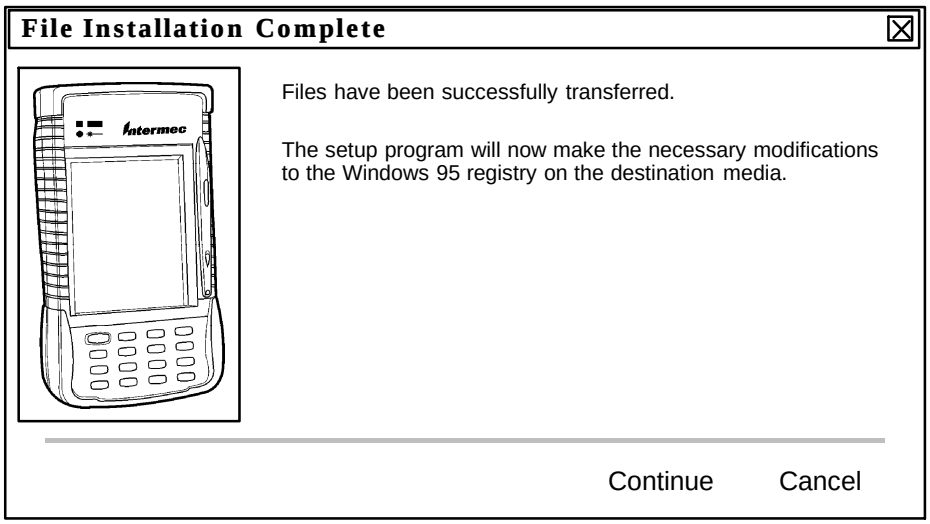


Figure A-7
Installation Complete (custom configuration)

When you click **Continue**, the install program makes changes to the registry on your PC Card. Then a message is displayed informing you that the text file MIN_95.ALZ has been placed in the *\windows* folder of the PC Card. This file contains a listing of all the files in your Windows 95 configuration.

For detailed information about stopping the PC Card, refer to page A-6.

In the *Installation Complete* screen, read the note about configuring the options that you have installed on your 6110 boot PC Card (this configuration is performed after booting the PC Card on your 6110 Computer). Click **Finish** to return to the *Windows 95 Toolkit Welcome* screen, shown on page 2-9 in the *6110 Windows 95 Tool Kit* section.

If *Copy IrDA Install Program* was one of the options you chose on page A-8, refer to the *IrDA Printing* paragraph in the *Windows 95 Support* section for installation instructions.

Toolkit Integration Utilities

These tools are intended to assist you in the sometimes arduous task of determining those files that are missing from the minimal Windows 95 configuration, which prevents your target application from running. In the majority of cases, the installed application attempts to access DLL files that it expects to be located in the *\Windows\System* folder. You can use these integration utilities to find the missing files and copy them into the Minimal Windows 95 configuration from the Win95 Toolkit CD. To install these utilities on your PC, run the file *\setup\tools.exe* from the 6110 Win95 Toolkit CD, as described on page A-12.

Utilities at a Glance

The following utilities are used for application monitoring method #1:

- FILEMON — A third-party utility that monitors file accesses
- FILECHK — Utility to parse the output of FILEMON and create a list of possible missing files. FILECHK requires the file MAX_95.ALZ to be in the same folder and that the FILEMON output file be named FILEMON.FIL.

Both of the following utilities are used for application monitoring method #2, and monitor system file accesses:

- ANALYZE — Monitors successful file accesses
- BUILDER — Uses output from ANALYZE to assist you in copying needed files to the Minimal Windows 95 configuration

The ANALYZE utility is an Intermec authored program that generates a simple sorted list of all successful files accesses.

The FILEMON utility is an excellent third-party program, not found on the Win95 Toolkit CD, but can be downloaded from the Internet at the following Internet address: http://www.sysinternals.com/filemon.htm

FILEMON generates a highly detailed list of both successful and unsuccessful file access attempts while consuming only 70K of disk space. Intermec provides a FILECHK utility, which parses FILEMON's output and creates an easy to read list of suspected missing Windows 95 files.

FILEMON and FILECHK can be run from Windows Explorer, or from the Windows desktop, select **Start → Run**.

To run the FILEMON and FILECHK programs, refer to page A-18, for a detailed procedure.

BUILDER, in conjunction with the ANALYZE utility, guides you through the analysis and copy process to determine which files, accessed by the target application, are not in the minimal configuration. BUILDER uses two additional files to create the list of missing files: MIN_95.ALZ and MAX_95.ALZ. The MIN_95.ALZ file contains a list of the files in the Minimal Windows 95 configuration, and the MAX_95.ALZ file contains a list of all the files in the full Windows 95 configuration (the two files must be in the same folder as the BUILDER application). The BUILDER utility uses the MIN and

MAX files, in addition to the results of the ANALYZE output for the target application, to generate a list of all files (used by the application) missing from the Minimal Windows 95 configuration. BUILDER also provides the option of copying the suggested files to the PC Card containing the 6110 minimum configuration.

" NOTE: *The Builder utility does not list the .INI and .DAT files in any of its file list boxes. However these files are listed in the .ALZ files.*

The following files MUST reside in the *C:\Intermec\6110\Toolkit* folder in order for this application to run.

- MAX_95.ALZ (list of all files in the full Windows 95 configuration)
- MIN_95.ALZ (list of all files in the reduced Windows 95 configuration)

You can use the Analyze utility as a stand-alone program to generate .ALZ script files, or called by the Builder utility. It requests the name of the application to monitor, starts the application, then (using FUNCTRAP.VXD) traps and records all file accesses (that occurred while the application is running). After the application terminates, the Analyze utility generates a script file with an .ALZ extension, containing the results of the analysis, and can be viewed with any text editor.

DIR2ALZ.EXE

This utility can create the MIN_95.ALZ created by your particular Windows 95 configuration.

" NOTE: *When the Installation program is run, if anything but a full Windows 95 configuration is selected, the install program will copy a MIN_95.ALZ file to the boot card in the* \windows *folder.*

Methods for Monitoring Target Applications

There are two file access detection methods for determining which files are needed to get a target application to run on a Minimal Windows 95 configuration:

- **Method #1** monitors the target application **on the 6110 Computer** with a Minimal Windows 95 configuration, using FILEMON and FILECHK.
- **Method #2** monitors the target application **on a PC**, using ANALYZE and BUILDER applications.

Method #1: On a 6110 Computer, using FILEMON and FILECHK

The target application is installed or copied onto the 6110 Computer running a Minimal Windows 95 configuration, and the FILEMON utility monitors all unsuccessful file access attempts when starting or running the application. The FILECHK program parses the output of FILEMON and creates a list of possible missing files. The 6110 minimal configuration PC Card can then be placed in a PC Card slot on your PC. The missing files, specified in OUTLIST.W95, can then be manually copied from the full Win95 image on the Win95 Toolkit CD.

To monitor your application using Monitoring Method #1, refer to the *Running the FILEMON Utility* paragraph on page A-18.

Method #2: On a PC, using ANALYZE and BUILDER

The target application is run on a PC with a full Windows 95 configuration. All file accesses are monitored while the application is running. The target application is then "exercised" and run through all the various screens that it contains. The ANALYZE application generates an APPNAME.ALZ text list of all files accessed during the execution of the target application. A sample ALZ file is included on page A-14. The APPNAME.ALZ file can then:

- Be visually examined, using any text editor, to manually determine which files are not in the Minimal Windows 95 configuration

  or

- Act as an input to the BUILDER application, which creates a list of files that are not present in the minimal configuration. BUILDER also provides the means to copy the missing Windows files from the Win95 Toolkit CD to the PC Card with a minimal configuration.

Installing Windows 95 Analysis Utilities

To install the Analysis tools on your PC, go to *Windows Explorer* or *My Computer* and run *\setup\tools.exe*, which resides on the 6110 Win95 Toolkit CD. The first screen is shown in Figure A-8:

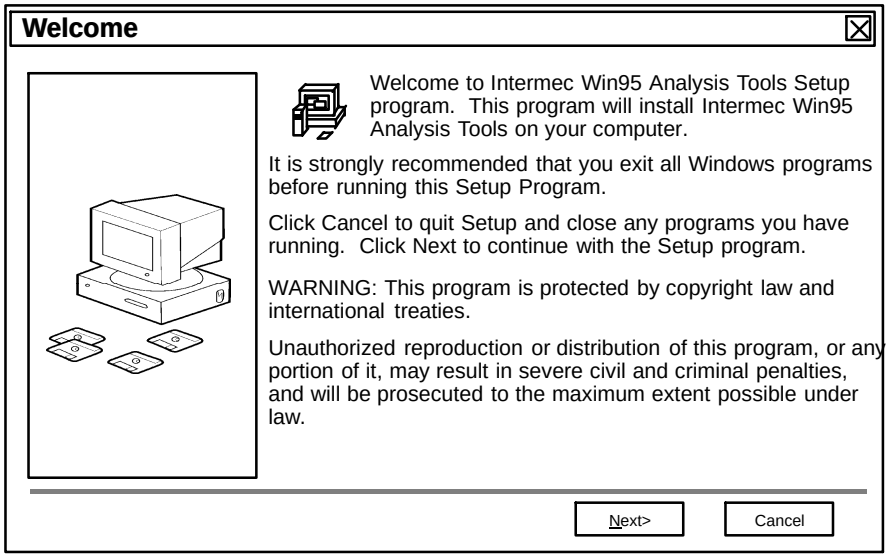


Figure A-8
Analyze Utility, Application to Monitor

Click **Next** to continue the installation.

The next screen shows the name of the folder into which the Analyze Utilities are to be installed.

Follow the prompts as you continue with the installation.

After completion, run the Analyze application first, then the Builder application. Refer to the *Toolkit Integration Utilities* paragraph, on page A-10, for a description of these tools.

The procedures for running the Analyze and Builder applications are described in the following paragraphs.

Running the Application Analysis Utility

To begin analyzing your application, go to *Windows Explorer* or *My Computer* (on the Windows desktop) and double-click on ANALYZE.EXE, which resides at *\Intermec\6110\toolkit* on your PC (most likely on drive C:), unless you changed the destination folder during the installation of these tools.

" NOTE: *Since the Analyze utility monitors all Windows 95 file accesses, not merely those performed by your application, you should close all other applications prior to running this utility.*

This activity determines which files are needed for your application to run, but are missing from the minimal configuration. The screens lead you through the required steps, as described below. Refer to the *Toolkit Integration Utilities* paragraph on page A-10, for additional information.

Select an Application

The opening screen (shown in Figure A-9) is displayed.

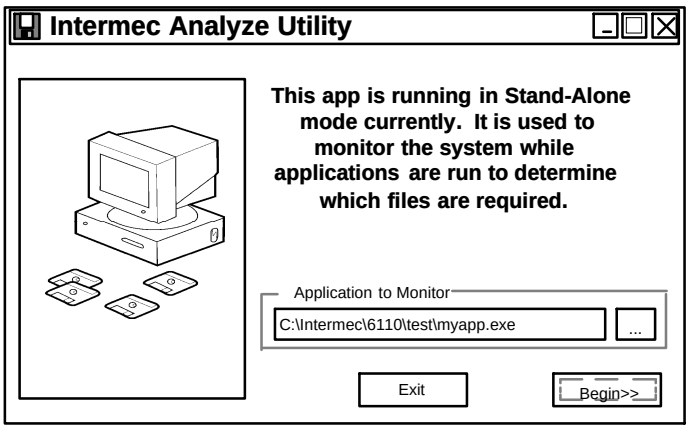


Figure A-9
Select Application to Monitor

To Browse for the application, click the button labeled as "..." (to the right of the *Application to Monitor* field) and browse through the system (using the standard Windows file selection method). Click on the application you want to analyze and select **Open**. After returning to the screen shown in Figure A-9, the file name and path should appear in the *Application to Monitor* field. Click **Begin** to start the monitoring process.

Run the Application

Run the target application through most of its screens and functions, then terminate it. If necessary, minimize the Analyze Utility screen or move it out of the way.

Upon termination of the target application, a screen (shown in Figure A-10) is displayed:

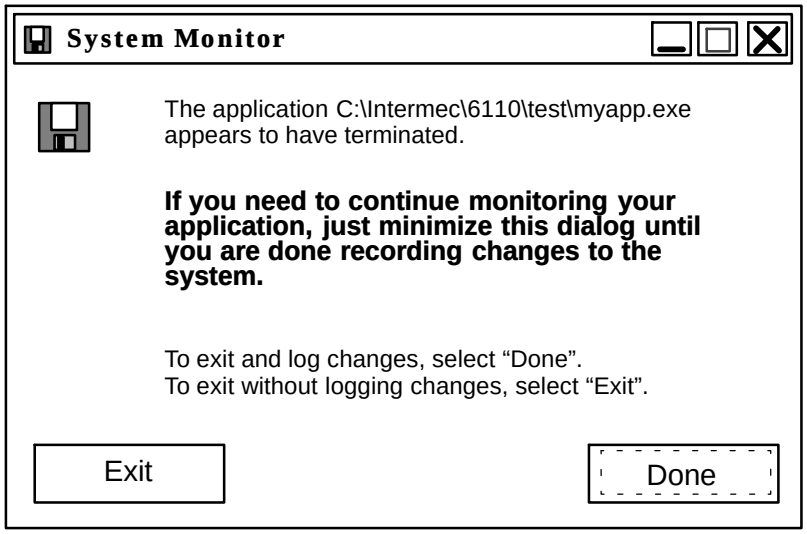


Figure A-10
Analyze Utility, System Monitor screen

After you click **Done**, ANALYZE stores the results in a file and displays a screen (shown in Figure A-11) informing you that a script file has been created:

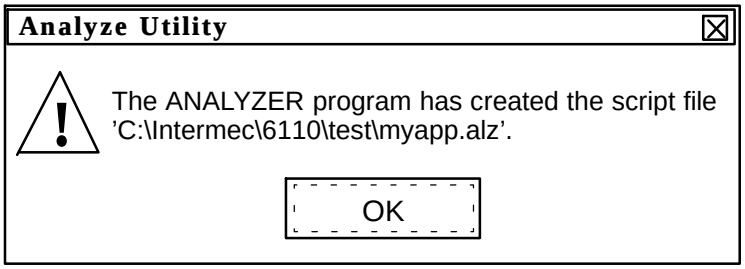


Figure A-11
Analyze Utility Output File

The output file created by the Analyze utility has the same name as the application except for the extension (in the example screens above, MYAPP.EXE is the application). The output file always has an ALZ extension, (MYAPP.ALZ is the output file for the example used here), and is stored in the *C:\Intermec\6110\toolkit* folder.

Sample Output File

The following is a sample ANALYZE output file:

```
-----------------------------------------------------------------
;; Analysis of C:\Program Files\Internet Explorer\IEXPLORE.EXE
;; Norand Analyzer Results

[Execution Path: C:\Program Files\Internet Explorer\IEXPLORE.EXE]
[Windows Directory: C:\WINDOWS]
```

```
[C:\NOVELL\CLIENT32]
NWSIPX32.NLM
[C:\PROGRAM FILES\INTERNET EXPLORER]
IEXPLORE.EXE

[C:\PROGRAM FILES\MCAFEE\VIRUSSCAN]
AVCONSOL.INI

[C:\WINDOWS\COOKIES]
LYONC@MICROSOFT.TXT
MM256.DAT

[C:\WINDOWS\FAVORITES]
ALTAVISTA MAIN PAGE .URL
INFOSEEK.URL
NORAND CORPORATION.URL
SALES BUILDER UPDATE PAGE.URL
WEBCRAWLER.URL

[C:\WINDOWS\HISTORY]
MM2048.DAT
MM256.DAT

[C:\WINDOWS]
SYSTEM.DAT

[C:\WINDOWS\SYSTEM]
BLANK.HTM
HLINK.DLL
INTRINSC.OCX
MSHTML.DLL
MSRATING.DLL
NWRRNSP.DLL
NWSIPX32.DLL
OLEAUT32.DLL
RATINGS.POL
RSACI.RAT
SHDOCVW.DLL
STDOLE32.TLB
URLMON.DLL
WININET.DLL
[C:\WINDOWS\TEMPORARY  INTERNET FILES\CACHE1]
HOME_HEADER2.GIF
MM2048.DAT
MM256.DAT
SM_BG1.GIF

[C:\WINDOWS\TEMPORARY  INTERNET FILES\CACHE2]
6110.GIF
NORAND.HTM
PIXEL(1).GIF
REALTIME.GIF
SEARCH(1).GIF
```

```
[C:\WINDOWS\TEMPORARY  INTERNET  FILES\CACHE3]
BNSALE.GIF
MM2048.DAT
MM256.DAT
WEBCRAWLER.HTM

;;-------End Norand Analyzer------
```

Run the **Builder** utility to load the missing files needed by your application. This activity uses the output from the Analyze utility. Refer to the *Toolkit Integration Utilities* paragraph on page A-10, for more information.

Running the Builder Utility

After you have completed the Analyze process, go to either *Windows Explorer* or *My Computer* (on the Windows desktop) and double-click on BUILDER.EXE, which resides at *C:\Intermec\6110\toolkit* on your PC, unless you changed the destination folder during the installation of these tools.

After a few introductory screens, the screen (shown in Figure A-12) is displayed, providing options to either analyze a new application or choose an application that has been previously analyzed.

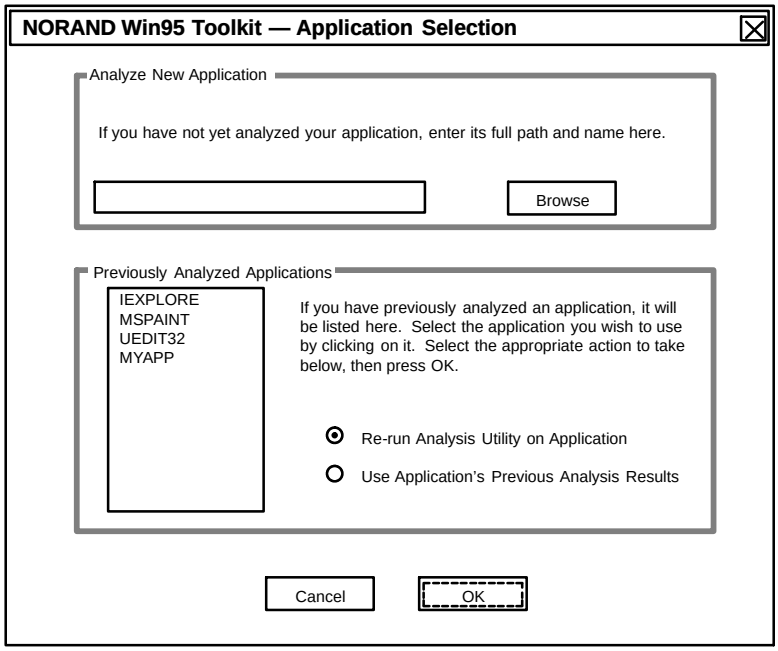


Figure A-12
Builder Utility, Select Application

The following options are provided:

- Run the Analyze utility by entering the name of an application into the field at the top of the dialog box.

  After clicking **OK**, the specified application is monitored by the ANALYZE utility. Once ANALYZE has terminated, the screen (shown in Figure A-13) is displayed.

- Run the Analyze utility by selecting the name of an application from the list box in the lower portion of the dialog window, and the *Rerun Analysis Utility on Application* checkbox is selected.

  After clicking **OK**, ANALYZE will be rerun on that application. Once ANALYZE has terminated, the screen (shown in Figure A-13) is displayed.

- Run Builder on the results of a previously analyzed application. Select an application from the list box in the lower portion of the dialog window, and select the *Use Application's Previous Analysis Results* checkbox.

After clicking **OK**, Builder uses the previous analysis (.ALZ file) contents, and the screen (shown in Figure A-13) is displayed.

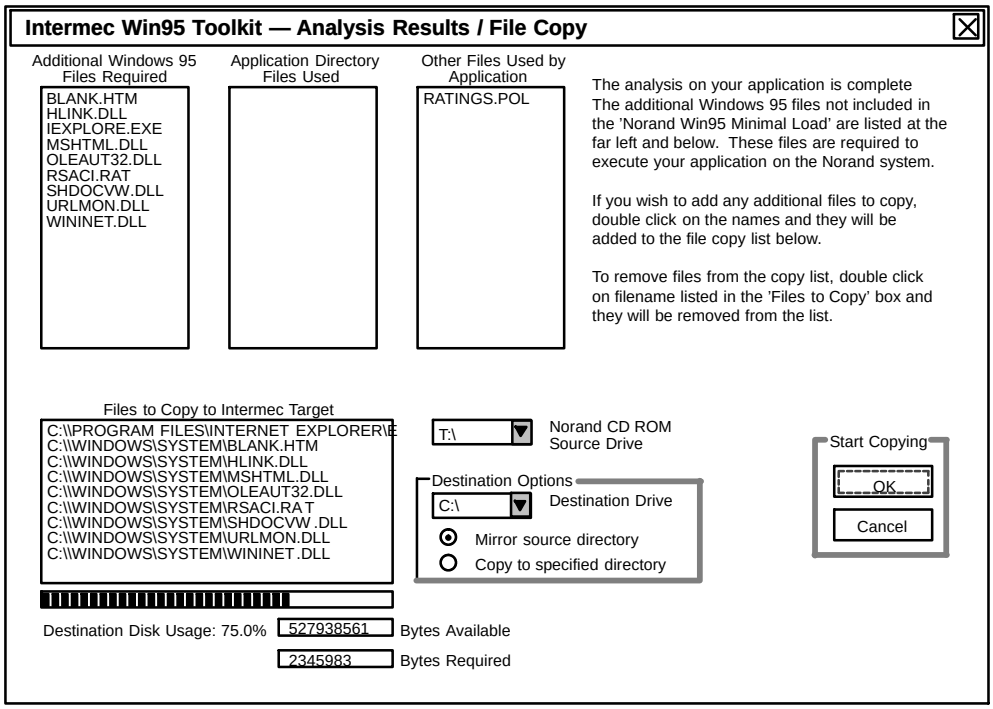


Figure A-13
Analysis Results / File Copy

The list box shown in the upper left corner of the screen contains the Windows 95 files that were accessed by the application, but are not present in the minimal configuration. This list is automatically copied to the list box in the lower left corner of the above screen, indicating they are the suggested files to copy to the PC Card that contains the Minimal Windows 95 configuration. To remove a file from the copy list box, simply double-click on that specific file.

The center list box contains files that were accessed, and are located in the same folder as the target application.

The list box on the right contains other "miscellaneous" files that are not necessarily Windows 95 files, or files that were not in the same folder as the application executable. This of files is primarily for informational purposes.

To copy the files to the Minimal Windows 95 configuration:

1. Place the 6110 PC Card into the card slot on the PC.
2. Select the proper destination drive letter for the PC Card.
3. Insert the Win95 Toolkit CD-ROM.
4. Select the proper CD drive letter, for the Win95 Toolkit CD, using the drop down box immediately above the *Destination Options* area.
5. Verify that there is enough disk space, as indicated in the Bytes Available field and the Bytes Required field.
6. Verify the destination drive and folder is appropriate, as indicated in the Destination Disk Usage field on the *Analysis Results/File Copy* screen above.
7. Click **OK** to start the transfer.

Once the files are copied to the PC Card, remove it from the PC and place it in the 6110 Computer. Boot the 6110 Computer and attempt to run the target application again. If it still does not run properly, try running the analysis utility on it again to check for other files that may be required.

Finding the files needed by an application can be an iterative exercise. There is no foolproof method to immediately determine the needed files. Running and rerunning the analysis utilities provides useful information that should eventually yield a running target application on a Minimal Windows 95 configuration. Also, manually examining the .ALZ (ANALYZE) and .FIL (FILEMON) output files can provide additional information for you.

You may also want to try Monitoring Method #1 (mentioned on page A-11) to check for missing files. The process listed in the following paragraphs describe how to monitor your application using the Monitoring Method #1.

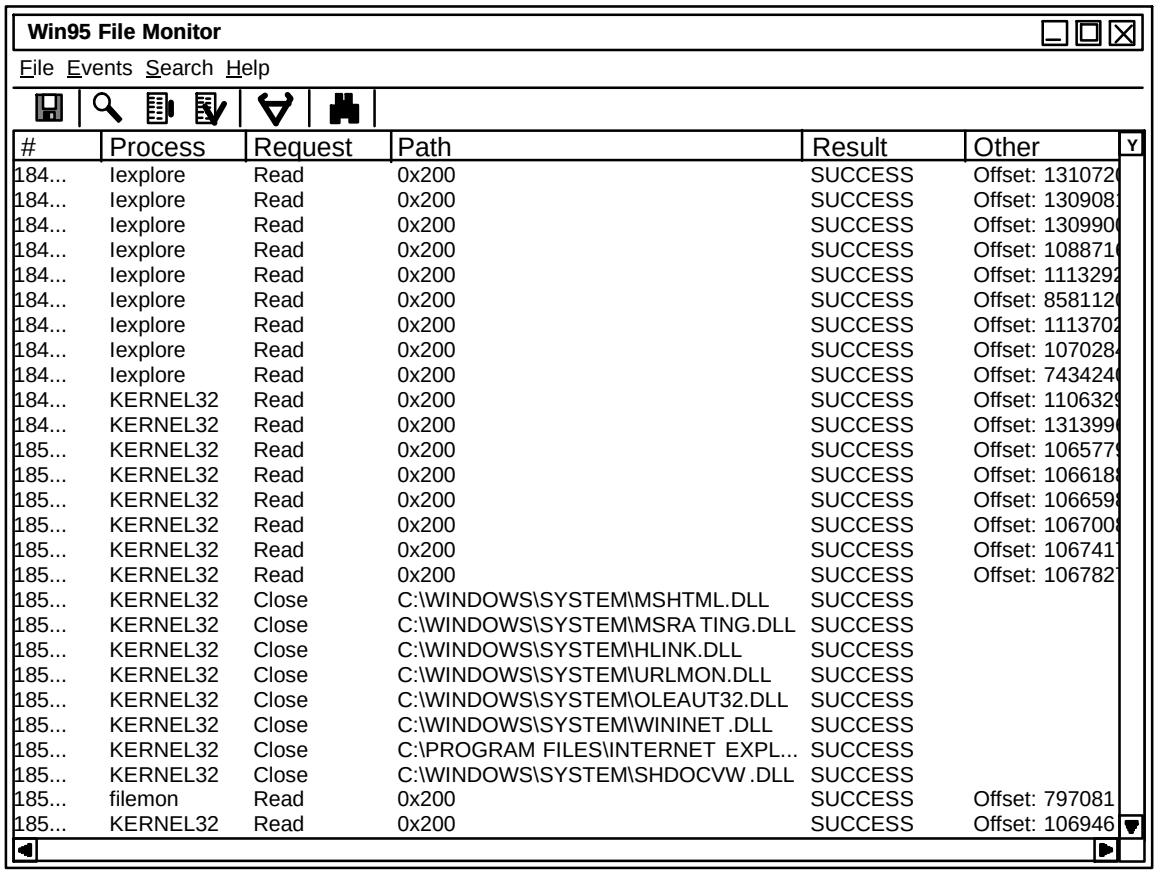
Running the FILEMON Utility

For application monitoring method #1, the following step-by-step procedure should be used to run FILEMON:

1. Using the 6110 Windows 95 Install program (on the PC), create the Minimal Windows 95 configuration on a PC Card.
2. Copy the target application to the minimal configuration PC Card.
3. Obtain the FILEMON utility from the sysinternals web site at *http://www.sysinternals.com/filemon.htm* (it consists of two files: FILEMON.EXE and FILEVXD.VXD).
4. Copy the FILEMON and FILEVXD files to the *\windows\desktop* folder of the minimal configuration.
5. Remove the PC Card from the PC, place it in the 6110 Computer, and boot from it.
6. Once booted, start the FILEMON utility from the desktop on the 6110 Computer (it begins logging right away).
7. Immediately start the target application, and continue running the target application until a failure occurs or the application is terminated.
8. Stop the FILEMON utility (click on magnifying glass so an X is across it).

9. In FILEMON, select "*Save*" from the "*File*" menu and name the file "FILEMON.FIL". Save the file to the *C:\windows\desktop* folder.
10. Shutdown Windows 95 on the 6110 Computer.
11. Remove the PC Card from the 6110 Computer, and place it back into the PC Card slot on the PC.
12. Copy the FILEMON.FIL file, from the \windows\desktop folder of the 6110 PC Card, to the *C:\Intermec\6110\Toolkit* folder.
13. Double-click on the FILECHK.EXE to run the utility. Upon completion, it creates the file OUTLIST.W95.
14. Use a text editor to examine OUTLIST.W95, which contains a list of suggested files to copy to the minimal configuration. Then manually copy those files from *\WIN95\6110\Images\Full* folder on the Win95 Toolkit CD (full Windows 95 configuration) to the 6110 PC boot card.

A sample of a FILEMON screen is shown in Figure A-14, below:



#	Process	Request	Path	Result	Other
184...	Iexplore	Read	0x200	SUCCESS	Offset: 131072
184...	Iexplore	Read	0x200	SUCCESS	Offset: 130908
184...	Iexplore	Read	0x200	SUCCESS	Offset: 130990
184...	Iexplore	Read	0x200	SUCCESS	Offset: 108871
184...	Iexplore	Read	0x200	SUCCESS	Offset: 1113292
184...	Iexplore	Read	0x200	SUCCESS	Offset: 858112
184...	Iexplore	Read	0x200	SUCCESS	Offset: 1113702
184...	Iexplore	Read	0x200	SUCCESS	Offset: 107028
184...	Iexplore	Read	0x200	SUCCESS	Offset: 743424
184...	KERNEL32	Read	0x200	SUCCESS	Offset: 110632
184...	KERNEL32	Read	0x200	SUCCESS	Offset: 131399
185...	KERNEL32	Read	0x200	SUCCESS	Offset: 106577
185...	KERNEL32	Read	0x200	SUCCESS	Offset: 106618
185...	KERNEL32	Read	0x200	SUCCESS	Offset: 106659
185...	KERNEL32	Read	0x200	SUCCESS	Offset: 106700
185...	KERNEL32	Read	0x200	SUCCESS	Offset: 106741
185...	KERNEL32	Read	0x200	SUCCESS	Offset: 106782
185...	KERNEL32	Close	C:\WINDOWS\SYSTEM\MSHTML.DLL	SUCCESS	
185...	KERNEL32	Close	C:\WINDOWS\SYSTEM\MSRA TING.DLL	SUCCESS	
185...	KERNEL32	Close	C:\WINDOWS\SYSTEM\HLINK.DLL	SUCCESS	
185...	KERNEL32	Close	C:\WINDOWS\SYSTEM\URLMON.DLL	SUCCESS	
185...	KERNEL32	Close	C:\WINDOWS\SYSTEM\OLEAUT32.DLL	SUCCESS	
185...	KERNEL32	Close	C:\WINDOWS\SYSTEM\WININET .DLL	SUCCESS	
185...	KERNEL32	Close	C:\PROGRAM FILES\INTERNET EXPL...	SUCCESS	
185...	KERNEL32	Close	C:\WINDOWS\SYSTEM\SHDOCVW .DLL	SUCCESS	
185...	filemon	Read	0x200	SUCCESS	Offset: 797081
185...	KERNEL32	Read	0x200	SUCCESS	Offset: 106946

Figure A-14
Win95 File Monitor screen

Before running the FILECHK program, be sure you have done what is required in item (9) above. Then run FILECHK.EXE from the *C:\Intermec\6110\tools* folder on your PC Card, or from the *\tools* folder the Win95 Install CD.

The FILECHK utility parses the file, FILEMON.FIL, and produces an output file, OUTLIST.W95, as in the example given below:

Sample Output File

```
---------------------------------------------------------------

The following files were sought by Windows, but were
never found while Filemon was running its trace:
    OLEAUT32.DLL
    SELT23.EXE
    TESTX.DLL
Of those files listed above, the following are files
which are contained in the full Windows 95 load:
    OLEAUT32.DLL
---------------------------------------------------------------
```

Win95 Configuration Components

This section describes many of the file types in the installation and configuration of Windows 95. Becoming familiar with the file types, may help you to understand how they function together to configure the operating system. These files could be of assistance to you in solving some of the problems you may encounter with the Minimal Windows 95 configuration.

INF Files — Driver / Software Install

INF files are text files that guide Windows 95 during the installation of specific Windows 95 component(s). Most INF files are located in the C:\Windows\inf folder. When you use a text editor to examine an INF file, you can get an idea of the files that are required and the registry changes that are going to be made when the installation is performed. Also, if you know the name of a file that is used in a Windows 95 component, you can use the Windows find utility to look for the specific file name throughout all the INF files. Searching the contents of INF files with the Windows 95 find program can provide valuable information on which Windows 95 applications/components use specific files. Below is a sample from the APPLETS.INF file:

```
;
; This is the Setup information file for the applets
; and utilities for the Windows 95 retail product.
;
; Copyright 1993–1995, Microsoft Corporation

[version]
LayoutFile=layout.inf
signature="$CHICAGO$"
SetupClass=BASE

[DestinationDirs]
online.files.user     = 24,%OEM_PROGRAMF%\%OEM_ACCESSOR%\%OEM_HYPERTER%
;LDID_SHARED\HyperTrm
online.files.icons    = 24,%OEM_PROGRAMF%\%OEM_ACCESSOR%\%OEM_HYPERTER%
;LDID_SHARED\HyperTrm
online.del.files      = 25,HyperTrm    ;LDID_SHARED\HyperTrm
online.files.sys     = 11     ; LDID_SYS
online.files.hlp     = 18     ; LDID_HELP
mfcdlls.files        = 11     ; LDID_SYS
dxxspace.sys.files   = 11     ; LDID_SYS
dxxspace.win.files   = 25     ; LDID_SHARED
dxxspace.hlp.files   = 18     ; LDID_HELP
.
.
.
[BaseWinOptions]
Register_Applets

[Register_Applets]
AddReg=Register_Applets.AddReg
```

```
CopyFiles=Register_Applets.Copy

[Register_Applets.Copy]
applets.inf
clip.inf

[Register_Applets.AddReg]
;Create entries for Maint Mode Setup, set all initially to
;uninstalled:
; these are the registry entries
HKLM,%KEY_OPTIONAL%,"Mspaint",,"mspaint"
HKLM,%KEY_OPTIONAL%\mspaint,INF,,"applets.inf"
HKLM,%KEY_OPTIONAL%\mspaint,Section,,"mspaint"
HKLM,%KEY_OPTIONAL%\mspaint,Installed,,"0"

HKLM,SOFTWARE\Microsoft\Windows\CurrentVersion\explorer\
mycomputer\backuppath,,,%25%\BACKUP.EXE
.
.
.
[Optional Components]
AccessTop
CommApps
DiskToolTop
MultiM
screensavers
dxxspace

 [Calc]
OptionDesc  = %CalcOpt_DESC%
Tip         = %Calc_TIP%
Parent      = AccessTop
CopyFiles   = Calc.copy, Calc.hlp.copy
DelFiles    = Calc.del
UpdateInis  = Calc.links
AddReg      = Calc.install.reg
InstallType = 10              ;Typical, Custom.
IconIndex   = 30              ;Windows mini-icon for dialogs
Uninstall   = Calc_remove

[Calc_remove]
DelFiles    = Calc.copy, Calc.hlp.copy
AddReg      = Calc.remove.reg
UpdateInis  = Calc.links.remove
-----------------------------------------------
```

LAYOUT.INF file

There is one especially noteworthy INF file: LAYOUT.INF.

It contains a list of all Windows 95 files, specifying the size and location (which cabinet file it is in, see cabinet description below) of each. You might also find it useful to search this file to determine which files are part of the Windows 95 operating system and where they are located. If the file you are looking for is not in layout.inf, then it is not part of the standard Windows 95 operating system. Below are a few lines from layout.inf

```
; — sample from layout.inf
user.exe=5,,462112
redirect.mod=5,,4313
logo2_0.sys=5,,129078
arial.ttf=6,,65412
arialbd.ttf=6,,66952
arialbi.ttf=6,,73984
```

" NOTE: *Subtract 1 from the number specified after the equal sign to determine the cab file number where the file is located. In the example above, the file USER.EXE is in cabinet file WIN95_04.CAB and, when extracted, is 462,112 bytes in size.*

CAB Files — Cabinet Files

All the files that make up the Windows 95 operating system are contained within 30 files called "cabinet" files. Cabinet files are compressed files that hold everything needed to create a given Windows 95 configuration. During the Windows 95 configuration, the files specified in the INF setup program are extracted from the cabinet files. Extraction from the cabinet files is typically an automatic process during setup or new component installation. These standard Windows 95 cabinet files are named:

```
MINI.CAB
PRECOPY1.CAB
PRECOPY2.CAB
WIN95_02.CAB  through  WIN95_28.CAB
```

They are contained in the C:\WIN95 folder on the full 6110 Windows 95 configuration.

Individual files can be manually extracted from the cabinets by running the DOS extract.exe utility.

Typing "Extract" in a DOS window gives the following options:

```
Microsoft (R) Diamond Extraction Tool — Version (16) 1.00.0530 (04/3/95)
Copyright (c) Microsoft Corp. 1994–1995. All rights reserved.
EXTRACT [/Y] [/A] [/D | /E] [/L dir] cabinet [filename ...]
EXTRACT [/Y] source [newname]
EXTRACT [/Y] /C source destination

 cabinet  – Cabinet file (contains two or more files).
 filename – Name of the file to extract from the cabinet.
            Wild cards and multiple filenames (separated by
            blanks) may be used.

 source   – Compressed file (a cabinet with only one file).
 newname  – New filename to give the extracted file.
            If not supplied, the original name is used.

 /A       Process ALL cabinets.  Follows cabinet chain
          starting in first cabinet mentioned.
 /C       Copy source file to destination (to copy from DMF disks).
 /D       Display cabinet folder (use with filename to avoid extract).
 /E       Extract (use instead of *.* to extract all files).
 /L dir   Location to place extracted files (default is current folder)
 /Y       Do not prompt before overwriting an existing file.
```

For example:

To extract USER.EXE from CAB file WIN95_04.CAB:

```
EXTRACT WIN95_04.CAB  USER.EXE
```

If it is not known which cabinet file it is in:

```
EXTRACT  /A  WIN95_02.CAB  USER.EXE
```

This will start at WIN95_02 and go through all the cabinet files until USER.EXE is found. The /A option causes the extract command to parse all the files in the cabinet chain starting at the cab number that is specified.

DLL Files — Dynamic Link Libraries

Dynamic Link Libraries are special forms of executable code used by various applications in Windows 95. DLL files are not executable by themselves, but contain code that can be shared by applications, thereby reducing the size of Windows 95. DLLs consume the most space of all the Windows 95 components. The vast majority of DLL files are in the C:\Windows\System folder. They are often used by several different application programs. When working with the Minimal Windows 95 configuration, the missing files needed by your applications will usually be a DLL. When an application cannot locate a needed DLL, sometimes it puts up a dialog box identifying the missing DLL. Unfortunately, this may not always be the case. Sometimes the application simply does not run at all. Using the tools supplied on the Win95 Toolkit CD you may be able to determine the missing files required by your application.

Refer to the *Running the Application Analysis Tools* paragraph for further information on how to determine missing files that are needed for applications to run.

CPL Files — Control Panel Entries

These files function as Control Panel programs. They can be deleted if the Control Panel is not needed. However, they take up very little space. They are located in the C:\windows\system folder.

ALZ Files — Intermec/NORAND Analyze Script

These files are generated by the NORAND Analyze utility. They can be viewed with a text editor. Each script file contains a list all the files that were accessed while an application was running. They are used by the NORAND Builder utility to determine what files were missing from the Windows 95 minimal configuration.

Refer to the *Application Analysis Tools* paragraph for further information about script files.

Appendix B

Windows 95 Files

Throughout this appendix, there may be references to additional information included on the 6110 Win95 Toolkit CD. There are two methods to view this information:

- The **View Technical Documentation** feature of the 6110 Windows 95 Installation program, described in the **6110 Windows 95 Toolkit** section of this publication, provides easy access to documentation on the CD.
- Also, from the Windows desktop, you can access the CD-ROM drive by double-clicking either the **Windows Explorer** or the **My Computer** icon. Right-click the 6110 Toolkit CD-ROM drive, then select **Open** from the popup menu for a list of folders. Double-click on the appropriate folder to find the desired files.

NOTE: ***Do not*** *double-click the 6110 Toolkit CD-ROM drive. This causes the Installation program to run.*

About Windows 95 Files

The purpose this appendix is merely to identify the Windows 95 files included in the various configurations, at the time of this release.

The following folders on 6110 boot PC Card contain Windows 95 files.

- *\windows*
- *\windows\system*
- *\command*

The first three columns in each of the tables contain check marks that indicate which files are included in each respective configuration. The column titles indicate the types of configurations.

There are two Lite load configurations: *Lite I* and ***Lite II***. The checkmark (**n**) in the ***Lite*** column indicates that the file checked is included in both Lite configurations. The asterisk (*****) indicates the file is included in the ***Lite II*** configuration, but not in the ***Lite I*** configuration.

\Windows Folder

Some or all of the following files reside in the *\windows* folder of your PC Card. The exact list of files depends upon which load you have as indicated by the checks in the first three columns of Table B-1. "Min." represents the Minimal Win95 configuration:

Table B-1
Files in \Windows Folder

Full	Lite	Min.	\Windows Files	Size (bytes)
n	n	n	NETWORKS	407
n	n		PROTOCOL	800
n	n	n	SERVICES	6,007
	n	n	SHELLICONCACHE	141,154
n	n	n	TTFCACHE	1,677
n			INTERNET MAIL	3
n			INTERNET NEWS	3
	n		MIN_95.ALZ	17,815
n			NORM.BAT	127
n			PANNING.BAT	215
n			VGA.BAT	251
n			BLACK THATCH.BMP	182
n			BLUE RIVETS.BMP	194
n			BUBBLES.BMP	2,118
n			CARVED STONE.BMP	582
n			CIRCLES.BMP	190
n			HOUNDSTOOTH.BMP	470
n			PINSTRIPE.BMP	578
n			SETUP.BMP	38,462
n			STRAW MAT.BMP	590
n			TILES.BMP	578
n			TRIANGLES.BMP	198
n			WAVES.BMP	190
n	n		SYSTEM.CB	86
n	n	n	COMMAND.COM	93,974
n	n	n	WIN.COM	24,503
	*		APPWIZ.CPL	
n			SYSTEM.DA0	760,124
	*	n	SYSTEM.DAT	
n			USER.DA0	53,280
n	*	n	USER.DAT	53,280
n			INETMIB1.DLL	53,584

Table B-1 (Continued)
Files in \Windows Folder

Full	Lite	Min.	\Windows Files	Size (bytes)
n			MORICONS.DLL	84,412
n	n	n	NDDEAPI.DLL	14,032
n	n	n	NDDENB.DLL	10,768
n	n	n	SNMPAPI.DLL	22,080
n			TWAIN.DLL	87,328
n			TWAIN_32.DLL	77,312
n	n	n	WINSOCK.DLL	21,520
n			ABOUT PPTP AND DIAL-UP NETWORKING 1.3.DOC	79,872
n			DIAL-UP NETWORKING 1.3 RELEASE NOTES.DOC	53,248
n	n		SCRIPT.DOC	38,400
n	n	n	PROTMAN.DOS	22,810
n			ACCSTAT.EXE	24,576
n	n		ARP.EXE	20,768
n			CALC.EXE	59,392
n	n	n	CONTROL.EXE	2,112
n			DEFRAG.EXE	239,136
n			DIALER.EXE	68,992
n			DIRECTCC.EXE	60,416
n	n		DRVSPACE.EXE	395,280
n	n		EMM386.EXE	125,495
n	n	n	EXPLORER.EXE	204,288
n			EXPOSTRT.EXE	33,280
n	n		EXTRAC32.EXE	95,744
n			FILEXFER.EXE	48,128
n	n		FONTVIEW.EXE	36,352
n	n		FTP.EXE	36,400
n	n		GRPCONV.EXE	31,232
n	n		JVIEW.EXE	12,288
n			MPLAYER.EXE	147,968
n	n		NBTSTAT.EXE	34,069
n			NET.EXE	375,930
n	n		NETDDE.EXE	54,992
n	n		NETSTAT.EXE	24,944
n	n	n	NOTEPAD.EXE	34,304
n			PACKAGER.EXE	65,024
n			PBRUSH.EXE	4,608
n	n	n	PENALIGN.EXE	17,408

Table B-1 (Continued)
Files in \Windows Folder

Full	Lite	Min.	\Windows Files	Size (bytes)
n	n	n	PING.EXE	15,328
n			PROGMAN.EXE	113,456
n	n	n	PROTMAN.EXE	14,952
n			QFECHECK.EXE	36,352
n	n	n	REGEDIT.EXE	105,984
n			REGTLIB.EXE	40,960
n			ROUTE.EXE	27,664
n	n	n	RUNDLL.EXE	4,912
n	n	n	RUNDLL32.EXE	8,192
n	n		SCANDSKW.EXE	4,896
n	n		SETUPSLT.EXE	1,067,520
n	n		SETVER.EXE	18,939
n	n		SMARTDRV.EXE	44,867
n	n	n	SNMP.EXE	18,704
n	n		TASKMAN.EXE	28,672
n	n	n	TELNET.EXE	74,720
n	n		TRACERT.EXE	11,696
n			TWUNK_16.EXE	48,560
n			TWUNK_32.EXE	69,632
n			UNINST.EXE	283,648
n			WABMIG.EXE	18,944
n			WELCOME.EXE	16,384
n			WINFILE.EXE	155,456
n			WINHELP.EXE	2,416
n			WINHLP32.EXE	306,688
n	n	n	WININIT.EXE	40,801
n	n	n	WINIPCFG.EXE	39,424
n			WINPOPUP.EXE	27,600
n			WINVER.EXE	3,632
n	n		WRITE.EXE	5,120
n			ACCESSOR.GRP	9,058
n			COMMUNIC.GRP	67
n			DESKTOP.GRP	1,391
n			DOCUMENT.GRP	46
n	n		INTERNET.GRP	1,653
n	n		MAIN.GRP	3,853
n	n		MULTIMED.GRP	1,619
n	n		ONLINE1.GRP	3,338

Table B-1 (Continued)
Files in \Windows Folder

Full	Lite	Min.	\Windows Files	Size (bytes)
n	n		ONLINESE.GRP	3,345
n	n		PROGRAMS.GRP	4,027
n	n		SYSTEMTO.GRP	3,116
n	n		TELNET.HLP	11,436
n	n		DRVSPACE.INF	1,121
n	n		CONTROL.INI	818
n	n		EXCHNG32.INI	44
n	n		IOS.INI	10,444
n			MSOFFICE.INI	26
n	n		NETDET.INI	7,885
n			PANSYS.INI	1,796
n			PROGMAN.INI	430
n	n	n	PROTOCOL.INI	122
n	n		QTW.INI	28
n	n	n	SYSTEM.INI	1,970
n	n	n	TELEPHON.INI	5,178
n			VGASYS.INI	1,795
n	n	n	WAVEMIX.INI	54
n	n	n	WIN.INI	5,943
n	n	n	IOS.LOG	851
n			NET.MSG	109,229
n			NETH.MSG	73,275
n			DOSPRMPT.PIF	545
n	n	n	HOSTS.SAM	728
n			LMHOSTS.SAM	3,691
n	n		ASPI2HLP.SYS	1,105
n	n		CMD640X.SYS	24,626
n	n		CMD640X2.SYS	20,901
n	n	n	DBLBUFF.SYS	2,100
n	n	n	HIMEM.SYS	33,191
n	n	n	IFSHLP.SYS	3,708
n	n		LOGOS.SYS	129,078
n	n		LOGOW.SYS	129,078
n	n	n	NDISHLP.SYS	6,140
n	n	n	RAMDRIVE.SYS	12,663
n			CONFIG.TXT	17,773
n			DISPLAY.TXT	16,483
n			EXCHANGE.TXT	7,161

Table B-1 (Continued)
Files in \Windows Folder

Full	Lite	Min.	\Windows Files	Size (bytes)
n			EXTRA.TXT	2,546
n			FAQ.TXT	42,485
n			GENERAL.TXT	32,530
n			HARDWARE.TXT	23,377
n			INFRARED.TXT	39,795
n			INTERNET.TXT	11,794
n			MOUSE.TXT	5,422
n			MSDOSDRV.TXT	42,191
n			MSN.TXT	4,111
n	n	n	NDISLOG.TXT	0
n			NETWORK.TXT	24,030
n			PRINTERS.TXT	16,690
n			PROGRAMS.TXT	38,517
n			PWS.TXT	4,513
n			README.TXT	3,728
n			SUPPORT.TXT	7,309
n			TIPS.TXT	28,561
n		n	VER.TXT	4
n			WINNEWS.TXT	1,056
n			Y2KW95.TXT	23,611

\Windows\System Folder

Some or all of the following files reside in the *\windows\system* folder of your 6110 boot PC Card. The exact list of files depends upon which configuration you have as indicated by the checks in the first three columns of Table B-2. "Min." represents the Minimal Win95 configuration:

Table B-2
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n	n	VDHCP.386	55,155
n	n	n	VIP.386	75,873
n	n	n	VNBT.386	87,765
n	n	n	VTCP.386	60,245
n	n	n	VTDI.386	5,711
n	n		VUDP.386	20,637
n	n	n	VGAFULL.3GR	14,624
n			LHACM.ACM	38,912
n			MSNAUDIO.ACM	79,872
n			IR41_32.AX	788,992
n	n		UNICODE.BIN	3,279
n			MINI.CAB	441,905
n	n		MIDIMAP.CFG	1
n	n		TELEPHON.CP$	33,272
n			ACCESS.CPL	57,344
n	n	n	APPWIZ.CPL	63,488
n	n	n	DESK.CPL	8,704
n	n		INETCPL.CPL	110,304
n	n		INFRARED.CPL	7,168
n	n	n	INTL.CPL	48,640
n	n		JOY.CPL	51,200
n	n	n	MAIN.CPL	67,072
n	n	n	MMSYS.CPL	193,024
n	n	n	MODEM.CPL	52,080
n	n	n	NETCPL.CPL	5,312
n	n	n	PASSWORD.CPL	37,376
n	n	n	SYSDM.CPL	260,480
n	n	n	TIMEDATE.CPL	48,640
n	n		ACTXPRXY.DLL	37,440
n	n	n	ADVAPI32.DLL	43,008
n	n		ADVPACK.DLL	74,960
n			ASYCFILT.DLL	147,728

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n		ASYCPICT.DLL	161,552
n	n		AVICAP.DLL	72,272
n	n		AVICAP32.DLL	59,904
n	n		AVIFIL32.DLL	88,064
n	n		AVIFILE.DLL	109,424
n			AWCODC32.DLL	24,576
n	n		AWDCXC32.DLL	6,144
n	n		AWDENC32.DLL	11,776
n	n		AWKRNL32.DLL	27,136
n	n		AWRESX32.DLL	26,624
n	n		AWVIEW32.DLL	10,240
n	n		CACHEVU.DLL	29,008
n	n		CCAPI.DLL	30,208
n			CFGWIZ.DLL	2,544
n	n		CHOOSUSR.DLL	22,016
n	n		CIRRUS.DLL	23,552
n	n		COMCAT.DLL	21,264
n	n	n	COMCTL32.DLL	450,832
n	n	n	COMDLG32.DLL	92,672
n	n	n	COMMCTRL.DLL	154,880
n	n	n	COMMDLG.DLL	88,544
n	n		COMPOBJ.DLL	31,120
n	n		CONFCP.DLL	113,664
n	n		CONFLNK.DLL	51,200
n	n	n	CRTDLL.DLL	161,280
n	n		CTL3DV2.DLL	27,632
n	n		D3DHALF.DLL	107,008
n	n		D3DIM.DLL	68,096
n	n		D3DRAMPF.DLL	110,080
n	n		D3DRG16F.DLL	217,088
n	n		D3DRG24F.DLL	156,672
n	n		D3DRG32F.DLL	154,624
n	n		D3DRG8F.DLL	217,088
n	n		D3DRGBF.DLL	110,080
n	n		D3DRM.DLL	282,112
n	n		D3DRM16F.DLL	470,528
n	n		D3DRM24F.DLL	137,216
n	n		D3DRM32F.DLL	134,656

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n		D3DRM8F.DLL	469,504
n	n		D3DXOF.DLL	72,704
n	n	n	DCIMAN.DLL	6,928
n	n		DCIMAN32.DLL	5,632
n	n	n	DDEML.DLL	32,240
n	n		DDRAW.DLL	159,744
n	n		DDRAW16.DLL	22,992
n	n	n	DESKCP16.DLL	146,784
n	n		DEVMGR32.DLL	4,608
n	n	n	DIBENG.DLL	202,896
n	n		DIGSIG.DLL	204,288
n	n		DISKCOPY.DLL	16,384
n	n		DISPDIB.DLL	6,992
n	n		DLCNDI.DLL	2,474
n	n		DOCPROP.DLL	17,408
n	n		DPLAY.DLL	39,936
n	n		DPSERIAL.DLL	41,472
n	n		DPWSOCK.DLL	24,064
n	n		DSKAPI16.DLL	194,876
n	n		DSKAPI32.DLL	21,504
n	n		DSKMAINT.DLL	214,048
n	n		DSOUND.DLL	86,016
n	n		DUNZIPNT.DLL	94,720
n	n		ENABLE3.DLL	6,160
n	n		ENUMFILE.DLL	3,504
n	n		FM20.DLL	1,087,248
n	n		FM20ENU.DLL	26,624
n	n	n	FONTEXT.DLL	105,984
n	n		FRAMEBUF.DLL	8,192
n	n		FTE.DLL	57,344
n	n		FTMAPI.DLL	66,048
n	n		FTSRCH.DLL	231,936
n	n		GAPIA32.DLL	83,552
n	n	n	GDI32.DLL	131,072
n	n		GLU32.DLL	139,712
n	n		HLINK.DLL	61,200
n	n		HLINKPRX.DLL	14,160
n	n		HTMLEDIT.DLL	228,624

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n		ICCVID.DLL	92,160
n	n		ICHRCNV.DLL	28,160
n	n		ICM32.DLL	140,288
n	n	n	ICMP.DLL	9,632
n	n		ICMUI.DLL	22,016
n	n		ICWDIAL.DLL	89,088
n	n		ICWPHBK.DLL	82,944
n	n		IEDKCS32.DLL	57,856
n	n		IMAGEHLP.DLL	99,376
n	n		IMM32.DLL	6,144
n	n		IMNIMP.DLL	43,152
n	n		INDICDLL.DLL	5,120
n	n		INET16.DLL	5,856
n	n		INETAB32.DLL	20,992
n	n		INETCFG.DLL	96,256
n	n	n	INFRARED.DLL	63,448
n	n		INLOADER.DLL	78,848
n	n		IOSCLASS.DLL	10,560
n	n		IR32_32.DLL	193,024
n			ISDNUI.DLL	26,112
n	n		ISIGN32.DLL	41,472
n	n		JAVAPRXY.DLL	22,016
n	n		JAVART.DLL	56,832
n	n		JGDWMIE.DLL	153,088
n	n		JIT.DLL	82,432
n	n		JSCRIPT.DLL	247,808
n	n	n	KERNEL32.DLL	414,208
n	n		LICMGR10.DLL	41,632
n	n	n	LINKINFO.DLL	13,824
n	n	n	LZ32.DLL	5,632
n	n	n	LZEXPAND.DLL	23,696
n			MAILNEWS.DLL	1,148,176
n	n	n	MAINCP16.DLL	22,096
n	n		MAPI32.DLL	725,184
n	n		MCIOLE.DLL	5,584
n	n		MCIQTZ32.DLL	41,488
n	n		MCM.DLL	129,536
n	n		MF3216.DLL	30,720

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n		MFC30.DLL	322,832
n	n		MFC40.DLL	933,888
n	n		MFCANS32.DLL	133,904
n	n		MFCD30.DLL	55,808
n	n		MFCN30.DLL	15,872
n	n		MFCO30.DLL	133,392
n	n		MFCO40.DLL	384,512
n	n		MFCUIA32.DLL	5,632
n	n		MFCUIW32.DLL	4,096
n	n		MMCI.DLL	13,536
n	n	n	MMSYSTEM.DLL	103,248
n	n	n	MODEMUI.DLL	36,144
n	n		MOSCC.DLL	47,616
n	n		MOSCL.DLL	36,864
n	n		MOSCUDLL.DLL	37,888
n	n		MOSMISC.DLL	9,216
n	n	n	MPR.DLL	40,448
n	n	n	MPRSERV.DLL	119,296
n	n	n	MSAB32.DLL	61,952
n		n	MSACM.DLL	53,552
n		n	MSACM32.DLL	91,648
n	n		MSAFD.DLL	27,648
n	n		MSAWT.DLL	221,696
n	n		MSCONF.DLL	47,104
n			MSHTML.DLL	847,632
n	n		MSIPRT.DLL	10,752
n	n		MSJAVA.DLL	372,224
n	n		MSJT3032.DLL	965,904
n	n		MSMIXMGR.DLL	1,264
n	n	n	MSNET32.DLL	60,416
n	n	n	MSNP32.DLL	67,584
n	n	n	MSNSSPC.DLL	75,792
n	n	n	MSPCIC.DLL	36,480
n	n	n	MSPP32.DLL	17,920
n	n	n	MSPRINT.DLL	55,920
n	n	n	MSPRINT2.DLL	48,128
n	n	n	MSPWL32.DLL	21,504
n		n	MSRATING.DLL	82,112

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n		MSRLE32.DLL	11,264
n	n		MSSHRUI.DLL	76,288
n	n	n	MSTCP.DLL	31,872
n	n		MSVCRT.DLL	295,360
n	n	n	MSVCRT20.DLL	253,952
n	n	n	MSVCRT40.DLL	326,656
n	n		MSVFW32.DLL	129,536
n	n		MSVIDC32.DLL	30,208
n	n		MSVIDEO.DLL	113,664
n	n		MSWEBNDI.DLL	2,832
n	n	n	MSWSOCK.DLL	70,144
n	n	n	MSWSOSP.DLL	24,064
n	n		NAC.DLL	70,144
n			NDSWAN16.DLL	1,728
n			NDSWAN32.DLL	4,608
n	n	n	NETAPI.DLL	106,960
n	n	n	NETAPI32.DLL	4,096
n	n	n	NETBIOS.DLL	6,656
n	n	n	NETDI.DLL	284,784
n	n	n	NETOS.DLL	24,400
n	n		NPRA32.DLL	38,400
n	n		NTDLL.DLL	5,632
n	n		NW16.DLL	6,528
n	n		NWAB32.DLL	25,600
n	n		NWNDS.DLL	7,424
n	n		NWNET32.DLL	21,504
n	n		NWNP32.DLL	77,312
n	n		NWPP32.DLL	43,008
n	n		ODBCJT32.DLL	227,840
n	n		OLE2.DLL	39,744
n	n		OLE2CONV.DLL	57,328
n	n		OLE2DISP.DLL	169,440
n	n		OLE2NLS.DLL	153,040
n	n	n	OLE32.DLL	558,704
n	n	n	OLEAUT32.DLL	598,288
n	n		OLECLI.DLL	82,944
n	n		OLECLI32.DLL	12,288
n	n		OLECNV32.DLL	40,576

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n		OLEDLG.DLL	112,640
n	n		OLEPRO32.DLL	164,112
n	n		OLESVR.DLL	24,064
n	n		OLESVR32.DLL	6,144
n	n		OLETHK32.DLL	79,424
n	n		OPENGL32.DLL	733,296
n	n		P2D.DLL	126,976
n	n		PANMAP.DLL	20,480
n	n	n	PIFMGR.DLL	82,816
n	n		PKPD.DLL	48,880
n	n		PKPD32.DLL	11,776
n	n		PMSPL.DLL	26,608
n	n	n	POWERCFG.DLL	29,184
n			PPPNDI.DLL	2,160
n	n		PRODINV.DLL	75,776
n			QUARTZ.DLL	801,680
n	n		RA32.DLL	186,368
n	n		RA3214_4.DLL	130,560
n	n		RA3228_8.DLL	71,168
n	n		RAGUI32.DLL	226,304
n	n		RAOCX32.DLL	116,192
n	n		RASAPI16.DLL	1,632
n	n	n	RASAPI32.DLL	174,080
n	n		RICHED20.DLL	385,536
n	n		RICHED32.DLL	173,536
n	n	n	RNANP.DLL	11,264
n	n		RNASETUP.DLL	5.408
n	n		RNATHUNK.DLL	4,608
n	n	n	RNAUI.DLL	72,704
n	n	n	RNR20.DLL	42,496
n	n		RPCLTC1.DLL	8,192
n	n	n	RPCLTC3.DLL	7,584
n	n		RPCLTC5.DLL	9,200
n	n		RPCLTC6.DLL	8,128
n	n	n	RPCLTS3.DLL	9,168
n	n		RPCLTS5.DLL	10,736
n	n		RPCLTS6.DLL	9,696
n	n		RPCNS4.DLL	30,832

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n	n	RPCRT4.DLL	202,240
n	n		RRCM.DLL	31,744
n	n		RSABASE.DLL	71,440
n	n		SAGE.DLL	69,120
n	n		SAPNSP.DLL	9,216
n	n	n	SC4_2BPP.DLL	10,240
n	n		SCHANNEL.DLL	109,200
n	n		SEC_SSPI.DLL	33,792
n	n	n	SECUR32.DLL	25,088
n	n		SENDMAIL.DLL	14,896
n	n	n	SERIALUI.DLL	12,032
n	n	n	SETUP4.DLL	6,240
n	n	n	SETUPX.DLL	592,720
n	n		SHDOCVW.DLL	449,296
n	n	n	SHELL.DLL	125,408
n	n	n	SHELL32.DLL	819,200
n	n	n	SHLWAPI.DLL	36,864
n	n		SHSCRAP.DLL	24,576
n	n		SMMSCRPT.DLL	46,080
n	n		SMMSETUP.DLL	7,680
n	n	n	SPOOLSS.DLL	91,136
n	n		STEM0409.DLL	7,168
n	n		STORAGE.DLL	4,208
n	n		SVCPROP.DLL	11,264
n	n	n	SVRAPI.DLL	13,312
n	n		SYNCENG.DLL	55,296
n	n	n	SYNCUI.DLL	151,040
n	n	n	SYSCLASS.DLL	20,800
n	n		SYSDETMG.DLL	318,512
n	n	n	SYSTHUNK.DLL	16,432
n	n	n	TAPI.DLL	161,712
n	n	n	TAPI32.DLL	11,776
n	n	n	TAPIADDR.DLL	20,616
n	n	n	TOOLHELP.DLL	12,112
n	n		TREENVCL.DLL	16,384
n	n		TYPELIB.DLL	177,856
n	n		ULCLIENT.DLL	68,608
n	n	n	UMDM16.DLL	2,096

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n	n	UMDM32.DLL	6,144
n	n		UMDMXFRM.DLL	12,192
n	n		UNIDRV.DLL	197,648
n	n	n	URL.DLL	87,552
n	n		URLMON.DLL	182,752
n	n	n	USER32.DLL	44,544
n	n		VBSCRIPT.DLL	206,848
n	n		VDMDBG.DLL	4,096
n	n	n	VER.DLL	12,144
n	n	n	VERSION.DLL	6,656
n	n	n	VLB32.DLL	42,496
n	n		VMHELPER.DLL	18,944
n	n		VMODCTL.DLL	4,096
	*		W32N20.DLL	
n	n		W95INF16.DLL	2,272
n	n		W95INF32.DLL	4,608
n	n		WAB32.DLL	205,072
n	n		WHLP16T.DLL	3,888
n	n		WHLP32T.DLL	10,240
n	n		WIN32S16.DLL	3,200
n	n	n	WIN87EM.DLL	11,904
n	n		WINASPI.DLL	3,536
n			WININET.DLL	289,552
n	n	n	WINMM.DLL	49,152
n	n		WINNET16.DLL	2,000
n	n		WINSSPI.DLL	19,568
n	n		WINTRUST.DLL	130,048
n	n		WNASPI32.DLL	16,384
n	n		WOW32.DLL	4,096
n	n	n	WS2_32.DLL	55,808
n	n	n	WS2HELP.DLL	5,120
n	n	n	WS2THK.DLL	8,704
n	n	n	WSOCK32.DLL	21,504
n	n		WSOCK32N.DLL	27,648
n	n		XFILEXR.DLL	150,528
n	n		CIRRUS.DRV	70,736
n	n	n	COMM.DRV	5,856
n	n		FRAMEBUF.DRV	22,192

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n	n	KEYBOARD.DRV	12,688
n	n		MCIAVI.DRV	67,696
n	n		MCICDA.DRV	12,800
n	n		MCIPIONR.DRV	13,712
n	n		MCIQTZ.DRV	11,776
n	n		MCISEQ.DRV	18,736
n	n		MCIVISCA.DRV	95,776
n	n		MCIWAVE.DRV	22,016
n	n	n	MIDIMAP.DRV	16,976
n	n	n	MINIDISP.DRV	12,288
n	n	n	MMSOUND.DRV	3,104
n	n	n	MOUSE.DRV	7,712
n		n	MSACM.DRV	21,872
n	n		NETWARE.DRV	1,632
n	n		NOR4800.DRV	7,200
n	n	n	PENC.DRV	6,560
n	n	n	POWER.DRV	1,920
n	n		SERWVDRV.DRV	11,904
n	n		SUPERVGA.DRV	52,320
n	n	n	SYSTEM.DRV	2,288
n	n		TAMAUDIO.DRV	12,336
n	n		UCLKPEN.DRV	12,288
n	n	n	VGA.DRV	52,064
n	n		WAVEWRAP.DRV	18,480
n	n		WINSPL16.DRV	3,552
n	n	n	WINSPOOL.DRV	18,944
n	n		ACTMOVIE.EXE	39,280
n	n		ADDREG.EXE	14,336
n	n		AWADPR32.EXE	9,728
n	n		AWFXEX32.EXE	77,312
n	n		CARDDRV.EXE	27,296
n			CFGWIZ32.EXE	47,616
n	n	n	CONAGENT.EXE	14,596
n	n		DDHELP.EXE	31,744
n	n		DIALMON.EXE	25,600
n			DRWATSON.EXE	38,351
n			DUNSETUP.EXE	38,400
n	n		FONTREG.EXE	6,656

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n	n	GDI.EXE	312,208
n	n		INTERNAT.EXE	12,800
n			IPSETUP.EXE	33,280
n	n		JDBGMGR.EXE	47,616
n	n	n	KRNL386.EXE	126,944
n	n		LIGHTS.EXE	32,768
n	n		LMSCRIPT.EXE	4,785
n	n		MKCOMPAT.EXE	33,792
n	n	n	MPREXE.EXE	12,800
n	n	n	MSGSRV32.EXE	10,640
n	n		MSNEXCH.EXE	17,408
		n	NET.EXE	375,930
n	n		NWLSCON.EXE	13,824
n	n		NWLSPROC.EXE	71,680
n			RAPLAYER.EXE	75,264
n	n		REDIR32.EXE	13,312
n	n		REGSVR32.EXE	23,552
n			REGWIZ.EXE	176,640
n	n	n	RNAAPP.EXE	34,816
n	n		RPCSS.EXE	81,644
n	n		RUNONCE.EXE	11,264
n	n		SIGRES.EXE	15,104
n	n	n	SPOOL32.EXE	20,992
n	n		SYSEDIT.EXE	19,488
n	n	n	SYSTRAY.EXE	37,888
n	n	n	TAPIEXE.EXE	1,784
n	n		TAPIINI.EXE	7,632
n	n		ULSVC.EXE	39,396
n	n	n	USER.EXE	462,112
n	n		VVEXE32.EXE	10,240
n	n		WSASRV.EXE	7,040
n			WINTRUST.HLP	9,943
n	n		BLANK.HTM	93
n	n	n	CONTROL.INF	2,497
n	n	n	MAPISVC.INF	5,266
n	n	n	PEDCAB1.INF	1,117
n	n		KBDUS.KBD	398
n	n		REDIRECT.MOD	4,313

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n	n	WINOA386.MOD	61,680
n	n	n	CP_1252.NLS	9,194
n	n	n	CP_20866.NLS	6,824
n	n	n	CP_28592.NLS	5,416
n	n		CP_28593.NLS	5,448
n	n		CP_28594.NLS	5,448
n	n		CP_28597.NLS	5,320
n	n	n	CP_437.NLS	9,522
n	n		CP_850.NLS	9,826
n	n	n	LOCALE.NLS	134,022
n	n	n	UNICODE.NLS	34,676
n			AMOVIE.OCX	191,296
n	n		INTRINSC.OCX	116,160
n	n		ISCTRLS.OCX	127,488
n	n		MARQUEE.OCX	77,888
n	n		PLUGIN.OCX	86,464
n	n		PCIMP.PCI	6,624
n			LMSCRIPT.PIF	995
n	n		RSACI.RAT	3,186
n			3D FLOWER BOX.SCR	96,784
n			3D FLYING OBJECTS.SCR	211,488
n			3D MAZE.SCR	485,920
n			3D PIPES.SCR	168,304
n			3D TEXT.SCR	129,824
n			FLYING WINDOWS.SCR	14,336
n	n		CSMAPPER.SYS	13,383
n			NETPPTP.SYS	45,360
	*		RS485.SYS	
n	n		STDOLE.TLB	5,532
n	n		STDOLE2.TLB	17,920
n	n		STDOLE32.TLB	7,168
n	n		ISO88591.TRN	601
n	n		NORWEG.TRN	601
n	n		SWEDISH.TRN	601
n	n		USASCII.TRN	601
n	n	n	MMTASK.TSK	1,168
n	n	n	UNIMDM.TSP	42,144
n			WAN.TSP	36,912

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n			MAILNEWS.TXT	11,799
n	n		THREED.VBX	64,432
n	n	n	AFVXD.VXD	29,567
n	n		CIRRUS.VXD	17,964
n	n		DSOUND.VXD	17,087
n	n	n	EISA.VXD	13,669
n	n		ENABLE2.VXD	25,154
n	n		ENABLE4.VXD	21,629
n	n		FILESEC.VXD	23,025
n	n	n	FLS1MTD.VXD	3,706
n	n	n	FLS2MTD.VXD	3,810
n	*		GETNETID.VXD	
n	n	n	ISAPNP.VXD	11,333
n	n	n	JAVASUP.VXD	5,684
	*		LAN2COM.VXD	
n	n	n	LOGGER.VXD	11,637
n	n	n	LPT.VXD	35,511
n	n	n	LPTENUM.VXD	17,192
n	n		MMDEVLDR.VXD	11,844
n	n	n	MSMOUSE.VXD	15,804
n	n	n	MSSP.VXD	21,657
n	n	n	NDIS.VXD	115,789
n	n	n	NDIS2SUP.VXD	23,744
	*		NDISHOOK.VXD	
n			NDISWAN.VXD	13,011
n	n	n	NETBEUI.VXD	45,752
n	n		NSCL.VXD	23,606
n	n		NWLINK.VXD	50,998
n	n		NWREDIR.VXD	123,987
n	n		NWSERVER.VXD	130,620
n	n		NWSP.VXD	14,438
n	n		PARALINK.VXD	23,105
n	n	n	PCCARD.VXD	78,017
n	n	n	PCI.VXD	42,247
n	n	n	PPM.VXD	18,458
n	n	n	PPPMAC.VXD	135,288
n		n	QUARTZ.VXD	5,676
n	n	n	SERENUM.VXD	19,968

Table B-2 (Continued)
Files in \Windows\System Folder

Full	Lite	Min.	\Windows\System Files	Size (bytes)
n	n	n	SERIAL.VXD	18,572
n	n	n	SERWAVE.VXD	14,160
n	n	n	SOCKETSV.VXD	17,545
n	n		SPAP.VXD	9,908
n	n		SPLITTER.VXD	2,596
n	n	n	SRAMMTD.VXD	3,202
n	n	n	UNIMODEM.VXD	55,438
n	n	n	VFD.VXD	5,857
n	n		VGATEWAY.VXD	42,749
n	n	n	VMM32.VXD	696,784
n	n	n	VNETBIOS.VXD	27,221
n	n	n	VNETSUP.VXD	19,129
n	n	n	VREDIR.VXD	156,749
n	n	n	VSERVER.VXD	112,880
n	n	n	WSHTCP.VXD	9,937
n	n		WSIPX.VXD	14,521
n	n	n	WSOCK.VXD	15,547
n	n		WSOCK2.VXD	23,203
n	n		WSVV.VXD	92,244

\Windows\Command Folder

Some or all of the following files reside in the *\command* folder of your boot PC Card. The exact list of files depends upon which configuration you have as indicated by the checks in the first three columns of Table B-3. "Min." represents the Minimal Win95 configuration:

Table B-3
Files in \Windows\Command Folder

Full	Lite	Min.	\Windows\Command Files	Size (bytes)
n			DRVSPACE.BIN	65,271
n			CHOICE.COM	5,175
n			DISKCOPY.COM	21,975
n			DOSKEY.COM	15,495
n		n	EDIT.COM	69,886
n			FORMAT.COM	49,543
n			KEYB.COM	19,927
n			MODE.COM	29,271
n			MORE.COM	10,471
n			SYS.COM	18,967
n			EGA.CPI	58,870
n			ATTRIB.EXE	15,252
n			CHKDSK.EXE	28,096
n		n	DEBUG.EXE	20,554
n		n	DELTREE.EXE	19,019
n			EXTRACT.EXE	46,656
n			FC.EXE	20,574
n			FDISK.EXE	63,116
n			FIND.EXE	6,658
n			LABEL.EXE	9,324
n			MEM.EXE	32,146
n			MOVE.EXE	27,235
n			MSCDEX.EXE	25,473
n			NLSFUNC.EXE	6,940
n	n	n	SCANDISK.EXE	142,353
n			SORT.EXE	25,882
n			START.EXE	9,216
n			SUBST.EXE	17,904
n		n	XCOPY.EXE	3,878
n		n	XCOPY32.EXE	41,472
n			EDIT.HLP	10,790
n	n	n	SCANDISK.INI	7,332

Table B-3 (Continued)
Files in \Windows\Command Folder

Full	Lite	Min.	\Windows\Command Files	Size (bytes)
n			ANSI.SYS	9,719
n			COUNTRY.SYS	27,094
n			DBLSPACE.SYS	2,135
n			DISPLAY.SYS	17,175
n			DRVSPACE.SYS	2,135
n			KEYBOARD.SYS	34,566
n			KEYBRD2.SYS	31,942

Appendix C
Communications

This section includes general information about communications for hand-held computers.

Topic Summary

Communications Using INTERLNK and INTERSVR

Overview

INTERLNK interconnects a PEN*KEY 6000 Series Computer and a PC through serial ports. INTERSVR is the INTERLNK server, a communication option in the PEN*KEY Utilities program. These two resources are shipped with the DOS Toolkit. The cable that connects the PC to your hand-held computer is a standard null modem cable. A TTY TCOM cable also works. And, you need a dock for your hand-held computer.

INTERLNK causes the hand-held computer drives to appear as virtual drives on the PC, with drive letters that are immediately beyond the highest drive letter currently used on the PC. Typing “INTERLNK” from the PC command line displays the designations of the redirected drives. For more details relating to INTERLNK and INTERSVR topics, refer to the DOS online help.

Installation

The following instructions assume that when you installed the HHC flash, all files from the archive were placed in C:\PENKEY\FLASH on your host PC. If you have files in a different location, adjust these instructions accordingly.

Read all instructions below before proceeding.

INTERLNK

INTERLNK, which is part of MS-DOS supplied with your PC operating system, can be installed on a PC, using the following statement in the CONFIG.SYS file on your host PC:

```
device=c:\dos\interlnk.exe /drives:4
```

The above statement assumes that MS-DOS is located in the C:\DOS directory on your host PC. The "/DRIVES:4" parameter allows mapping of four drives from your HHC. This statement should be inserted at the end of the CONFIG.SYS file (after any other statement that creates a drive letter).

After rebooting your host PC, you can copy the application files to the HHC, with INTERLNK.

" NOTE: *If you are running Windows 95 on your PC, you may want to consider an alternative method of running INTERLNK/INTERSVR, such as booting to an earlier version of DOS.*

INTERSVR

Begin with the HHC at the PEN*KEY UTILITIES LOAD PROGRAMS/DATA menu.

1. Press Enter at the main menu to advance to the LOAD PROGRAMS/DATA menu. Select Option 9 "ADVANCED UTILITIES".
2. Select Option 3 "FORMAT RAM DRIVE".
3. Create a 2 MB (or larger) RAM Drive on your HHC. After completion, return to the LOAD PROGRAMS/DATA menu and select option 2, COMM. From the COMM menu select option 6 INTERSVR. Now select option 1, BEGIN COMM SESSION.
4. Establish the INTERSRV connection to your desktop/laptop PC, using a PEN*KEY single dock and cable, IrDA Dongal or direct serial cable.
5. Copy all files in C:\PENKEY\FLASH to the RAM Drive on your HHC. To determine what drive on your PC corresponds to the RAM Drive on the HHC, execute INTERLNK at the DOS prompt, as follows:

```
C:\WIN>INTERLNK
```

You will see a chart similar to the one below:

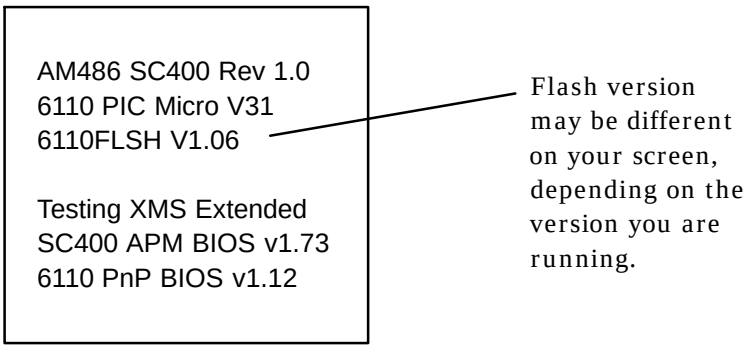
```
Port=COM2

This Computer          Other Computer
  (Client)               (Server)
_______________      ________________
 H:            equals   C:
```

In the example above, you would copy the files to drive H:.

6. Once the files are transferred, exit INTERSVR on your HHC by pressing [Esc]. The unit automatically resets at this time.
7. When the unit resets, it begins the flash update process. You are prompted to put the unit on charge and press a key. And then you are prompted to press the "3" key to begin the reflashing process.
8. After reflashing, your HHC resets itself and boot back to the default drive. To confirm the Flash version, observe the screen while booting (note the information displayed in the example boot screen below. If necessary, refer to the instructions above for overriding the default boot drive.
9. You must now remove the flash files from your ramdrive by following the procedures above for formatting a ramdrive or by starting another interlink session and deleting the files manually.

To terminate INTERSVR, press the ESC key.

See the release notes for information on changes in this version of Flash.



PEN*KEY Utilities: PSROM0C.EXE, PSROB0C.EXE

The PEN*KEY Utilities program provides the basic functions required to prepare the 6000 Series Computer for use. It can also be called from applications to perform data communications.

Initial Program Load

By default, the HHC DOS Toolkit startup files execute PSROM0C.BAT (residing in the \Psrom0c\ directory), which starts PEN*KEY Utilities to perform an Initial Program Load.

During Initial Program Load, the working directory is \App. In other words, downloaded files are placed in the \App directory by default.

You should not download \AUTOEXEC.BAT directly because it could become deleted during a failed communication session, making the computer unable to boot. Instead, include AUTOEXEC.BAT in a compressed archive or download it under a different filename. The application's CONFIG.SYS file must install the application's AUTOEXEC.BAT file. For example, include these lines in the CONFIG.SYS file:

```
set path=c:\psrom0c;c:\utils
install=c:\command.com c:\ /c updates.bat
```

The UPDATES.BAT file provided in c:\Psrom0c extracts all. lzh archives located in the \App directory. Files are extracted relative to the root directory.

NPCP Network

NPCP is the NORAND Portable Communications Protocol. This protocol is supported by the NORAND 6920, 4920, and 498x communication controllers.

1. Create a download include file, as described in the IPLFMT.EXE paragraph in the DOS Device Driver Support section.
2. Create a 6920 or 4920 boot disk, if necessary.

   The only file on a 6920 or 4920 boot disk is a download include file. The include file is copied to the DOWNLOAD subdirectory of the 6920 or 4920.

" NOTE: *4000 Series applications are copied to a BOOT subdirectory.*
6000 Series applications are copied to the DOWNLOAD subdirectory.

3. Create a 4980 boot disk, if necessary (be aware there is limited space on the 4980 system).

   Place the 4980 system files on the 4980 boot disk in the same way as is done for 4000 Series applications (using the 4980 Boot Toolkit, for example).

   Place the download include file on the disk by executing the following commands:

   ```
   MD A:\DATA
   COPY <include file> A:\DATA
   NCDIR.EXE A:\DATA
   ```

" **NOTE:** *NCDIR.EXE is included in the 4980 Boot Tool Kit.*

You would substitute the name of your include file for the text, "<include file>".

PEN*KEY Utilities Internals:

The PEN*KEY Utilities program first attempts a session to NORAND_SERVER, which allows the application to be retrieved from a 498x controller. If the application is not stored on the 498x controller, a session is initiated to NORAND_HOST, which connects to the host.

NRINET

NRINET is a protocol that performs a NORAND file transfer session over TCP/IP Ethernet. It is supported by the Nor*Ware 6920 Communication Server. For a description of a NORAND file transfer session, refer to the *TCOM Session Overview* paragraph, on page C-18.

Setup

1. Create a download include file, as described in the *IPLFMT.EXE* paragraph in the *DOS Device Driver Support* section. Place it in the download directory of the 6920 Controller.
2. Optionally, configure a DHCP server to provide some or all of the information required by the HHC, including the IP addresses of the client, router, and subnet mask. Any information not provided by DHCP must be entered manually by the user on the HHC. A DHCP server can also provide a domain name and IP addresses of domain name servers, which allows you to enter a host name rather than an IP address. If the SERVER_NAME field on the HHC is left blank, a connection to the name "Norand6920" is attempted, as a default.

For a list of errors that may be displayed when an NRINET session is attempted, refer to the *Protocol Errors* paragraph, on page C-14.

PEN*KEY Utilities Internals:

The PEN*KEY Utilities program creates a NET.CFG file and a PCTCP.INI file on the RAM drive.

The NET.CFG and PCTCP.INI files are not erased, so they may be used by applications. For a description of the contents of these files, refer to the *System Setup Requirements* paragraph, on page C-7.

TFTP

TFTP (Trivial File Transfer Protocol) is a standard TCP/IP protocol supported on many TCP/IP servers.

Setup

1. A tftpd service must be running on a TCP/IP server.
2. Optionally, configure a DHCP server to provide some or all of the information required by the HHC (IP addresses of the client, router, and subnet mask). Any information not provided by DHCP must be entered manually by the user on the HHC. A DHCP server can also provide a domain name and IP addresses of domain name servers, which allows the HHC user to enter a server name rather than an IP address. If the SERVER NAME field on the HHC is left blank, a connection is attempted to the name "NorandTftp" as a default.
3. Create a download list file, as described in the *IPLFMT.EXE* paragraph in the *DOS Device Driver Support* section. Place it in the default working directory for the tftpd service. The list file must be named <workgroup>.BCF where <workgroup> is the value of the WORKGROUP field in the UNIT ID menu.

The following errors may be displayed when attempting a TFTP connection:

Error	Description
1	PSROB0C.EXE could not be loaded
100	TCP/IP kernel is not loaded
101	Invalid client IP address
201	TFTP.EXE failed
202	TFTP.EXE not found
203	Unknown server
204	Remote file name is invalid
205	Local file name is invalid
206	File not found on server
207	Time out

TTY

TTY is another NORAND proprietary protocol, supported by the 6920 and 4920 Communication Controllers.

- Create a 6920 or 4920 boot disk, as described in the preceding paragraphs for the NPCP Network.

Calling PEN*KEY Utilities From an Application

The following paragraphs describe how an application can use the communications facilities of the PEN*KEY Utilities to perform data communications.

PSROM0C.EXE is the primary program module that supports data communications between a PEN*KEY 6000 Series hand-held computer (HHC) and a host computer. It supports the NORAND two-way TTY, NORAND Portable Communications Protocol (NPCP) Local Area Network (LAN), and NRInet protocols.

PSROB0C.EXE is not called directly by applications. It is called by PSROM0C.EXE.

Use the following syntax on the command line:

```
PSROM0C.EXE ctl-file
```

where *ctl-file* is the name of a text file containing parameters that control the telecommunications session. Valid parameters are described in the following paragraphs. Parameters that are not applicable may be omitted.

The return value from PSROM0C.EXE is a session status code. Values for this code are described in the *Communications Log File* paragraph, page C-13.

System Setup Requirements

To use PSROM0C.EXE, the file NRTCMERR.TBL must exist in the current working directory or in the PATH.

When using PSROM0C.EXE Ver. 2.00 or later, if the application uses CardSoft device drivers to access PC Cards, it must reassign the drive letters A and B. For example:

```
ASSIGN.COM  A:=E:  B:=F:
```

NPCP

To use NPCP, you must load the program MININET.EXE. Refer to the *DOS Device Driver Support* section for details.

TTY

To use the TTY protocol, the file NRTTYM.TBL must exist in the PATH.

If the application uses NORMOD.SYS to support PC Card modems, the command line for the driver must include "–NMODEMn" where "n" is the COM port number used by the driver.

NRInet

To use the NRInet protocol, the PATH must include the directories of the following drivers:

```
BOOTP.EXE
DHCP.EXE
ETHDRV.EXE
INET.EXE
LSL.COM
ODIPKT.COM
RS485ODI.COM
```

BOOTP.EXE and DHCP.EXE are required only if IP information is to be retrieved from a BOOTP server or a DHCP server as described below. PSROM0C.EXE executes BOOTP.EXE first. DHCP.EXE is executed only if BOOTP.EXE fails.

The files NET.CFG and PCTCP.INI are required to load these drivers.

NET.CFG must exist in the current working directory and must include the following, indented as shown:

```
Link driver RS485ODI
  Frame Ethernet_II
```

PCTCP.INI must include:

```
[pctcp ifcust 0]
async-send = yes
ip-address = nnn.nnn.nnn.nnn
subnet-mask = nnn.nnn.nnn.nnn
router = nnn.nnn.nnn.nnn
[pctcp general]
etc-dir = d:\tcp\etc
domain = xxxxxxxx.com
[pctcp addresses]
domain-name-server = nnn.nnn.nnn.nnn
[pctcp kernel]
interface = ifcust 0
```

The "etc-dir" field must specify a directory that contains a SERVICES file. A minimal SERVICES file exists in the flash at `d:\tcp\etc`.
For NRInet, SERVICES must contain a protocol entry for "nrinet" with a protocol type of "tcp". For example:

```
nrinet 44965/tcp #Norand Inet File Transfer
```

The fields "domain" and "domain-name-server" are not required if the host is specified by IP address rather than domain name. Also, the fields that specify IP addresses (nnn.nnn.nnn.nnn) and the "domain" field can be omitted if BOOTP.EXE or DHCP.EXE loads the information from a BOOTP server or a DHCP server.

Set the environment variable PCTCP to the path of PCTCP.INI. For example, in AUTOEXEC.BAT:

```
SET PCTCP=C:\PCTCP.INI
```

Control File Parameters

Valid control file parameters for all protocols:

```
PROTOCOL, TRIES
```

Valid control file parameters for TTY:

```
COM, CONFIG, DATABITS, MODEMSELECT, MODEMTYPE, PARITY
PHONE, SPEED, STOPBITS
```

Valid control file parameters for NPCP:

```
COM, NPCPHOST
```

Valid control file parameters for NRINET:

```
IPHOST
```

The following is a list of control file parameters and their descriptions.

COM=

Valid only if two-way TTY protocol is specified. It indicates the COM port to use for two-way TTY communications.

Default value: 1 (COM1)

Example:

```
COM=4
```

CONFIG=

This is a modem command string to configure a Hayes-compatible modem.

Example:

```
CONFIG=ATE0V0Q0X4&C1&D2&M0&RS0=0
```

DATABITS=

Valid only if two-way TTY protocol was specified.

Valid values: 7, 8

Example:

```
DATABITS=7
```

IPHOST=

This is the IP address or the domain name of the Ethernet host

MODEMSELECT=

Valid only if two-way TTY protocol was specified. This is the modem ID of of a record in the modem table file NRTTYM.TBL. If this parameter is specified, the COM= and CONFIG= parameters may be omitted. The parameters MODEMSELECT= and MODEMTYPE= are mutually exclusive; therefore only one may be specified in a control file.

Example:

```
MODEMSELECT=30
```

MODEMTYPE=

Valid only if two-way TTY protocol was specified. It indicates the type of modem, if any, to which the hand-held computer is connected. The parameters MODEMSELECT= and MODEMTYPE= are mutually exclusive; therefore only one may be specified in a control file.

Valid Values:

0 = No modem, i.e. direct connect (default)
1 = NORAND modem, or other Hayes-compatible modem

Example:

```
MODEMTYPE=1
```

NPCPHOST=

The name of the NPCP host. Valid values are NORAND_HOST and NORAND_SERVER.

PARITY=

Valid only if two-way TTY protocol was specified.

Valid values:

0 = none (default)
1 = odd
2 = even

Example:

```
PARITY=2
```

PHONE=

This modem command string dials a Hayes-compatible modem.

Example:

```
PHONE=ATDT3693361
```

PROTOCOL=

This parameter indicates the protocol to be used:

- 3 = TTY
- 4 = NPCP (LAN)
- 14 = NRINET

Example:

PROTOCOL=3

SPEED=

Indicates the TCOM speed for two-way TTY. Valid only if two-way TTY protocol was specified.

Valid values:

1200, 2400, 9600, 19200, 38400, 57600, or 115200.

Example:

SPEED=2400

STOPBITS=

Valid only if two-way TTY protocol was specified.

Valid values:

1 = One stop bit
2 = Two stop bits
3 = 1 1/2 stop bits

Examples:

STOPBITS=1

TRIES=

Specifies the number of times to attempt a successful communication session. If TRIES is exhausted before a session is successful, PSROM0C.EXE returns the error of the last session. A parameter value of 0 indicates that the retry is to continue until a session is successful or the user aborts.

Example Control File for NPCP

```
PROTOCOL=4
```

Example Control File for NRInet

```
PROTOCOL=14
IPHOST=nnn.nnn.nnn.nnn
```

Example Control File for TTY

```
PROTOCOL=3
COM=1
SPEED=9600
PARITY=0
DATABITS=8
STOPBITS=1
```

Upload Control File Parameters

Information about files to be transferred must be contained in a file named NRUPLD.CTL. Valid parameters for this file are described in the following paragraphs.

FILE=

This is the name of an upload file. Files are uploaded according to the preceding header information. Multiple FILE parameters may follow a single HEADER parameter, if the header applies to all the specified files.

Example:

```
FILE=BYPRD.DAT
```

FORMAT=

This parameter defines the format of variable-length records whose record types match the preceding RECTYPE parameter. The format of a record consists of the data type and length of each field within the record, specified as follows:

```
FORMAT=tnnntnnn . . .

     t   Data type
   nnn   Field length, right-justified and zero-padded
```

Although the NORAND file transfer protocol supports a number of data types, many of these are specific to the PL/N language from Norand Mobile Systems Division. For the sake of simplicity, just specify a data type of X (for character) and the record length, which does not include the record type character. If you need more information on PL/N file formats, refer to the *Writing TCOM Modules in PL/N for the HHC* publication or to the host TCOM manual.

Example:

```
FORMAT=X020
FORMAT=N012X016N004
```

HEADER=

This file header record precedes the files subsequently specified in FILE parameters. This header record provides the host information on data formatting.

If the HEADER parameter is omitted or blank, the files subsequently specified are transferred *as is*; that is, no header precedes the file. Any header information is assumed to be embedded in the file itself.

When you specify the binary file descriptor (DOSFIL), you do not need to completely specify the header. If the size is not specified or is zero, the entire file is uploaded, and the actual size is inserted into the header that is uploaded to the host. If the filename is not specified, the file name specified in the FILE parameter is inserted into the header that is uploaded to the host.

Example:

```
HEADER=<DBYPRD  00000X040>
```

RECTYPE=

RECTYPE and FORMAT parameters upload files that contain variable-length records, in which the first character of each record identifies the type of record. RECTYPE and FORMAT parameters remain in effect only until the next HEADER parameter is encountered.

RECTYPE is a single, printable ASCII character; it indicates the record type to which the following FORMAT applies.

Example:

```
RECTYPE=A
```

Minimum NRUPLD.CTL

At a minimum, the NRUPLD.CTL file must specify a session control file or a download request file. For a description of these files, refer to the *TCOM Session Overview* paragraph on page C-18.

Example NRUPLD.CTL

```
HEADER=<DSCNTRl00001X042>
FILE=SCNTRL.DAT
HEADER=<DBYPRD 00000X040>
FILE=BYPRD.DAT
HEADER=<DBYTRXN00000X001>
RECTYPE=A
FORMAT=N004N005
RECTYPE=B
FORMAT=X010
RECTYPE=C
FORMAT=N004X005
FILE=BYTR00.DAT
FILE=BYTR01.DAT
file=bytr02.dat
FILE=BYTR03.DAT
HEADER=<DDOSFIL00001X010>FIMAGE.PCX
FILE=IMAGE.PCX
HEADER=<DDOSFIL00001X020>F\RT00001\COMMON.DAT
FILE=COMMON.DAT
HEADER=<DDOSFIL00001X000>
FILE=MYFILE.DAT
```

Communications Log File

A log of the communications is output to a text file named NRTLOG.DAT. Information is continually appended to the file until it is deleted. It is not cleared by PSROM0C.EXE. Your application is responsible for deleting NRTLOG.DAT. The format and syntax for this information is described in the following paragraphs.

BEGS=nnnn

Indicates the start of a TCOM session.

where: nnnn = Session number (currently always 1)

Example:

```
BEGS=1
```

DOWN=d:\pathname\filename.nnn

Indicates that a file download was attempted.

where: nnn = Error code.

Valid Values: 0 indicates a successful download.

Example:

```
DOWN=C:\CUST.DAT,23
```

ENDS=x,m,nnn

Indicates the end of a TCOM session.

where:

x = Session status. It is a single character code.
m = Stage of the communications session.
nnn = Protocol error code.

This code is also the return value of PSROM0C.EXE.

The following table shows the valid values for (x).

Code	Meaning
"G"	Good session.
"T"	Unexpected end of transmission.
"H"	An incorrect file header was encountered.
"F"	A file error was encountered.
"L"	communication was aborted before the first file header was received.

The following table shows the valid values for (m).

Value	Meaning
5	Sign-on started.
4	Data send started.
3	Turn-around started.
2	Data receive started.
1	Sign-off started.
0	Session complete.

See Protocol Errors below for valid values for (nnn).

UP=d:\pathname\filename,nnn

Indicates that a file upload was attempted.

where: nnn = Error code.

Valid values: 0 indicates a successful upload.

Example:

```
UP=C:BYTRXN.DAT,0
```

Protocol Errors

In addition to the session status code returned by PSROM0C.EXE, an application can interrogate the Communications Log file to get the specific protocol error that occurred. The valid Protocol error code for (n), as indicated in the End of TCOM Session parameter "ENDS=", are described in the following tables for each supported protocol.

Table C-1
NPCP Protocol Errors

Error #	Meaning
0	No error
1	MININET.EXE is not installed
6	User aborted communications
11	Invalid parameter specified in control file

The following NPCP errors are returned by MININET.EXE. 100 is added to the error returned by MININET.EXE to avoid conflict with other defined errors.

Table C-2
NPCP MININET Protocol Errors

Error #	Meaning
101	Illegal buffer length
103	Invalid command
105	Command timed out
106	Message incomplete
108	Illegal local session number
109	No resource available
110	Session closed
111	Command canceled
113	Duplicate name in local name table
114	Name table is full
115	Name is deregistered, command completed
117	Local session table full
118	Session open rejected
119	Invalid name number
120	No answer
121	Name not found
122	Name in use on remote adapter
123	Name deleted

Error #	Meaning
124	Session ended abnormally
125	Name conflict
126	Incompatible remote device
133	Network interface is busy
134	Too many commands outstanding
135	Invalid LAN adapter number
136	Command completed while cancel occurring
138	Command not valid to cancel
164–179	Unusual network condition
180–354	Adapter malfunction

Table C-3
NRINET Protocol Errors

Error #	Meaning
0	No error
1	PSROBOC.EXE could not be loaded. Make sure the directory for PSROB0C.EXE is in the PATH
6	User aborted communications
11	An invalid parameter was specified in the control file
800	PC TCP/IP kernel could not be loaded. Possible causes for this are: ♦ NET.CFG or PCTCP.INI does not exist ♦ The PCTCP environment variable is not set ♦ The PATH does not include the directories of the drivers ♦ The computer does not have an Ethernet ID or the Ethernet ID could not be accessed
801	Invalid client IP address; verify the entry for 'ip-address' in PCTCP.INI, or make sure the DHCP server is running
802	Invalid Service or Service Type, or invalid port number; verify the 'etc-dir' entry in PCTCP.INI specifies the correct path for the SERVICES file, and that an entry exists for 'nrinet'
803	Invalid host name or IP Address. Verify the IPHOST parameter and the entries for 'subnet-mask', 'router', 'domain', and 'domain-name-server' in PCTCP.INI; make sure the host computer is running
804	Could not create socket. Check all cables and network connections
806	Block sent was incomplete, or block received was incomplete
807	Client/server negotiation failed
808	Server specified an unsupported block size
809	Invalid buffer pointer
810	All server connections are already in use; try again later
811	Time out while sending data. Connection to remote machine dropped; make sure host is still running; check all cables and network connections
812	Time out while receiving data. Connection to remote machine dropped; make sure host is still running; check all cables and network connections

Error #	Meaning
813	Attempt to send data to the server failed due to a closed connection; ensure server is still running, and check all cables and network connections
814	Attempt to receive data from the server failed due to a closed connection; ensure server is still running, check all cables and network connections
815	Could not access the network attach information
816	An error occurred reading the network attach information
817	Server did not respond to connect request. Make sure server is still running; check all cables and network connections
818	An error occurred reading the TCP/IP kernel information
935	Client/server negotiation failed
939	Destination address required
940	Message too long
948	Address already in use
950	Network is down
951	Network is unreachable
952	Network dropped connection or reset
954	Connection reset by peer
955	No buffer space available
960	Connection timed out
961	Connection refused
962	Too many levels of symbolic links
963	File name is too long
964	Host is down
965	Host is unreachable
966	Directory not empty

Table C-4
TTY Protocol Errors

Error #	Meaning
0	No error
6	User aborted communications
11	Invalid parameter specified in control file
23	End of transmission
101	Line lost
102	Parity error
103	Character gap too long
104	Data loss
105	Excessive NAKs (negative acknowledgements)
106	Block count error
107	Block check error
108	Block framing error
109	Control character error
2xx	Modem error; xx is a Hayes response code or one of the following codes defined by this program: 03 No carrier 04 Command not recognized 06 No dial tone

Error #	Meaning	
	07	Dialed number is busy
	08	No answer
	86	Error sending command to modem
	87	Expected numeric response non-numeric
	88	Invalid response format
	89	No significant response from modem
	97	COM port disabled by system due to low battery or removal of PC Card modem
	98	Unrecognized English response
	99	Memory allocation error

TCOM Session Overview

Under the Norand standard file transfer session, the hand-held computer always uploads first. Once all upload files are sent, the line is turned around and the host then sends any download files. Each file is preceded by a header record that gives the receiving computer information on the format, which is used by that file.

The hand-held computer must first send a session control file, which identifies the hand-held computer to the host computer. The hand-held computer may then send a download request file. This optional file prepares the host computer to download one or more files to the hand-held computer. Upload files can then be sent to the host.

Session Control File

To identify itself to the host, the hand-held computer sends the session control file at the beginning of a TCOM session. The host uses the application-dependent terminal identification to identify the proper files for downloading to the hand-held computer. The format of the session control file is as follows:

```
<DSCNTRL00001Xnnn>PPPPPPPPPPPPPPTTTTTTTTTTTTTTTTTTYYMMDDHHMMSS. . .
```

where:

```
              < = beginning of file header
              D = file type (fixed)
         SCNTRL = file name (fixed)
          00001 = decimal number of records in file (fixed)
              X = data type (ignored by host)
            nnn = decimal number of bytes in file record
              > = end of file header
  PPPPPPPPPPPPPP = program identification
TTTTTTTTTTTTTTTT = terminal identification (determined by application)
         YYMMDD = date
         HHMMSS = time
          . . . = additional hand-held computer information
```

The application determines the actual data in the session control file. The data fields shown in the preceding list are simply a convention in NORAND applications. However, the session control header always consists of 18 bytes. Further, NORAND host communication packages usually expect to find the terminal identification starting in byte 33 of the data stream; this location is configurable, however.

Download Request File

A hand-held computer may directly request specific files from the host. To do this, it sends a download request file to the host just after sending the session control file. The files are not downloaded at that moment, but rather after the line has been turned around. If a download request file is sent, the host does NOT use the terminal identification in the session control file to determine which files to download to the hand-held computer. Only files requested in the download request file are downloaded.

" NOTE: *The download request file must be the first or second file sent; otherwise it is not treated as a special file by the host.*

The following is the format of the download request file:

```
<DDWNLRQnnnnnX016>[--filename1---][--filename2---]. . .
```

where:

<	= beginning of file header
D	= file type (fixed)
DWNLRQ	= file name (fixed)
nnnnn	= decimal number of records in file
X	= data type (X for character)
016	= decimal number of bytes in record (fixed)
>	= end of file header
[--filename?---]	= name of file to download, must be left-justified and blank-padded to 16 characters

You can include as many filename records as are specified in the number of records field of the header. This permits requests for more than one file to be batched together.

Upload and Download Files

While the NORAND file transfer protocol supports a number of data types and file types, many of these are specific to the NORAND PL/N language. If more information is needed on PL/N file formats, refer to the *Writing TCOM Modules in PL/N for the Hand-Held Computer* publication or to your host TCOM manual. For the sake of simplicity, DOS programmers can use one basic file header for all upload and download files.

The general format of a file header is as follows:

<tfffffffmmmmmtnnntnnntnnn>data ...

where:

```
            < = beginning of file header
            t = file type
                'D' for unpacked data
                'E' for unpacked executable
                'P' for packed data
                'B' for packed executable
       ffffff = file name
        mmmmm = decimal number of records in file, right-justified and
                zero-padded
            t = field data type (described below)
          nnn = unpacked length of the field, right-justified and
                zero-padded
            > = end of file header
        . . . = additional hand-held computer information
```

The actual name of the file that is created on the hand-held computer has ".DAT" or "P.PL6" appended to the ffffff file name. File types 'D' and 'P' have ".DAT" extensions. File types 'E' and 'B' have "P.PL6" appended to the name.

Valid field data types are as follows:

Type	C data type	Comments
X	char[ ]	This type specifies a character buffer that does NOT have a NULL terminator.
B	unsigned char	The field length in the file header can be 001 to 003. Valid field values are 0 to 255.
I	signed int	The field length in the file header can be 001 to 006. Valid field values are –32767 to 32767. '+' is not uploaded for positive values. Leading zeroes are uploaded if necessary to meet the specified field length.
D	signed long	The field length in the file header can be 001 to 011. Valid field values are –2147483647 to 2147483647. '+' is not uploaded for positive values. Leading zeroes are uploaded if necessary to meet the specified field length.
S	char[ ]	This type specifies a NULL terminated string. The field length does not include the NULL, as the NULL is not included in the unpacked file. The NULL is inserted when the field is written to the hand-held computer file.
N	N/A	This field type is specific to the NORAND PL/N programming language. For further information, see the PL/N Reference Manuals.
W	N/A	This field type is specific to the NORAND PL/N programming language. For further information, see the PL/N Reference Manuals. This type is equivalent to an unsigned int in field size, but is packed in the opposite byte order. Two special field descriptors for repetition are also defined. (ddd and)000 where '(ddd' marks the beginning of a repeated field descriptor sequence, ddd is the number of repetitions of the sequence, and ')000' marks the end of the sequence. For example, the following are equivalent: B002X004B002X004 (002B002X004)000

In NORAND host communication packages, a record length of one indicates that the file contains variable length records, where the first character of each record identifies the type of record. These single character record types are used by the formatting utilities of the communications packages to format the file into logical records.

PL/N File Descriptor for Binary Files

For the support of full DOS file names and for better support of non-PL/N binary files, an expanded header structure is defined:

```
<DDOSFIL00001Xmmm>F[--dosfilename--] S[filesize]data. . .
```

where:

```
                < = beginning of file header
                D = file type (fixed)
          DOSFIL = file name (fixed)
           00001 = fixed
                X = data type (fixed)
              mmm = decimal number of bytes of file information between end
                    of file header and start of file
                > = end of file header
                F = F indicates the file name parameter
[--dosfilename--] = complete DOS file name (this parameter may be of any
                    length)
        <space> = a space must separate the parameters
              S = S indicates the file size parameter
     [filesize] = the exact number of bytes in binary file (this parameter
                  may be up to 8 digits long)
      data. . . = the binary file starts immediately after the filesize
                  parameter.
          . . . = additional hand-held computer information
```

For example, to send a file to be named \DATA\DATAFILE.DAT that has a size of 102,000 bytes, the following header would precede the file:

```
<DDOSFIL00001X027>F\DATA\DATAFILE.DAT  S102000
```

It is the responsibility of the PEN*KEY 6000 Series application program to ensure that the file name specified is unique on the host. This could be accomplished by incorporating the terminal identification as part of the file name or path name:

```
<DDOSFIL00001X027>F\DATA\DATA0001.DAT  S102000
<DDOSFIL00001X031>F\HH000001\DATAFILE.DAT  S102000
```

Appendix D

Converting Applications

This section contains information applicable for converting 4000 Series applications for use on the 6110 Computer.

Topic Summary

Converting 4000 Series Applications for the 6110 Computer

When applications are converted from a 4000 Series System to a 6110 Computer, the information in the following paragraphs should be considered:

Files No Longer Supported

The following 4000 Series files are not used in 6110 configurations:

File	Comments
10X16.EXT	Use 6110RTAT.EXE and FONTSEL.EXE (see *New 6000 Series Files*, page D-4)
BOOT.SYS	
BOOTCFG.SYS	
BOOTPH0.SYS	
CATFILES.EXE	Use IPLFMT.EXE (see *New 6000 Series Files*, on page D-4)
CATMAKE.BAT	Use IPLFMT.EXE
CATPREAM.BIN	
DEXIO.BIN	Use PC-DEXIO.BIN
FONTBUF.COM	
FPNOP.COM	
IO.SYS	Use IO.SYS in full MS-DOS 6.22
MAXI-DOS.SYS	
MEMIO.EXT	
MINI-DOS.SYS	Use MSDOS.SYS in full MS-DOS 6.22
MINI-IO.SYS	Use IO.SYS in full MS-DOS 6.22
MINI-NET.COM	Use MININET.EXE (see *New 6000 Series Files*, on page D-4)
NOR-ANSI.SYS	
NORANDBB.EXE	
NP4805.EXT	The 4805 Endcap Printer is specific to 4000 Series systems
NPRTBIOS.EXT	Use PC4800.SYS (see *Files that Have Changed*, on page D-4)
NT4800.SYS	Use PC4800.SYS (see *Files that Have Changed*, on page D-4)
PRTBIOS.EXT	RCT printers (NP207, NP111) are not supported
PRTIO.BIN	Use PC-PRTIO.BIN
RAMCARD.SYS	
RAMCFMT.EXE	
RAMCUTIL.EXE	
RAMDISK.EXT	
RPLHOST.EXE	Use INTERLNK.EXE
SCAN4000.EXE	
SETDISP.EXE	Use 6110RTAT.EXE and FONTSEL.EXE (see *New 6000 Series Files*, on page D-4)
SOFTBIOS.EXT	BIOS is loaded from flash
TNETBIOS.EXE	
XLMEMIO.BIN	

Files that Have Changed

The following 4000 Series Files are used differently on the 6110 Computer. You can make the changes as specified.

CONFIG.SYS

The extended CONFIG.SYS commands in the 4000 Series version of IO.SYS are no longer supported:

Command	Comments
EXT=	BIOS is loaded from flash. Remove these lines from CONFIG.SYS.
TSR=	Use INSTALL= or execute TSRs from AUTOEXEC.BAT.
VERIFY	The VERIFY ON command, a feature of COMMAND.COM, can be used. However, this command is not identical with its use on 4000 Series platforms, where MINI-DOS/MAXI-DOS wrote through the disk buffers, as well as to directory information to the media whenever it changed. These actions do not occur in DOS. The application is responsible for performing file commits.

Refer to the CONFIG.SYS file in your DOS toolkit, to see how CONFIG.SYS is used for applications with the 6110 Computer.

CPLNI.COM

Do not use the *–d* command line switch. Do not delete driver files from the RAM drive after they are loaded. All files needed to restart the application after a reset must remain on the RAM drive.

PC4800.SYS

Use Version 1.80 or later for a PEN*KEY 6000 Series platform. This driver is used for NORAND Portable Communications Protocol (NPCP) printer support for both PL/N and non-PL/N applications. 4000API.EXE must be loaded when PC4800.SYS is used.

PC-DEXIO.BIN

Use Version 1.26 or later for a PEN*KEY 6000 Series configuration. 4000API.EXE must be loaded when PC-DEXIO.BIN is used.

SYSIO.BIN

URTIO.BIN

New 6000 Series Files

The following files are new 6000 Series files that were not used on the 4000 Series platform.

AUTOEXEC.BAT

This is a standard DOS configuration file. Refer to your AUTOEXEC.BAT file in the DOS toolkit to see an example of how this file is used.

4000API.EXE

This program provides functionality for certain applications written for the 4000 Series to run unmodified on the PEN*KEY 6000 Series platform. Refer to the *4000 Series Interfaces* paragraph on page D-6 for additional information.

6110RTAT.EXE and FONTSEL.EXE

Use 6110RTAT.EXE for rotating the display screen. Use FONTSEL.EXE to change the screen font. These programs also provide functionality expected by applications written for the 4000 Series so that these applications can run unmodified on the PEN*KEY 6000 Series Computer. Refer to the *4000 Series Screen Emulation* topic, in the *DOS Device Driver Support* section, for additional information.

*.FNT

Font files for use with FONTSEL.EXE.

IPLFMT.EXE

This program concatenates a list of files into a single file that is suitable for download in a Norand communications session. Refer to the *DOS Utilities* paragraph, in the *DOS Device Driver Support* section, for additional information.

MININET.EXE

This program replaces the 4000 Series MINI-NET.COM on the PEN*KEY 6000 Series platforms. It provides the NET BIOS interface to the NPCP LAN. To use the NPCP protocol, you must load the program MININET.EXE, a TSR that supplies a NetBIOS compatible interface for accessing the NPCP LAN. Refer to the *LAN Communications* paragraph, in the *DOS Device Driver Support* section, for additional information.

Unchanged Files

The following 6000 Series files have not changed from the 4000 Series.

File	Comments
CLKIO.BIN	
DELETE.COM	
HOSTIO.BIN	
INT15.EXE	For a PC only. Do not run on a PEN*KEY 6000 Series platform.
KBDIO.BIN	
LZEXE.DOC	
LZEXE.EXE	
MEMIO.BIN	
MV.EXE	
NORSESS.COM	
PRN2COM.COM	
TTYIO.BIN	
XYXFER.COM	

4000 Series Programming Interfaces: 4000API.EXE

Overview

4000API is a TSR that supplies Application Programming Interfaces (APIs) that are compatible with those previously supplied on 4000 Series terminals. With the capability to port 4000 Series applications to the 6000 Series environment, the amount of work required to port an application is greatly reduced.

However, please note that 4000API functions are not industry standards. The use of certain 4000API functions limits the ability of the application to function on standard platforms. If you desire portability and standardization of applications, consider modifying old programs and developing new programs to conform to industry standards. The 6000 Series platforms are PC-compatible.

Installation and Configuration

To load 4000API.EXE for use with a C++ application (disabling the interrupt override) use the following command:

```
4000API.EXE /C3 /PC /10 /14 /16
```

To load 4000API.EXE for use with a PL/N application, use the following commands:

- If an internal modem is used:

  ```
  4000API.EXE /C3 /16 /10 /PC
  ```

- If an internal modem is not used:

  ```
  4000API.EXE /16 /10 /PC
  ```

NOTE: *Either the slash (/) or the dash (–) can be used for command line switches.*

Command Line Switches

Typically, you should supply the following switches, unless your application is a PL/N application originally designed to run on a 4000 Series Computer.

/C3	Do not redirect COM3 to COM1. Do not ignore modem control signals. Existing PL/N applications frequently use COM3 to communicate with COM1, only without using modem control signals.
/PC	Change the value returned by interrupt 15h AX=01FBh. The default value is “SOFT BIOS V3.00”. When this switch is supplied, the value returned is “PC BIOS V3.00”.
/10	Do not trap interrupt 10h (video BIOS interrupt). There are a few 4000-compatible video BIOS extensions enabled by default and disabled with this switch.

/14 Do not trap interrupt 14h (COM port BIOS interrupt). By default, 4000API supplies 4000-compatible BIOS extensions to communicating with COM ports. Supplying this switch, the 4000API services are replaced by the COM port BIOS (from ROM BIOS).

/16 Do not trap interrupt 16h (the keyboard BIOS interrupt). By default, 4000API emulates the 4000 keyboard, complete with the ability to remap keys. Since the 6110 Computer has interrupt 16h support, you can apply this switch, resulting in PC-compatible keycodes returned instead of 4000-style keycodes.

Cross-Reference to Functions

The following cross-reference table includes the NORAND enhanced video BIOS functions and the extended SCAN BIOS interface.

Table D-1
API Function Cross-Reference

INT #	Video Functions	AH	AL	Page
10h	Version Information	7Fh	00h	D-9
	Absolute Write String	7Fh	13h	D-9
	Repaint Text Screen	7Fh	20h	D-10
	Load or Select Font	7Fh	21h	D-10
	Get Window Size	7Fh	28h	D-11
	Set Window Size	7Fh	29h	D-11
	Physical Write Image	7Fh	2Ah	D-12
	Disable Shadow Updates	7Fh	30h	D-12
	Disable Rotated Video	7Fh	32h	D-13
	Enable Rotated Video	7Fh	33h	D-13
INT #	**SCANBIOS Functions**	**AH**	**AL**	**Page**
7Ah	Enable Device	80h		D-18
	Disable Device	81h		D-19
	Select Device	82h		D-19
	Set Bar Code Options	83h		D-20
	Read Data	84h		D-20
	Reserved (functions 85h through 88h)			D-20
	Driver Version Check	89h	00h	D-21
	Read Device Options	89h	01h	D-22
	Set Device Options	89h	02h	D-22
	Device Status Check	89h	03h	D-23
	Reserved	90h		D-23

NORAND Enhanced Video BIOS Functions

The screen rotation driver implements the Norand Enhanced Video BIOS calls, as described in the following paragraphs.

The NORAND Enhanced call Formats are as follows:

Function 00h, Get Version Information

This function returns version information and determines whether NORAND enhancements are installed.

On Entry:

AH = 7Fh NORAND Enhanced operations
AL = 00h
ES:DI = communications port number
CX = size of the target version structure

On Return:

AH = 00h
AL = 7Fh If enhanced function is supported
ES:DI contains the following structure:

```
{
  unsigned  int  InfoSize;
  char      Key[14];          // should be "NORAND_VIDEO"
  unsigned  int  Version;
  unsigned  int  Revision
}
```

Function 13h, Absolute Write String

This function performs absolute screen writes, allowing application to write string anywhere on the screen, overriding the emulation window.

On Entry:

AH = 7Fh NORAND enhanced operations
AL = 13h
BL = Attribute (not yet implemented)
CX = Character count
DX = start cursor position
ES:BP string to write

On Return:

AH = 00h (error code)
AL = 7Fh If enhanced function is supported

Function 20h, Repaint Text Window

This function repaints the displayed portion of the emulated text window.

On Entry:

AH = 7Fh NORAND enhanced operations
AL = 20h

On Return:

AH = 00h (error code)
AL = 7Fh If enhanced function is supported

Function 21h, Load or Select Font

This function provides a means of either selecting an existing font or loading a new font.

On Entry:

AH = 7Fh NORAND enhanced operations
AL = 21h

Select Font:

BH = 0 (font select option)
BL = font number (0 = 8x8, 1 = 8x16, 2 = user defined)

Load Font:

BH = 1 (font load option)
BL = font number
CH = character height (must be a multiple of 8)
CL = character width (must be a multiple of 4)
ES:DI = font table (must be rotated format)

On Return:

AH = 00h (error code)
0 = successful
1 = invalid font
2 = bad load font format
AL = 7Fh If enhanced function is supported

" **NOTE:** *If you change to a different font, you must then select that font before it can be used.*

Function 28h, Get Window Size

This function gets information about the current window size and position, where the standard video BIOS calls are restricted. The restricted area is the only area that standard BIOS calls can modify.

On Entry:

AH = 7Fh NORAND enhanced operations
AL = 28h

On Return:

AH = 00h
AL = 7Fh If enhanced function is supported
CX = Window width
DX = Window height
SI = Window X position
DI = Window Y position

Function 29h, Set Window Size

Set Window Size

This function sets information about the current window size and position, where the standard video BIOS calls are restricted. The restricted area is the only area that standard BIOS calls can modify.

On Entry:

AH = 7Fh NORAND enhanced operations
AL = 29h
BX = 00h
CX = Window width
DX = Window height
SI = Window X position
DI = Window Y position

On Return:

AH = 00h
AL = 7Fh If enhanced function is supported

Function 2Ah, Physical Write Image

This function provides a method to cause graphical data to be bit-mapped to anywhere on the physical screen. This call bypasses the windowing features to allow the application to place graphics outside the emulated video BIOS screen.

On Entry:

AH = 7Fh NORAND enhanced operations
AL = 2Ah
ES:DI contains a pointer to the image data block, as follows:

```
Type    dw 0          ; must be 0
X, Y,   dw ?          ; position to place block on screen
Width dw ?          ; width of image
Height  dw ?          ; height of image
BPP     dw ?          ; bits per pixel
Imagedw ? dup( ? ) ; image packed to match display
```

On Return:

AH = 00h (error code)
0 = successful
1 = BPP not supported
AL = 7Fh If enhanced function is supported

" **NOTE:** *Data must be passed with each scan line, starting on a byte boundary.*

There is a Windows utility (currently called “BMUTIL”) that takes a standard Windows BMP file that is in line art resolution (1 BPP) and generates a 'C' include file with the data for the width, height, and image information. The assumption is that this can then be compiled into a 'C' application.

Function 30h, Disable Shadow Buffer Updates

This function disables the updates to the text shadow buffer, which is used for repaint and some scrolling operation, along with normal video BIOS calls to get the character and attributes of the screen. The effect of disabling the shadow buffer is that a repaint or other similar operation is based upon old screen data.

On Entry:

AH = 7Fh NORAND enhanced operations
AL = 30h

On Return:

AH = 00h (error code)
0 = successful
AL = 7Fh If enhanced function is supported

Function 32h, Disable Rotated Video

This function disables the rotated text driver, so it cannot manage the screen.

On Entry:

AH = 7Fh NORAND enhanced operations
AL = 32h

On Return:

AH = 00h (error code)
0 = successful
AL = 7Fh If enhanced function is supported

Function 33h, Enable Rotated Video

This function enables the rotated text driver, so it can manage the screen.

On Entry:

AH = 7Fh NORAND enhanced operations
AL = 33h

On Return:

AH = 00h (error code)
0 = successful
AL = 7Fh If enhanced function is supported

Extended SCANBIOS Interface

Introduction

The SCANBIOS API was derived from the older PL/N compatible APIs used on 4000 series terminals. Both APIs were originally written to support bar code scanners. Over time, scanners have changed and the manner in which scanners operate has changed. New data acquisition devices, such as magnetic stripe readers, have been developed. The Extended SCANBIOS interface allows applications to utilize the new devices and operating modes, while maintaining backward compatibility with legacy RF terminal and other application software.

Scope

These Extended SCANBIOS APIs are intended for controlling generic data acquisition devices, such as scanners and magnetic stripe readers (MSR); and provide software developers with tools to implement applications and environments while interfacing directly with DOS device drivers that support this API.

Overview

The SCANBIOS API defines a standard operating paradigm where data acquisition devices are initialized, enabled, status checked, read from and disabled. The API consists of Interrupt 7Ah functions that when called would ultimately instruct the device driver or drivers to perform one of the activities.

In simple terms, the SCANBIOS operating procedure follows this sequence:

1. Select and initialize the device(s)
do {
    2. Enable the device(s)
    do {
        3. Acquire data from the device
    } while (as long as you like)
    4. Disable the device
} while (there is a need to acquire data from a device)
5. Select and initialize another device(s).

Notice that once a device is selected and initialized, a program can enable and disable it as many times as it needs to. Also, with certain restrictions, it is possible to select and initialize more than one device, but data can only come from one device at a time. Finally, once a device is enabled, a program can read from it until the device is explicitly disabled (some drivers take exception to this; see the release notes for individual drivers).

Some of the steps in the procedure may operate in one of several modes. For example: data can be acquired in step 3 by first calling a polling function that

indicates whether data has arrived and transferred into a buffer that an application can utilize standard BIOS or DOS keyboard routines to read the data. The buffer can be either a designated buffer or the keyboard buffer.

The following sections examine details of each of these steps.

Select and Initialize the Device(s)

Selecting and initializing the device(s) is a prerequisite before performing any other step. In selecting a device, the application is informing all data acquisition device drivers which devices it wishes to initialize. A device driver initializes the hardware communication path to its device and readies it for enabling. As part of the initialization process, the application can set various options that are device specific.

The functions that are defined for the purposes of selecting and initializing the devices are: *Function 82h, Select Device*; *Function 83h, Set Bar code Options*; *Function 89h, Subfunction 01h, Read Device Options*; and *Function 89h, Subfunction 02h, Set Device Options*.

A call to ***Function 82h, Select Device***, instructs the appropriate drivers to initialize their devices. The original name for this function was *Set Device Type*. And historically, it was intended that the application, through this function, would specify, to the device driver, the type of scanner connected to the system; not which scanner to initialize. Different types of scanners used different data protocols and the device driver was required to know which device was in use in order to communicate correctly with the device. Since the application always received data in ASCII format from the driver, its operation did not change based on the scanner type. It simply acted as an agent that read a configuration file or prompted the user to identify the type of scanner being used and passed that information along to the driver.

Device drivers are now either bundled with devices that operate with a standard protocol, or the driver obtains information about the device on its own, not through the application. Because of this, the use of ***Function 82h, Select Device***, to identify the connected scanner type, is rendered obsolete; and the function now serves a new role of identifying which device, connected to the system, the application wants to select and initialize. The device chosen for selection is identified by means of a Device ID.

Function 83h, Set Bar code Options, is a legacy SCANBIOS function intended for setting bar code scanner parameters only, and can be called at any time. If this function is not called prior to initializing a scanner, default settings are used. Calling this function prior to initialization, allows the driver to change appropriate settings for use while initializing the device. The function does not initialize scanners on its own; but if it is called while scanners are already initialized, those scanners are reinitialized and re-enabled. However, the implementation of ***Function 83h, Set Bar code Options***, is entirely driver dependent. The driver is allowed to implement any part or none of the function. Consult the release notes for the particular device driver to determine if it supports this function.

Setting configuration parameters of other devices is accomplished by calling ***Function 89h, Subfunction 02h, Set Device Options***, with a pointer to an array of options. The format of the array of options, which is used by this function, is specific to the device driver. This function returns an indication, if the device driver does not support setting parameters. ***Function 89h, Subfunction 01h, Read Device Options***, allows the application to read the current state of the driver configuration. It is useful if the application needs to set a subset of the configuration options. Because the driver uses the same array for both functions, the application can call to read the current configuration, change only those values as needed, and pass the array back to the driver. Note that both functions are callable at any time. Consult individual driver release notes for additional details on reading and setting options.

Enable the Device(s)

After a device is initialized, no transmission of data is allowed from it until the device is enabled. Also, scanner devices do not activate lasers on a trigger pull unless enabled. ***Function 80h, Enable Device***, is defined to enable all previously selected and initialized devices. If no devices were selected, this function has no effect. After enabling, the device is ready to read and transmit data to the device driver, which processes and transfers the data as appropriate to the application.

As part of enabling a device, the application declares, to the device driver, how it intends to acquire the data; and whether or not the driver must notify the application when it has data to send. Different modes of operation are defined for data acquisition and status notification. In addition, depending on which mode is selected, additional parameters may be required when calling this function (see the Function Reference section for details).

Acquire Data from the Device

The SCANBIOS API provides two mechanisms for transferring data to an application.

Declare Choice of Transfer Mechanisms

The application must declare its choice of transfer methods when enabling the device so that the driver can determine how to handle the data when it arrives.

- The **key wedge** is a transfer mechanism in which the data is transferred in key sequences that appear in the BIOS keyboard buffer. When using the key wedge method, data from the device appears in the application as though it were entered from the keyboard. This method requires no special code in the application; the same code used to accept entry from the keyboard can also accept data from the device. The key wedge method does have drawbacks, especially with large amounts of data as the transfer occurs at a relatively slow pace.

- The **designated memory buffer** transfer mechanism is through a designated memory buffer, as specified in the call to ***Function 84h, Read Data***.

Notify Applications and Receive Data

How applications are notified that data has arrived is dependent upon how the application wants the data transferred.

- Applications that obtain the data from the **keyboard buffer** can use the standard DOS or BIOS keyboard function calls to poll for the status of arriving data. Once the application receives that key, a call to *Function 84h, Read Data*, is made, which should always return with the data.
- For transfers though a **memory buffer**, the application can use ***Function 84h, Read Data***, for polling. If data has not arrived, this function will return with that indication. As an alternative, an additional mode exists for memory buffer transfers, in which the driver can send a single specified key into the keyboard buffer.

Get the Data Quickly

The API guarantees that, after a device has obtained data and transferred it to the device driver, this data is held until the application calls for it or until the device is disabled. However, the API does not guarantee that future data items from the device will be accepted or kept until previously read data is called for. Thus, it is important that the application obtain the data from the driver soon after it has arrived, or after being notified that it is available. Check the release notes of individual device drivers to determine if successive data reads are stored and the maximum amount of storage that is available.

Disable the Device

Function 81h, Disable Device, is used to unconditionally disable all previously enabled devices. The disabled device returns to the state it was in prior to being enabled, but the device still remains selected. If no intervening call is made to ***Function 82h, Select Device with a different Device ID***, then a call to ***Function 80h, Enable Device***, enables the device again.

Select and Initialize Another Device

Function 82h, Select Device, is used to select and initialize another device. Applications can deselect all previously selected devices by calling this function with a device ID of zero.

Function Definitions

The definitions for each of the functions supported under the SCANBIOS API are listed in numerical order. Any of these functions can be called by performing an Interrupt 7Ah with the appropriate registers set as described below.

Function 80h, Enable Device

Input:

AH = 80h

AL = Mode for reading data

Valid modes:

0	READ data via *Function 84h, Read Data*
1	WEDGE mode — data is placed in the keyboard buffer
0FFh	POST a key code into keyboard buffer on receipt of a good scan

BX = Key code to post on receipt of a good scan in POST mode
(BH = Scan Code, BL = ASCII Code)

DL = Code designating a character to append after each data field for multifield devices (i.e. MSRs). For bar code data, character is appended to the data only when WEDGE mode is enabled.

Valid codes:

0	None
1	New Line (CR)
2	Tab (HT)

Output:

None

Selecting a device or devices via a call to *Function 82h, Select Device* is a prerequisite before calling this function, otherwise this function has no effect.

Description of the Read Modes:

READ Mode: READ data via *Function 84h, Read Data*. In this mode, the application attempts to call *Function 84h, Read Data* to poll the driver for status information.

WEDGE Mode: Data is placed in the keyboard buffer when it is received. The driver places the data into the buffer so the application can use the standard BIOS or DOS keyboard functions to obtain the data.

POST Mode: POST a designated key code into the keyboard buffer on receipt of a good scan. This mode is a modification of the READ mode where the application specifies a key code in BX that the driver will place into the keyboard buffer when it has data. The application then uses the standard BIOS or DOS keyboard functions to poll/read the keyboard. When it receives the designated key code, the application then calls *Function 84h, Read Data* to obtain the actual data. Applications using this mode should not call *Function 84h* until it sees the designated key code arrive in the keyboard buffer.

Function 81h, Disable Device

Input:
AH = 81h

Output:
None

This function unconditionally disables all enabled devices. If no devices are enabled, this function has no effect. When disabled, a device no longer sends data to the host system and power is removed from the device whenever possible.

Calling this function does not alter the Device ID setting, as set by *Function 82h, Select Device.*

Function 82h, Select Device

Input:
AH = 82h
DL = Device ID

Valid Device IDs:
00h None (uninitializes all previously initialized devices)
01h Wand Bar code Scanner
02h Laser Scanner
08h Wand Emulation Scanner
10h Automatic Scanner Detection
11h Magnetic Stripe Reader
12h Pod Scanner
13h Tethered Scanner
14h to 0FEh (reserved)
0FFh (Invalid device ID)

Output:

If Device ID selected is 01h to 10h
None

If Device ID is 00h and device driver successfully deselected the device
AL = 00h

If Device ID is 11h or higher AND if the device is supported:
AL = Device ID (if device is successfully selected)
AL = Unchanged (if device NOT successfully selected)

Device Types of 1 through 10h are legacy SCANBIOS scanner Device IDs. To support backwards compatibility with older applications, any call to this function with (DL = 01h through DL = 10h) will cause all scanner drivers to enable their scanners. The scanner which data actually arrives from is determined by the user when he presses the appropriate trigger.

For Device IDs of 11h or higher, the function initializes the device(s) identified by the ID, and unselects all other devices. Any device initialized remains disabled until *Function 80h, Enable Device* is called.

" **NOTE:** *Only one device driver can implement support for a Device ID that selects multiple devices.*

Function 83h, Set Bar code Options

Input:
AH = 83h
DS:DX = Pointer to array of structures of options

Output:
None

This function exists to allow applications to set options for bar code scanner devices. Scanner drivers will accept calls to this function, but drivers are not required to use the information. Consult the release notes for individual device drivers to determine if this function is supported.

Function 84h, Read Data

Input:
AH =84h
DS:DX = Pointer to a data buffer into data is placed
CX = Length of the data buffer in bytes

Output:
AL = 00h Data is available
01h No data is available
02h to 1Fh Reserved
BL = 0 obsolete (formerly Scan Direction)
CX = Number of characters actually placed into the buffer
DX = Driver specific (consult individual driver release notes for additional details on this return value)

This function returns a status code in AL upon return. If data is available, AL is set to 01h and the data is copied into the memory buffer pointed to by the DS:DX register pair. The actual format of the data is specific to the device driver.

If this function is called, but no devices are enabled or the devices are enabled in WEDGE mode, then AL is always set to zero. If the devices are set to POST mode, AL will always return zero until the designated key code is POSTed to the keyboard buffer.

Functions 85h through 88h, Reserved for Use by Intermec

These functions are reserved for Intermec use only. Ensure that applications do not call them, since undefined results may occur.

Function 89h, Extended SCANBIOS Subfunction Call

This interface provides a general purpose subfunction call interface, for use by applications to perform device specific operations. The general form of this call requires the application to input the subfunction number and the Device ID of the device upon which to perform the operation. All other input register definitions are specific to the subfunction.

General Input:
AH = 89h
AL = Subfunction Number
DL = Device ID (see *Function 82h, Select Device* for the list of valid IDs)
Other register definitions are specific to the subfunction.

General Output:
If either the function or the Device ID is not supported:
AL = 00h
Otherwise:
Register definitions are specific to the subfunction.

Individual device drivers may implement private subfunction calls using subfunction numbers 80h to 0FFh. All other subfunction numbers (00h – 07Fh) are reserved for use by the Extended SCANBIOS API Specification. This revision of the API defines three subfunctions documented below.

Function 89h, Subfunction 00h, Driver Version Check

Input:
AH = 89h
AL = 00h
DL = Device ID (note that a Device ID of zero has no meaning for this call)

Output:
AL = 0 (if device NOT supported)

AL = Device ID (if device is supported)
BH = 1 – Major version number of Extended SCANBIOS API supported by device driver
BL = 0 – Minor version number of Extended SCANBIOS API supported by the device driver
CX = segment of driver's version string
DX = offset of driver's version string

It is possible for different devices to be supported by different device drivers, each of them monitoring the Int 7Ah calls. Applications that support multiple devices can determine whether all appropriate drivers are installed by calling Subfunction 00h, selecting devices one at a time, and examining the return values for valid version strings. For example, the BH and BL registers contain the revision number of the Extended SCANBIOS API that the device driver supports. For this specification (rev 1.0), BH is set to 1 and BL is set to 0.

CX:DX is a segment:offset pointer to the ASCII version string with a 00h terminator value. The start of the string is formatted as follows:

DrvrName.Ext X.XX

where *DrvrName.Ext* is a standard DOS 8 character name, 3 character extension of the driver supporting the device, and X.XX is the driver's version level (as in 1.00). If *DrvrName* is less than 8 characters in length, it is padded with leading spaces. The format for the remainder of the string is device driver specific. Consult the release notes for the particular device driver, in which you are interested, for more information.

Function 89h, Subfunction 01h, Read Device Options

Input:

AH = 89h
AL = 01h
DL = Device ID
DS:BX = Pointer to the array to store the current option settings into.

Output:

If device and/or device driver does NOT support getting or setting the device options:
AL = 0
If an error occurred:
AL = 0FFh

The format of the array to store the options into is specific to the device driver. Consult the driver's release notes for more information.

Function 89h, Subfunction 02h, Set Device Options

Input:

AH = 89h
AL = 02h
DL = Device ID
DS:BX = Pointer to the array containing the options for the driver to set

Output:

If the device and/or device driver does not support setting the current options:
AL = 0
If an error occurred:
AL = 0FFh

The format of the array to store the options into is specific to the device driver. However, the format of the array for the Read Device Options is the same for this function. Consult the driver's release notes for more information.

Function 89h, Subfunction 03h, Device Status Check

Input:

AH = 89h
AL = 03h
DL = Device ID

Output:

AL = Device ID
BL = 00h The device is not enabled or selected
01h The device is selected but not enabled
02h The device is selected and enabled

Function 90h, Intermec Reserved

This function is reserved for Norand use only. Ensure that applications do not call it as undefined results may occur.

Appendix E

Windows 95 Y2K Update Disclosure

Introduction

This section contains information to supplement the Microsoft documentation regarding Y2K issues with the Windows 95 implemented on the 6110 Computer.

The Windows 95 Year 2000 Update is provided by Microsoft Corporation® to resolve known year 2000 issues with the Windows 95 operating systems.

" NOTE: *The information in this appendix was copied from the y2kw95.txt file, which was distributed with the Y2K Update from Microsoft Corporation, and is provided by Intermec for information only, without warranty of any kind.*

For current year 2000 information regarding Microsoft products, visit the Microsoft Web site at http://www.microsoft.com/year2000 or call **1-888-MSFT-Y2K** or contact your local Microsoft subsidiary. Such information is generally available to all Microsoft customers for the sole purpose of assisting the planning strategies for the transition to the year 2000. This document contains the information currently available concerning the date-handling behavior of Microsoft products and is subject to change, at any time, without notice. It is therefore recommend that you continue to check the information on the Microsoft Year 2000 Web site regularly for any such changes.

Summary of Y2K Information

Intermec Technologies Corporation has applied solutions that are provided with the Microsoft Windows 95 Y2K Update for the following issues, except where explicitly stated within specific solution descriptions.

Contents **Page**

Y2K Issues and Resolutions

Windows 95 Year 2000 Issues Defined

This Y2K update resolves the following issues.

Find "File or Folders" Dialog (SHELL32.DLL)

The Date tab in Find "File or Folders" dialog displays the year in YY format. This format results in incorrect displays for years greater than 2000. For example, entering 03/20/2003 will incorrectly display 03/20/C3. However this does not effect the search. When searching for files changed within a certain date range, enter a 2-digit or 4-digit date and the search will be performed based on the dates entered. This file will be updated only if you are running Windows 95 version 950 or 950a. This issue does not exist in later Windows 95 versions.

Windows File Manager (WINFILE.EXE)

Windows File Manager does not display or sort dates beyond the year 2000 correctly. When using Windows File Manager to view the contents of folders, and you have selected to view "all file details", the dates of files created in the year 2000 and beyond may appear as follows:

- January 1st, 2000 would appear as 1/1/;1
- February 3rd, 2023 would appear as 2/3/>3
- March 5th, 2036 would appear as 3/5/=6

Command Interpreter (COMMAND.COM)

The DATE command (internal to COMMAND.COM) does not correctly handle 2-digit dates from 00-79. Entering 2-digit dates within this range returns the error "Invalid Date".

Date/Time Picker (COMCTL32.DLL)

Previously, when you set your Regional Settings in the Control Panel to handle years as two digits, the Date/Time Picker function did not correctly reflect the date. This update addresses that issue.

Phone Dialer Applet (DIALER.EXE)

The Show View Call Log option doesn't display the date properly after successful completion of a telephone call. If the system date is adjusted to the year 2000, the date is displayed as 100, 101,102, and so on.

For example, in the year 2000, you make a call using the Dialer applet. The log file created or appended to after the completion of the phone connection displays the year portion of the call date incorrectly, such as 101, 102, 103, and so on.

Time and Date Control Panel Applet (TIMEDATE.CPL)

When you select the date February 29 and change the year using the up and down arrows in the Date/Time Properties dialog box, the calendar displays February 29 every year, whether it's a leap year or not. This is a display issue in the applet.

DHCP Virtual Driver (VDHCP.386)

Winipcfg /all — IP Leases obtained on or after 3/01/2000 are reported as being obtained the previous day. The system date is displayed properly but the DHCP client reports a date one day prior.

For example, if you log on to a LAN after March 1, 2000, and you run Winipcfg /all from Start\Run or Ipconfig /all from a DOS VM, the lease obtained date is one day behind. After 2/28/2000, the lease obtained date is one day behind the expected date.

Microsoft Foundation Class Library File (MFC40.DLL)

After the year 2000, programs that use the built in operators of the COleDateTime class may incorrectly parse a date. For example, 02/05/2000 may display as 2/05/100. Microsoft has modified the COleDateTime class so that it is less sensitive to program assumptions.

DOS Xcopy (XCOPY.EXE, XCOPY32.EXE)

When using xcopy in real mode with the optional parameter /D:date, xcopy does not accept years entered as two digits, except for the years 80 through 99. The message "Invalid date" is displayed. When using xcopy in protected mode (from within Windows) two-digit dates are accepted but are recognized as being within the 20th century (02/05/01 is seen as 02/05/1901).

Microsoft Run Time Library File (MSVCRT40.DLL)

Some applications that utilize this runtime library may behave as if the current time is one hour earlier than the correct time shown on the Windows clock. The problem will continue for one week from April 1 through April 8, 2001, after which these applications will shift to daylight savings time and again be in sync with the operating system. The problem results from the fact that April 1, 2001, falls on a Sunday, which confused a small algorithm in the run time library file that checks for the start of daylight savings time. This is not a year 2000 issue but rather a daylight savings time issue. It could occur in the years 1973, 1979, 1984, 1990, 2001, 2007, 2012, 2018, 2029, and 2035. What is common about these years is that April 1st falls on a Sunday.

OLE Automation (oleaut32.dll, olepro32.dll, stdole2.tlb, asycfilt.dll)

The Microsoft Automation library contains routines for interpreting 2-digit years and provides a convenient way for applications to create unambiguous (serial) dates. In Windows 95 the current 2-digit year cutoff is 1999. This means that two digit years beginning with 00 will be interpreted as being in the 20th century, i.e. 1/1/00 is converted to 1/1/1900.

Changes to Network Settings

This update installs a new year 2000-ready version of the file, vdhcp.386. This file has not been updated on the Intermec Win95 Installation CD. If you use networking and need this Y2K fix, you must perform it with the Y2K Update included on the Win95 CD, in the \Setup\Y2K folder.

This network system file, vdhcp.386, will be overwritten by an older version from your Windows 95 installation CD or disks if you make changes to your networking settings, using the Win95 CD. For instance, if you install a new network adaptor, setup an online service, or make changes in Control Panel\Network, your original version of vdhcp.386 will be copied to your system. If this occurs, run the Windows 95 Year 2000 Update again to install the correct version of vdhcp.386.

Updating Microsoft Internet Explorer

" NOTE: *If you use Internet Explorer as your Internet browser, you may need to implement their Y2K update on your own copy of Internet Explorer, because it does not come preinstalled on the Intermec Win95 Installation CD, and therefore has not been updated by Intermec.*

The Windows 95 Year 2000 Update checks your system for Microsoft Internet Explorer. If a version of Internet Explorer prior to version 4.01 Service Pack 2 is detected, a message is displayed explaining that it is necessary to install Internet Explorer 4.01 Service Pack 2 to correct several minor year 2000 issues. If you are already using Internet Explorer version 4.01 Service Pack 2, or a later version of Internet Explorer, or if you do not use Microsoft Internet Explorer as your browser, the Internet Explorer components below do not need to be updated. For more information about Microsoft Internet Explorer and year 2000, go to the **http:www.microsoft.com/ie** website.

" NOTE: *The download time for Internet Explorer 4.01 Service Pack 2 can be about 2 hours for a standard installation, depending on the speed of your Internet connection.*

If you are using a version of Internet Explorer prior to 4.01 Service Pack 2 the issues listed below are corrected by installing this Update.

Internet Explorer 4.0x

For Internet Explorer 4.0x the following issues are addressed:

Microsoft Virtual Machine

Year 2000 issues have been reported in connection with Java virtual machines based on the Sun Microsystems Java Development Kit, versions 1.1.1 through 1.1.5. Applications written in Java that make use of the java.txt.SimpleDateFormat class library may handle 4-digit dates incorrectly.

For example, if you have a Java applet or application that uses SimpleDateFormat and you enter four digits for the year, the date functions may truncate the year and use only the first two digits (for instance, 2000 might become 20).

Microsoft Wallet (ACTPMNT.OCX)

When entering credit card information in versions of Microsoft Wallet earlier than version 2.1.1383, you must enter the month, day, and year for expiration dates beyond the year 2000. Otherwise, information may not be handled as expected.

For example, entering a credit card with an expiration date of 1/01 is handled as January 1 of the current year. This behavior was changed in Microsoft Wallet version 2.1.1383 and later.

Microsoft Data Access (msdadc.dll, msadce.dll)

The msdadc.dll file is part of the OLE DB core components and a part of the Microsoft Data Access Components (MDAC). If you code to ADO, and your ADO Recordset includes Date data types, such as adDate, adDBDate, adFileTime, or adDBTimeStamp, and you're using a date format in which periods are used instead of slashes for date separator (for example, 01.01.98 instead of 01/01/98), and you specify a year less than 60, then Data Convert (msdadc.dll) might translate your date as a time.

For example, 01.01.01 (January 1, 2001) might be converted to 01:01:01 (December 30, 1899, 1:01:01A.M.).

For more information about OLE DB compliance, visit the Microsoft Web site at the **http://www.microsoft.com/year2000** website.

1. Click Product Guide.
2. In Compliance Information for Microsoft Products, select Microsoft OLE DB. Under Data Access, select Microsoft OLE DB.
3. Click Search, and the latest compliance documentation will be displayed.

Internet Explorer 3.0x

For Internet Explorer 3.0x the following issues are addressed:

- If a web site uses a cookie with a 2-digit year of "00", Internet Explorer recognized the cookie as expired. Cookies with 4-digit expiration dates, or expiration dates before and after the year 2000 are not affected.
- If a web server communicates a 2-digit year of "00" in its HTTP/1.0 header, Internet Explorer will recognize pages on that site as expired and not cache them locally. Browsing of the site will work normally while connected, but will not be available for offline browsing. HTTP/1.1 headers, headers with a 4-digit year, or headers containing 2-digit years before and after the year 2000 are not affected.
- If you change your control panel settings (International –> Use Century format (1990 vs 90)) and browse to an FTP server with files created in 2000 (according to the server), IE will display the files as created in 1900.
- The Javascript getYear() function/method calculates the year "00" (2000) as "100", and the year "01" (2001) as "101" etc. Scripts will need modifications to work around this issue.
- The date function (java.util.date) in the Microsoft VM based on Sun Microsystems Java Development Kit 1.0.2 does not interpret two digit dates correctly. The function maps a 2-digit date to the 1900s and does not take into consideration the year 2000.

" NOTE: *During the setup of Internet Explorer 4.01 Service Pack 2, if you choose the Installation Option "Browser Only Installation" rather than the default "Standard Installation", the updated files that correct the above year 2000 issues will not be installed. The "Browser Only Installation" installs only a subset of the entire Internet Explorer Service Pack and does not update your system for the above year 2000 issues. You should choose either the default Installation Option of "Standard Installation" or choose "Full Installation" to ensure that all updated files and Internet Explorer 4.01 Service Pack 2 components are installed on your system.*

Additional Issues

Microsoft Jet Database Engine 3.0 and Microsoft OFFICE 95 — When you try to synchronize two members of a replica set, which was created before the year 2000, and the current date on your computer is set to a date after the year 2000, a synchronization message might appear. This is because of the way the expression service mishandles date entries in the MSysExchangeLog table in replicas. When a replica set, created before the year 2000, is compacted after the year 2000, exchange information relating to synchronizations after the year 2000 is deleted from the MSysExchangeLog table. After this information is deleted, the generation information in the MSysExchangeLog table and the MSysGenHistory table does not match, and the replicas cannot be synchronized. To resolve this issue, download the latest Microsoft Office 95 Service Release from the **http://www.officeupdate.microsoft.com** web site.

Microsoft Product Support Services

Microsoft Technical support is provided in the United States and Canada by calling (425) 635–7222, 6:00 A.M. to 6:00 P.M., Pacific Time, Monday through Friday, excluding holidays. After hours, visit the Options topic at the **http://www.microsoft.com/support** web site. For customers using text telephone (TDD/TTY), technical support is available at (425) 635–4948 in the United States and Canada, during the same time period listed above. For support information outside the United States and Canada, contact your local subsidiary. Phone numbers for Microsoft Subsidiaries are subject to change. For the most recent listing, refer to the Support Online Web site at http://support.microsoft.com/support. If there is no Microsoft subsidiary office in your country, contact the vendor from which you purchased your Microsoft product. Support services from Microsoft are subject to Microsoft's then-current prices, terms, and conditions, which are subject to change without notice.

" NOTE: *The information below is a quote from Microsoft Corporation, relating to their Y2K Update, and should therefore be considered as a direct statement from Microsoft.*

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Glossary

NOTES:

The following definitions are either used within this manual, or relate to other terms used within this glossary.

1/0 Key

Power suspend/resume switch — used as a reset button on a 6110 Computer.

ALZ Files

Script files that contain a listing of files needed by an application, and used by the Builder utility to determine what Windows 95 files were missing from the minimal load.

ANSI *(American National Standards Institute)*

A private organization that coordinates some United States (US) standards setting. It also approves some US standards that are often called ASNI standards. ANSI also represents the US to the International Organization for Standards (ISO).

API *(Application Program Interface)*

A method of defining a standard set of function calls and other interface elements. An API usually defines the interface between a high-level language and the lower-level elements used by a device driver or operating system.

APM *(Advanced Power Management)*

The APM BIOS manages CPU/core logic, display, and backlight power in the background, based on device activity.

The APM system consists of one or more layers of software. The APM BIOS resides at the lowest layer, providing portability at the higher layers of the APM system, supplying a software interface to the hardware.

ASCII *(American Standard Code for Information Interchange)*

A standard character set that typically assigns a 7-bit binary code to each letter, number, and selected control character. It is often used erroneously to refer to 8-bit Extended ASCII. The other major encoding standard is EBCDIC (Extended Binary Coded Decimal Interchange Code, a common 8-bit character code scheme used in PC environments).

ASYNC

Asynchronous communications. A method of transmitting data using an external clocking source (the transmitted characters are preceded by a start bit and followed by a stop bit).

ATA Card

A credit-card-sized device, designed to meet the needs of small computers, and can be inserted and removed from a PC Card slot connected to a bus. In the PEN*KEY products, it is generally a flash storage card, modem, radio, etc. (See also: Flash Card, SanDisk, Spinning Media, or Hardcard)

Auto Panning

The Auto Panning mode causes the display driver to automatically pan, so the active window remains displayed inside the viewport. (See also: Panning and Pan Border)

Autorun

Also referred to as autoload. A feature of Windows 95 that allows you to automatically start up a program (usually an installation program) located on CD.

BBS *(Bulletin Board System)*

Intermec-NORAND has a BBS available to customers. This BBS contains forums for discussions on NORAND hardware and software products, file libraries, email, and other services. The address is:
http://norbbs.norand.com

BIOS *(Basic Input and Output System)*

A set of programs, usually in firmware, that lets each computer's central processing unit communicate with printers, disks, keyboards, consoles, and other attached input and output devices.

BISYNC *(BInary SYNChronous communications)*

A method of transmitting data in which the transmission of a character is marked by a drop or rise in the signal. An IBM defined, byte-controlled communications protocol, using control characters and synchronized transmission of binary coded data.

Bootable ATA

The ability to run the CONFIG.SYS and AUTOEXEC.BAT off of an ATA card. In some older versions of flash, the CONFIG.SYS from the flash drive had to be run

to load the drivers for the ATA card. With *Bootable ATA* the CONFIG.SYS and AUTOEXEC.BAT are run from the ATA card without loading any drivers.

BUS *(network)*

The main (multiple access) network cable or line that connects network stations. Also refers to a network topology of multiple stations communicating directly with the same cable with terminators at both ends, like an Ethernet or token bus.

CMOS *(Complementary Metal Oxide Semiconductor)*

A term that usually refers to the system configuration and real-clock status information, which is usually stored in CMOS memory. The term also applies to the construction method or a type of low-power computer chip.

Code 39 (Code 3 of 9) *(Bar Code Symbology)*

An alphanumeric bar code symbology including a set of 43 characters, including uppercase and seven special characters. The name comes from the idea that 3 of the 9 elements representing a character are wide while the remaining 6 are narrow.

It is the most widely used industrial bar code. This code fits the needs of most major companies, trade associations, and the federal government.

Code 128 *(Bar Code Symbology)*

A high density bar code symbology, allowing encoding of all 128 ASCII characters without adding extra symbol elements. It is used by retail and manufacturing industries.

Codabar *(Bar Code Symbology)*

A discrete self-checking bar code symbology with each character represented by a stand alone group of four bars and three intervening spaces. It was developed for retail price-labeling systems and is currently accepted in libraries, medical industries, and photo finishing services. (See also: Self-checking Code and Discrete Code)

Compression

A method of providing more room for files on a storage media (such as a PC Card or hardcard). For the sake of convention, this publication refers to compressed drives as if they are larger than without compression. However, in reality, the contents of the files on a compressed drive have been condensed so they take up less space.

Drivespace 3 not only creates compressed drives up to 2 GB, but uses all the space on the media. Whereas, previous versions of Drivespace only used unfragmented space on the drive, and could not create a drive over 512 MB.

Compression gains about 2 times the space of an uncompressed drive. For example, a 40 MB PC Card provides almost 80 MB when compressed.

CRC *(Customer Response Center)*

The Intermec-Norand CRC (technical support), telephone # 1-800-221-9236.

Email: crc@norand.com *If you want to Email a problem or question to the CRC be sure to include the following information in your message:*

Your name

The company name

The company address

Phone # and Email address where you or the customer can be contacted

Problem description / Question (be specific)

Also if the equipment was purchased through a VAR please include the VAR information

DEX/UCS *(Direct EXchange/Uniform Communications Standard)*

This refers to the part of UCS which is transmitted directly between computers with no intervening network. It is a face-to-face exchange between parties. DEX/UCS involves the exchange of invoice information between a supplier and a retailer at the retailer's back door receiving area.

Discrete Code

A bar code in which all spaces within the symbol are part of the characters. With no intercharacter gaps, greater information density is achieved.

Discrete 2 of 5 Code

A bar code symbology representing characters in groups of five, in which two of the elements are wide with the remaining three elements narrow.

EAN *(European Article Numbering Code) (Bar Code Symbology)*

A bar code symbology similar to the UPC symbology, although not interchangeable. The difference is that EAN contains 13 characters and uses the first two as a country identifier. This code is used primarily in the retail environment throughout Europe.

Ethernet

A general term used in reference to a coaxial standard for LANs, where all nodes connect to the coaxial cable contending for access.

Flash

A technology for non-volatile memory storage. A special type of EEPROM (Electrically Erasable Programmable Read Only Memory) that can be erased and reprogrammed.

Flash Card

A memory storage PC Card that meets the ATA standard. (See also: ATA Card, SanDisk, Spinning Media, or Hardcard)

Folder

The Windows term for a directory, where filenames are viewed as sheets of paper in manila folders in a literal file cabinet.

***FTP** (File Transfer Protocol)*

An efficient file transfer protocol that typically included as part of the TCP/IP suite of protocols supported in most implementations of TCP/IP. FTP is a TCP/IP-based protocol for transferring files between different systems.

***GPS** (Global Positioning System)*

A satellite based positioning and navigation system that provides precise position, velocity, and time information.

Hardcard

A spinning media (or PC Card hard drive) that plugs into a PC Card slot. (See also: ATA Card, Flash Card, SanDisk, or Spinning Media)

***HHC** (Hand-Held Computer)*

A generic acronym for an Intermec Hand-Held Computer.

***HMA** (High-Hemory Area)*

A part of memory that resides above Conventional and Upper memory.

Host

A customer's host computer.

A computer that provides services directly to users. In TCP/IP, host refers to an IP addressed device.

Host Computer *(ADK)*

A computer that serves one or more users in a network, such as a PC, minicomputer, or mainframe.

IFL Card *(Initial Flash Load)*

An SRAM card that installs the flash contents on most PEN*KEY systems.

InfraRed

A method for short-range wireless data communication.

Interleaved 2 of 5 (I 2of5 Code) *(Bar Code Symbology)*

A bar code symbology in which all characters are numeric. The characters are scanned in pairs, in groups of five. It is widely used for warehouse and heavy industrial applications, such as the automobile industry.

Interleaved Bar Code

A bar code that pairs characters together, in which the bars represent the first character and the interleaving characters to represent the second character, providing greater density of information with no intercharacter spaces.

IP *(Internet Protocol)*

The network layer for the TCP/IP Protocol Suite. It is a connectionless, best-effort packet switching protocol that offers a common layer over dissimilar networks.

IrDA

A standard for InfraRed communications. An IrDA device creates a connection between two devices or a device and a network, without a physical connection, using signals transmitted in the infrared spectrum.

IRQ *(Interrupt Request)*

A method involving a set of special address lines in PCs, connecting peripherals (such as a serial port or network adapter) to the processor and other computer architectures so the peripherals can request service from the processor.

ISP *(Internet Service Provider)*

A vendor that provides one or more Internet-related services, such as email, newsgroup access, and Internet Web site access.

LAN *(Local Area Network)*

A group of network devices in which each device can communicate through a wired or wireless link. The wired link may be composed of several segments joined by repeaters and bridges. The LAN is characterized by the relatively short distance it is designed to cover, a high speed of operation, and relatively low error rates. The geographic scope of LANs is limited to thousands of feet or closely-spaced building complexes.

Landscape mode

In terms of the display, it has an orientation such that the information displayed on the screen is viewed by rotating the computer ninety degrees clockwise, resulting in a wide display.

Master Boot Card

Same as IFL card. See IFL Card

Master Mode Booting

The process of booting from a PC Card, where the system needs to be reflashed with a functioning version of flash. See IFL Card

NetBIOS *(Network Basic Input/Output System)*

A *de facto* industry transport protocol standard used by a wide variety of vendors.

(ADK) A computer network or terminals connected by means (wires or radio transmissions) using software that enables them to exchange information.

NMSD

Norand Mobile Systems Division of Intermec Technologies Corporation.

NOVELL

Novell is a company that sells networking software. PEN*KEY handhelds that have Novell as a communications option could be configured to boot from an existing Novell network. For more information on Novell. See the web site at www.novell.com

NPCP *(NORAND Portable Communications Protocol)*

A NORAND proprietary protocol that provides session, network, and datalink services for NORAND HHCs in the NORAND LAN environment used with printers and data communications.

NRInet

A NORAND communications data transfer protocol that transfers data over TCP/IP.

OEM *(Original Equipment Manufacturer)*

A term that identifies certain hardware vendors who produce PC hardware for a system built by another company.

OSR1 *(OEM Service Release 1)*

Original Microsoft Windows 95 operating system release. Microsoft Plus! is required to use compression with this version of the OS.

OSR2 *(OEM Service Release 2)*

Second release of Microsoft Windows 95 operating system.

Pan Border

An invisible border that extends inward from the edges of the physical display, providing an easy means of panning. (See also: Panning and Auto Panning)

Panning

Panning is a mechanism, by which you can move the information around within the physical display to view the entire virtual display area. When Windows starts up, the physical display provides visibility into the area located at the upper-left corner of the virtual screen. Pan to the right or downward, or both to see other parts of the virtual display. Pan to the left or upward to get back, as needed. (See also: Pan Border and Auto Panning)

PC *(Personal Computer)*

Within this manual, this term refers to any desktop or laptop computer that is used for development of a boot card for use on the 6110 Computer.

PC Card

A device that fits into the card slot of an Intermec or other computer. In most PEN*KEY computers, the smaller type II card occupies one slot, while a type III card takes up two slots. The card may be used for data storage, modem or printer communications, wireless, or other purposes.

Within this manual, PC Card is used in reference to a device, whereas PCMCIA is used in reference to a standard.

(See also: ATA Card, SanDisk, Spinning Media, or Hardcard)

PC Card Icon

An icon located in the System Tray, which indicates a PC Card is plugged into the PC Card slot. (See also: System Tray)

PCMCIA (Personal Computer Memory Card International Association)

An industry standards group responsible for the creation of the standard for credit-card-sized devices for small computers, such as laptop and hand-held computers.

Formerly, devices were referred to as PCMCIA cards, but are now generally referred to as PC Cards, and PCMCIA is used as a reference to the standard.

*PEN*KEY Utilities*

A program that provides the basic functions needed to prepare a PEN*KEY hand-held computer for use, including program load and data communications.

PL/N Language

A third generation high level programming language proprietary to Intermec-Norand.

Portrait mode

In terms of the display, it has an orientation such that the information displayed on the screen is viewed in a normal manner without rotating the computer, resulting in a narrow display.

Protocol

A formal description of message formats and the rules computers must follow to exchange those messages.

Redundancy

The ability of a duplicate access point to immediately take over the function of another access point that goes offline.

Right-click

An operation using a mouse device, in which the secondary mouse button is clicked. When using a stylus, hold down the **GOLD** key, then tap the screen.

Unless reversed for left-handed operation, the left mouse button is used as the primary button and the right mouse button is used as the secondary button. (See also: Click, Double-click)

RS-232 *(Recommended Standard 232)*

An electrical interface standard.

RS-485 *(Recommended Standard 435)*

An electrical interface standard.

SanDisk

A brand of flash card. (See also: ATA Card, Flash Card, Spinning Media, or Hardcard)

Self-checking Code

A symbology with a checking algorithm that is capable of detecting encoding errors within the bar code symbol.

Serial Interface *(ADK)*

An interface in which the terminal or computer sends single bits of information to the other device, one after another.

SNMP *(Simple Network Management Protocol) (SNMP)*

A technology on which companies build management systems. The standard protocol for managing TCP/IP networks. The Internet standard protocol for managing nodes on an IP network.

Spinning Media

A credit-card-sized hard drive that plugs into a PC Card slot and is used to store a large amount of data. Within this publication, it is referred to as a hardcard. (See also: ATA Card, Flash Card, SanDisk, or Hardcard)

SRAM Card

A memory storage PC Card which functions like a floppy disk.

Stylus

A pen-shaped device, used for input on a touch screen by tapping or sliding.

System Tray

The System Tray appears as an indented panel on the Task Bar, and contains small icons. One example is the PC Card icon, which indicates there is a PC Card plugged into the PC Card slot. Other icons in the System Tray are representations of programs running in the background. The System Tray is located at the opposite end of the Task Bar from the Start button. (See also: PC Card Icon)

TCP *(Transmission Control Protocol) (SNMP)*

An Internet standard transport protocol in the Internet protocols suite for reliable, connection-oriented, full-duplex streams. Contrasts with UDP (User Datagram Protocol).

TCP/IP *(Transmission Control Protocol over Internet Protocol)* ***Suite***

Most networks combine IP with a higher-level protocol called Transport Control Protocol (TCP), which establishes a virtual connection between a destination and a source.

IP by itself is something like the postal system. It allows you to address a package and drop it in the system, but there's no direct link between you and the recipient. TCP/IP, on the other hand, establishes a connection between two hosts so that they can send messages back and forth for a period of time.

Telnet *(SNMP)*

The virtual terminal protocol in the Internet suite of protocols. Users on one host can access another host and work as users of that host.

Tethered

A scanning method requiring a cable between the computer and the scanner.

TTY

A 2-way TTY asynchronous data link protocol.

UART

A chip that allows a serial port to communicate with other computers or networks through the peripherals. Devices such as internal serial modems rely on the UART for communications.

UCC (Uniform Code Council)

The UCC is responsible for many things, one of which is the administration of UCS. The UCC is also responsible for assigning UPCs to suppliers.

UPC (Universal Product Code)

A bar code symbology containing two pieces of numerical information that are encoded on the bar code, producer identification, and product identification information.

It is used throughout the grocery and retail industries.

WAN *(Wide Area Network)*

A network that covers a large geographic area. It is often used to connect two or more LANs together. This usually involves a variety of methods to maintain communications between all nodes in the network. For example, microwave communications, fiber-optic connections, or leased telephone lines.

INDEX

General Index

This section has been divided into the following subsections:

General Index is a fairly comprehensive list of topics found in this publication.

Files Index consists of names of device drivers, applications, utilities, batch files, or other files referenced or described within this publication.

Throughout this section there are references to terms or definitions. See the ***Glossary*** *for a complete list of terms and their definitions.*

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Files Index

This index section is provided to assist you in locating descriptions of device drivers, applications, utilities, batch files, or other files within this publication. There is a complete list of Windows 95 files in *Appendix B, Windows 95 Files*.

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