GRiD

PalmPAD Computer

User's Guide

PalmPAD Computer User's Guide

May 1992

47211 Lakeview Boulevard
Fremont, CA 94538-6599
(510) 656-4700
FAX: (510) 683-9888

Manual Name: PalmPAD Computer User's Guide
Order Number: 002350-40
SKU: GMN-2354
Issue Date: May 1992
Revision: A

The information in this document is subject to change without notice.

Neither GRiD Systems Corporation nor this document makes any expressed or implied warranty, including, but not limited to the implied warranties of merchantability, quality, or fitness for a particular purpose. GRiD Systems Corporation makes no representation as to the accuracy or adequacy of this document. GRiD Systems Corporation has no obligation to update or keep current the information contained in this document.

GRiD Systems Corporation's software products are copyrighted by and shall remain the property of GRiD Systems Corporation.

Under no circumstances will GRiD Systems Corporation be liable for any loss or other damages arising out of the use of this manual.

GRiD, GRiDPAD, and GRiDCASE are registered trademarks of GRiD Systems Corporation. PalmPAD and PenRight! are trademarks of GRiD Systems Corporation.

Other brand and product names are trademarks or registered trademarks of their respective holders.

Limited Warranty and Limitation of Liability

You should carefully read the following terms and conditions. You will be deemed to have accepted these terms and conditions if you have not returned the product with your proof of purchase to your GRiD representative, within five days of the date of payment.

The term "Products," as used herein, means hardware, hardware parts, and documentation sold by GRiD.

1. Warranty

GRiD warrants that the Products sold hereunder shall be free from defects in materials and workmanship for a period of one year after date of shipment. Defective Products will be repaired or replaced, at GRiD's option, by GRiD during the warranty period. You shall notify GRiD of the defective Product within the one year period, obtain a Product Repair Order, and return the Product to GRiD along with proof of purchase data. If this Product is delivered by mail, you agree to insure the Product or assume the risk of loss or damage in transit, to prepay shipping charges to the warranty service location, and to use the original shipping container or equivalent. Contact an authorized GRiD Systems representative, call the GRiD Resource Center (GRC) at 1-800-654-GRID (4743), or write to: GRiD Systems Corporation, GRiD Resource Center, P.O. Box 5003, Fremont, California 94537-5003, for further information.

You are responsible for removing any data or programs or keeping backup copies prior to returning Products to GRiD. GRiD shall not be liable for loss of data contained in any returned equipment.

This warranty is not valid if the Products have been abused, misused, altered, neglected, or if repairs are attempted by unauthorized personnel. **Except as provided above, GRiD makes no warranties, expressed or implied, including any warranty of merchantability or fitness for a particular purpose.**

2. Limitation of Liability

In no event will GRiD be liable for special, incidental, or consequential damages, however caused. GRiD's liability under or for breach of this agreement shall be limited to refund of the purchase price.

3. General

You shall not assign this Agreement nor any rights hereunder without the prior written consent of GRiD. GRiD reserves the right to withhold such consent for any reason whatsoever. Subject to the foregoing, this Agreement shall bind and inure to the benefit of the respective parties hereto and their heirs, personal representatives, successors, and assigns.

The Terms and Conditions of this Limited Warranty and Limitation of Liability and of the Class A Software License Agreement represent the entire Agreement between GRiD and you relating to Product purchases and software licensing and may only be modified in writing, signed by both parties.

By reading this agreement, you acknowledge that you understand it, and agree to be bound by its terms and conditions.

Federal Communications Commission (FCC) Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Digital devices, including personal computers, are operated under the authority of the Federal Communications Commission. Changes or modifications to the equipment described in this manual, which are not expressly approved by GRiD Systems Corporation, could void your authority to operate the equipment if harmful interference is caused to radio and television reception.

PalmPAD Model 2350, 2351, and 2353 Computers

The PalmPAD computer has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. These computers generate, use, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If one of these computers does cause harmful interference to radio or television reception, which can be determined by turning the computer off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Disconnect peripherals and accessories one at a time to determine which device may be causing interference. For non-GRiD Systems products, contact the dealer or manufacturer for assistance.
- Ensure that shielded cables are used where required and that cables are properly connected.
- Reorient or relocate the receiving antenna.
- Increase the separation between the computer and receiver.
- Connect the computer to an electrical outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

PalmPAD Model 2352 Computer

The PalmPAD computer has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the computer is operated in a commercial environment. The PalmPAD computer generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this computer in a residential environment is likely to cause harmful interference, in which case, users will be required to correct the interference at their own expense.

Canadian Department of Communications (CDC) Statement

PalmPAD Model 2350, 2351, and 2353 Computers

The PalmPAD computer does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

PalmPAD Model 2352 Computer

The PalmPAD computer does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

Table of Contents

CHAPTER 9:
UTILITY PROGRAMS

APPENDIX B:
TECHNICAL INFORMATION

List of Figures

List of Tables

ABOUT THIS BOOK

This manual describes how to operate the PalmPAD™ computer from GRiD® Systems Corporation. It shows you how to set up and get started using your computer, and includes detailed information about how to use all of the controls, connectors, and other features of the computer.

PalmPAD computers are frequently used in situations that require custom application programs, written especially to do a specific job in a particular company. The operation and development of such custom applications is not covered in this manual.

Some software is included with every PalmPAD computer. This software is stored inside the computer in a computer chip called a Read Only Memory (ROM). This internal ROM contains the Microsoft® Disk Operating System (MS-DOS®) Version 5.0, which is the computer's operating system software. The MS-DOS ROM also contains other useful utility programs. All of the software contained in the MS-DOS ROM is documented in this manual or in the *MS-DOS* manuals listed in the section, Related Publications.

Manual Organization

The information in this manual is organized as follows:

- **Chapter 1** introduces the PalmPAD computer and describes its features.
- **Chapter 2** shows you how to get started using your PalmPAD computer. Read this chapter first if you want to get started quickly.
- **Chapter 3** describes the computer in detail and explains each hardware feature.
- **Chapter 4** describes how to use the different options that are available for powering the computer.

- **Chapter 5** describes and explains how to use the memory cards and SunDisk™ cards that are used for storing data and programs in the PalmPAD computer.

- **Chapter 6** provides troubleshooting information and explains what to do if you have problems with the computer. Computer error messages also are described in this chapter.

- **Chapter 7** contains important safety information and describes how to care for and maintain the computer.

- **Chapter 8** provides information about using MS-DOS on the PalmPAD computer.

- **Chapter 9** explains how to use the utility programs supplied in the MS-DOS ROM in each PalmPAD computer.

- **Appendix A** provides the PalmPAD computer specifications; and **Appendix B** provides a system memory map and connector pinout information.

- The **Glossary** contains definitions of important terms and all acronyms that are used throughout the text.

A postage paid customer response form is included at the end of this manual. Please use the form to comment on the usefulness and readability of this manual.

Related Publications

The following publications contain related information:

- *Internal Modem User's Guide* provides detailed information on using the optional internal modem and the modem command set.
- *PenRight! Application User's Guide* provides information on handwriting and using the pen effectively in PenRight!™ applications.
- *MS-DOS Version 5.0 User's Guide* and the *MS-DOS Version 5.0 Reference Manual* provide reference information on using MS-DOS 5.0.
- The manuals in the *PenRight! Pro Software Development Kit* provide information on developing custom PenRight! programs for the PalmPAD computer.
- *PalmPAD Computer Technical Reference Manual* provides technical information on the PalmPAD computer.
- *PalmPAD Computer Service Manual* provides service information for the PalmPAD computer.
- *PenLink Wireless LAN Programming and Installation Guide* describes the procedures for programming applications for PenLink and includes information on connecting to Novell NetWare.
- *MS-DOS Communication Utility User's Guide* describes the Interlnk and Intersvr commands for file transfer.

Notational Conventions

The following conventions are used to distinguish key elements of text in this manual:

bold	Used for commands, options, switches, and literal portions of syntax that must be entered exactly as shown.
italics	Used for file names, variables and placeholders that represent the type of text to be entered by the user.
`monospace`	Used for sample command lines, program code and examples, and sample sessions.
keycaps	Used to identify keys or key sequences on the optional computer keyboard or Screen Keyboard.

Occasionally, multi-key operations, such as "press **Shift-Tab**," are described. When you see a hyphen between two keycap names, press the keys in the order in which they appear. Thus, when you read "press **Shift-Tab**," you should press the **Shift** key and, while holding it down, press and release the **Tab** key. When you see hyphens between three keycap names, press the first two keys and, while holding them down, press and release the last key.

Note that the symbol **Enter** is used throughout this book to identify the **Enter** key. On some keyboards, this key is labeled **Return**.

CHAPTER 1: INTRODUCTION

This chapter introduces you to the PalmPAD hand-held computer.

The PalmPAD computer is a lightweight, rugged, hand-held computer. It features battery operation, a backlit screen, handwritten input, MS-DOS, and IBM XT compatibility.

Checking the Contents of the Box

The parts included in the computer shipping carton are shown in Figure 1-1.

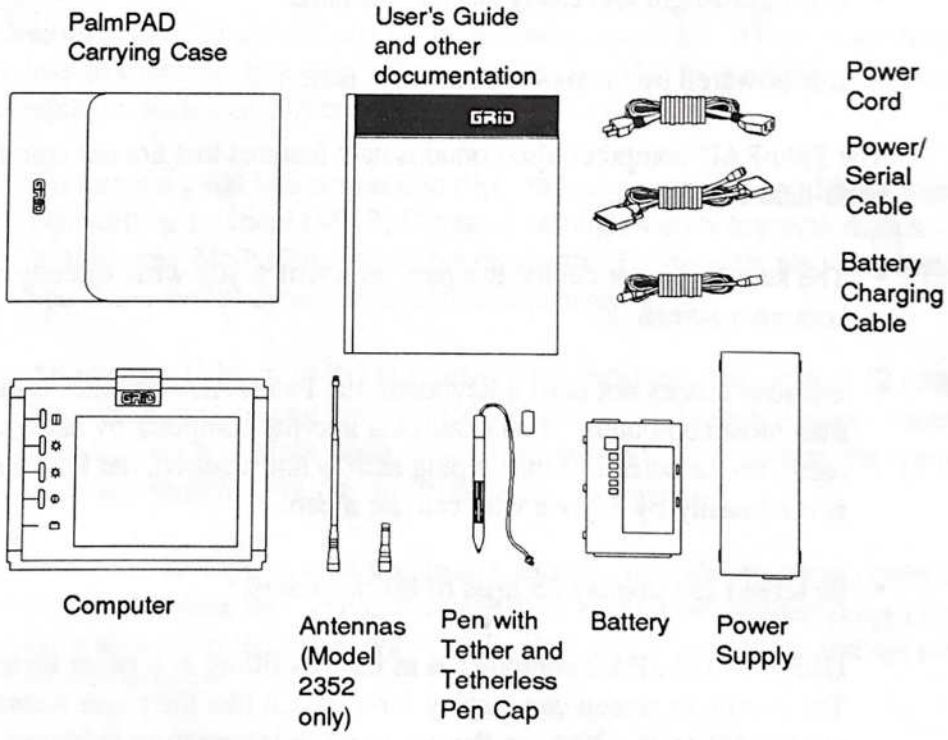


Figure 1-1. Contents of the Box

Check for shipping damage or missing parts. If any equipment is missing or damaged, and you are in the U.S., immediately contact an authorized GRiD Systems representative, call the GRiD Resource Center (GRC) at 1-800-654-GRID (4743), or write to: GRiD Systems Corporation, GRiD Resource Center, P.O. Box 5003, Fremont, California 94537-5003. Outside of the U.S., contact your local GRiD Systems representative or distributor.

Keep the shipping carton and original packing materials in case you need to return your PalmPAD computer to GRiD Systems for upgrading or service. Do not return your PalmPAD computer to GRiD Systems until you have received prior authorization from the GRC or your GRiD Systems representative.

A New Kind of Hand-Held Computer

The PalmPAD computer is a new kind of hand-held computer. It incorporates some features of existing hand-held computers:

- It is lightweight and easily held in one hand.
- It is powered by internal rechargeable batteries.

The PalmPAD computer also contains new features that are *not* common to other hand-held computers:

- The standard input device is a pen, with which you write directly on the computer screen.

  Because it does not need a keyboard, the PalmPAD computer is easier to use than most computers. You enter data into the computer by using the pen directly on the screen. Since typing skill is not required, the PalmPAD computer is used easily by anyone who can use a pen.

- Its screen can display 25 lines of 80 characters.

  Using the PalmPAD computer is as easy as filling in a paper form with a pen. The computer screen can display forms much like the paper forms that you are used to filling in. You use the pen to write information in blanks on the forms. The computer translates your handwriting into typewritten characters that it can work with and store.

- It runs the Microsoft Disk Operating System (MS-DOS) Version 5.0 and is IBM XT compatible.

  MS-DOS Version 5.0 supports ROM-executable MS-DOS and advanced power management features.

  The PalmPAD computer is really two computers in one. It is a powerful hand-held computer and it is a fast IBM XT-compatible computer that can be used like other personal computers.

- Internal storage options provide data storage on RAM cards (up to 2 megabytes of data) or on SunDisk cards (up to 20 megabytes of data).

- The PalmPAD computer is expandable into a full-function IBM XT-compatible computer by attaching a keyboard.

- The PalmPAD computer makes it easy to transfer files to IBM PC-compatible computers because it includes a serial port and communications software.

- Optionally, it may include one of the following modems. These modems make it easy to exchange data over telephone lines or radio frequencies with remote computers, such as a corporate mainframe computer.

  - An internal 2400 bits-per-second (bps) modem, with V.42 and Microcom Networking Protocol (MNP) Classes 2 through 4 error correction plus V.42bis and MNP Class 5 data compression. The modem also provides 9600 bps send/receive Group III facsimile capability.

  - An internal V.32bis 14400 bits-per-second (bps) modem, with V.42 and Microcom Networking Protocol (MNP) Classes 2 through 4 errors correction plus V.42bis and MNP Class 5 data compression. The modem also provides 9600 bps send/receive Group III facsimile capability.

  - A 902 to 928 MHz spread-spectrum radio that provides wireless connectivity to a Novell network. The data rate is 19.2 kilobits per second (kbps) from the computer to the radio, with a radio data rate of 242 kbps, and the range is up to 800 feet.

Feature Highlights

Here are the main features of the PalmPAD hand-held computer:

- The computer is small and lightweight; it measures 6.2 by 9 inches and weighs 2.9 pounds, including the battery pack. It can be held easily in one hand and is well-suited to mobile data collection.

- The computer has a battery life of up to eight hours in normal use before it needs to be recharged. (Battery life depends greatly on the computer configuration and individual use.)

- The rubberized coating on the base of the computer provides cushioning and makes it more comfortable to hold.

- The pen is used for data entry; no keyboard is needed. This saves weight and makes data entry easier and more natural, especially for those not accustomed to a keyboard. The computer automatically translates handwritten characters into characters that it understands, as if you had typed them in. You can attach a keyboard if you wish.

- The computer is IBM XT compatible. It runs most popular MS-DOS software (except a very few programs that require an 8087 numeric coprocessor).

- The computer has a 5.7-inch by 3.6-inch backlit Liquid Crystal Display (LCD) screen with 640 by 400 pixel resolution. It supports Color Graphics Adapter (CGA) graphics mode and AT&T 6300 monochrome graphics mode. Standard MS-DOS applications can display at least 25 lines of 80 characters on the screen.

- The computer contains 2 MB—over two million characters—of Random Access Memory (RAM), or main memory. Up to 640 kilobytes (kB) of this is "working" memory used for program execution; the remainder is Expanded Memory Specification (EMS) memory that conforms to the Lotus/Intel/ Microsoft version 4.0 specification for expanded memory.

- It contains one slot for storage. Either RAM storage cards or SunDisk cards can be used. RAM storage cards can store up to 2 MB—over two million characters—of information. The SunDisk card can hold up to 20 MB of information.

- The MS-DOS operating system and PalmPAD utility programs are built into each computer in a computer chip called a Read Only Memory (ROM).

- The serial port, built-in data transfer utility, and optional modems provide flexibility for connecting the PalmPAD computer to other computers for exchanging data and programs.

- A port supports an external keyboard or barcode reader.

- The computer contains an integrated power management system that extends battery life by automatically shutting down computer subsystems during periods of inactivity.

- The computer contains a small internal battery (called the bridge battery) that maintains standby power while you change battery packs. You do not need to turn off the computer or exit your work to replace an exhausted battery pack with a fresh one; simply put your computer into standby mode to change the batteries.

CHAPTER 2:
GETTING STARTED

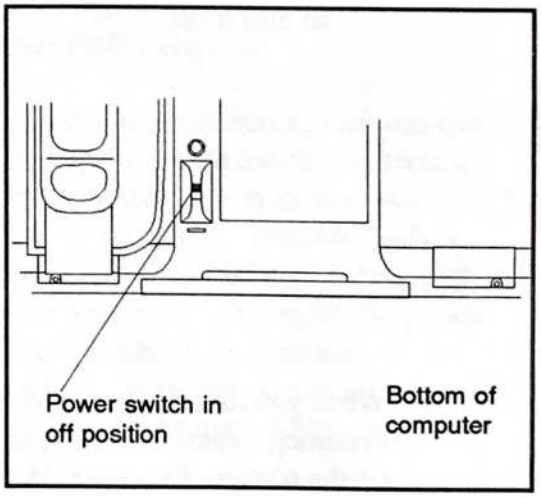
This chapter shows you how to get started quickly with your PalmPAD computer.

Starting Up

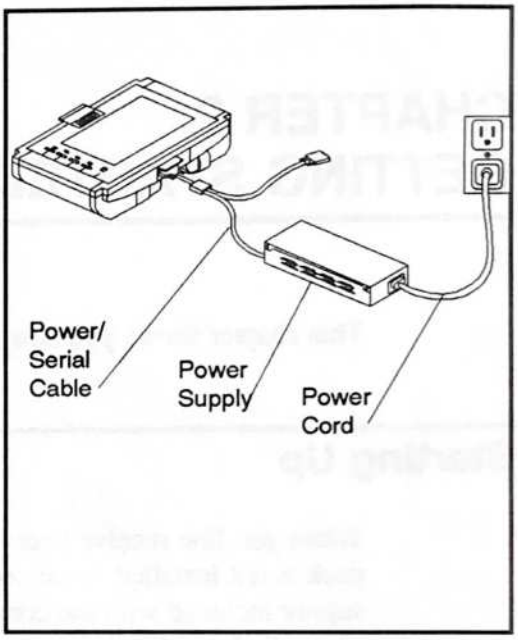
When you first receive your PalmPAD computer from GRiD Systems, the battery pack is not installed in the computer or charged. You will need to use the power supply included with the computer to operate the computer and charge the battery pack. Refer to Chapter 4 for information on inserting and charging the battery pack.

After unpacking your PalmPAD computer from its shipping materials, follow these simple steps to get started:

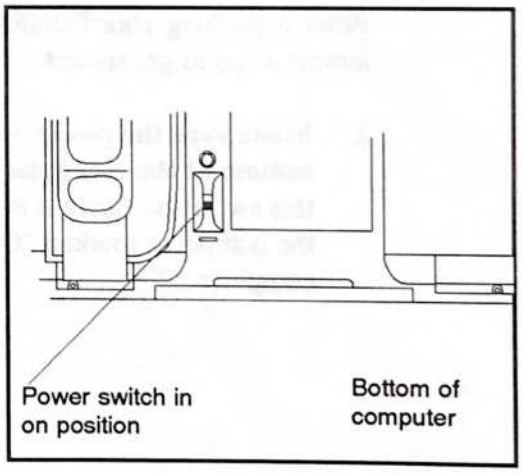
1. **Make sure the power switch on the bottom of the computer is off.** Slide this switch up (toward the center of the computer, marked "O") to turn the computer off.



2. **Connect the power supply to the PalmPAD computer and plug it into a power outlet.** Lift the cover to access the 25-pin power/serial connector. Plug the 25-pin D-shaped connector on the computer power/serial cable into the power/serial connecter on the side of the computer; plug the 8-pin round end of the cable into the power supply. The 9-pin D-shaped connector on the power/serial cable is described on page 3-9. Plug one end of the power cord into the power cord socket on the power supply; plug the other end into a power outlet that accepts a three-prong plug. If you use a plug adapter, make sure it is properly grounded.



3. **Turn on the computer.** Slide the computer power switch down (toward the edge of the computer, marked "|") to turn it on.



When you turn on the power, the computer runs a self-test and loads the MS-DOS operating system into its system memory. Then you will see the Executive Menu on the screen. Executive Menu allows you to pick a task that you want the computer to perform. Refer to the section Executive Menu, beginning on page 9-1, for information on how to use this program.

NOTE: If your computer was purchased and set up for you by your company, it may be set up to automatically run some other program when it starts up.

Hold the computer with the screen facing you so that the buttons and switches are at the left side of the screen, as shown in Figure 2-1.

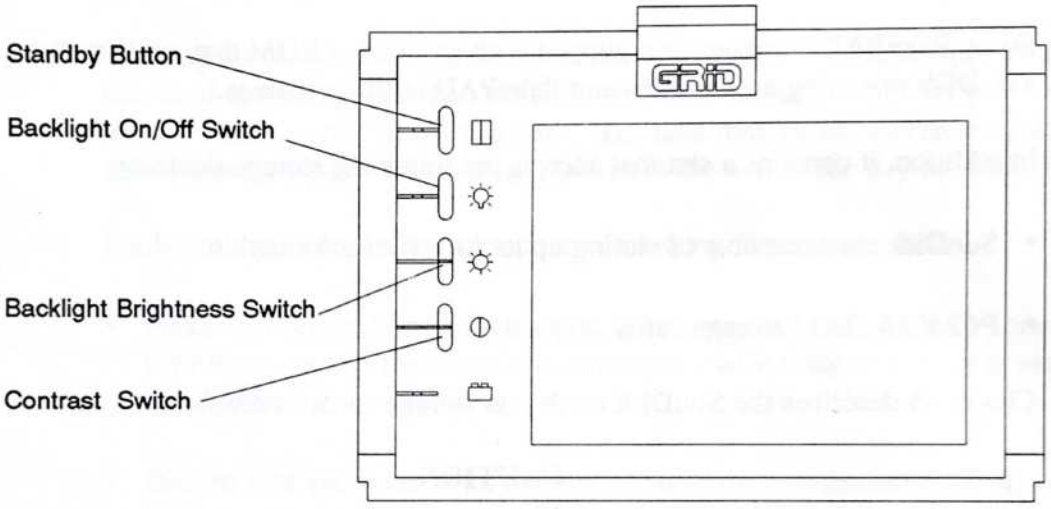


Figure 2-1. Landscape Orientation of the PalmPAD Computer

You may need to adjust the contrast and brightness of the screen so that you can see it clearly. The screen backlight is turned on and off with the second switch (see Figure 2-1). If the backlight is off, press the switch to turn on the backlight; if the backlight is on, press the switch to turn off the backlight. The third switch controls the backlight intensity, or screen brightness. Press the top of the switch to increase the brightness. Press the bottom of the switch to decrease the brightness. The contrast control is the fourth switch on the left side of the computer display. Press the top of the control to increase the contrast. Press the bottom of the switch to decrease the contrast. Refer to the section The Top on page 3-1 for additional information on the switches.

NOTE: The brightness of the screen affects power consumption—the brighter the screen, the greater the power consumption. Therefore, it is a good idea to decrease the backlight brightness or turn the backlight off to conserve power when using a battery pack.

The battery pack recharges fully in about 1.5 hours. You do not need to leave the computer on; the battery pack recharges as long as the computer is plugged in. Refer to Chapter 4 for more information about using the battery pack and other power options.

Internal Storage Devices

Every PalmPAD computer is equipped with an internal ROM that contains the MS-DOS operating system files and PalmPAD utility programs.

In addition, it contains a slot that accepts the following storage devices:

- SunDisk cards capable of storing up to 20 MB of information.
- PCMCIA RAM storage cards.

Chapter 5 describes the SunDisk cards and storage cards in detail.

CAUTION

Do not bend or drop RAM storage cards or SunDisk cards. RAM storage cards and SunDisk cards contain delicate electronic circuits that can be damaged by unusual stresses.

Each of the storage devices installed in your computer is assigned a separate drive letter by which it can be accessed. The internal ROM is device A, while the SunDisk card is device C, and the RAM storage card is device D.

Configuring Your Computer

Before you begin using your computer, you may want to change its configuration. The computer configuration includes such items as the device from which the system should start up, system power control, the screen brightness and other attributes, the device names for the serial port and optional modem, the speed of the microprocessor, and the status of the standby and auto-standby modes. Refer to the section Configurator, beginning on page 9-14, for information on changing your computer configuration.

Using PenRight! Application Programs

The PalmPAD computer is usually used with application programs, called PenRight! applications, designed especially for pen-based computers. Such PenRight! applications are typically designed around forms that are displayed on the computer screen. You fill in the forms and control the application by writing on and touching the screen with the pen.

In many cases, your computer will be set up so that a PenRight! application is executed automatically when the computer is turned on. Data that you enter is automatically stored in the computer. The data may be transferred to a desktop or mainframe computer periodically, such as at the end of the day or week.

PenRight! applications can include the following features:

- Fields that accept handwritten input. The computer automatically translates your handwritten characters into characters that it understands, as if you had typed them in.
- Buttons that you touch with the pen to cause the application to do something. For example, a button labeled "Next Page" may cause the application to display the next page of a form.
- Check boxes that you check by touching them with the pen.
- Lists from which you can select items.
- Menus that drop down from the top of the screen that allow you to select actions.

Refer to the *PenRight! Application User's Guide* for more information on handwriting techniques. This manual also includes information on editing text in fields, using the popup on-screen keyboard for data entry, and general tips for effectively using the PenRight! user interface.

Using Standard MS-DOS Application Programs

The PalmPAD computer can also run "off-the-shelf" MS-DOS programs. The computer is an IBM XT-compatible computer, so most programs that can run on the IBM XT computer can run on the PalmPAD computer.

NOTE: Programs that require an 8087 numeric coprocessor chip cannot run on the PalmPAD computer. It does not support this chip.

Unlike the IBM XT computer, the PalmPAD computer does not include a keyboard, which some MS-DOS programs may require. To make the PalmPAD computer fully equivalent to a standard IBM XT computer, you must attach a keyboard. Refer to the section, The Sides, on page 3-8 for information on attaching a keyboard.

Each of the PalmPAD storage devices appears like a disk drive to MS-DOS and is assigned a drive letter. The storage devices are assigned drive letters as shown in Table 2-1. You can also determine your device configuration by running the diagnostics program, described on page 9-10. This program shows you the drive letters assigned to each of the storage devices.

Table 2-1. Storage Device Drive Letters

Drive Letter	Storage Devices
A	MS-DOS ROM
C	SunDisk card
D	RAM card

SunDisk cards and RAM cards can be partitioned. When a SunDisk card is partitioned, the additional partitions start with D. The SunDisk allows two partitions. When a RAM card is partitioned, the additional partitions start with E.

Most MS-DOS programs that run in text mode (not graphics) and use the CGA display mode can be run on the PalmPAD computer without attaching a keyboard. These programs can be run by using the Screen Keyboard, a utility program built into the PalmPAD computer that emulates a physical keyboard on the screen.

Screen Keyboard displays a keyboard in the lower half of the screen while a program runs in the upper half of the screen. You "type" on the keyboard by touching keys with the pen. Refer to the section Screen Keyboard, on page 9-4, for more information on how to use this program.

MS-DOS programs that run in graphics mode (CGA or AT&T 6300 monochrome) can be run on the PalmPAD computer if you attach an external keyboard. You can attach any XT-compatible keyboard to the PalmPAD computer by using the optional keyboard adapter. The keyboard adapter has a D-shaped 15-pin connector at one end and a round 5-pin DIN connector at the other end. Refer to the section Keyboard Connector on page 3-9 for information on connecting a keyboard.

Refer to Chapter 8 for more information about using MS-DOS on the PalmPAD computer.

The Hand Strap

The hand strap is designed to go over the back of your hand to secure the computer during use. Slide your hand under the strap and grasp the end of the PalmPAD. Rest the other end of the computer on your forearm.

The hand strap can be loosened or tightened to fit more comfortably. It can also be moved to the other side of the computer if you are left handed. Refer to the section The Bottom on page 3-11 for information on the hand strap.

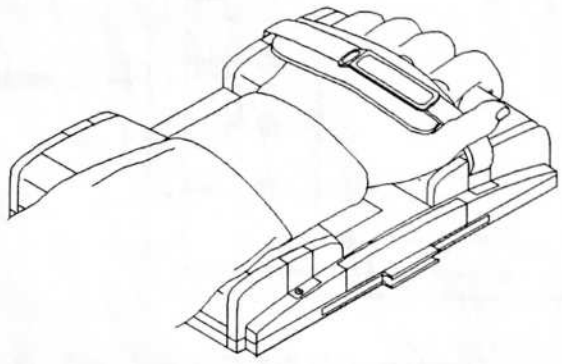


Figure 2-2. Using the Hand Strap

CHAPTER 3: GETTING TO KNOW YOUR PALMPAD COMPUTER

This chapter describes the PalmPAD computer in detail and explains each hardware feature on the top, sides, and bottom of the computer.

The Top

The top of the PalmPAD computer is shown in Figure 3-1. Each item shown in the figure is explained in the following sections.

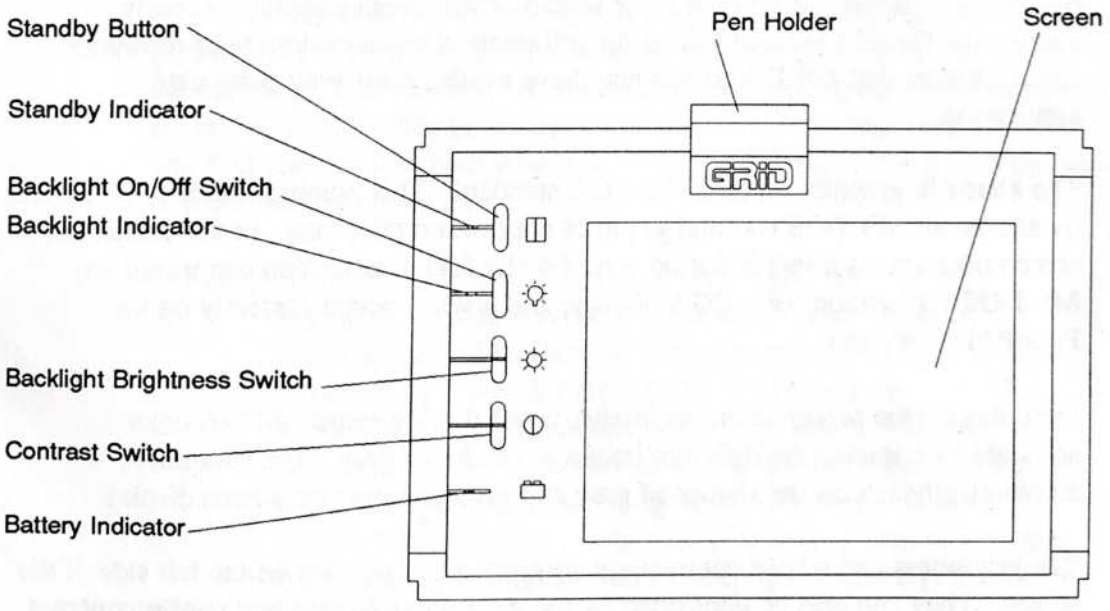


Figure 3-1. Top View of PalmPAD Computer

Screen

The screen is a sidelit transflective Liquid Crystal Display (LCD).

The screen acts as both a display and a data input device. The computer displays information on the screen, and you give information to the computer by writing on the screen with the pen.

The screen has a resolution of 640 by 400 pixels. (A pixel is one dot.) It operates in two different graphics modes, for those programs that use graphics.

The first graphics mode is the AT&T 6300 Monochrome standard. This graphics mode provides very high resolution, and is used by all PenRight! applications. Many other "off-the-shelf" MS-DOS graphics applications also can use this graphics mode if you are using the PalmPAD computer as an XT-compatible computer, with a keyboard attached.

If you have an MS-DOS graphics application that you want to use on the PalmPAD computer, and it includes an option to install for an AT&T 6300 Monochrome display, choose that installation option. If that option is not available or does not work properly, try installing the application for a Compaq or Toshiba 640 by 400 display. If none of these screen driver choices operate properly, contact the GRiD Resource Center for information about custom high-resolution screen drivers that GRiD Systems may have available for your particular application.

The alternate graphics mode is the CGA standard. This graphics mode is supported by almost all MS-DOS text and graphics application programs. In this mode, the screen operates as if its resolution were 640 by 200 pixels. You can install any MS-DOS application for a CGA display, and it will operate correctly on the PalmPAD computer.

Even though the screen is monochrome, it can display standard CGA color software by showing the different colors as shades of gray. The computer automatically selects the shades of gray that give you the best screen display.

The brightness and screen contrast are controlled by switches on the left side of the screen. They can also be controlled by the **config brightness** and **config contrast** commands; for information on changing the screen brightness or contrast, refer to the section Configurator, beginning on page 9-14, and the sections Backlight Brightness Switch and Contrast Switch on page 3-5.

Buttons and Switches

The buttons and switches on the left side of the display control standby mode, the backlight, the backlight brightness, and the screen contrast.

Standby Button

The standby button puts the PalmPAD computer into and out of *standby mode.* Standby mode is used to save battery power.

In standby mode, all of the computer subsystems are turned off, except for the system RAM. This both preserves your work and saves a great deal of battery power. Because the computer system RAM continues to receive power, all of your work is maintained and you can return to it exactly as you left it.

NOTE: A RAM storage card is not affected by standby mode. It receives power from its own internal battery.

You can use standby mode if you are going to stop using the computer for a while, but you do not want to turn the computer off. When you press the standby button, the screen goes blank and the computer appears to be off, but your work is still preserved in system RAM. The standby indicator glows green to remind you that the computer is in standby. To return to normal operation, press the standby switch again; the screen will turn on and show the same thing that was displayed before you first pushed the standby button. You can also touch the pen to the screen to return to normal operation.

NOTE: Standby mode operates with all PenRight! application programs. It also has been tested with a wide range of "off-the-shelf" MS-DOS applications and generally is reliable. However, it is possible that it may not work properly with some MS-DOS applications; some applications may not be able to return from standby mode. Before using it with a new MS-DOS application, we suggest that you test it yourself to protect yourself against data loss. It is a good idea to save the file you are working on before pressing the standby button.

If you find that standby mode does not work properly with an application, and you have enabled the automatic standby feature, you should disable it.

Automatic Standby

To conserve power automatically and make your batteries last longer, you can set up your computer so that it goes into standby mode when you have not touched the pen to the screen (or typed on a keyboard) for a certain number of minutes. For example, you could set it so that it goes into standby mode if you have not written anything for five minutes. When you want to start working again, just press the standby switch and continue from where you stopped.

Note that if the application program is changing the display, automatic standby is prevented from occurring. This could happen if a clock is displayed, for example.

Refer to the section Configurator, beginning on page 9-14, for information on using the **config autostandby** command to set your computer to automatically enter standby.

NOTE: Automatic standby may not work with some MS-DOS application programs. It does work with all PenRight! applications.

The PalmPAD computer also automatically enters standby mode in an attempt to preserve your work in system RAM if you are operating on battery power and the battery pack becomes nearly exhausted. You are alerted by the yellow battery indicator and a beeping sound when the battery is low (unless the computer is in standby mode). Refer to the section Configurator, beginning on page 9-14, for information on using the **config lowstandby** command to set your computer to enter low-power standby.

Backlight On-Off Switch

This switch turns the screen backlight on and off (see Figure 3-1). If the backlight is off, press the switch to turn on the backlight; if the backlight is on, press the switch to turn off the backlight.

The screen backlight can also be controlled with the **config backlite** command. However, the switch on the computer will override the MS-DOS settings. Refer to the section Configurator, beginning on page 9-14, for details.

Backlight Brightness Switch

The screen backlight brightness can be increased by pressing the top of the switch (see Figure 3-1). Press the bottom of the switch to decrease the backlight brightness. There are three brightness settings: low, medium, and high. The backlight must be on for this switch to have any effect.

The backlight brightness can also be controlled with the **config brightness** and the **config backlitelimit** commands. Refer to the section Configurator, beginning on page 9-14, for more details.

NOTE: The brightness of the screen affects power consumption—the brighter the backlight, the greater the power consumption. Therefore, it is a good idea to decrease the brightness to conserve power when using a battery pack.

Contrast Switch

The screen contrast can be adjusted by pressing the contrast switch (see Figure 3-1). Press the top of the switch to increase the contrast; press the bottom of the switch to decrease the contrast.

The contrast can also be adjusted with the **config contrast** command. Refer to the section Configurator, beginning on page 9-14, for more details.

NOTE: The contrast does not affect battery life.

Indicators

The indicators are light-emitting diodes (LEDs) located to the left of the switches (refer to Figure 3-1).

The status of the LEDs is shown in Table 3-1 and described in the following sections.

Table 3-1. Status of LED Indicators

LED Indicator	Status	Meaning
Standby Indicator	On (solid green)	Computer is in standby mode
	Off	Computer is in operating mode
Backlight Indicator	On (solid green)	Backlight is on
	Off	Backlight is off
Battery Indicator	On (solid yellow)	Battery is low
	Off	Battery is charged

Standby Indicator

The standby indicator is a green LED. It glows green when the computer is in standby mode. It does not light when the computer is in operating mode.

Backlight Indicator

The backlight indicator is a green LED. It glows green when the backlight is on. It does not light when the backlight is off. The backlight can be turned on and off using the Backlight switch. The backlight can also be controlled by the **config backlite** command (refer to the section Configurator, begining on page 9-14, for details).

Battery Indicator

The battery indicator is a yellow LED. This indicator alerts you when the battery pack is low.

The LED glows steady when the PalmPAD computer is running on battery power and the battery is nearly exhausted. It is off when the battery is charged. When this indicator lights, you may have as little as two minutes of battery power remaining. The exact amount of battery life remaining depends on many factors and is difficult to predict.

The computer also gives three short beeps every 15 seconds when the battery pack is low. These beeps start at the same time that the battery indicator lights. The beeping feature is controlled by the **config lowbeep** command; for more information refer to the description of this command on page 9-25.

When you see the battery indicator light or hear the beeps, you should immediately save the file you are working on to avoid losing any data. Then take one of the following actions:

- Connect the power supply to the PalmPAD computer to supply external power. This recharges the battery pack while you operate the computer.

- Press the standby button to put the computer into standby mode, then remove the battery pack and replace it with another charged battery pack. While you change battery packs, a small internal rechargeable battery, called the bridge battery, maintains standby power for at least a few minutes.

If you do not take any action to supply more power to the PalmPAD computer when the battery indicator lights, the battery pack will continue to drain. When it is almost exhausted, the computer automatically enters standby mode in an attempt to preserve your work in system RAM. When this happens, the screen goes blank, the standby indicator lights, and the battery indicator stays lit. This feature is known as low-power standby.

To return to your work, connect the power supply or insert a charged battery pack; then press the standby button to exit standby mode.

Depending on how fully charged the internal bridge battery is, the computer can remain in standby mode for approximately one-half hour. When the internal bridge battery becomes exhausted, the computer turns off. You may lose data if you have not saved your work.

The Sides

The side views of the PalmPAD computer are shown in Figure 3-2. Each item shown in the figure is explained in the following sections. The connectors and storage slot have covers over them. Lift the cover from the bottom to access the connector or storage slot; the cover stays attached to the computer at the top.

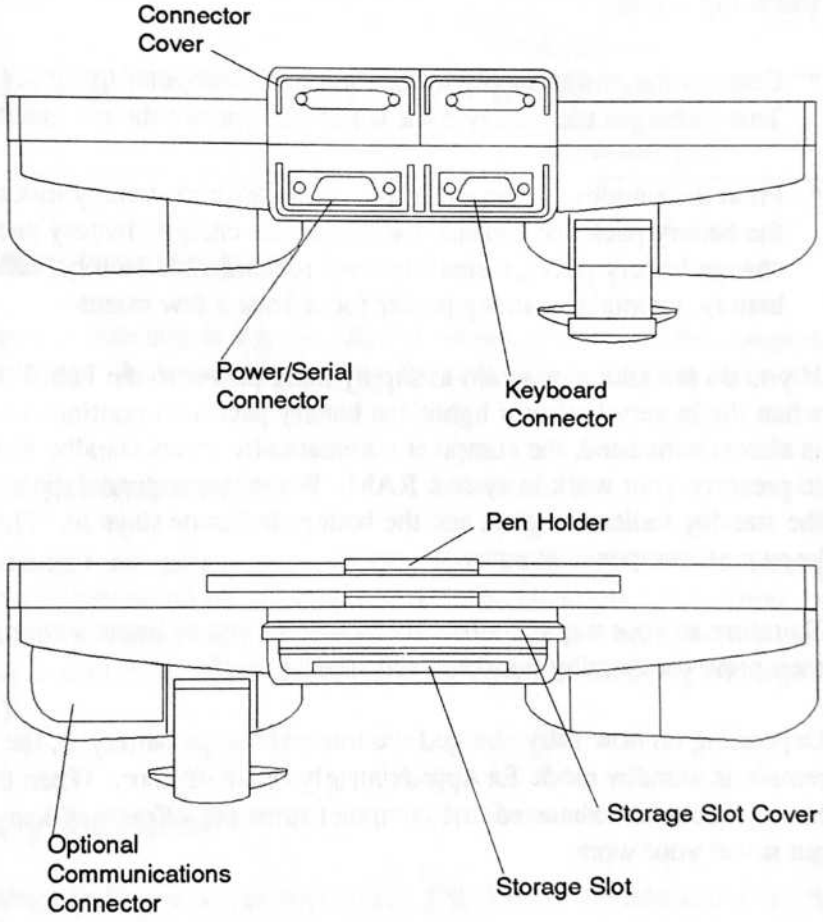


Figure 3-2. Side Views of PalmPAD Computer

NOTE: This computer has been FCC-certified under test conditions which include the use of SHIELDED keyboard and serial cables. GRiD-supplied cables are shielded. To reduce the possibility of causing interference to radio, television, and other electronic devices, it is important that you use shielded cables when connecting external devices. Telephone cords do not require shielding.

Power/Serial Connector

The power/serial connector is a 25-pin microminiature connector. The power/serial connector accepts the 25-pin D-shaped connector on the power/serial cable. The 8-pin round connector on the other end of the cable plugs into the power supply to provide external power to the PalmPAD computer. Refer to Appendix B for the pinouts for the connectors.

The power/serial cable is a Y cable that also provides a 9-pin D-type RS-232C-compatible connector. The 9-pin, RS-232C serial connector allows you to connect the PalmPAD computer to another computer so that you can transfer data between the two computers. It also allows you to connect your computer to external modems, serial printers, and other standard PC-compatible serial devices.

An optional serial cable is also available. The serial cable has a 25-pin microminiature connector at one end and a 9-pin RS-232C connector at the other end. The serial cable may be used to connect peripherals to the serial connector.

You can use the MS-DOS **mode com*n*** command to change the serial port default settings. For instructions on using this command, refer to the *MS-DOS Reference Manual.*

The serial port initially is assigned device name COM1. You can use the **config serial** command to change the device name of the serial port. Refer to the section Configurator, beginning on page 9-14, for more information.

Keyboard Connector

The keyboard connector is used to attach an IBM XT-compatible keyboard or a barcode reader to the PalmPAD computer.

The 15-pin keyboard connector accepts the plug from the optional keyboard adapter. The keyboard adapter adapts the 15-pin connector on the computer to a standard size 5-pin DIN jack used by keyboards.

The D-shaped end of the keyboard adapter plugs into the keyboard connector. The trapezoidal or "D" shape makes an improper connection impossible. If the connector does not fit, turn it upside down. The round end of the keyboard adapter plugs into any IBM XT-compatible keyboard.

NOTE: Keyboards designed **only** for IBM AT-compatible computers **cannot** be connected to the PalmPAD computer. Certain keyboards are designed to configure themselves automatically for use with either XT or AT-compatible computers. Some of these types of keyboards can be connected to the PalmPAD computer.

Storage Device Slot

PalmPAD computers have a storage device slot on the side. This slot accepts PCMCIA RAM storage cards or SunDisk cards with capacities up to 20 MB.

Storage cards hold programs and data like floppy diskettes, except that storage cards have no internal moving parts. Data is stored in electronic circuits inside the cards.

SunDisk cards are solid-state silicon hard drives that hold programs and data. Refer to Chapter 5 for more information about using storage cards and SunDisk cards.

The Communications Connectors (Optional)

The PalmPAD provides three factory-installed communications options. These are:

- V.42bis 2400 bps/9600 bps FAX modem
- V.32bis 14400 bps/9600 bps FAX modem
- A 902 to 928 MHz spread-spectrum radio

If one of these options was installed in your computer, the connector will be located on the side. Refer to the section Internal Features on page 3-18 for information on these options.

The Bottom

The bottom view of the PalmPAD computer is shown in Figure 3-3. Each item shown in the figure is explained in the following sections.

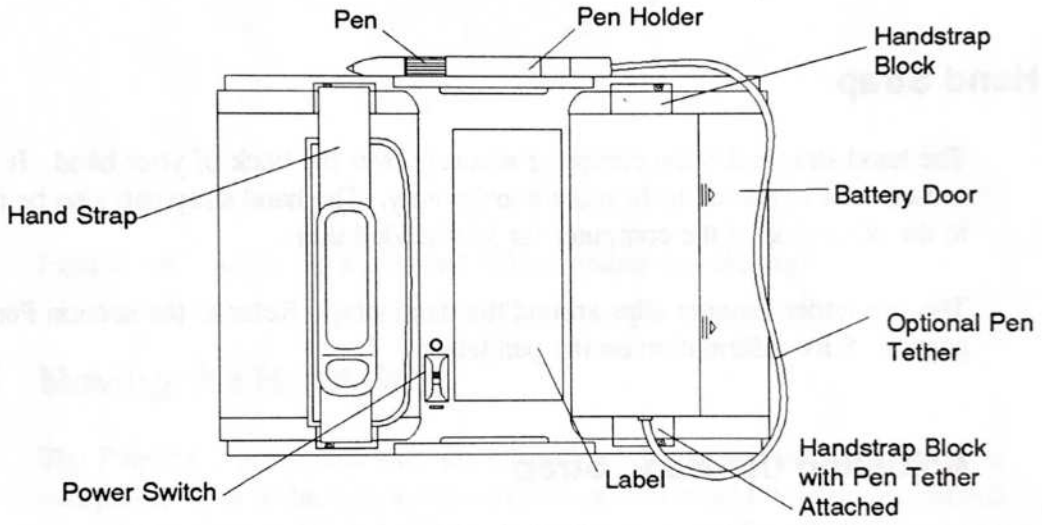


Figure 3-3. Bottom View of PalmPAD Computer

Power Switch

The power switch turns the PalmPAD computer on and off. Slide the switch up (toward the center of the computer, marked "O") to turn off the computer. Slide the switch down (toward the edge of the computer, marked "|") to turn on the computer.

CAUTION

The computer system (working) memory is erased when you turn off the power. If you want to save your work, be sure to do so before turning off the power. Refer to the documentation for your application program for instructions on how to save your work.

Always turn the computer off if the computer is not connected to the external power supply or a battery is not installed. If the power switch is left on and no power source is available, the computer will go into low-power standby and drain the bridge battery.

The Hand Strap

The hand strap holds the computer securely over the back of your hand. It can be loosened or tightened to fit more comfortably. The hand strap can also be moved to the other side of the computer for left-handed users.

The pen tether fastener slips around the hand strap. Refer to the section Pen on page 3-15 for information on the pen tether.

Adjusting the Hand Strap

The hand strap can be adjusted to fit as loose or tight around your hand as you desire. To adjust the hand strap, follow these steps:

1. Turn the PalmPAD over so the bottom is facing you.
2. Slide your hand under the hand strap as shown in Figure 3-4.
3. Pull up on the strap to separate the fastener. The handstrap has hook-and-loop fasteners to hold it in position.
4. Loosen or tighten the hand strap around your hand.
5. Refasten the hook-and-loop fastener.

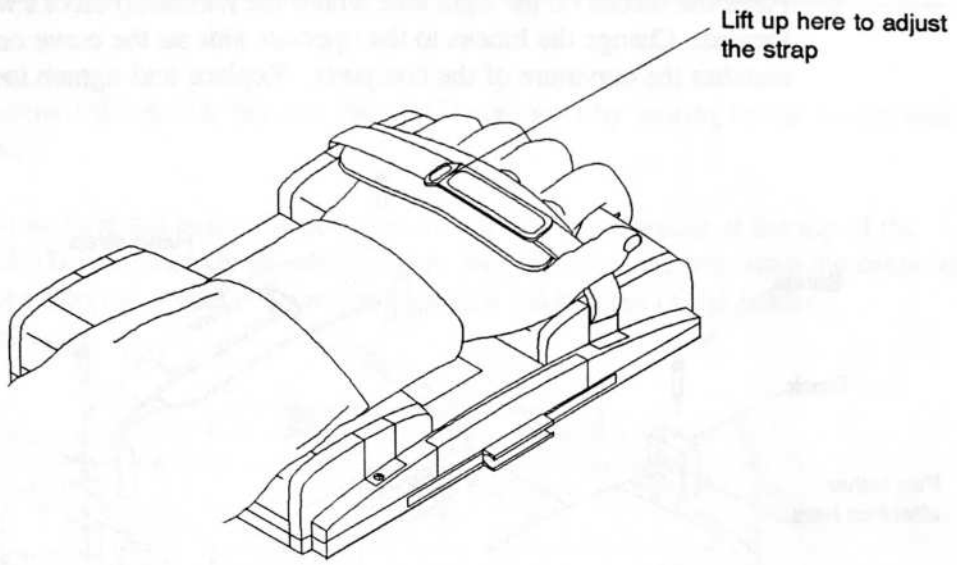


Figure 3-4. Adjusting the PalmPAD Computer Hand Strap

Moving the Hand Strap

The PalmPAD is shipped with the hand strap attached to the left side of the computer. This is the way a right-handed person would hold the PalmPAD computer in his/her left hand while using the right hand for writing on the screen. If you are left-handed, you can move the strap to the left side of the computer by performing the following steps (see Figure 3-5):

1. Turn the PalmPAD computer upside down so the bottom is facing you.

2. Remove the screw on the blocks at each end of the hand strap. Use a small Phillips-head screwdriver. Lift out the hand strap and blocks.

3. Remove the screws from the blocks on the other side of the bottom of the PalmPAD computer. Lift out the blocks.

4. Turn the handstrap end-to-end and position the hand strap blocks in the slots on the left from which the blocks were originally removed. Replace and tighten the screws.

5. Place the blocks on the right side where the handstrap blocks were originally located. Change the blocks to the opposite side so the curve on the block matches the curvature of the computer. Replace and tighten the screws.

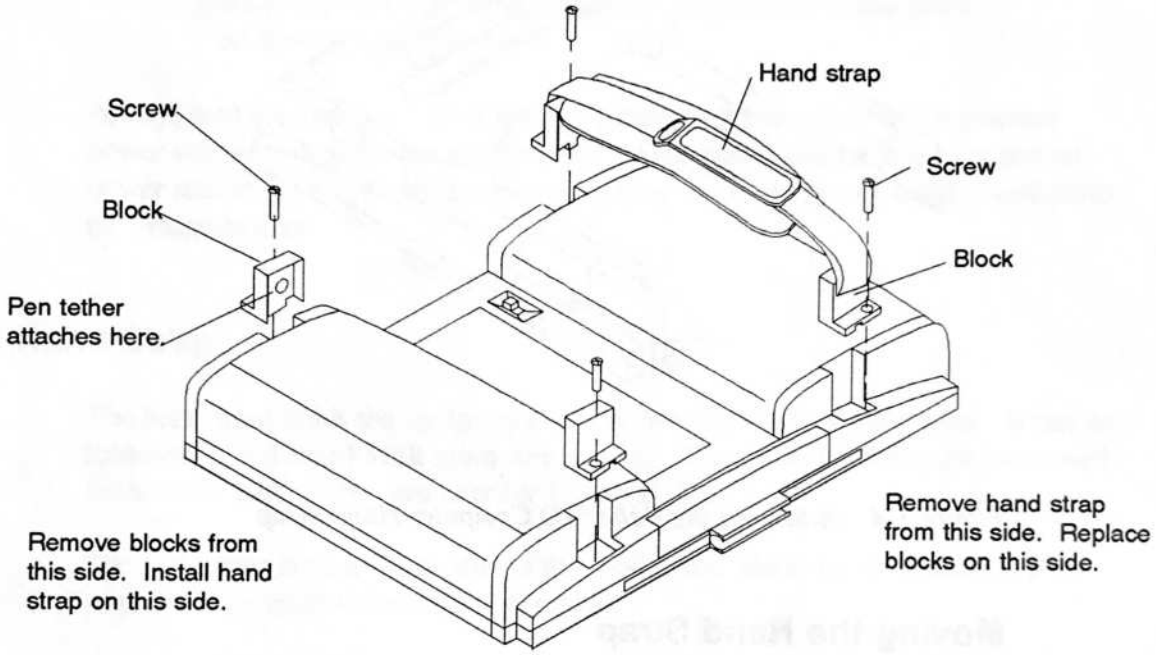


Figure 3-5. Moving the Hand Strap

Pen

You enter information into the PalmPAD computer by writing on the screen with the pen.

When you are not using the pen, it stores neatly in the holder at the top of the PalmPAD computer, as shown in Figure 3-6. To store the pen, snap the center of the pen into the holder. To remove the pen, slide it out of the holder.

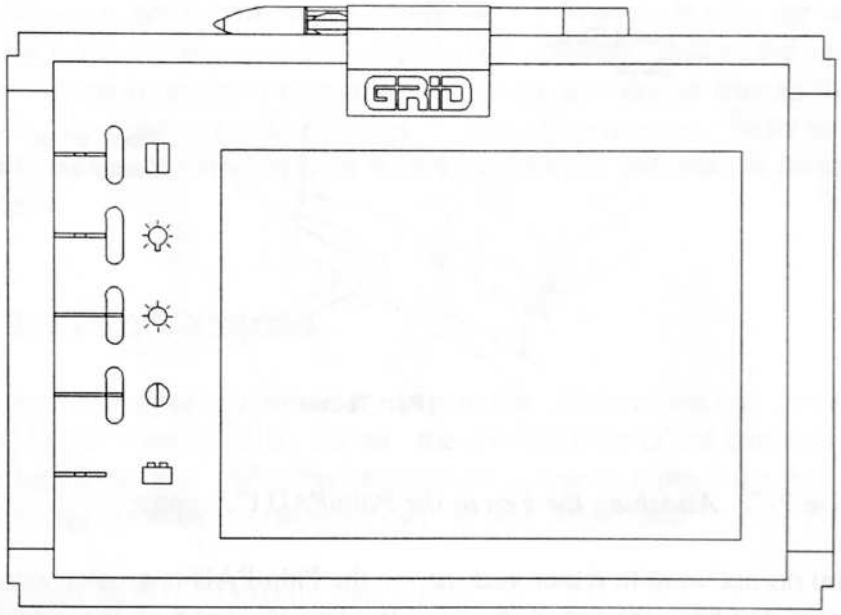


Figure 3-6. Pen Stored in Computer

The pen is designed so that if it is not used (that is, touched to the computer screen) for five minutes, the pen shuts down. To wake up the pen, press the tip of the pen to the screen and release it. This wakes up the pen and it is ready to use.

Attaching the Pen with the Optional Tether

The pen was shipped with a tether attached to the pen cap. The opposite end of the pen tether connects to the hand strap block. Push the pointed connector into the round hole in the hand strap block. If you are right handed, the tether will be connected at the lower edge of the PalmPAD computer. If you are left handed and

have moved the hand strap, the tether will be connected at the top edge of the PalmPAD computer. The tether is designed to pull out of the fastener if firm pressure is applied. The pen tether will not support the weight of the computer.

NOTE: The fastener on the end of the pen tether is not designed to be repeatedly inserted into and removed from the hand strap block. Once you connect the pen tether to the hand strap block, you should plan to leave it there.

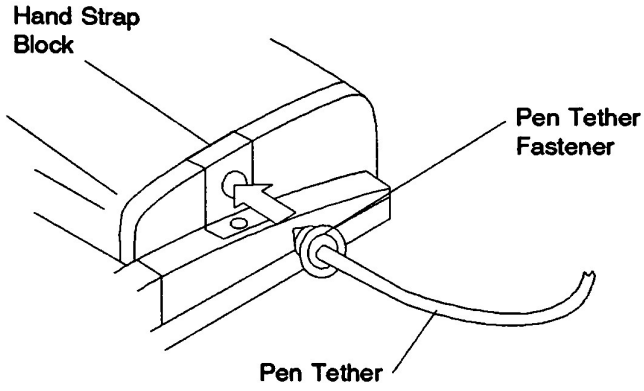


Figure 3-7. Attaching the Pen to the PalmPAD Computer

If you do not want to tether your pen to the PalmPAD computer, unscrew the tethered cap from the top of the pen. Replace the cap with the untethered cap that was shipped with the pen.

Testing the Pen Batteries

The pen contains two small batteries that should last at least a year.

The batteries in the pen can be tested whenever you turn the computer on. As the computer starts up, it displays the following message:

```
Touch the pen to the screen and lift to test pen battery.
```

When you touch the pen to the screen and then remove the pen, the batteries are tested. If the batteries are low, you are alerted by a message on the screen before the computer finishes starting up. You must touch the pen to the screen or press a key on an attached keyboard to acknowledge the message.

You should change the batteries in the pen soon after the low-battery indication, so that your PalmPAD will continue to operate. After you receive the low-battery indication, the batteries may continue to last as long as a month before they become completely exhausted. However, there is no certainty that they will last that long, so we recommend that you change the batteries as soon as possible.

If the pen is not touched to the screen within 60 seconds after the start-up message appears, the message is removed and your computer finishes the start-up procedure. If you have an attached keyboard, you can press a key to instruct the computer to ignore the pen test and to continue the start-up procedure. Refer to the **config penbattery** command on page 9-28 for additional information on testing the pen battery.

Changing the Pen Batteries

To replace the battery, unscrew the pen cap. Remove the old batteries. Insert two new lithium battery cells. Be sure the positive ends of the batteries point toward the top of the pen. After the batteries are changed, replace the pen cap. The following replacement batteries may be used in the pen:

Eveready Battery Company Inc., E13E
Rayovac Corp., RN13

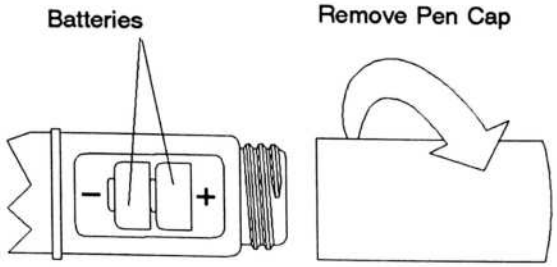


Figure 3-8. Changing the Pen Batteries

WARNING

> Batteries may explode if they are mistreated. Do not recharge them, disassemble them, or dispose of them in fire. Dispose of the used batteries promptly. Keep batteries away from children.

Internal Features

This section describes features inside the PalmPAD computer: the system memory and the optional communications devices.

System Memory

The system memory inside of the PalmPAD computer consists of 2 MB of RAM. This system memory is the "working" memory. It is where you run programs and do your work when the computer is turned on. The system memory is erased when the computer is turned off. Data that needs to be saved must be written to a RAM storage card or a SunDisk card before the computer is turned off.

The system memory is split into two different kinds of memory: conventional memory and Lotus/Intel/Microsoft Expanded Memory Specification (LIM EMS) memory. Conventional memory is the memory that is available to MS-DOS for running programs. EMS, or *expanded*, memory is additional memory that some programs can take advantage of.

The 2 MB of memory in your PalmPAD computer is split as follows:

- 640 kB of conventional memory
- 1408 kB of expanded memory

Communications Options

Your PalmPAD computer can optionally contain one of the following options:

- V.42bis 2400 bps/9600 bps FAX modem
- V.32bis 14400 bps/9600 bps FAX modem
- RF modem

If one of these options was ordered with your computer, it was installed at the factory. Use of the option is described in the following sections.

Optional Modem

Your PalmPAD computer can contain an internal modem that is available as an option. The internal modem transmits and receives data through the telephone system.

PalmPAD Model 2351 contains a 2400 bits-per-second (bps)/9600 bps FAX modem that can both transmit and receive data at 300, 1200, or 2400 bps. It also provides V.42 and Microcom Networking Protocol (MNP) Classes 2 through 4 error correction as well as V.42bis and MNP Class 5 data compression.

PalmPAD Model 2353 contains a V.32bis 14400 bits-per-second (bps)/9600 bps FAX modem that can both transmit and receive data at speeds up to 14400 bps. It also provides V.42 and Microcom Networking Protocol (MNP) Classes 2 through 4 error correction as well as V.42bis and MNP Class 5 data compression.

These types of modems ensure that data is exchanged quickly and error-free. The modems operate with the industry-standard set of AT commands. Refer to the *Internal Modem User's Guide.*

The facsimile capability allows sending and receiving fax documents at 9600, 7200, 4800, or 2400 bps. The modems are EIA-578 Class 1, Group III compatible so they can be used with a variety of fax software packages.

Connecting the Telephone Line

If your PalmPAD computer contains an internal modem, there is an RJ-12 telephone jack on the side of the computer. The modem connects to the telephone system through the telephone jack.

To connect the PalmPAD computer to the telephone system, unplug the cord from the back of a telephone, and plug it into the telephone jack on the computer, as shown in Figure 3-9.

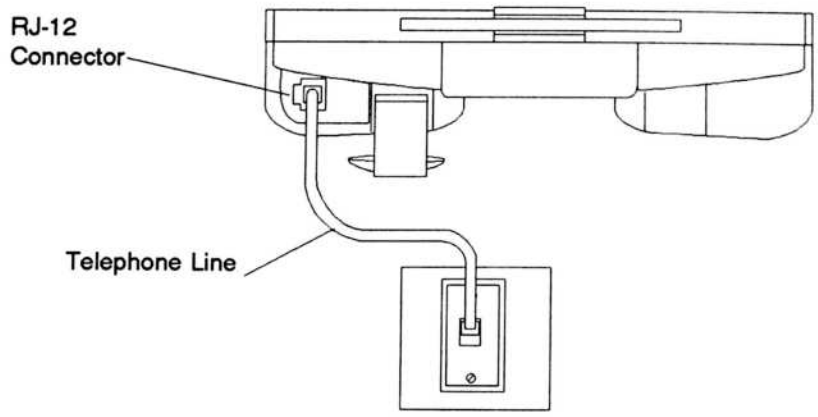


Figure 3-9. PalmPAD Computer Connected to Telephone System

NOTE: The PalmPAD computer modem will not function with PBX telephone systems that use digital telephone sets. Most of these types of telephone systems use modular connectors that are not compatible with the telephone jack on the computer. If you are unsure whether or not your computer will work with your PBX telephone system, contact your local GRiD representative.

Alternative Telephone Connections

There are some telephone systems that do not use the modular plug-in jack connector. Some use different types of connectors, and others are permanently wired. Read this section if you find that there is no modular connector available to plug into your computer's telephone jack and you are using your computer in the U.S. or Canada.

Some older telephone systems use four-prong connectors. These require an adapter available from electronics stores. (One such adapter is the Radio Shack Model 279-351.)

Some offices use large Amphenol connectors for phones that have several lines coming in. Many adapters are available to tap into these connectors. (Radio Shack Models 43-271 and 43-270 are two commonly available adapters.)

In situations where the telephones are permanently wired, the simplest solution is to use a special coupler that attaches to the handset of the telephone and provides a modular connector for plugging into your computer. The following couplers are available:

- The GRiD Acoustic Modem Adapter (GRiD Model M03-2180), which attaches to almost any size and shape handset. This adapter supports 300 bps communications and, in many cases, can be used in 1200 bps or faster communications if the telephone line quality is good.

- The Black Jack (from the Microperipheral Corporation), which attaches to telephone handsets with round mouthpieces. This adapter supports communication speeds up to 1200 bps.

- The Konexx Modem Connection Adapter (from Konexx Corporation), which allows direct electronic connection to telephones not equipped with modular connectors. This adapter plugs into the handset jack on the telephone base and supports both voice and data modes, all data rates, and several different types of telephones.

Using the Modem

Most application programs that use the modem automatically configure and control the modem. You do not need to do anything special to make the modem work, other than plugging it into a telephone line.

The modem initially is assigned the MS-DOS device name COM2. If your application requires you to change the operating configuration of the modem, refer to the *Internal Modem User's Guide* for more information. You can also use the PalmPAD configurator program to change certain operating parameters. Refer to the section, Configurator, beginning on page 9-14.

To take advantage of its error correction features, your modem must be communicating with another V.42 or MNP modem. If the modem to which you are connecting is not a V.42 or MNP modem, your modem will still work, but without using its error correction features.

The RF Modem

The PalmPAD Model 2352 computer contains an internal RF modem that communicates by 902 to 928 MHz spread spectrum radio to a Novell network. The RF modem is controlled by device drivers.

Two antennas were included in the shipping carton. You need to install one of the antennas on the side of your computer. The antenna you need to use was determined by a site survey conducted by GRiD Systems. If you do not know which antenna to use, call your MIS department or your GRiD Systems representative.

To install the antenna, be sure the computer power switch is turned off. Screw the antenna onto the round connector on the side of the computer (see Figure 3-10). Turn it until it is tight but do not force it.

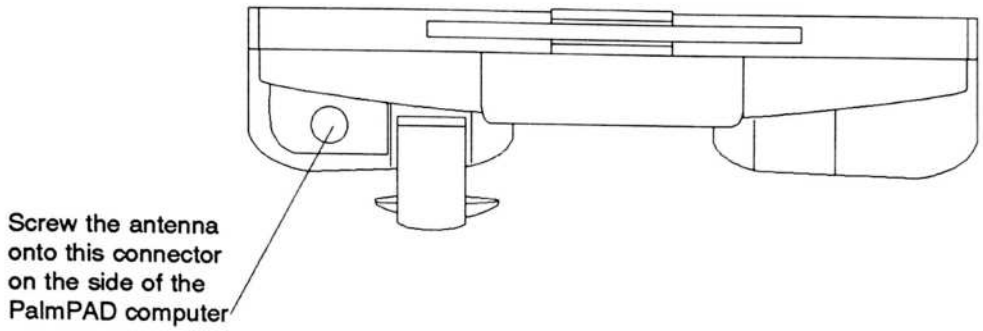


Figure 3-10. Installing the Antenna on the PalmPAD Computer

You do not need to do anything special to operate the RF modem. It automatically transmits and receives information when your application tells it to.

The antenna for the radio modem extends a short distance out of the side of the computer. Be careful not to bump or damage the antenna, as this could prevent the RF modem from operating properly. Do not hold or carry the computer by the antenna. Avoid touching the antenna when the computer is transmitting; this could significantly reduce the transmitting range. Figure 3-10 shows a PalmPAD computer with the antenna of an installed RF modem.

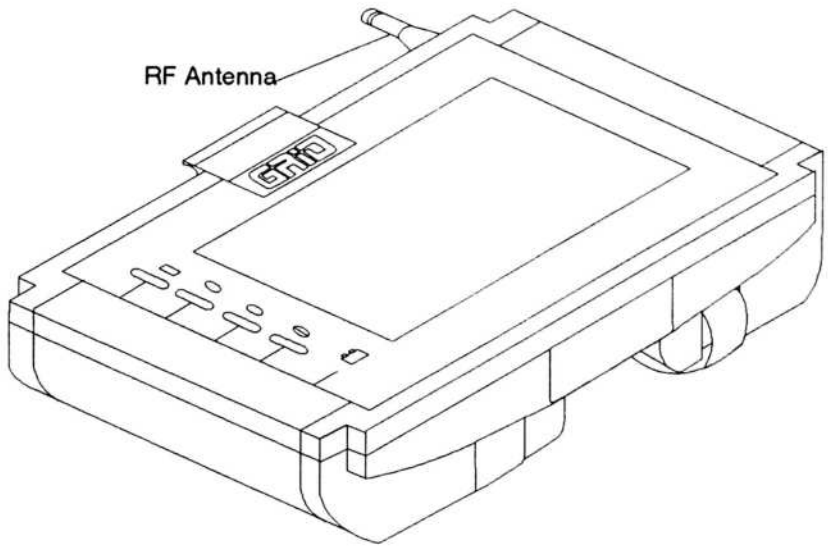


Figure 3-11. PalmPAD Computer with Radio Modem

CHAPTER 4:
POWERING YOUR COMPUTER

This chapter describes standby mode, the options that are available for powering the PalmPAD computer, and other power considerations. You can use the power supply, the internal battery pack, or the optional auto adapter to power the computer.

Important Safety Instructions

The PalmPAD computer is intended to be electrically grounded when connected through the power supply to an external source of power.

The power supply is equipped with a three-wire grounding-type plug, which has a third (grounding) pin. This plug fits only a grounding-type power outlet. This is a safety feature.

If you are unable to insert the plug into an ac outlet, contact a licensed electrician to replace the outlet with one that is properly grounded.

Do not defeat the purpose of the grounding-type plug.

WARNING

> Electrical equipment may be hazardous if misused. Operation of this product, or similar products, must always be supervised by an adult. Do not allow children access to the interior of any electrical product, or permit them to handle any cables.

Standby Mode

Standby mode is a valuable power management feature of your PalmPAD computer. It helps you achieve a longer operating time when you are using a battery pack by shutting down almost all computer systems when you are not using the computer, while maintaining your application in memory exactly as you left it.

When the computer is in standby mode, the screen goes blank and the computer appears to be off, but your work is preserved in memory. The standby indicator glows green to remind you that the computer is in standby mode. Computer battery usage is reduced by over 95 percent because the computer uses only enough power to maintain the system RAM, or main memory.

We recommend that you save the file you are working on before putting the computer into standby mode.

When to Enter Standby Mode

Put your computer into standby mode in the following situations:

- You are running on battery power and are not going to be using the computer for a while but do not want to turn it off.
- You need to change the battery and do not want to turn off the computer.

How to Enter Standby Mode

Your computer can enter into standby mode in three ways:

- When you press the standby button

  Press the standby button when you want to put the computer into standby.

- When you use an option of the **config** command

  The **config** command has several options for putting your computer into standby mode. For details refer to the section Configurator, beginning on page 9-14.

- The **config autostandby** command is used to set a specific length of inactivity, after which your computer automatically goes into standby mode.

- The **config standby** command puts your computer into standby mode immediately. The **config standby** command also enables and disables standby mode. You would not normally want to disable standby mode.

- The **config lowstandby** command tells your computer to automatically go into standby mode when battery power is nearly exhausted. You should not normally disable this feature.

- When power is removed when the power switch is on

  Your computer will enter emergency standby mode if power is removed from the computer. If the battery is removed or power is disconnected while the power switch is on, the computer automatically goes into standby. This feature is a safeguard and should not normally be used to put your computer into standby. The computer will remain in standby until the bridge battery is exhausted. Once you provide power, exit standby and continue using your computer.

  CAUTION

  If you are writing to a SunDisk card or RAM storage card when power is removed and the computer enters emergency standby mode, data may be lost and the card may be corrupted. Use a disk recovery program to check your card.

While you are in standby, the standby indicator glows green.

Exiting Standby Mode

Press the standby button to return to operating mode. Touching the pen to the screen also returns you to operating mode.

If you go into standby mode to change the battery or to conserve battery power while you are away from the machine, pressing the standby button or touching the pen to the screen returns your work files to the same status as they were when you entered standby mode.

When you leave standby, the standby indicator goes off.

Notes Regarding Standby Mode

- Standby mode operates with PenRight! application programs.

- Standby mode has been tested with a variety of widely used MS-DOS applications. Some MS-DOS applications may not work properly; they may not be able to return from standby mode. Before using standby with a new MS-DOS application, test to see if your application can return from standby mode to protect yourself against data loss. Save the file you are working on before entering standby mode.

- If you find that standby mode does not work properly with an application, disable the automatic standby feature using the MS-DOS command; refer to the section Configurator, beginning on page 9-14.

- Do not press the standby button during an Interlnk data transfer; you may lose data and your computer may be unable to recover from standby mode. If you do an Interlnk data transfer from the Executive Menu, the computer will not automatically enter standby mode during the data transfer.

- If you are communicating through a modem when you enter standby mode, you will lose your carrier because power to the modem is turned off in standby mode. However, the host may not recognize that you are no longer connected.

- Most communication software programs initialize the modem with configuration commands only when the program starts. If power to the modem is turned off (or the computer enters standby) while the communication program is running but after the initialization step has been completed, the modem will lose its configuration information, and the communication program may not operate properly. If the communication program instructs the modem to copy its configuration commands to modem User Profile 0 before the computer enters standby, the necessary configuration will be restored to the modem when the computer comes out of standby. To store the configuration into User Profile 0, add **&W0** to the end of the modem initialization string. Refer to the *Internal Modem User's Guide* for more information. (When the modem is powered on, it gets its initial configuration information from User Profile 0. If desired, User Profile 1 can also be used for the power up configuration.)

- You may need to disable the automatic standby and low-power standby features if you are using a non-MS-DOS operating system.

Using the Power Supply

The power supply provides external power from a three-wire power outlet. The power outlet must supply power at 100-240 volts at 47-63 or 400 Hertz.

NOTE: The power/serial cable is a Y cable that also provides a 9-pin serial connector. This connector is not needed to power the computer. An optional power cable is available; it provides the 25-pin power/serial connector and the 8-pin power connector needed for powering the computer.

The power supply attaches to the computer as described below and as shown in Figure 4-1.

1. Plug the 25-pin D-shaped connector on the power/serial cable into the power/serial connector on the side of the computer; plug the 8-pin round connector into the power supply.

2. Plug the female end of the power cord into the power cord socket on the power supply.

3. Plug the male end of the power cord into an outlet that accepts a three-prong plug. If you use a two-prong plug adapter, make sure that it is properly grounded. Ensure that the power supply is resting on its bottom so that none of the air vents are blocked.

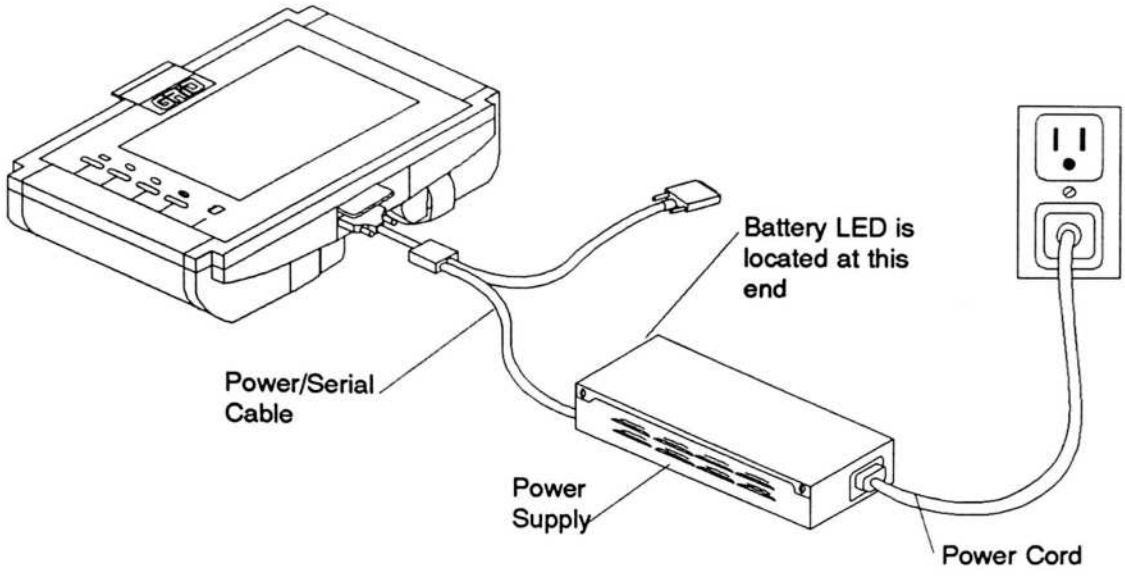


Figure 4-1. Powering Computer from the Power Supply

The power supply also functions as battery charger.

When the power supply is plugged into the computer, it recharges the computer battery pack in approximately 1.5 hours. The computer does not need to be turned on for the battery pack to recharge.

The power supply can be plugged directly into the battery pack to charge the battery in 1.5 hours. For more information, refer to the section Recharging the Battery Pack, on page 4-9.

Table 4-1 shows the status of the green LED on the power supply.

Table 4-1. Power Supply LED Status

Power Supply LED State	Meaning
Solid green	Battery is fully charged.
Flashing green	Battery is rapid charging.
Off	Power supply is not connected to the PalmPAD computer or to a battery.

Using the Battery Pack

The internal battery pack provides power to the PalmPAD computer from rechargeable batteries sealed inside the pack. The battery pack is not charged initially when it is shipped in the computer.

Removing the Battery Pack

To remove the battery pack:

1. Press down on the arrows on the battery door on bottom of the PalmPAD computer (Figure 4-2).

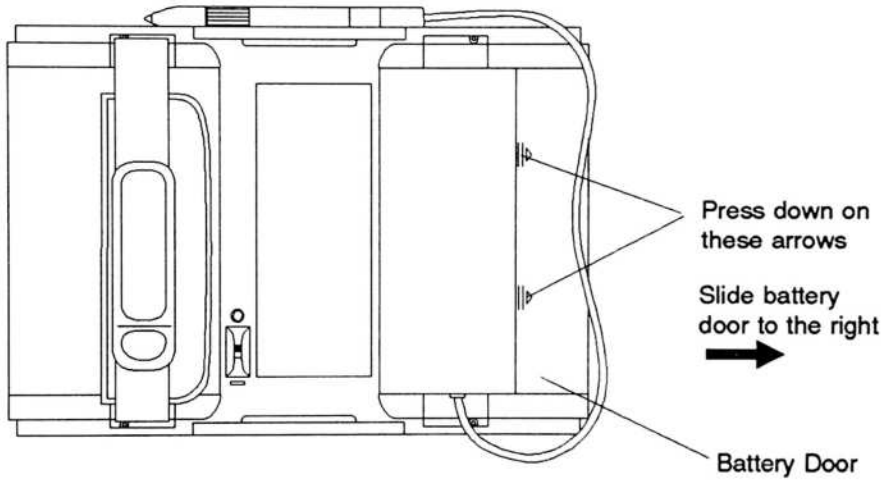


Figure 4-2. Opening the Battery Door

2. Remove the battery door by sliding it out.

3. Press down on the battery latch; then grasp the battery and pull it out, as shown in Figure 4-3.

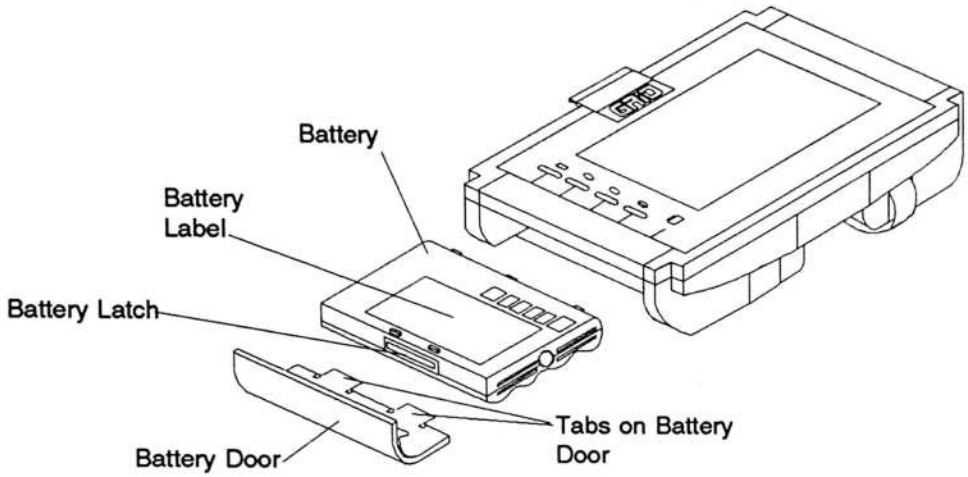


Figure 4-3. Removing the Battery Pack

Inserting the Battery Pack

To insert the battery pack into the computer, remove the battery door and slide the battery into the computer. The battery slides along tracks in the battery opening of the computer. The battery label faces up when the battery is inserted. Be sure the battery latch catches to hold the battery in place; the battery latch will click when the battery is completely inserted. Replace the battery door by inserting the tabs first; then snap the door into place.

Low Battery Warnings

The computer gives three short beeps every 15 seconds when the battery pack is low. These beeps start at the same time that the battery indicator lights. The beeping feature is controlled by the **config lowbeep** command; refer to the section Configurator, beginning on page 9-14, for further information.

When you hear the beeps and see the battery indicator light, you should **immediately save the file** you are working on to avoid losing any data. Then, take one of the following actions:

- Connect the power supply to the PalmPAD computer to supply external power. This recharges the battery pack while you operate the computer.

- Press the standby button to put the computer into standby mode, then remove the battery pack and replace it with another charged battery pack. While you change battery packs, a small internal rechargeable battery, called the bridge battery, maintains standby power for at least a few minutes, up to one hour.

If you do not take any action to supply more power to the PalmPAD computer when the power indicator begins blinking, the battery pack will continue to drain. When it is almost exhausted, the computer automatically enters standby mode in an attempt to preserve your work in system RAM. When this happens, the screen goes blank, and the standby indicator is solid green. This feature is known as low-power standby.

To return to your work, connect the power supply or insert a charged battery pack, then press the standby button to exit standby mode.

Recharging the Battery Pack

The battery pack can be used and recharged many times. It automatically recharges whenever the computer is plugged in; it does not need to be turned on. You also can recharge the battery pack by plugging it directly into the power supply.

When the battery pack becomes exhausted, you must recharge it.

NOTE: Before recharging a battery pack, you should wait for it to become fully discharged. The computer beeps when it is time for you to recharge the battery. If you frequently recharge your battery pack before it is fully discharged, the batteries may lose some of their capacity; they will not last as long after each charge.

You have two options for recharging the battery pack:

- Leave the battery pack in the computer and plug the power supply into the computer, as shown in Figure 4-1. The batteries recharge automatically, whether or not the computer is turned on.

- Remove the battery pack from the computer and connect the power supply directly to the battery pack, using the battery cable. Plug one end into the power supply and plug the other end into the connector on the side of the battery pack, as shown in Figure 4-4. Connect the power supply to the wall outlet using the power cord. You can use this method to recharge one battery pack externally while using another in the computer, if you have more than one battery pack.

It requires about 1.5 hours to recharge a fully discharged battery pack. It doesn't matter whether the computer is turned on.

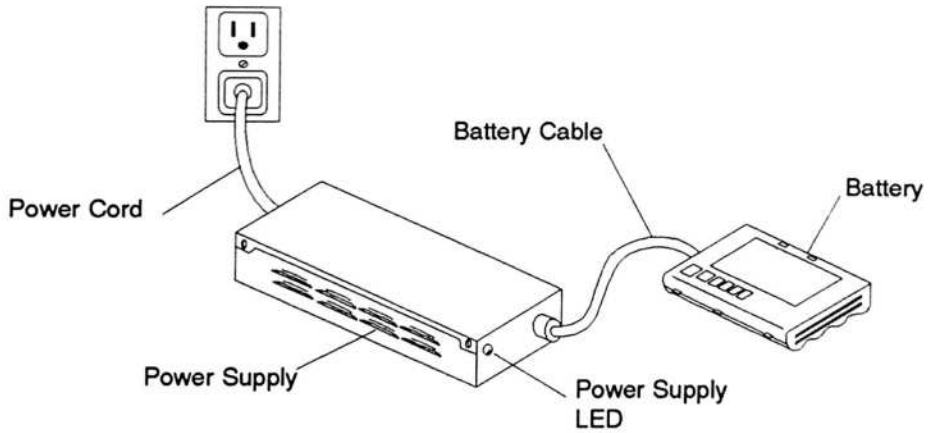


Figure 4-4. Charging Battery Pack Directly from the Power Supply

Optimizing Battery Life

To get the most computer operating time from your battery pack, follow these suggestions:

- Put the computer into standby mode when you are not going to be using it for a while and you do not want to turn it off. When it is in standby mode, the computer uses less than 5 percent of the power it normally requires.

  To put the computer into standby mode, press the standby button. The computer also can be configured to automatically enter standby mode if there has been no activity for a few minutes. For more information on standby mode, refer to the section Standby Mode, on page 4-2. For information on enabling standby mode and the automatic standby feature, refer to the section Configurator, beginning on page 9-14.

- Decrease the brightness of or turn off the screen backlight when you don't need it (the contrast of the screen has no effect on battery life). Decreasing the brightness from the maximum to the minimum decreases the power drain up to 25 percent. Turning off the backlight decreases the power drain by up to 50 percent.

- If you have an optional internal modem, turn off the modem port when it is not being used. This can extend the battery life by as much as 15 percent. For more information, refer to the section Configurator, beginning on page 9-14.

- Operate the computer at its slower speed if it does not matter how fast it operates. Operating at the slower speed can extend the battery life. For more information, refer to the section Configurator, beginning on page 9-14.

- Do not connect a keyboard unless you are using it. Disconnecting a keyboard can extend the battery life by as much as 15 percent.

- Wait for the battery pack to become fully discharged before you recharge it. If you frequently recharge your battery pack before it is fully discharged, the batteries may lose some of their capacity; they will not last as long after each charge.

Using the Optional Auto Adapter

The optional auto adapter provides power to the PalmPAD computer from the cigarette-lighter socket of a car or from other 12-volt power sources that have cigarette-lighter sockets. You do not need the power supply when you are using the auto adapter. Note that the auto adapter does not provide enough power to charge the computer battery pack.

To connect the auto adapter to the computer, follow these steps:

1. Plug the cigarette-lighter plug end of the auto adapter cable into the cigarette-lighter socket in the car. Plug the other end of the cable into the auto adapter.

2. Plug the D-shaped connector on the computer power cable into the power/serial connector on the side of the computer. Plug the round end of the cable into the auto adapter as shown in Figure 4-5.

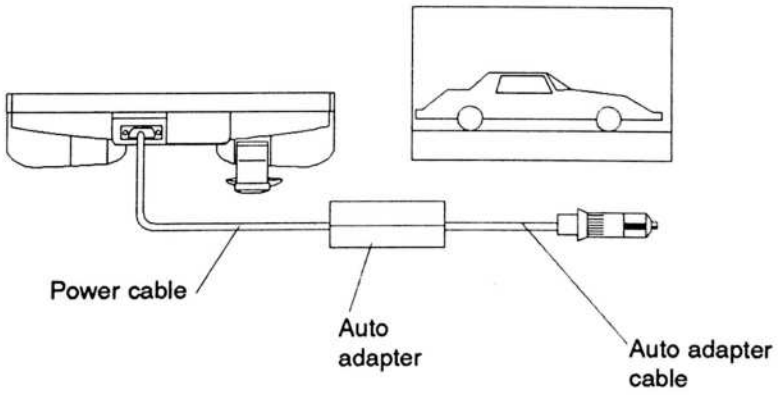


Figure 4-5. Powering Computer from Auto Adapter

NOTE: Many automobiles cause power surges or depressions to the cigarette-lighter socket when the engine is started. If the computer is connected to the cigarette-lighter socket when you start the engine, it may be momentarily turned off. This causes the loss of any data currently in system memory.

We recommend having the battery pack installed in your computer to ensure continuous power while operating from a car cigarette-lighter socket.

CAUTION

In special applications, you may wish to cut off the cigarette-lighter plug and wire the adapter directly into the vehicle electrical system. If you do this, you must include a 5 ampere fuse on the positive line to protect your computer. If you fail to do this, your computer could be damaged.

Internal Bridge Battery

The internal bridge battery is a small rechargeable battery that is contained inside the PalmPAD computer. It is not user-accessible.

The bridge battery supplies enough power for the computer to operate only in standby mode. It is designed so that you do not have to turn the computer off to change battery packs; you just have to press the standby button to put the computer into standby mode. Then you can remove the exhausted battery pack and insert a fresh one, while the bridge battery maintains the computer system RAM. To resume normal operation, press the standby button again.

NOTE: We recommend that you save the file you are working on before pressing the standby button to put the computer into standby mode. Standby does not automatically save your files onto a permanent storage device.

When fully charged, the bridge battery can supply approximately one-half hour of standby mode power. However, the bridge battery may not be fully charged, so we recommend changing battery packs without delay when in standby mode.

The bridge battery recharges automatically whenever the computer is turned on. The bridge battery recharges no matter how the computer is being powered (power supply, battery pack, or auto adapter). It takes approximately 10 hours for the bridge battery to recharge fully if it has been completely discharged. However, it is not likely that the bridge battery would ever become fully discharged, unless you left the computer in standby mode for several days with no other power source connected.

If you do not have a power source connected to the computer (such as a installed battery or external power), do not leave the computer with the power switch in the on position. Doing so will cause the bridge battery to become fully discharged.

CHAPTER 5:
USING STORAGE DEVICES

This chapter describes the storage cards available for the PalmPAD computer and explains how to use them. Changing the RAM card battery is also covered. It also describes the SunDisk cards and explains how to use them. Your computer will accept both PCMCIA/JEIDA RAM storage cards and SunDisk cards.

SunDisk Cards

The SunDisk card operates like a hard drive to store programs and data on the PalmPAD computer. The SunDisk card is a credit-card shaped solid-state silicon hard drive card. It contains no moving parts.

Description

The PalmPAD computer uses SunDisk cards that are compatible with the 68-pin PCMCIA 1.0/JEIDA connector. A special controller in the PalmPAD computer provides a proprietary interface to the SunDisk cards that is not PCMCIA compatible and will only interface to SunDisk controller systems. GRiD supplies SunDisk cards in 2.5 MB, 5 MB, 10 MB, or 20 MB sizes. A SunDisk card is shown in Figure 5-1.

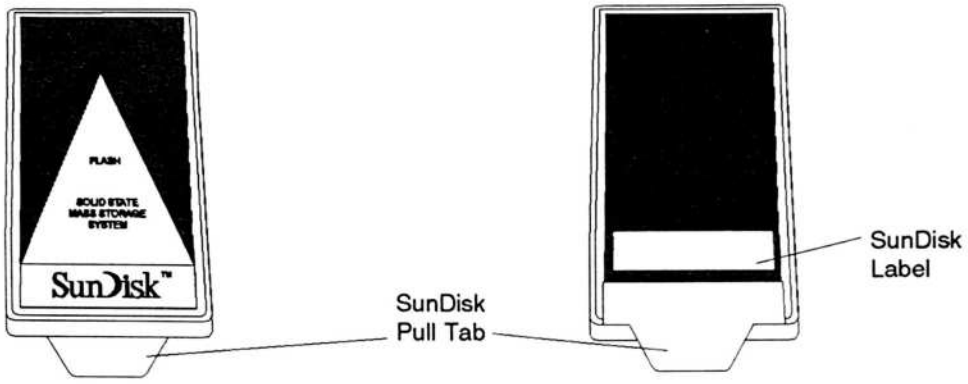


Figure 5-1. SunDisk Card

The SunDisk card stores data and programs and allows you to read from and write to the disk—just like a hard disk.

Using SunDisk Cards

This section describes how to insert and remove SunDisk cards from the PalmPAD computer, and how to use them.

Inserting a SunDisk Card

You do not need to turn off the computer when inserting a SunDisk card.

1. Hold the SunDisk card with the connector towards the computer; the side with the pull-tab and label should be facing towards the top of the PalmPAD computer. Slide the SunDisk card into the storage slot, as shown in Figure 5-2.

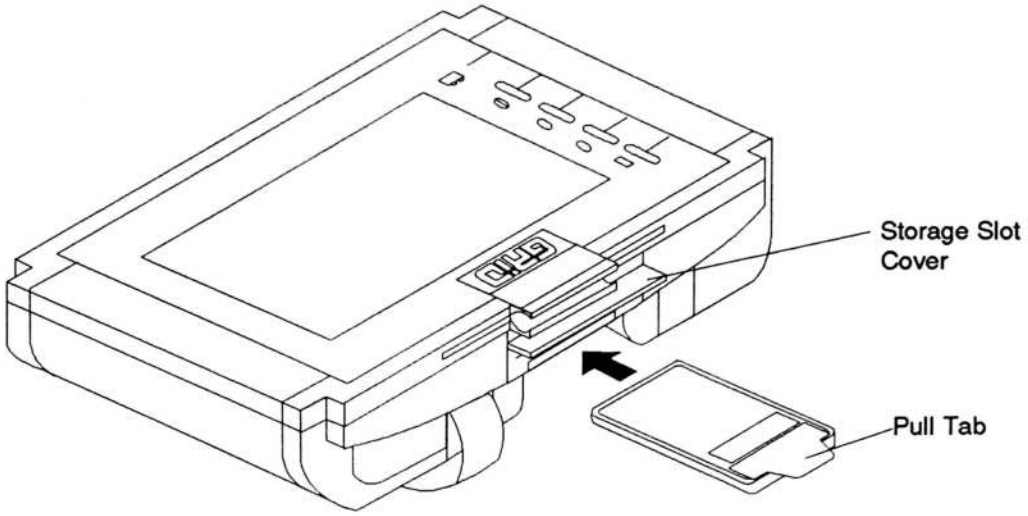


Figure 5-2. Inserting the SunDisk Card

2. Push the SunDisk card in firmly until it will not go in any further. It is OK to use firm pressure, but you should not need a great deal of force to seat the SunDisk card properly in its connector. If it does not go in easily, you probably have the SunDisk card turned upside down.

3. Close the storage slot cover over the card. Be sure the cover is closed tightly so the card will not work loose when the computer is being moved.

Removing a SunDisk Card

You do not need to turn off the computer when removing a SunDisk card.

CAUTION

Removing the SunDisk card while the card is being written to will result in loss of data. It may also damage the file allocation table and make the SunDisk card unreadable.

To remove the SunDisk card, lift the storage slot cover, grasp the pull tab, and pull the SunDisk card straight out, as shown in Figure 5-3.

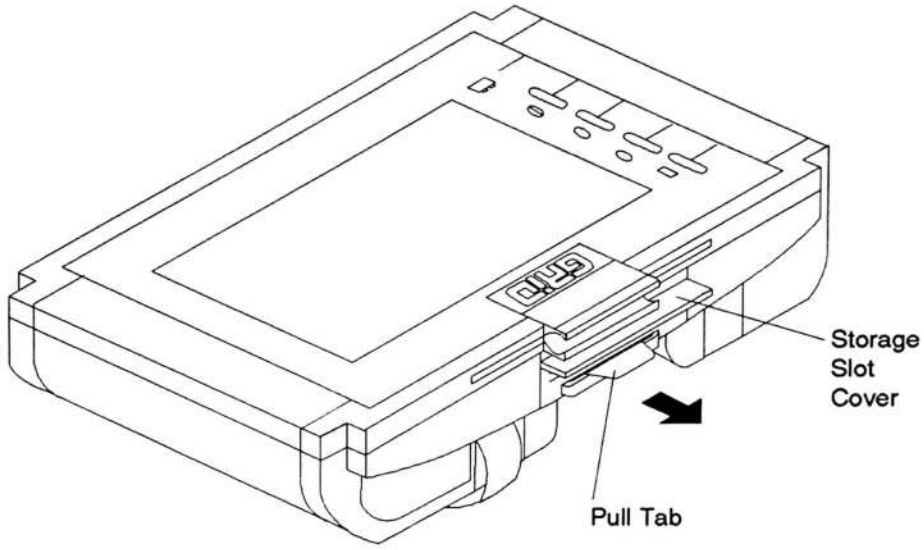


Figure 5-3. Removing the SunDisk Card

Formatting a SunDisk Card

The SunDisk card is similar to a hard drive. It has a drive letter—C—just like a hard drive. A new SunDisk card must be formatted before it can be used. Use the MS-DOS **fdisk** and **format** commands to partition and format your SunDisk card prior to using it; refer to the *MS-DOS Reference Manual* for information on these commands. You may also create a second partition on your SunDisk card if you wish to do so; it is assigned device letter D. The SunDisk card cannot be formatted as a system disk.

CAUTION

If your PalmPAD computer was purchased for you by your company and has been set up for use, the SunDisk card has already been formatted. Reformatting it will erase all the data on the SunDisk card.

Wear Leveling

Because of the way data is written to the SunDisk, it is sometimes necessary to have the data rearranged to increase the life of the SunDisk. This can be done automatically with the **config wearlevel** command (refer to page 9-31). The **config wearlevel** command specifies a number meaning that after the computer has been turned on that number of times, the SunDisk is automatically checked to determine if wear leveling is needed. If it is needed, it is automatically performed. It may take up to a minute to determine whether the wear leveling is needed and to perform the wear leveling.

Periodic wear leveling can significantly increase the life of your SunDisk. The frequency for checking for the wear leveling should be based on the number of times the disk is written to. In typical use, weekly wear leveling is recommended.

Accessing the SunDisk Card

To your computer's operating system (MS-DOS), the SunDisk card appears identical to a hard drive. You may also access partitions on the SunDisk card by using the appropriate device letter for the partition. To access the SunDisk card from MS-DOS, use its drive letter. For example, to get a directory of the storage device, enter the following command:

```
dir c:
```

If you insert a SunDisk card with more than one partition while the computer is on, only the first partition is recognized. To have the other partitions recognized, turn the computer off and then back on.

You might not ever use MS-DOS commands on your PalmPAD computer, and, therefore, may never need to issue commands such as the one shown above to access storage cards. Typically, PenRight! applications are custom-written programs that access the storage device automatically so you do not need to be bothered with these details.

If you are using MS-DOS commands on your PalmPAD computer, the SunDisk card will respond to most MS-DOS commands just as if it were a hard drive.

PCMCIA/JEIDA RAM Storage Cards

PCMCIA 1.0/JEIDA RAM storage cards store programs and data on the PalmPAD computer. They are similar to floppy diskettes, except that storage cards have no internal moving parts. Data is stored in electronic circuits inside the thin credit-card shaped cards.

Description

The PalmPAD computer uses storage cards that are compatible with the 68-pin PCMCIA 1.0/JEIDA standard. A RAM storage card is shown in Figure 5-4. The following sections describing RAM storage cards apply to those cards available from GRiD Systems Corporation. The cards available from GRiD Systems have been tested and verified to work in the PalmPAD computer. Other storage cards may not be compatible.

NOTE: Flash cards are not supported on the PalmPAD computer.

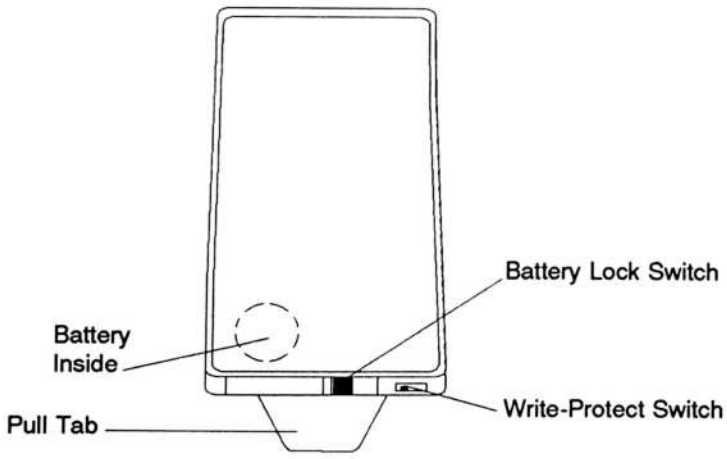


Figure 5-4. RAM Storage Card

CAUTION

Do not bend or drop storage cards. Storage cards contain delicate electronic circuits that can be damaged by stress and shock.

The write-protect switch prevents data from being written or erased on the storage card. Figure 5-4 shows the write-protect switch in the unprotected position; the storage card can be read or written to. The switch write-protects the card when it is pushed towards the outside edge of the card (opposite from the position shown in Figure 5-4).

The battery lock switch locks the battery carrier closed so that it cannot be accidentally opened.

The position of the battery inside the storage card is indicated by a dotted circle. The battery carrier is removed by prying it out using the thumbnail slot on the edge of the storage card. Instructions on changing the battery are provided in the section Changing a RAM Storage Card Battery, beginning on page 5-10.

You can write data to a RAM card and read data from it—just like a floppy disk. The data in a RAM card is preserved by a small amount of electricity flowing from a battery inside the card. The battery lasts for at least six months inside the RAM card, after which it must be replaced. (The battery may last much longer, but this cannot be certain.)

A bridge battery in the RAM card provides power to the RAM card for a few minutes; this allows you to change the battery in the RAM card without losing data.

CAUTION

Not all RAM cards have a bridge battery backup; RAM cards supplied by GRiD Systems for the PalmPAD computer contain a bridge battery. If you are using RAM cards without a bridge battery, you must back up the data before changing the battery.

Using RAM Storage Cards

This section describes how to insert and remove RAM storage cards from the PalmPAD computer, and how to use them.

Before using a storage card, you must apply the label to it, install the battery, and format it. If your PalmPAD computer was purchased for you by your company, this has probably already been done. If not, refer to the section Preparing Storage Cards, on page 5-14, for instructions on preparing your RAM card for use.

Inserting a RAM Storage Card

You do not need to turn off the computer when inserting a RAM storage card.

To insert a storage card in the PalmPAD computer, follow these steps:

1. Set the write-protect switch in the proper position, as shown in Figure 5-5. Push the switch towards the outside edge of the card to write-protect the card; or push the switch towards the middle of the card if you want to read and write to the card.

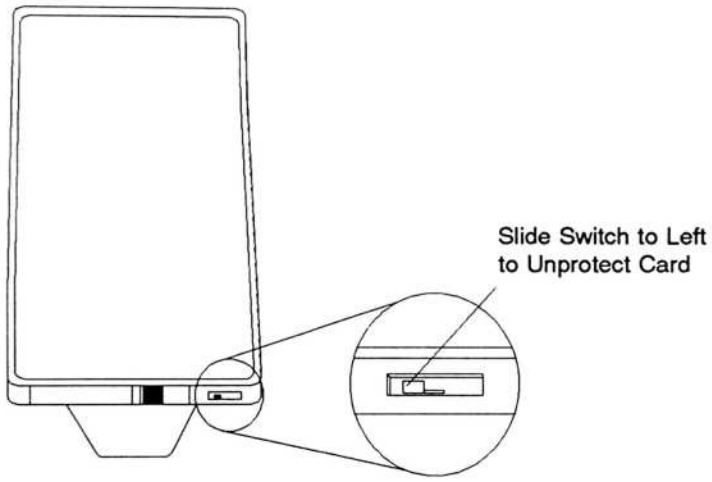


Figure 5-5. Set the Write-Protect Switch

2. Hold the storage card with the connector towards the computer; the side with the pull-tab label should be facing down. Lift the storage slot cover. Slide the storage card into the storage card slot, as shown in Figure 5-6.

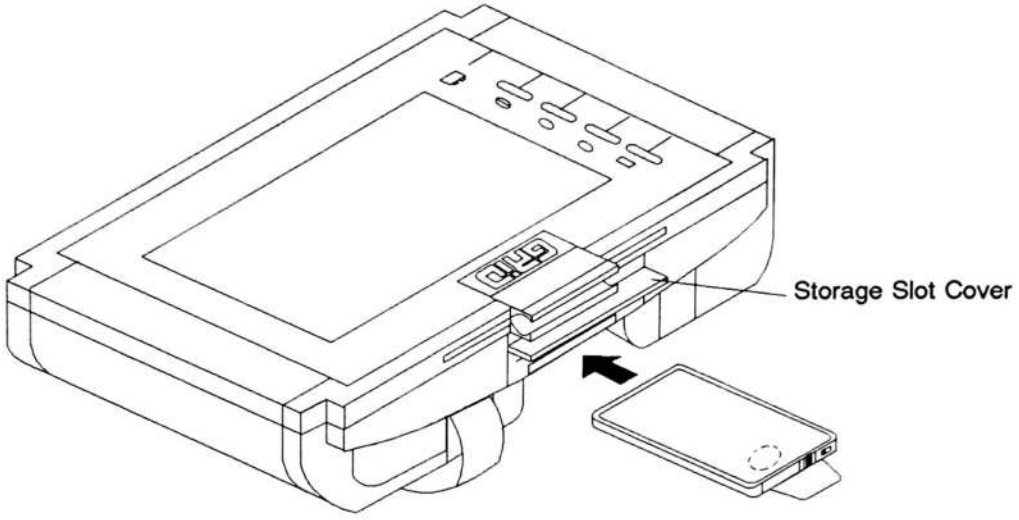


Figure 5-6. Insert the RAM Storage Card

3. Push the card in firmly until it will not go in any further. It is OK to use firm pressure, but you should not need a great deal of force to seat the card properly in its connector. If it doesn't go in easily, you probably have the card turned upside down.

4. Close the storage slot cover over the card. Be sure the cover is closed tightly so the card will not work loose when the computer is being moved.

Removing a RAM Storage Card

You do not need to turn off the computer when removing a storage card.

To remove a RAM storage card from the PalmPAD computer, lift the storage card cover, grasp the storage card pull tab, and pull the storage card straight out, as shown in Figure 5-7.

CAUTION

Removing the SunDisk card while the card is being written to will result in loss of data. It may also damage the file allocation table and make the SunDisk card unreadable.

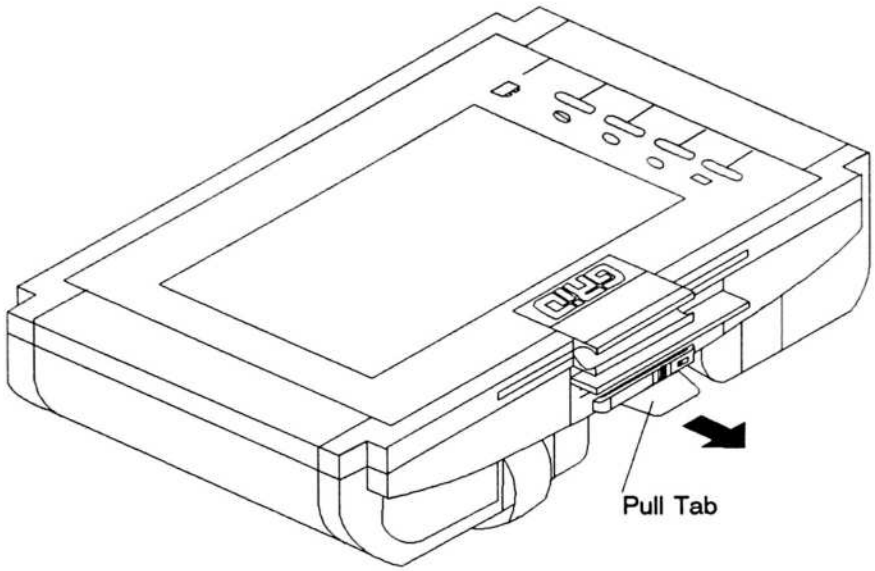


Figure 5-7. Pull Out the RAM Storage Card

Changing a RAM Storage Card Battery

The data in a RAM storage card is preserved by a small amount of electricity supplied by a battery inside the card. The battery lasts for at least six months inside the RAM card, after which it must be replaced. (The battery may last much longer, but this cannot be certain.)

The PalmPAD computer checks the power level of the battery in an installed RAM card each time you turn on the computer. If a low battery is detected, you are alerted by a message on the screen before the computer finishes starting up (you must touch the pen to the screen or press a key on an attached keyboard to acknowledge the message). Batteries in RAM cards can also be checked using the "Run PalmPAD Diagnostics" option on the Executive Menu (refer to page 9-1). If you attempt to test the RAM card battery with the main RAM card battery removed, the proper status may not be detected and you risk losing your data.

You should change the battery in a RAM card soon after the low-battery indication, so that you do not accidentally lose any data stored on the card. After you receive a low-battery indication, the battery may continue to last as long as a month before it becomes completely exhausted. However, there is no certainty that it will last that long, so we recommend that you change the battery as soon as possible.

CAUTION

If the battery becomes completely exhausted, the RAM card is erased and not usable.

RAM cards sold by GRiD Systems specifically for the PalmPAD computer have a bridge battery that maintains power to the RAM card while the battery is being changed. RAM cards supplied by other vendors may not have a bridge battery; they require that the data be backed up prior to changing the battery.

Before beginning the battery replacement procedure, you should have a replacement battery available. The following replacement batteries can be used in a PalmPAD RAM card:

Crompton Parkinson Ltd., BR2325	Eveready Battery Company Inc., BR2325
Matsushita Electric, BR2325	Panasonic, BR2325
Radio Shack, BR2325	Rayovac Corp., BR2325

The following procedure describes how to change the battery in a RAM card supplied by GRiD Systems.

For information on changing the battery in other RAM cards, refer to the instructions accompanying the RAM card.

WARNING

The battery may explode if it is mistreated. Do not recharge it, disassemble it, or dispose of it in fire. Dispose of the used battery promptly. Keep batteries away from children.

1. Hold the RAM card so that the side showing the battery location is facing up (this is the side opposite the GRiD label).

2. Move the battery lock switch to the OPEN position (towards the outside edge of the card), as shown in Figure 5-8. The battery lock switch keeps the battery carrier locked so that it cannot be opened accidentally.

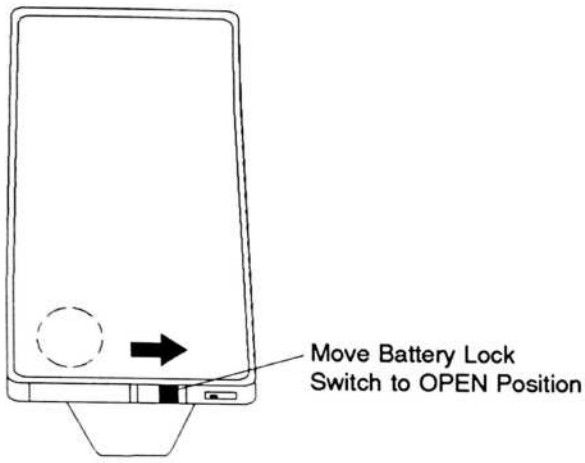


Figure 5-8. Unlocking Battery Carrier

3. Locate the battery carrier thumbnail slot in the edge of the card near the battery lock switch.

4. Place your thumbnail in the slot, grip the plastic border, and gently pull out the battery carrier while firmly holding the RAM card (see Figure 5-9). The carrier and battery may flip out of the card suddenly, so you may want to hold the card over a desk while removing the battery carrier.

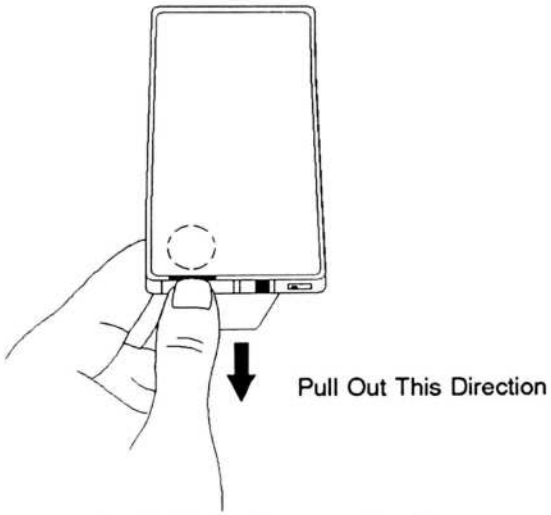


Figure 5-9. Pull Out Battery Carrier

5. Remove the old battery from the carrier and replace it with a new battery of the same type or its equivalent. The battery rests in the carrier with the positive side (marked with a +) facing up, as shown in Figure 5-10.

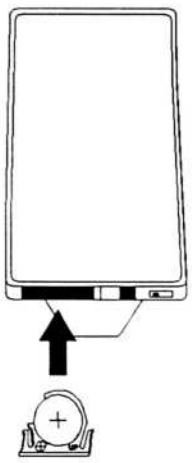


Figure 5-10. Insert Battery Carrier

6. Push the carrier with the new battery into the battery slot in the edge of the card until it snaps into place.

7. Move the battery lock switch to the locked position (towards the battery carrier). The battery lock switch keeps the battery carrier locked so that it cannot be opened accidentally.

8. Write the date you inserted the new battery on the RAM card label. If there is already a date written there, erase it before writing the new date.

   Writing the date you replaced the battery helps you remember when it is time to replace the battery again. You should replace the battery every six months, or when you are alerted that the battery is low, to prevent loss of data.

NOTE: The six-month life of the battery begins when the battery is installed in the RAM card.

Preparing Storage Cards

Before using a storage card in the computer the first time, you need to do three things:

- Apply the label to the storage card.
- Insert the battery.
- Format the card.

Refer to the next three subsections for instructions on how to do these things.

NOTE: If your PalmPAD computer was purchased for you by your company, a storage card may have been prepared already, loaded with software, and installed in your computer for you. In this case, you can skip the following subsections on preparing and formatting a storage card.

Applying the Storage Card Label

The RAM storage card is shipped with a GRiD label. Apply the label to the side of the storage card that has a notch cut in the upper-left corner, as shown in Figure 5-11. Place the label so that the pull-tab extends over the edge of the card and be careful to center the label on the card from side to side.

Figure 5-11. Applying Label to Storage Card

You can write on the label to record the contents of the storage card. If you use pencil, the label is erasable.

Installing the RAM Storage Card Battery

A RAM storage card is shipped with a battery, but the battery is not installed because the battery begins to discharge as soon as it is installed.

To install the battery in a RAM storage card, refer to the section Changing the RAM Card Battery on page 5-10. You will not have an old battery to remove in step 5, but otherwise you can follow those instructions.

Formatting a RAM Storage Card

Before you can use a RAM storage card, you must prepare it to accept data. This is done by running the MS-DOS **memcard** command, described in the following paragraphs. To run **memcard**, you either need to invoke the screen keyboard or use an attached keyboard.

Memcard is a RAM card setup program that partitions, formats, erases, deletes partitions from, and displays information about RAM cards. To start the setup program, type **memcard** at the command prompt. When the program starts, the main menu appears, as follows:

```
PC Memory Card Setup Program Version 1.00
Copyright (C) Microsoft Corporation 1991
Current Memory Card Slot: 1 of 1 slots

MEMCARD Options

      1      Create & Format Partition
      2      Erase Entire Memory Card Slot
      3      Delete Partition
      4      Display Partition Information

Enter Choice [ 4 ]

Press ESC to exit MEMCARD.
```

To choose a menu option, type the option number, and then press **Enter**. To return to the previous menu, press any key. To quit **memcard**, return to the main menu, and then press **Esc**.

Each menu displays a "Current Memory Card Slot" message, followed by a number. Since you have only one RAM card slot, the number is always 1.

Viewing Partition Data

You can view information about the status, type, and size of the partitions on your RAM card by choosing Display Partition Information (option 4) from the **memcard** main menu. The Display Partition Information screen looks like this:

```
Display Partition Information

Current Memory Card Slot: 1

     Device       Device Size
     Type         (Bytes)

     SRAM         1024K
Total Size of Card:    1024 K

Partition  Start     End       Partition    Partition    Size
Letter     Address   Address     Type       Status       (Bytes)

   D       1024      1048575      DOS       FORMATTED    1023 K

Press any key to return to the main menu.
```

The information varies, depending on the number, size, and type of partitions on your RAM card.

Column	Description
Device Type	Indicates the type of device or memory chip in the slot. Possible types are read-only memory (ROM), one-time programmable ROM (OTPROM), ROM that is erasable with ultraviolet radiation (EPROM), ROM that is electrically erasable (EEPROM or FLASH), static random-access memory (SRAM), dynamic RAM (DRAM), and an input/output card (I/O).
Device Size	Shows the size, in bytes, of the entire RAM card.
Drive/Partition Letter	Shows the drive letter associated with each partition.
Start Address	Shows the starting address of each partition.
End Address	Shows the ending address of each partition.
Disk Type	Shows whether the space is an MS-DOS partition (DOS), a partition created by the card manufacturer (Unknown), or unpartitioned (Free) space.
Disk Status	Shows whether the partition is formatted or unformatted. If the partition is unknown, its status is also Unknown.
Size	Shows the size, in bytes, of each partition.

If there are more partitions than **memcard** can display on one screen, press any key to view the next screen of information.

Creating and Formatting an MS-DOS Partition

You can create and format only MS-DOS partitions on RAM cards.

You cannot change the size of an existing MS-DOS partition. If you want to change the size of an MS-DOS partition, you must delete the existing partition and create and format a new one. When you delete the existing partition, you lose any information stored there. For information about deleting a partition, see Deleting a Partition on page 5-20.

To create and format a partition that occupies the entire RAM card, perform the following steps:

1. From the main menu, choose Create & Format Partition (option 1).

   The setup program displays the following message:

   ```
   Do you want to use the entire card for DOS? [Y/N] [Y]
   ```

   Press **Enter**.

2. If the card already has an MS-DOS partition, the setup program displays the following message:

   ```
   This card has already been formatted with DOS.
   Creating a partition will destroy the data on the card.

   Continue [Y/N] [N]
   ```

   Type **y** to continue.

3. Specify the total number of files and subdirectories you want in the root directory. Valid numbers range between 16 and 512. The default number that the setup program displays varies, depending on the size of the RAM card you have.

4. Specify the volume label for the partition.

   Or, press **Enter** to specify no volume label.

   Once you press **Enter** (either after specifying a label or to specify no label), the formatting proceeds. It takes approximately one minute. No messages are issued telling you formatting is in progress.

To create and format a partition that occupies part of the RAM card, perform the following steps:

1. From the main menu, choose Create & Format Partition (option 1).

   The setup program displays the following message:

   ```
   Do you want to use the entire card for DOS? [Y/N] [Y]
   ```

   Type **n**

2. Specify the size of the partition you want to create. The minimum size is 16 kB. The maximum size depends on the amount of free space available on the RAM card. The default number that the setup program specifies is the largest free block of space available.

3. Specify the volume label for the partition.

   Or, press **Enter** to specify no volume label.

   Once you press **Enter** (either after specifying a label or to specify no label), the formatting proceeds. It takes approximately one minute. No messages are issued telling you formatting is in progress.

Deleting a Partition

If you want to change the size of a partition, you must delete the partition and recreate it. When you delete a partition, all information about it is lost and cannot be recovered. Therefore, be sure to have backup copies of the information you want to save.

If there are logical drives that have drive letters greater (in alphabetical order) than the drive you delete, these letters will change. For example, if you have logical drives D, E, and F on your RAM card and delete drive D, drive E becomes drive D and drive F becomes drive E.

NOTE: If you only have one partition (drive D) on your RAM card, you cannot delete it using this option.

To delete a partition:

1. Choose Delete Partition (option 3) from the **memcard** main menu. The Delete Partition screen appears.

2. Specify the partition you want to delete.

   The setup program prompts you to verify that you want to delete the partition.

3. Type **y** to delete the partition.

   Or, type **n** to return to the main menu.

Erasing a RAM Card

When you buy a RAM card, it may contain extraneous information that you will need to erase before you can use the card. Erasing a card destroys all the information stored on it. Because you cannot recover this information, make sure that you have copies of the information you want to save.

To erase a RAM card:

1. Choose Erase Entire Memory Card (option 2) from the **memcard** main menu. The Erase Entire Card screen appears, as follows:

```
Erase Entire Card

Current Memory Card Slot: 1

Partition  Start    End      Partition   Partition   Size
Letter     Address  Address    Type      Status      (Bytes)

   D       1024     1048575     DOS      FORMATTED   1023

Erasing a card destroys all partition and data on the card.
Use this option only if the card does not contain
information you want to save.

Continue? [Y/N] [N]
```

2. Type **y** to erase all information from the RAM card.

   The setup program displays the following message:

```
This operation may take some time.
Please do not remove the card from the slot while this
message is displayed.
```

Accessing RAM Cards

To your computer's operating system (MS-DOS), RAM cards appear similar to floppy disks. To access a RAM card from MS-DOS, use its device letter—D. You may also access partitions on a RAM card by using the appropriate letter to refer to the partition. For example, to get a directory of the files on the RAM card, enter the following command:

```
dir d:
```

If you insert a RAM card with more than one partition while the computer is on, only the first partition is recognized. To have the other partitions recognized, turn the computer off and then back on.

You might not ever use MS-DOS commands on your PalmPAD computer, and, therefore, may never need to issue commands such as the one shown above to access RAM cards. Typically, PenRight! applications are custom-written programs that access the storage device automatically so you do not need to be bothered with these details.

If you are using MS-DOS commands on your PalmPAD computer, the RAM cards will respond to MS-DOS commands just as if they were floppy diskettes.

Transferring Application Programs to a Storage Device

A SunDisk card or RAM card can hold data and application programs that run on the PalmPAD computer. There are two ways you can transfer files to or from a storage device in a PalmPAD computer:

- Using the Interlnk file transfer utility. Refer to the section Transferring Files Using Interlnk on page 9-8 or to the *MS-DOS Communication Utility User's Guide* for details.

- Using the optional modem or radio, if your PalmPAD computer contains this option, and you already have a communication program on another storage device. Run your communication program and refer to its documentaton for information on how to use it.

CHAPTER 6: TROUBLESHOOTING

This chapter describes problems that might arise as you use your PalmPAD computer and provides tips on how to resolve them.

Troubleshooting Table

Table 6-1 lists common problems you might encounter when setting up or using your computer. To use the table, look for your problem under the heading Symptom, identify the Cause, then follow the suggested Remedy.

Table 6-1. Troubleshooting Chart

Symptom	Cause	Remedy
No response when computer is turned on	No external power	Check that the power supply is plugged into a live power outlet and that the power cord is plugged into the computer.
	Battery not installed or charged	Check to be sure the battery is installed properly (page 4-8). If necessary, charge the battery (page 4-9).
Beep and blank screen when computer is turned on (battery low indicator may or may not be lit)	Screen contrast or brightness is set wrong	Reset the contrast control (page 3-5) or the brightness (page 3-5).
	Batteries need recharging	Recharge batteries by plugging the power supply into the computer (page 4-5) or the battery pack directly (page 4-9).

Symptom	Cause	Remedy
Screen is all black	Screen contrast or brightness is set wrong	Reset the contrast control (page 3-5) or the brightness (page 3-5).
	Computer is hot	Move the computer to a cool area and let it cool.
Pen does not work	Pen is in sleep mode	Touch the pen to the screen to wake it up.
	Pen batteries are dead	Change the batteries in the pen (see page 3-17 for more information).
Storage card does not fit into slot	It is upside down	Turn the card over and be sure the connector edge goes in first.
RAM card is unreadable	Battery exhausted	When the RAM card battery becomes exhausted, all data on the card is erased. Insert a new RAM card battery (page 5-10), and reformat the RAM card (page 5-16).
	RAM card is not formatted	Format the RAM card using the **memcard** command (page 5-16).
Serial device does not function or file transfer does not work	Serial device not found	Make sure your software knows to which port the serial device is assigned. You can use the Diagnostics to check to which port your serial device is assigned, and the **config serial** command to change the port (pages 9-10).
Characters are lost during high-speed communication	COM port has low priority	Change the setting of the **config priority** command to **comm** (page 9-28).
Partitons on SunDisk cards or RAM cards not recognized	The card was inserted while the computer was on	Turn off the computer; insert the SunDisk card or RAM card; and turn the computer on.

Symptom	Cause	Remedy
Internal modem does not function	Telephone line bad	Check the telephone line by making a call on that line, or use a different phone line.
	Modem not turned on	Use the **config modem** command to turn on the modem (page 9-27).
	Modem not found	Make sure your communication software knows to which port the modem is assigned. You can use the Diagnostics to check to which port your modem is assigned, and the **config modem** command to change the port (pages 9-10).
	Modem bad	Contact the GRiD Resource Center (the number follows this table).
MS-DOS application could not return from standby mode	Application not compatible with standby mode	Not all MS-DOS applications can successfully return from standby mode. Turn off the automatic standby feature while using such an application (page 9-18).
Incorrect date or time	Clock set wrong	Use MS-DOS **date** and **time** commands to reset the clock (refer to your MS-DOS documentation).
External keyboard does not function	Not connected to computer	Check that the keyboard cable is firmly connected to the PalmPAD keyboard adapter cable, and the adapter cable is firmly connected to the keyboard connector.
	Incorrect keyboard	You can use only a 100% IBM XT-compatible keyboard.
Screen Keyboard keycaps don't match characters echoed on screen	Language of keyboard driver and Screen Keyboard don't match	Use the **config keyb** command to change the system language to one of the available built-in languages (page 9-23). To use a custom language, make sure the Screen Keyboard resource file can be found in the path.

If you encounter problems with specific software, try erasing your working copy of the problem software and replacing it with a different copy of the same version. Do not erase your master copy of any software.

If the software still does not function properly, and if you have ordered a GRiD Customer Support Service (CSS) contract with your computer, call the GRiD Resource Center at 1-800-654-GRID (4743) for help with diagnosing the problem. Make sure you know the tracking number of your computer; it is located on the back of the computer. If you are outside the U.S., contact your local GRiD Systems representative or distributor for assistance.

If you decide your problem is not a set-up or software problem, then it may be a hardware problem. Call the GRiD Resource Center for help in problem diagnosis.

Start-up Error Messages

When you start up the PalmPAD computer, you might see certain error messages. These error messages are explained in this section in alphabetical order.

Bad application ROM

The ROM containing the MS-DOS utilities and Executive Menu has failed. Contact the GRiD Resource Center or your local GRiD representative.

Bad MS-DOS ROM

The ROM containing MS-DOS Menu has failed. Contact the GRiD Resource Center or your local GRiD representative.

CMOS chip lost power

The computer has lost its configuration information. The configuration items have been reset to their factory defaults. This error message may signal a hardware problem. Contact the GRiD Resource Center or your local GRiD representative.

Digitizer initialization failed

The screen digitizer information could not be found. It is normally included when the BIOS is programmed at the factory. Contact the GRiD Resource Center or your local GRiD representative.

Memory test failed

There is a problem with the computer memory. Contact the GRiD Resource Center or your local GRiD representative.

PCMCIA card battery low. Press any key or touch the pen to the screen to continue

The battery in a RAM card is low and needs to be replaced. For more information, refer to the section Changing a RAM Storage Card Battery, on page 5-10.

Pen battery is low.

The batteries in the pen are low and need to be changed. Touch the pen to the screen to continue. Refer to the section Changing the Pen Batteries on page 3-17.

System battery low—wear leveling is not performed. Press any key or touch the pen to the screen to continue

The **config wearlevel** command specifies how often your computer will check to see if the SunDisk card needs wear leveling performed. Even if it should be done according to the command parameters, wear leveling will not be performed if the battery pack in the computer is low.

Time-of-day clock stopped

The internal computer clock battery is exhausted or the clock chip is damaged. Contact the GRiD Resource Center or your local GRiD representative.

CHAPTER 7:
SAFETY AND MAINTENANCE

This chapter contains important safety information and describes how to care for your PalmPAD computer.

Be sure to save these instructions for reference by you and other users.

Follow all instructions and warnings dealing with the computer or the power supply.

Important Safety Instructions

The PalmPAD computer is intended to be electrically grounded when connected through the power supply to an external source of ac power.

The power supply is equipped with a three-wire grounding-type plug, which has a third (grounding) pin. This plug fits only a grounding-type power outlet. This is a safety feature.

If you are unable to insert the plug into a power outlet, contact a licensed electrician to replace the outlet with one that is properly grounded.

Do not defeat the purpose of the grounding-type plug.

WARNING

Electrical equipment may be hazardous if misused. Operation of this product, or similar products, must always be supervised by an adult. Do not allow children access to the interior of any electrical product, or permit them to handle any cables.

Warnings

This product was designed and tested to comply with various national and international safety agency standards that reflected the current state of the art at the time it was manufactured. Use and application of this product requires exercising common sense. It is an electrical device.

Observe the following warnings. Ignoring these warnings could lead to physical injury.

- Be sure to read all installation instructions carefully before you plug the power supply into a power outlet.

- Do not get the computer wet; electrical equipment may be hazardous in a moist environment. Keep the computer away from sources of liquids such as washbasins, bath tubs, shower stalls, etc. If the computer gets wet, wipe it off as quickly as possible.

- Never expose the computer to bad weather, such as rain or snow, for extended periods of time. The top surface of the PalmPAD computer is water-resistant, but the computer should not be operated if water has gotten inside the computer.

- Do not operate your computer in any potentially flammable atmosphere, unless it is specially certified for such usage.

- Do not attempt to open the computer case; it contains no user-serviceable parts. Such action voids your warranty and service contract and can damage the computer.

- Arrange any power cords or other cords so they cannot be pulled out or tripped over when the computer is in use.

- Make sure you properly ground any power-plug adapter.

- Always turn off the computer before unplugging it or plugging it in.

- Disconnect the power plug if the power cord or plug is frayed or otherwise damaged; if the computer performs such that you suspect it needs servicing; if anything has been spilled into the case; if the computer has been exposed to rain or other excess moisture; or, if the computer has been dropped or the case is otherwise damaged.

- Do not operate the PalmPAD Model 2352 for prolonged periods with the radio modem antenna closer than 2 inches (5cm.) to your eyes or reproductive organs. Transmitting antennas, like those on the PalmPAD Model 2352 computer, emit electromagnetic signals that may be harmful to these areas of your body if you are exposed to these signals for a long time at very close distances. Also, avoid touching the radio modem antenna for prolonged periods when the computer is turned on and transmitting.

Cautions

Observe the following cautions. Ignoring these cautions could damage your computer.

- Operate the computer only when the surrounding temperature is from 0° to 50° C (32° to 122° F). The temperature range for the PalmPAD Model 2351 is 0° to 45° C (32° to 113° F).

- Operate the computer only when the relative humidity level is from 5% to 95% noncondensing.

- Store the computer where the surrounding temperature is from -20° to 60° C (-4° to 140° F).

- Do not operate the computer in an excessively dirty or dusty environment.

- Do not subject the computer to unnecessary shock or vibration.

- When cleaning the computer, never use any cleaning agent such as dust wax, spray cleaner, or any abrasive substance.

Computer Ruggedness

Your PalmPAD computer is a rugged, durable computer. It has been designed to stand up to a certain amount of shock and rough handling, but you should always treat it as you would any other precision instrument—with care.

The most fragile part of the computer is its screen. The screen is made of glass and could break if the computer is dropped or if the screen is bumped against a hard object. Keep this in mind as you handle or carry the computer.

When you carry the computer, carry it with the screen towards you, to prevent it from accidentally hitting something. You should use the protective carrying case whenever possible.

The PalmPAD computer is not designed to withstand extreme temperatures. Be careful not to leave the computer inside a closed vehicle in the sun for an extended time. Enclosed vehicles can heat up to extreme temperatures when in the sun, and the PalmPAD computer could be damaged if the temperature exceeds 60° C (140° F).

If the computer is heated to a high temperature, the screen may darken and become unreadable. If this happens, let the computer cool before using it. Very cold temperatures may also affect the screen contrast, requiring you to adjust it.

The computer has an emergency standby feature that puts it into standby mode if power is removed. If you are writing to a storage card when the computer goes into emergency standby, it is possible that data may be lost and the card may be corrupted. Use a disk recovery program to check your storage card if this should happen.

Cleaning the Computer

Before cleaning your computer, turn it off and disconnect the power cord from the outlet.

To clean the case, use a slightly damp, soft cloth and plain water. If necessary, you can use a mild, nonabrasive detergent.

CAUTION

Never use any cleaning agent such as dust wax, spray cleaner, or any abrasive substance.

Wipe the case clean and then dry it.

To clean the screen, slightly dampen a soft cloth with water or an ammonia-based glass cleaner and gently wipe the screen. Use the cleaner sparingly so that no fluid runs down the screen and into the frame. Do not use a cleaner that leaves any residue.

WARNING

To prevent shock hazard, never apply any liquid to the openings or connectors on your computer.

Storing the Computer

Always store your computer between the temperatures -20° to 60° C (-4° to 140° F). To keep it free from dust and dirt, store it in a protected location.

If you are storing the computer for an extended period of time, you should back up the data on RAM storage cards to some other storage medium, since the battery that maintains the data in these cards may become exhausted. The data on these cards is maintained by a battery that lasts at least six months.

Traveling with the Computer

When traveling with your computer, keep it in the protective carrying case and carry it instead of checking it as luggage. Many transportation carriers do not cover the replacement cost of your computer should they lose or damage it. If you do check it as luggage, pack it in the original shipping carton and packing materials that came with your computer. Any damage incurred due to improper shipping is considered abuse and will not be covered under the warranty.

CAUTION

If you are carrying the battery pack inside the computer, make sure that the power switch is off. If it is left on, the battery pack will discharge during transportation. As an extra precaution, you may want to remove the battery pack from the computer and carry it separately.

It should be safe to x-ray the computer or any peripherals in airport security checks, but you can have it hand-checked, if you wish.

Updating the Clock

The time-of-day clock, which keeps the time inside the computer, is not a high-precision time keeper. The precision of its time-measuring electronics may vary because of temperature changes. Check the time and date of your clock periodically.

To change the time or date, use the MS-DOS commands **time** or **date**. Refer to the *MS-DOS Reference Manual* for more information about these commands.

CHAPTER 8:
USING MS-DOS ON THE PALMPAD COMPUTER

Each time you turn on the PalmPAD computer, it loads the MS-DOS operating system from its MS-DOS ROM or another storage device. This is the same operating system used by other IBM PC-compatible computers.

Depending on how your PalmPAD computer is set up, you may never need to interact directly with the MS-DOS operating system. Your computer may start up and go directly into an application program or a menu from which you can pick a program to run.

If you want to use MS-DOS commands on the PalmPAD computer, or run MS-DOS programs, you should read this chapter. It contains important information about how to use GRiD MS-DOS, which has features not found in MS-DOS on other computers.

This chapter is not intended to teach you MS-DOS. You should be familiar with the operating system before reading this chapter. Refer to the *MS-DOS User's Guide* or other widely available MS-DOS tutorial guides for basic operating system information.

MS-DOS Start-up

After MS-DOS starts up, the first thing it does is look for the file *config.sys*. If it finds this file, MS-DOS reads it and loads device drivers or sets system configuration information based on commands in this file.

When starting up from the MS-DOS ROM with no storage device in the storage slot, GRiD MS-DOS loads the *config.sys* file on the MS-DOS ROM. If a RAM card is in the storage slot, the *config.sys* file on the MS-DOS ROM is loaded. If a SunDisk card is in the storage slot, the *config.sys* file on the SunDisk card is loaded.

After executing the *config.sys* file, the next thing MS-DOS does is look for the file *autoexec.bat*. This is a batch file that is executed whenever MS-DOS starts up. If no storage device is in the slot, the *autoexec.bat* file on the MS-DOS ROM is loaded. This brings up the Executive Menu. Executive Menu allows you to run other PalmPAD utility programs. Refer to the section Executive Menu, beginning on page 9-1, for more information.

If a SunDisk card is in the storage slot, the *autoexec.bat* file on the SunDisk card is loaded. If a RAM card is in the storage slot, the *autoexec.bat* file on the RAM card is loaded. If the *autoexec.bat* files does not exist on the storage device, one is not loaded.

Table 8-1 summarizes the location of the files that are loaded when the PalmPAD computer is turned on.

Table 8-1. Location of Start-up Files on the PalmPAD Computer

Contents of Storage Slot	**Loads MS-DOS from:**	**Loads *config.sys* file from:**	**Loads *autoexec.bat* file from:**
Empty	ROM	ROM	ROM
SunDisk Card	ROM	SunDisk Card	SunDisk Card
RAM Card	ROM	ROM	RAM Card

Using Expanded Memory

Your PalmPAD computer has 1408 kB of expanded memory (also known as EMS memory). In order to use this memory, you must install on your system the Expanded Memory Manager device driver, *emm.sys*. The Expanded Memory Manager device driver supports the Lotus/Intel/Microsoft Expanded Memory Specification (LIM EMS) version 4.0. Using the *emm.sys* driver, programs written to use EMS memory can access it. You also can use EMS memory as a RAM disk.

The *emm.sys* device driver is available in the MS-DOS ROM. The *config.sys* file on the ROM loads the *emm.sys* driver if you have either a RAM card or no storage device in the storage slot. If you are using a SunDisk card, you must add the following statement to the *config.sys* file on your SunDisk card to install the *emm.sys* driver on your system:

```
device=a:\emm.sys [/d]
```

Drive A contains the *emm.sys* driver. The optional **/d** switch causes the *emm.sys* driver to perform additional memory diagnostics when it is loaded. Each page of EMS memory is checked for errors. These additional memory diagnostics may require a minute or two to perform.

After adding this line to the *config.sys* file, you must restart your computer for the device driver to take effect. For instructions on creating or modifying the *config.sys* file, refer to your MS-DOS documentation.

Programs that use EMS will automatically do so when you install the *emm.sys* driver. For more information on how MS-DOS applications use EMS, refer to the documentation provided with those programs.

NOTE: If you are using EMS as a RAM drive, the `device=emm.sys` statement must precede the `device=ramdrive.sys /a` statement in the *config.sys* file.

CHAPTER 9:
UTILITY PROGRAMS

This chapter describes and explains how to use the utility programs that are stored inside the PalmPAD computer in the MS-DOS ROM. These programs are built into every PalmPAD computer.

Executive Menu

Executive Menu is a simple program that displays a menu of the other PalmPAD utility programs, as shown in Figure 9-1. You can start any of the other utility programs by selecting it from the menu.

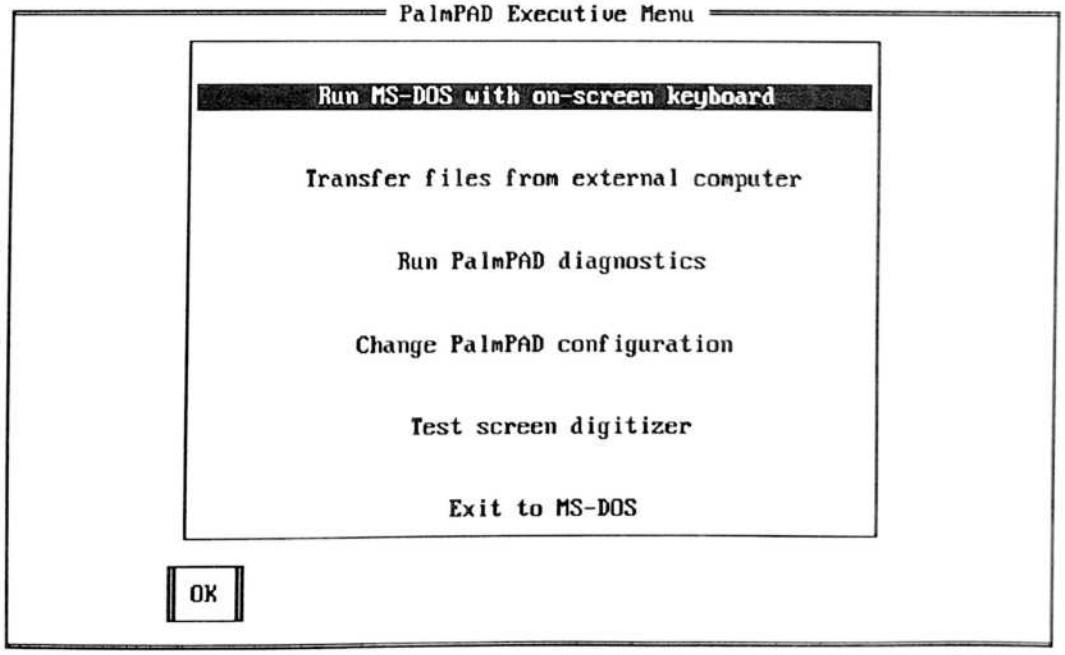


Figure 9-1. Executive Menu

Starting Executive Menu

There are two methods for starting Executive Menu:

- Executive Menu is started automatically if you do not have a SunDisk card or RAM card installed in the storage slot.

- Run the program **padmenu**, which is on the MS-DOS ROM inside your computer (drive A). Enter the command **a:padmenu** from the MS-DOS prompt. To do this automatically each time you start your computer, include the command **a:padmenu** in your *autoexec.bat* file

Using Executive Menu

To start one of the functions listed in Executive Menu, touch the pen to the function you want to pick. This moves the highlight bar to that function. Then touch the pen to the OK button. This starts the function you have chosen. As a shortcut, you can double tap on the function you want; in this case you do not need to touch the OK button. (To double tap, you tap twice very quickly.)

To "touch" with the pen means to tap quickly on a spot on the screen. Tap quickly enough so that the pen contacts the screen only momentarily, like striking a key on a keyboard. Be sure to make good contact with the screen, but do not leave the pen down on the screen.

NOTE: The term button, above, refers to a small box on the screen labelled with text. Such screen buttons cause specific actions when they are touched with the pen. The term button is also used in this manual to refer to the buttons or switches beside the computer screen.

If you are using an attached keyboard, the up and down arrow keys move the highlight up and down. Pressing the **Enter** key is the same as touching the OK button.

When the function you have chosen from Executive Menu is finished, Executive Menu is displayed again.

Each of the items listed in Executive Menu is described in Table 9-1.

Table 9-1. Executive Menu Items

Menu Item	Description
Run MS-DOS with on-screen keyboard	Starts Screen Keyboard, allowing you to run programs that require a keyboard without attaching a physical one. Refer to the section Screen Keyboard, beginning on page 9-5, for more information.
Transfer files from external computer	Starts the MS-DOS Intersvr utility, making the PalmPAD computer the server computer. This allows you to transfer files between the PalmPAD computer and another computer through a serial cable. Refer to the section Transferring Files with Interlnk, beginning on page 9-8, for more information.
Run PalmPAD diagnostics	Starts the Diagnostics program. This program checks out the operation of various parts of your computer and reports configuration information. Refer to the section Diagnostics, beginning on page 9-10, for more information.
Change PalmPAD configuration	Starts the full-screen configurator. Refer to the section Configurator, beginning on page 9-14, for more information.
Test screen digitizer	Starts the PenDraw program. This program allows you to test the screen digitzer. Refer to the section Testing the Screen Digitzer, beginning on page 9-32, for more information.
Exit to MS-DOS	Exits from Executive Menu to MS-DOS. If you do not have a physical keyboard attached to your computer when you make this choice, you will not be able to continue operating the computer when Executive Menu stops. MS-DOS requires you to type commands in order to do anything.

Screen Keyboard

Screen Keyboard is a versatile program that emulates a physical IBM XT-compatible keyboard on the PalmPAD computer screen. It allows you to enter keyboard data even though you do not have an external keyboard attached to the computer.

For example, you can use the screen keyboard program to operate most "off-the-shelf" MS-DOS programs that use text-mode and expect keyboard input, since such programs do not take handwriting input from the pen. Or, you can use it to type MS-DOS commands.

You need to use Screen Keyboard only if you want to give MS-DOS commands or run MS-DOS application programs without attaching an external keyboard. You do not need Screen Keyboard if you have an external keyboard or if you use PenRight! application programs designed to take input from the pen.

Screen Keyboard works by displaying a picture of a keyboard in the lower half of the PalmPAD screen; the screen keyboard is shown in Figure 9-2. MS-DOS runs in the top half of the screen, which contains the standard 25 lines by 80 characters per line. You "type" on the keyboard by touching the keys with the pen. The keys you type are passed directly to MS-DOS, as if you had typed them on a real keyboard.

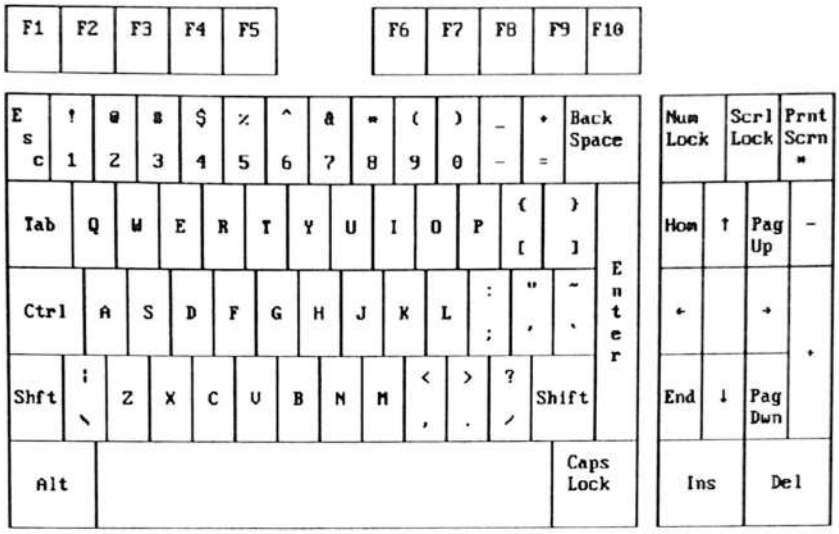


Figure 9-2. Screen Keyboard (U.S.)

Starting Screen Keyboard

There are two methods for starting Screen Keyboard:

- Choose "Run MS-DOS with on-screen keyboard" from the Executive Menu. This method works best if you occasionally need to use Screen Keyboard.

- Run the program **padkbd**, which is on the MS-DOS ROM inside your computer (drive A). To do this automatically each time you start your computer, include the command **a:padkbd** in your *autoexec.bat* file.

When Screen Keyboard starts, it splits the screen in half and displays a keyboard in the lower half.

Screen Keyboard is a Terminate-and-Stay-Resident program (TSR). It stays in memory at the same time that you are using MS-DOS or running an application program.

Features and Limitations

Screen Keyboard has the following features:

- The upper half of the screen is a standard 640- by 200-pixel CGA screen. Almost any MS-DOS application that can use a CGA screen in text mode can run there.

- In the lower half of the screen, the Screen Keyboard includes all of the keys found on a standard IBM XT-compatible keyboard. When a key is touched, it is briefly highlighted, unless it is a locking or modifying key.

- The locking keys, **CapsLock**, **NumLock**, and **ScrlLock**, stay highlighted and modify other keys until they are touched a second time to turn them off.

- The modifying keys, **Shift**, **Ctrl**, and **Alt**, work differently. First touch the modifying key (it stays highlighted), then touch a second key, and the modifying key returns to normal. For example, to type a capital B, touch **Shift**, then touch **B**. If you accidentally touch one of the modifying keys, touch it again to turn the highlight off.

- When the **NumLock** key is touched, the numeric keypad keys are shown on the keys below it (at the right side of the screen). When **NumLock** is off, the direction keys are displayed in that area.

- The **Alt** key works specially in combination with the numeric keypad. If you touch **Alt**, it normally modifies only the key that immediately follows it. But if you use the numeric keypad, you can enter a two- or three-number decimal ASCII code following **Alt**. For example, **Alt**-156 causes the British pound sign (£) to be displayed.

  In this way, you can enter extended character ASCII codes the same as on a real keyboard. (Extended character ASCII codes include foreign characters and line draw characters, which some application programs use.)

- If you touch the pen to a key and hold it there, the key repeats.

- Screen Keyboard does not interfere with a real keyboard, if one is attached to the computer. Both keyboards can be used interchangeably. However, if you use the locking keys, **CapsLock**, **NumLock**, and **ScrlLock**, interchangeably on both Screen Keyboard and a real keyboard, the indicators for these keys may not reflect their actual settings.

Screen Keyboard has the following two limitations:

- Only character-mode MS-DOS applications are supported; if an application changes the screen to graphics mode, Screen Keyboard will not be visible.

- MS-DOS applications that use the second page (page 1) of video memory will interfere with Screen Keyboard and are not supported. Most character-mode applications do not do this and will run properly.

NOTE: Screen Keyboard can be used to *start* any application, even if the application then interferes with Screen Keyboard operation. For example, you could use Screen Keyboard to start a graphics application program that requires no further input from you, so it does not matter that the Screen Keyboard disappears when the application is started.

Removing Screen Keyboard

If you started Screen Keyboard from Executive Menu, you can remove it and return to Executive Menu by giving the **exit** command. To do this, type the command **exit** and press **Enter**.

If you started Screen Keyboard by running the program **padkbd**, you can remove it by giving the command **padkbd /r** and pressing **Enter**.

Remember that if you do not have an external keyboard attached to your computer and you remove Screen Keyboard this way, you will not be able to type any more.

National Keyboard Support

Screen Keyboard supports national keyboards other than the default US keyboard. Your MS-DOS ROM contains built-in keyboards for other languages. To install a different keyboard, use the **config keyb** command; refer to page 9-23.

It is also possible to create custom keyboards for languages not supplied by GRiD Systems. Contact your GRiD representative for more information.

Transferring Files Using Interlnk

The Intersvr file for the Interlnk program is built into the PalmPAD MS-DOS ROM. To use it, you will also need a 3-wire or 7-wire null modem serial cable to connect the computers together. The computer to which you want to connect the PalmPAD computer must be running MS-DOS version 3.0 or later.

When using the Interlnk program, the storage devices on your PalmPAD computer are accessible from another computer. For example, if on the other computer you have drives A, B, and C, you would be able to access your PalmPAD devices using subsequent drive letters such as D and E.

To use Interlnk, you need to have the Interlnk program files on both the PalmPAD computer and the other computer. To obtain the files, order the MS-DOS Communications Utility from GRiD Systems (Order number: M02-9572). This product includes a diskette with the Interlnk files, the *MS-DOS Communication Utility User's Guide*, and a null modem serial cable with which to connect the computers.

Here are brief instructions on how to use Interlnk to transfer files. Refer to the *MS-DOS Communication Utility User's Guide* for more information.

Throughout the following steps, *client* computer refers to the computer to which you are connecting the PalmPAD computer. *Client* is the Interlnk term for the computer that takes control and from which MS-DOS commands are issued to access another computer's storage devices. *Server* is the Interlnk term for the computer (in this case the PalmPAD computer) that shares its storage devices with another computer. The server computer remains occupied and unavailable as long as the client computer is in control.

1. Connect the power/serial port on the PalmPAD computer to the serial port of the other computer using the null modem cable, as is shown in Figure 9-3.

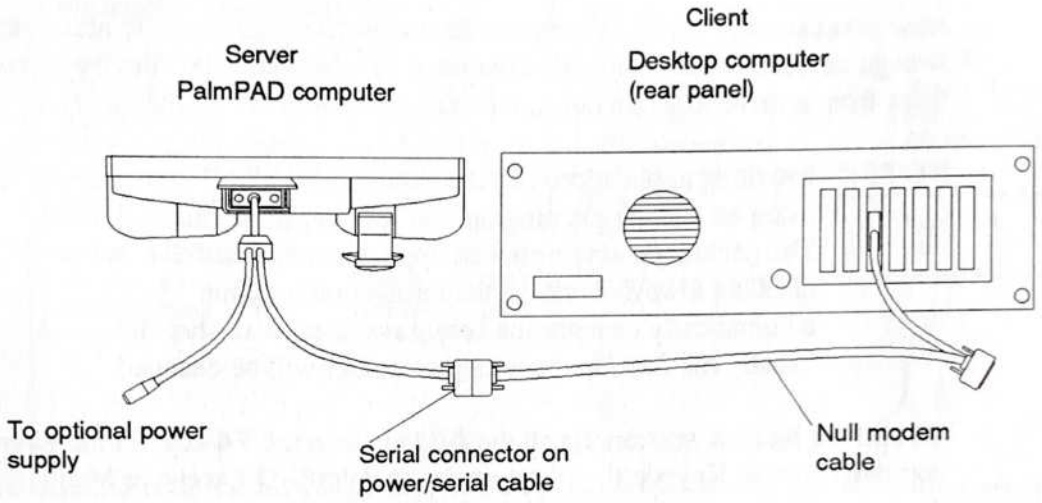


Figure 9-3. Computers Connected for Intersvr/Interlnk File Transfer

2. Install the Interlnk device driver on the client computer by including the following statement in the *config.sys* file on that computer:

   device=interlnk.exe

   Restart the client computer by pressing **Ctl-Alt-Del**.

3. Start the Executive Menu program on the PalmPAD computer, select the function "Transfer files from external computer," and touch the OK button. The Intersvr status screen and the Screen Keyboard are displayed on the screen. The status screen is displayed as long as Intersvr is running. You do not need to change anything on it.

   Note that the screen backlight may turn off during the Intersvr session; for more information, refer to the **config backlite** command on page 9-19.

   Standby is disabled during a data transfer. Once you end the Interlnk session, the original standby state is restored.

4. At the client computer, give the **interlnk** command. This displays a message giving the drive letters that you can use to access the PalmPAD computer storage devices. Make a note of these drive letters.

Now you can enter MS-DOS commands on the client computer to access the storage devices on the PalmPAD computer. You can transfer files by copying them from a drive letter on one computer to a drive letter on the other.

NOTE: Installing applications directly onto the PalmPAD computer by using an installation program via Interlnk is not recommended. This technique may install an application successfully, but does not always work. If the installation program automatically changes the *config.sys* or *autoexec.bat* files, usually the files on the wrong computer will be changed.

To end the Interlnk session, touch the **Alt** key, then the **F4** key, on the PalmPAD computer Screen Keyboard. To return to the PalmPAD Executive Menu, type **exit**, then press **Enter** on the Screen Keyboard.

Diagnostics

The Diagnostics program checks out the operation of various parts of the PalmPAD computer and reports configuration information. You can run the Diagnostics program in two ways:

- Choose "Run PalmPAD diagnostics" from the Executive Menu.
- Run the program **padscan**, which is on the MS-DOS ROM inside your computer (drive A).

When you run the Diagnostics program, the computer pauses for a few seconds and then displays the screen shown in Figure 9-4. The information on your screen may be different, depending on how your computer is configured. To exit the Diagnostics screen, touch the pen to the screen, or press any key if you have a keyboard attached.

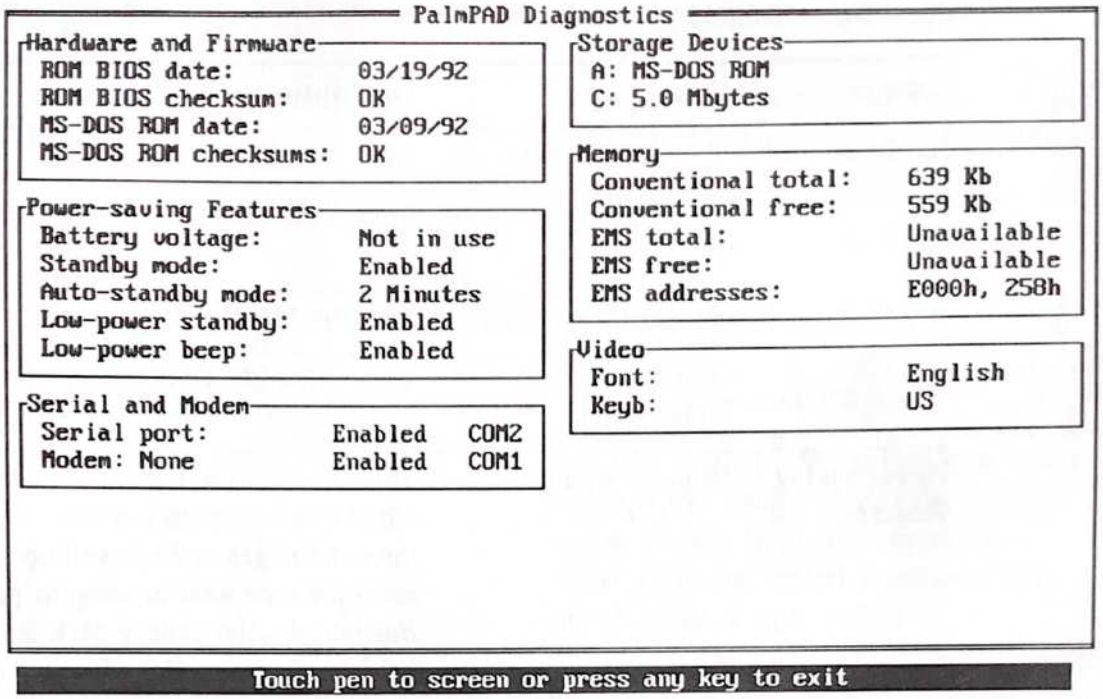


Figure 9-4. Diagnostics

The information on your screen will be somewhat different, depending on how your computer is configured. The items shown in the Diagnostics screen are described in Table 9-2.

Table 9-2. Diagnostics Items

Category	Item	Description
Hardware and Firmware	ROM BIOS date	Date the BIOS was produced.
	ROM BIOS checksum	Tells if the BIOS is valid or damaged.
	MS-DOS ROM date	Date the MS-DOS ROM was produced.
	MS-DOS ROM checksums	Tells if the MS-DOS ROM files are valid or damaged.
Power-saving Features	Battery voltage	Tells whether the battery is in use and whether it is charged or low. One of three messages is displayed here: *Not in use*—the computer is using ac power; *Battery ok*—the battery pack is sufficiently charged; or *Battery low*—the battery pack needs to be recharged.
	Standby mode	Tells if standby mode is enabled or disabled (change with the Configurator).
	Auto-standby mode	Gives the auto-standby mode time interval, if enabled (you can change this with the Configurator). Auto-standby activates standby mode if a certain amount of time has passed without any computer activity.
	Low-power standby	Tells if low-power standby mode is enabled or disabled (normally it is always enabled). Low-power standby activates standby mode if the computer battery pack becomes nearly exhausted.
	Low-power beep	Tells if the low-power beep feature is enabled or disabled (you can change this with the Configurator). Low-power beep causes the computer to beep if the computer battery pack becomes nearly exhausted.

Category	Item	Description
Serial and Modem	Serial port	Status and device name of serial port (you can change this with the Configurator).
	Modem	Status, type, and device name of optional internal modem (you can change this with the Configurator).
Storage Devices	A:	The DOS-ROM.
	C:	The size of the SunDisk card.
	D:	The size of the RAM card and the status of the RAM card battery. (The battery status of cards from other vendors or cards with main batteries removed may not be detected accurately.)
Memory	Conventional total	The amount of conventional memory installed.
	Conventional free	The amount of free (unused) conventional memory available (not including the amount used by *padscan.exe*).
	EMS total	The amount of expanded memory installed (to install expanded memory you must install *emm.sys*, the expanded memory manager device driver—refer to page 8-3).
	EMS free	The amount of free expanded memory.
	EMS addresses	The expanded memory page frame addresses. The first number shown is the base address of the EMS page frame. The second number is the EMS I/O address.
Video	Font	Language of current screen font (you can change this with the Configurator).
	Keyb	Country code of the keyboard driver, screen font, and message language.

Configurator

The Configurator program allows you to change your computer configuration. The computer configuration includes such items as the device from which the system should start up, system power control, the screen brightness and other attributes, the device names for the serial port and optional modem, the speed of the microprocessor, and the status of the standby and auto-standby modes.

The Configurator program can be used in either full-screen or command line mode. To use the full-screen configurator, select "Change PalmPAD configuration" from the Executive menu. The full-screen configurator consists of four screens. When you select "Change PalmPAD configuration" from the Executive menu, the Power (F2) options screen is displayed. Buttons at the bottom of the screen let you access the other screens: Per. (F3) (Peripherals), System (F4), or Video (F5). Press the Exit (Esc) button to return to the Executive Menu. Table 9-3 lists the items that can be configured on each screen. Figure 9-5 shows the screens.

To use the full-screen editor, press the pen to a button at the bottom of the screen to highlight the item. The screen for that group of items is displayed. To change an option on the screen, touch the name of the item with the pen. Then touch the bar on the right side of the screen to increment the values. Holding the pen down on the bar causes the values to cycle.

You can also use the Configurator program from the MS-DOS command line. To get an MS-DOS command line along with the Screen Keyboard, choose "Run MS-DOS with on-screen keyboard" from Executive Menu. To give Configurator commands, type **config** followed by the appropriate parameters. For convenience, you can include Configurator commands in batch files.

The settings of some configuration items are saved after the computer is turned off and other configuration items are reset each time the computer is started. Table 9-3 lists each of the Configurator items, notes whether it is saved or not, and gives the factory default setting for the command. If the command is saved after the computer is turned off, a plus sign (+) appears in the last column.

Each of the Configurator items is described in alphabetical order in the sections following Table 9-3. In the command line syntax statements, the vertical bar (|) is used to indicate a choice between two or more parameters. You should enter one of the parameters that are separated by vertical bars. Brackets [ ] are used to indicate optional parameters.

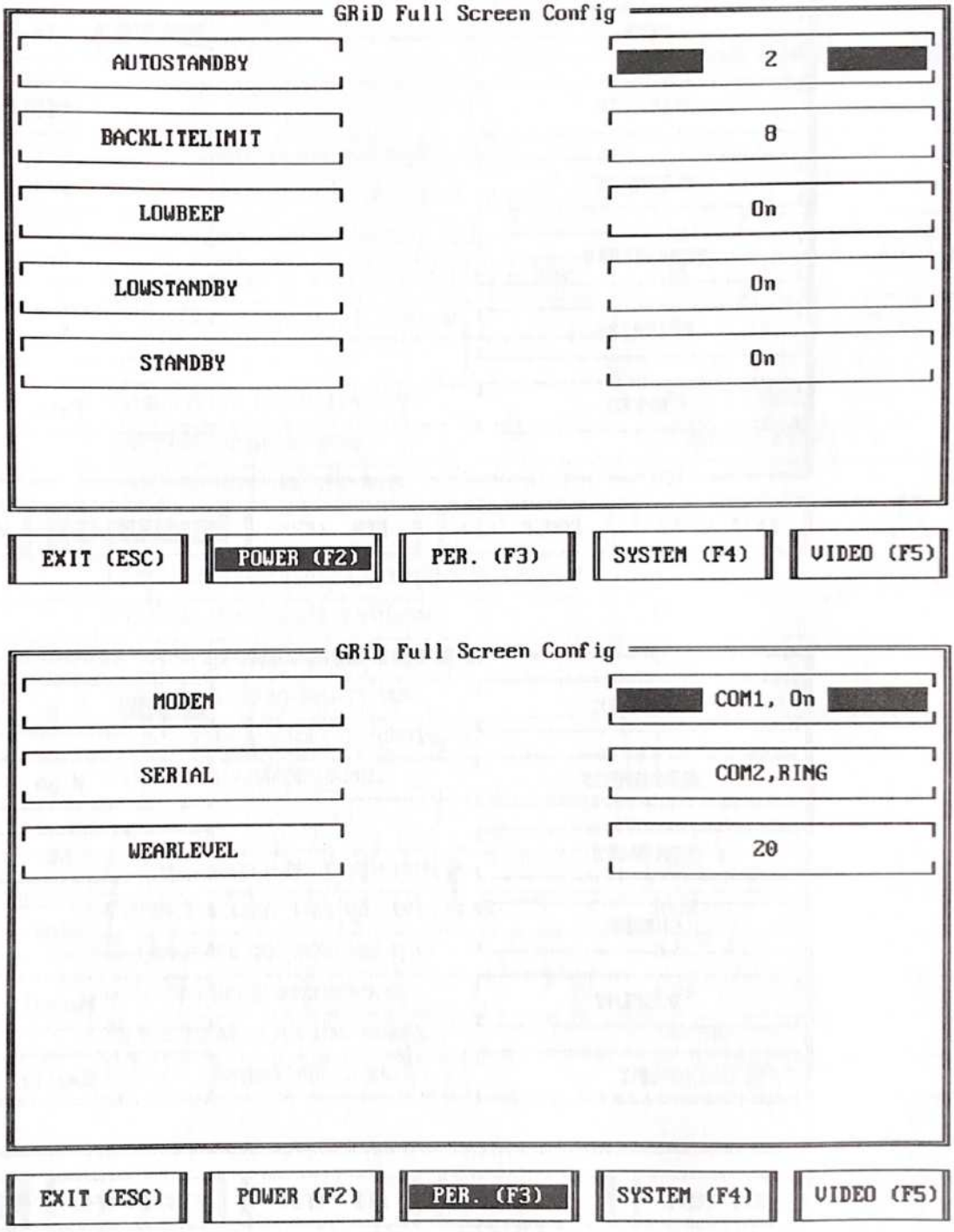


Figure 9-5. Configurator Screens

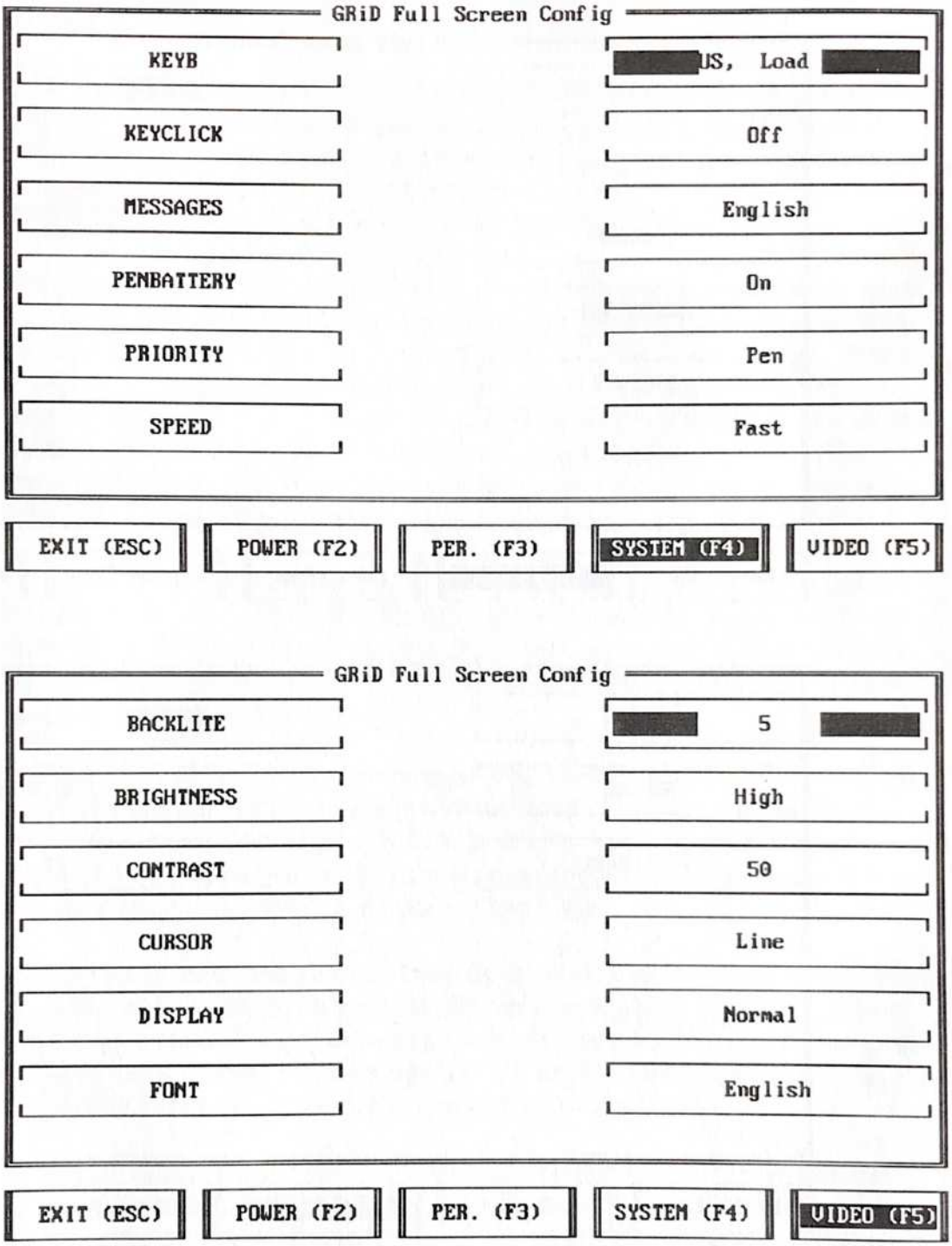


Figure 9-5. Configurator Screens (continued)

Table 9-3. Configurator Command Summary

Command	Description	Default Setting	Saved
Power Features			
autostandby	Enables/disables the automatic standby feature.	2 minutes	+
backlitelimit	Controls the backlight maximum intensity.	4	+
lowbeep	Controls low battery warning beep.	On	+
lowstandby	Controls entering standby if battery is low.	On	
standby	Controls entering standby mode.	On	+
Peripheral			
modem	Controls the internal modem.	On & COM2	+
serial	Controls the serial port.	COM1 & RING	+
wearlevel	Specifies the SunDisk wear level frequency.	20	+
System			
keyb	Configures computer for a specific language.	US	+
keyclick	Controls the key click volume.	Off	
messages	Sets the BIOS message language.	English	+
penbattery	Controls the pen battery test.	On	+
priority	Controls the priority of interrupts.	Pen	+
speed	Sets the processor speed.	Fast	
Video			
backlite	Controls screen backlight timing.	On	+
brightness	Controls screen backlight brightness.	low	+
contrast	Controls the contrast intensity.	64	+
cursor	Sets the cursor appearance.	Line	
display	Sets normal or reverse video.	Normal	+
font	Selects international fonts.	English (Font 1)	+

Config Autostandby

The **config autostandby** command enables or disables automatic standby mode. This command has the following format:

```
config autostandby = 1 | 2 | ... | 60 | off
```

To conserve the most power and make your batteries last longer, you can set up your computer so that it automatically goes into standby mode if the display has not changed or you have not touched the pen to the screen (or typed on a keyboard) for a certain number of minutes. The default is 2 minutes.

You can specify from 1 to 60 minutes. For example, you could set it up so that it goes into standby mode if there has been no activity for five minutes. When you want to start working again, just press the standby button and continue where you stopped.

To turn off the automatic standby feature if you have previously enabled it, specify **off**.

When you are using the full-screen configurator, the values increment in 2-minute intervals.

Note that the automatic standby feature operates only when the computer is running on battery power.

The setting of the **config autostandby** command is saved when the computer is turned off.

NOTE: Automatic standby may not work with some MS-DOS application programs. It works fine with all custom PenRight! applications.

Refer to the commands **config standby** (page 9-30) and **config lowstandby** (page 9-26) for more information about entering standby mode.

Config Backlite

The **config backlite** command controls the timing of the backlight for the LCD display. This command has the following format:

```
config backlite = 1 | 2 | ... | 60 | on | off
```

To conserve power and make your batteries last longer, you can set up your computer so that it automatically turns off the screen backlight if the display has not changed or you have not touched the pen to the screen (or typed on a keyboard) for a certain number of minutes. You can specify from 1 to 60 minutes. The screen backlight is automatically turned back on as soon as the pen or a keyboard is used or the display changes.

To permanently turn off the screen backlight, specify **off**. In this case, using the pen or keyboard will not cause the backlight to turn on again.

To permanently turn on the screen backlight, specify **on**. The screen backlight stays on until you change this setting. The initial setting is **on**.

When you are using the full-screen configurator, the value increments in 2-minute intervals.

The backlight on/off switch on the computer overrides the **config backlite** setting.

The setting of the **config backlite** command is saved when the computer is turned off.

Config Backlitelimit

The **config backlitelimit** command controls the range of brightness when the backlight switch is pressed or **config brightness** command is issued. This command has the following format:

```
config backlitelimit = 0 | 1 | ... | 8
```

This setting controls the intensity of the backlight when the **config brightness** command is set at low, medium, or high.

When this command is set at 0, there is no variation in the brightness of the backlight. However, if it is set at 8, the brightness on high is very intense. Table 9-4 shows the impact in the output of the backlight for several combinations of the **config backlitelimit** command.

Table 9-4. Backlight Output

config backlitelimit setting	**config brightness** setting	Backlight output
8	high	100%
	medium	50%
	low	1%
4	high	50%
	medium	25%
	low	1%
0	high	1%
	medium	1%
	low	1%

Because having the backlight at full brightness uses 60 percent more power than having the backlight off, you should set this command as low as possible for your work conditions.

Config Brightness

The **config brightness** command sets the brightness of the screen backlight. This command has the following format:

```
config brightness = low | medium | high
```

This command allows you to set the brightness of the LCD screen backlight. Initially, the brightness is set to low. To conserve battery power, it is very helpful to set the screen backlight brightness to a low level.

The intensity of the backlight at each setting is dependent on the setting of the **config backlitelimit** command (as shown in Table 9-4).

The backlight brightness switch on the computer changes the **config brightness** setting.

The setting of the **config brightness** command is saved when the computer is turned off.

Config Contrast

The **config contrast** command adjusts the contrast of the screen. This command has the following format:

```
config contrast = 0 | 1 | ... | 255
```

This commands allows you to set the screen contrast. Initially the contrast is set to 64, a medium contrast.

The contrast switch on the computer changes the **config contrast** setting.

If you have a keyboard attached or are using Screen Keyboard, you can increase the contrast by pressing **Ctrl-Alt-↑**, or decrease the contrast by pressing **Ctrl-Alt-↓**. These keystrokes simply cycle through each of the contrast settings forwards or backwards, respectively.

When you are using the full-screen configurator, the value changes in increments of 5.

Config Cursor

The **config cursor** command sets the appearance of the MS-DOS cursor on the computer screen. This command has the following format:

```
config cursor = line | block
```

If you specify **line** (the default setting), the cursor appears as a short, horizontal underline. If you specify **block**, the cursor appears as a small highlighted rectangle.

The setting of the **config cursor** command is not saved when the computer is turned off. Each time you start the computer, it is reset to **line**.

Config Display

The **config display** command changes the video mode of the screen from normal to reverse video. This command has the following format:

```
config display = normal | reverse
```

If you specify **normal** (the default setting), the screen shows dark characters on a light background. If you specify **reverse**, the screen shows light characters on a dark background.

Note that if you have a keyboard attached or are using Screen Keyboard, you can switch instantly between the two display modes by using the keystroke **Ctrl-Alt-Backspace**.

The setting of the **config display** command is saved when the computer is turned off.

Config Font

The **config font** command sets the character set used to display characters on the computer screen. This command has the following format:

```
config font = 1 | 2 | 3 | 4
```

The four character sets are the following:

Number	Character Set
1	English (the default)
2	French-Canadian
3	Norwegian
4	Hebrew

To effectively use these character sets, you also need a keyboard that can generate the special national language characters. To install a different keyboard, use the **config keyb** command.

When using the full-screen configurator, the names of the character sets rather than the font numbers are displayed.

The setting of the **config font** command is saved when the computer is turned off.

Config Keyb

The **config keyb** command sets the keyboard driver and screen font for a particular language. This command has the following format:

```
config keyb = language load|noload
```

where *language* can be one of the following two-letter language codes:

Code	Country or Language
BE	Belgium
CF	Canadian-French
DK	Denmark
FR	France
GR	Germany
IT	Italy
LA	Latin America
NL	Netherlands
NO	Norway
PO	Portugal
SF	Swiss-French
SG	Swiss-German
SP	Spain
SU	Finland
SV	Sweden
UK	United Kingdom
US	United States
X0-X9	User-defined keyboards

This command is used to load national keyboards other than the default US keyboard. You should restart your computer after changing the setting of the **config keyb** command. When you restart your computer, the *setkeyb.bat* file automatically sets up the national support in your computer. This includes the keyboard driver, screen font, Screen Keyboard, and message language for the country you have selected.

Use the **noload** parameter to cause no national language support to be loaded. In this case, the memory-resident keyboard and screen drivers are not automatically loaded when the computer is restarted. You might want to do this if you want to customize and install national language support yourself.

The default language code is US.

The setting of the **config keyb** command is saved when the computer is turned off.

NOTE: If you choose to manually install national language support by loading a custom keyboard driver and Screen Keyboard, you could encounter a situation in which the keycaps on the Screen Keyboard don't match the characters echoed on the screen. This happens because the resource file for the Screen Keyboard cannot be found. Make sure the Screen Keyboard resource file matches the keyboard driver language and is in the system path.

Config Keyclick

The **config keyclick** command sets the loudness of key clicks if you have a keyboard attached or if you are using Screen Keyboard. This command has the following format:

```
config keyclick = off | low | high
```

If you use Screen Keyboard or attach a keyboard to your computer, the computer can make a clicking noise each time you touch a key. This audible feedback may be helpful, especially when using Screen Keyboard. This feature is initially set to **off**. To turn it on, specify **low** or **high**, depending on how loud you want the key clicks to be.

Note that if you have a keyboard attached or are using Screen Keyboard, you can increase the keyclick volume by pressing **Ctrl-Alt-Grey plus(+)**, or decrease the volume by pressing **Ctrl-Alt-Grey minus(–)**. [1] These keystrokes simply cycle through each of the keyclick settings forwards or backwards, respectively.

When you are using the full-screen configurator, the values change in increments of 5, from 5 to 60, rather than showing **low** and **high**.

The setting of the **config keyclick** command is not saved when the computer is turned off. Each time you start the computer, it is reset to **off**.

Config Lowbeep

The **config lowbeep** command controls the low power beep feature. This command has the following format:

```
config lowbeep = on | off
```

The initial setting is **on**. When turned on, the low power beep feature causes the computer to give three short beeps about every 15 seconds if it is running from the battery pack and the battery pack becomes nearly exhausted. The beeps begin at the same time that the battery indicator lights steadily and continue until the battery is exhausted.

You may have as little as two minutes of battery power remaining when the beeps start. When you hear the beeps, you should immediately save the file you are working on to avoid losing any data. Then you should connect power to the computer, or put the computer into standby mode and replace the exhausted battery pack with a charged battery pack.

If you do not take any action to supply more power to the PalmPAD computer when the low power beeps start, the battery pack will continue to drain. When it is almost exhausted, the computer will automatically enter standby mode in an attempt to preserve your work in system RAM. You will see the screen go blank when this happens.

1 Grey plus and grey minus refer to the plus and minus keys on the numeric keypad.

You can turn off the low power beep feature by specifying **off**.

The setting of the **config lowbeep** command is saved when the computer is turned off.

Config Lowstandby

The **config lowstandby** command enables or disables low-power standby mode. This command has the following format:

```
config lowstandby = on | off
```

When low-power standby mode is enabled, the computer automatically enters standby mode if it is operating from battery power and the battery pack becomes nearly exhausted. You will see the screen go blank when this happens, and the battery indicator will stay lit.

Before the computer enters low-power standby mode, you are warned that the battery is low by the battery low/hard disk indicator and the low-power beep. You usually have about two minutes of warning before the computer enters low-power standby mode.

To return to your work, connect external power or insert a charged battery pack, then press the standby button to exit standby mode.

Depending on how fully the internal bridge battery is charged, the computer can remain in standby mode for over one hour. When the internal bridge battery becomes exhausted, the computer turns off. You may lose data if you have not saved your work.

Low-power standby is set **on** by default. This setting is not saved when the computer is turned off. Each time you start the computer it is reset to **on**.

CAUTION

Do not disable low-power standby mode. In some situations the computer hardware or your RAM card data could be damaged if low-power standby mode is disabled and the computer completely exhausts the battery pack it is operating from. You can check the status of low-power standby mode using the Diagnostics.

Refer to the commands **config standby** (page 9-30) and **config autostandby** (page 9-18) for more information about entering standby mode.

Config Messages

The **config messages** command is provided to allow PenRight! to use languages other than English. This command has the following format:

```
config messages = english | french | german
```

The initial setting is **english**.

The setting of the **config messages** command is saved when the computer is turned off.

Config Modem

The **config modem** command turns the optional internal modem driver on or off. This command also assigns the modem a device name. This command has the following two formats:

```
config modem = on | off

config modem = com1 | com2
```

The first form of the **config modem** command turns on or off the modem driver. Initially, the modem is set to **on**. When you are not using it, we recommend that you turn off the modem. The modem consumes a small amount of power when it is on, and by turning it off, you can save battery power.

The second form of the **config modem** command assigns the modem a device name. The modem initially is assigned device name COM2. If you want, you can specify COM1 to assign it that device name.

When you are using the full-screen configurator, you can select one of four combinations of **COM1** or **COM2** and **on** or **off**.

NOTE: If you assign the modem to a different COM device name, the serial port is reassigned automatically to the other COM device name.

The setting of the **config modem** command is saved when the computer is turned off.

Config Penbattery

The **config penbattery** command determines whether the pen batteries are checked when the computer is turned on. This command has the following format:

```
config penbattery = on | off
```

If this command is set to on, everytime you turn on your computer a message is issued telling you to touch the pen to the screen. After you touch the pen to the screen, a low battery warning is issued if the pen batteries are low. Refer to the section Pen on page 3-15 for information on testing and changing the pen batteries.

If this command is set to **off**, your pen batteries are not checked. You should periodically turn on this setting to check your pen batteries.

Config Priority

The **config priority** command sets the priority of hardware interrupts. You would need to use this command only under special circumstances. This command has the following format:

```
config priority = comm | pen
```

The **pen** setting is the default setting, in which the hardware interrupts follow the normal IBM XT sequence (IRQ0 through IRQ7, in order). You should normally leave the priority set this way. With the **pen** setting, the highest processing priority in the system is given to tracking the pen on the display.

You might need to change the priority to the **comm** setting if you are performing communication through the serial port or modem at the same time that you are using the pen on the display. This situation could cause slow communication performance or, if you are using no error-checking protocol, loss of incoming data.

If you are experiencing such problems, using the **comm** setting may remedy the situation by giving the highest processing priority in the system to the communication ports. The pen is still tracked accurately on the display.

NOTE: When the **comm** setting is chosen, the hardware interrupt priority is changed to the following (highest to lowest priority): IRQ3, IRQ4, IRQ5, IRQ6, IRQ7, IRQ0, IRQ1, IRQ2.

The setting of the **config priority** command is saved when the computer is turned off.

Config Serial

The **config serial** command assigns the serial port a device name. This command also changes how the serial port works to accommodate a bar code reader. This command has the following two formats:

```
config serial = com1 | com2
config serial = ring | barcode
```

The first form of the **config serial** command assigns the serial port a device name. The serial port initially is assigned device name COM1. If you want, you can specify COM2 to assign it that device name.

NOTE: If you assign the serial port to a different COM device name, the modem is reassigned automatically to the other COM device name.

The second form of the **config serial** command changes how the serial port works in order to accommodate a bar code reader. Normally, pin 9 in the serial port connector is used for the Ring Indicator signal. This is set by specifying **ring** (the default setting). Many bar code readers require this pin to supply +5V dc power. You can change the pin so that it supplies power by specifying **barcode**. Note that the maximum current available is 50 milliAmps.

When using the full-screen configurator, you can select one of four combinations of **com1** or **com2** and **ring** or **barcode**.

The setting of the **config serial** command is saved when the computer is turned off.

Config Speed

The **config speed** command sets the speed at which the computer microprocessor operates. This command has the following format:

```
config speed = fast | slow
```

If you specify **fast** (the default setting), the microprocessor immediately begins operating at its fast speed (9.54 MHz). If you specify **slow**, the microprocessor immediately begins operating at its slow speed (4.77 MHz).

Note that if you have a keyboard attached or are using Screen Keyboard, you can also switch between fast and slow processor speeds using the keystrokes **Ctrl-Alt-PgUp** and **Ctrl-Alt-PgDn**, respectively.

The setting of the **config speed** command is not saved when the computer is turned off. Each time you start the computer, it is reset to **fast**.

Config Standby

The **config standby** command enables or disables standby mode or immediately puts the computer into standby mode. This command has the following format:

```
config standby [=on | =off]
```

Standby mode is enabled by default. When you press the standby button on top of the computer, it puts the computer into standby mode. Specify **off** to disable standby mode. When standby mode is disabled, nothing happens when you press the standby button.

To immediately put the computer into standby mode, you can also issue the command **config standby** with no parameters.

The setting of the **config standby** command is saved when the computer is turned off.

Refer to the commands **config autostandby** (page 9-18) and **config lowstandby** (page 9-26) for more information about entering standby mode.

Config Wearlevel

The **config wearlevel** command is used to activate automatic wear leveling of the SunDisk card. This command has the following format:

```
config wearlevel = 0 | 1 | ... | 255
```

Wear leveling is a procedure in which the location of data on the SunDisk is automatically rearranged to ensure that data in one area is not lost due to a large number of write statements.

The purpose of this command is to indicate how often the SunDisk should be checked to determine whether wear leveling is needed. The SunDisk is checked when the computer is turned on. If the setting is 0, the SunDisk will never be checked to determine whether wear leveling is necessary. A setting between 1 and 255 specifies that after the computer is turned on that number of times, the SunDisk is automatically checked to determine if wear leveling is needed. If it is needed, it will be performed. The wear leveling check could take up to a minute during the computer start-up.

Testing the Screen Digitizer

The PenDraw program allows you to check the calibration of the screen digitizer, to make sure that the pen is being located with the best accuracy when it is touched to the screen.

There are two methods for starting the digitizer test program:

- Choose "Test screen digitizer" from the Executive Menu.
- Run the program **pendraw**, which is on the MS-DOS ROM inside your computer (usually drive A).

When you start the program, the test screen shown in Figure 9-6 is displayed. This is a test screen on which you can draw with the pen. The pen leaves "electronic ink" as you draw with it. You can test the screen digitizer calibration by drawing exactly on top of the lines shown on the screen. If the electronic ink closely matches the lines, then the screen is calibrated properly. The screen overlay is calibrated at the factory and should never need to be recalibrated.

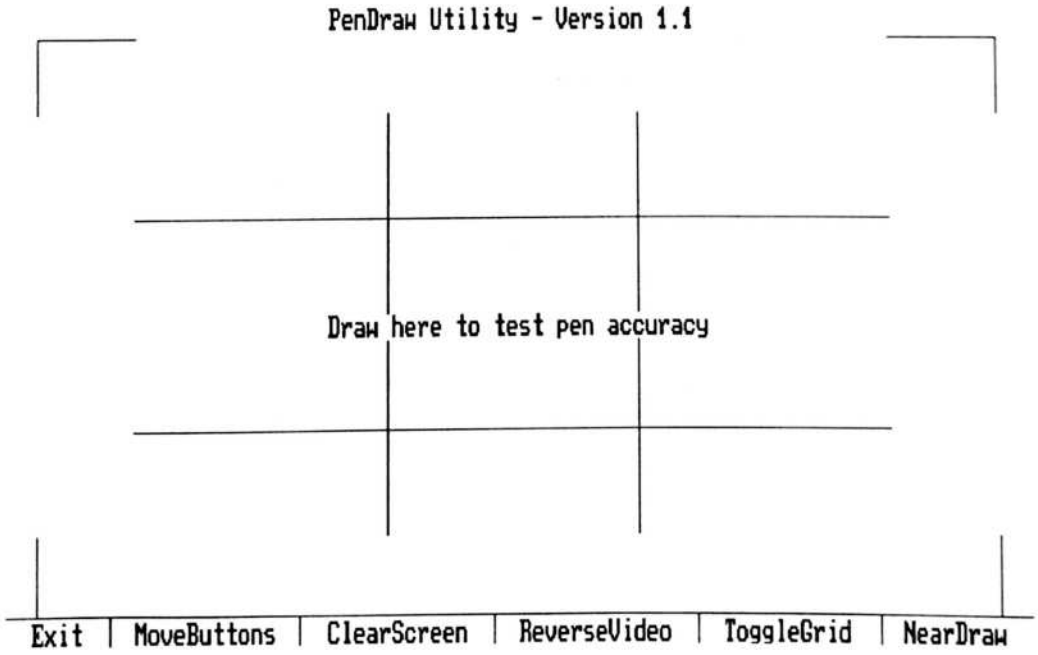


Figure 9-6. Digitizer Test Screen

The buttons at the bottom of the test screen allow you to:

- Exit—Return to the Executive Menu.
- Move buttons—Move the row of buttons to the top of the screen (or back to the bottom of the screen.
- Clear screen—Remove the electronic ink and refresh the test screen.
- Reverse video—Toggle between the light and dark background.
- Toggle grid—Turn on and off the lines on the test screen.
- Near draw/Down draw—Change to Near draw (if the NearDraw button is displayed) or change to Down draw (if the DownDraw button is displayed). Near draw means the electronic ink is deposited if the pen is near the screen. Down draw means electronic ink is deposited only if the pen is in contact with the screen.

APPENDIX A: PALMPAD COMPUTER SPECIFICATIONS

Table A-1 shows the model numbers of the different configurations of the PalmPAD computers. The computer specifications are given in Table A-2.

Table A-1. PalmPAD Computer Model Numbers

Communications Option	Model Number
PalmPAD	2350
PalmPAD with V.42bis/FAX modem	2351
PalmPAD with RF modem	2352
PalmPAD with V.32bis 14400/FAX modem	2353

Table A-2. PalmPAD Computer Specifications

Microprocessor	
Main microprocessor	NEC V20 CPU, operating at 9.54 or 4.77 MHz
Display	
Transflective LCD	6.5-inch diagonal, backlit transflective LCD; 640 x 400-pixel, PC-compatible display, with an aspect ratio of 1:1

Memory	
2 MB RAM	640 kB conventional memory and 1408 kB expanded (EMS) memory.
Storage	
MS-DOS ROM (standard)	256 kB of internal Flash EPROM storage for MS-DOS operating system and PalmPAD utility programs.
1 MB RAM storage card G44-1331	1 MB storage card (68-pin PCMCIA 1.0/ JEIDA standard) fits into the storage card slot.
2 MB RAM storage card G44-1332	2 MB storage card (68-pin PCMCIA 1.0/ JEIDA standard) fits into the storage card slot.
2.5 MB SunDisk card G44-1333	2.5 MB SunDisk card for use in the storage slot.
5 MB SunDisk card G44-1335	5 MB SunDisk card for use in the storage slot.
10 MB SunDisk card G44-1337	10 MB SunDisk card for use in the storage slot.
20 MB SunDisk card G44-1339	20 MB SunDisk card for use in the storage slot.

Communications Options

V.42bis 2400 bps/FAX modem (Model 2351)	2400 bits-per-second (bps) Hayes Smartmodem 2400 compatible; auto-dial, auto-answer; V.42 and Microcom Networking Protocol (MNP) Classes 2 through 4 error correction, as well as V.42bis and MNP Class 5 data compression support. Supports 9600 bps send/receive Group III facsimile transmission.
RF Modem (Model 2352)	Compatible with Novell Netware 2.2. Provides 500 mW, 242 kbps direct sequence spread spectrum radio with a range up to 800 feet. Provides three independent channels. Operates in the 902-928 MHz frequency band. Supports Carrier Sense Multiple Access with Collision Avoidance.
V.32bis 14400 bps/FAX modem (Model 2353)	14400 bits-per-second (bps) Hayes compatible; auto-dial, auto-answer; V.42 and Microcom Networking Protocol (MNP) Classes 2 through 4 error correction, as well as V.42bis and MNP Class 5 data compression support. Supports 9600 bps send/receive Group III facsimile transmission.

Interfaces

Power/Serial port	RS-232C 25-pin, with support for bar code readers.
Keyboard port	15-pin connector for IBM XT-compatible keyboard, using keyboard adapter cable.
Phone jack (optional)	One modular telephone jack for internal modem and telephone (RJ-12 jack).

Other Features

System Indicators	Three LEDs show standby, backlight, and battery status.
Audio	Built-in speaker, non-voice quality.
Clock/calendar	Internal, lithium battery-powered.
Bridge battery	Internal, NiCad battery provides standby mode power while changing the battery pack.

Power

Computer requirements	8 to 15 Vdc, 17 W, 100 mV p-p max. noise.
Sources:	
Internal NiCd battery G44-1340	Removable, rechargeable nickel cadmium (NiCad) battery pack provides 2-4 hours of life in full use, 6-8 hours of life in typical use.
Power supply G44-1344	Requires 100-240 Vac, at 47-63 or 400 Hz, autosensing; supplies 12 Vdc, 30 W (without battery charging).
Auto adapter G44-1346	Connects power from a 12 Vdc cigarette-lighter socket.
Optional NiMH battery G44-1342	Removable, rechargeable, nickel metal hydride (NiMH) battery pack provides approximately 20 percent more battery life than the NiCad battery

Physical Characteristics

Case	High-impact plastic
Weight	2.9 lbs (1.3 Kg), with battery pack 2.3 lbs (1.1 Kg) without battery pack
Height	6.2 inches (15.8 cm)
Width	9.0 inches (22.8 cm)
Depth	1.9 inches (4.8 cm)
Temperature	
Operating	
(Model 2351)	0° to 45° C (32° to 122° F)
(other models)	0° to 50° C (32° to 131° F)
Storage	-20° to 60° C (-4° to 140° F)
Relative humidity	
Operating	5% to 95% noncondensing
Storage	5% to 95% noncondensing
Drop	2.25 feet
Vibration	5-500-5 Hz at 5g, 0.5 in. maximum displacement, 1 octave/minute
Altitude	
Operating	10,000 feet (3,048 meters)
Nonoperating	40,000 feet (12,191 meters)
Electrostatic discharge	15 kV

Cables

Power Cord	Connects the power supply to an ac power outlet.
Power/Serial Cable	Y cable with a 25-pin D-shaped power/serial connector, a 9-pin D-shaped RS-232C serial connector, and an 8-pin round power connector.
Keyboard Adapter G44-1351	Provides a 15-pin D-shaped keyboard connector and a 5-pin DIN keyboard connector.
Battery Cable	Provides two 8-pin power connectors.
Serial Cable G44-1353	Provides a 25-pin D-shaped power/serial connector and a 9-pin D-shaped RS-232C serial connector.
Power Cable	Provides a 25-pin D-shaped power/serial connector and an 8-pin round power connector.

APPENDIX B: TECHNICAL INFORMATION

This appendix contains information about the memory usage in the PalmPAD computer and information about the pinouts of the interface connectors.

System Memory

Main memory for the PalmPAD computer is two megabytes of dynamic RAM.

Main memory is allocated starting at the low end of the available address space (address 0h). The memory from 0h to 9FFFFh (640 kB) is conventional MS-DOS memory. The memory from A0000h to FFFFFh (384 kB) is reserved for video, the EMS page frame, the BIOS, and other system functions. The first one megabyte of system memory is allocated as shown in Figure B-1.

The starting address of the 64 kB EMS page frame is located at E0000h.

The additional 1408 kB of system memory can be used as EMS memory when you install the EMS device driver. Refer to the section Using Expanded Memory, beginning on page 8-3, for more information on using EMS memory.

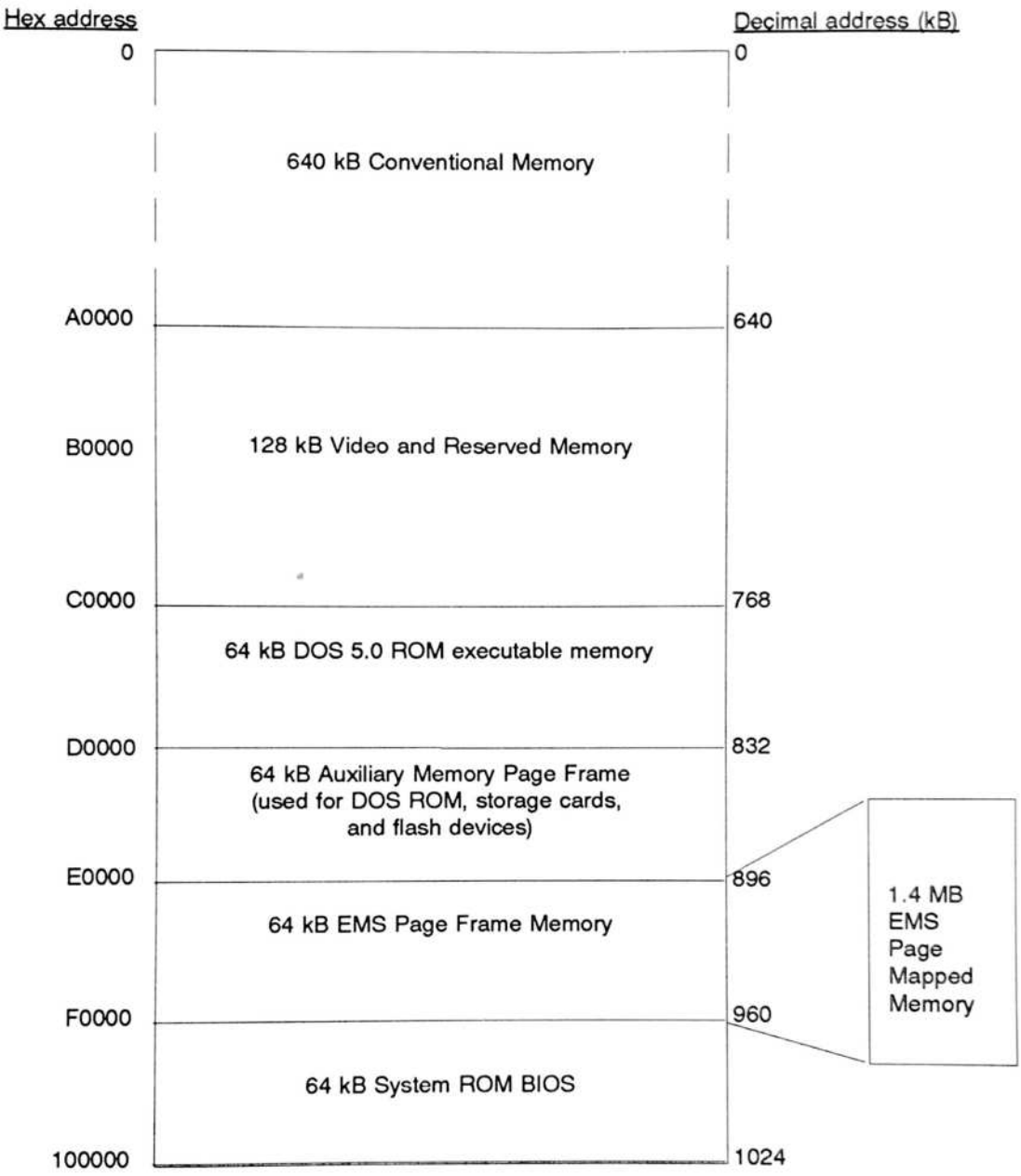


Figure B-1. Memory Map

Connectors

This section gives the pinout information for each of the interface connectors on the computer.

NOTE: The tilde (~) symbol after a signal name means that signal is "true" or "active" in its low state.

Keyboard Connector

The keyboard connector is a 15-pin D-shaped microminiature connector. It can be used to connect a keyboard or barcode reader to the computer using the optional keyboard cable. Figure B-2 shows the Keyboard connector and Table B-1 gives the pinouts for the Keyboard Connector.

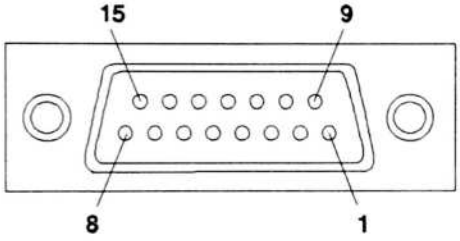


Figure B-2. Keyboard Connector Layout

Table B-1. Keyboard Connector Pinouts

Pin	Signal
1	Keyboard Clock
2	Keyboard Data
3	Not connected
4	Ground
5	+5 volts Keyboard Power (Switched)
6-15	None

Power/Serial Connector

The power/serial port is a 25-pin D-shaped microminiature connector. It is used to connect the power supply to the computer using either the power/serial cable or the optional power cable. This connector can also be used to connect serial peripherals using either the power/serial cable or the optional serial cable.

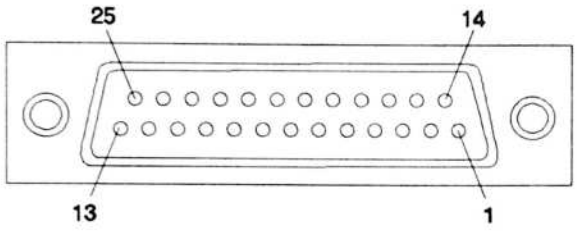


Figure B-3. Power/Serial Connector Layout

Table B-2. Power/Serial Connector Pinouts

Pin	Signal	Pin	Signal
1	Ground	14	External Power
2	Transmit Data	15	External Power
3	Receive Data	16	External Power
4	Request To Send	17	Cradle Power
5	Clear To Send	18	Cradle Power
6	Data Set Ready	19	Ground
7	Ground	20	Carrier Detect~
8	Data Carrier Detect	21	Ground
9	Ground	22	Ring Indicator/+5V
10	Not connected	23	Positive Current Sense
11	Not connected	24	Negative Current Sense
12	Rapid Charge Status~	25	Ground
13	Charge Enable~		

Telephone Connector

Computers equipped with an optional internal modem contain one telephone connector. The telephone connector is a 6-pin RJ-12C connector that allows you to connect the telephone line to the computer. Figure B-4 shows the telephone connector and Table B-3 gives the pinouts for the telephone connector.

The telephone connector accepts and is compatible with the 6-pin RJ-11C telephone plugs that are standard in the U.S.

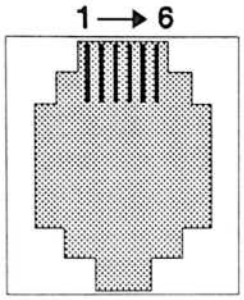


Figure B-4. Telephone Connectors

Table B-3. Telephone Connector Pinouts

Pin	Signal (U.S.)	Signal (International)
1	Not connected	EQL3
2	Not connected	EQL2
3	Ring	Ring
4	Tip	Tip
5	Not connected	EQL1
6	Not connected	IA

Serial Port on Serial or Power/Serial Cable

The power/serial cable and the optional serial cable have 9-pin D-shaped RS-232C serial connectors. The serial port is a Data Terminal Equipment (DTE) input/output port for use with a serial printer, external modem, mouse, bar code reader, or other serial peripheral. You can configure the serial port using the

MS-DOS commands **mode com*n*** and **config serial**. Refer to the *MS-DOS User's Guide and Reference* and the description of the **config serial** command on page 9-29, for further information.

Figure B-5 shows the Serial connector and Table B-4 gives the pinouts for the Serial connector.

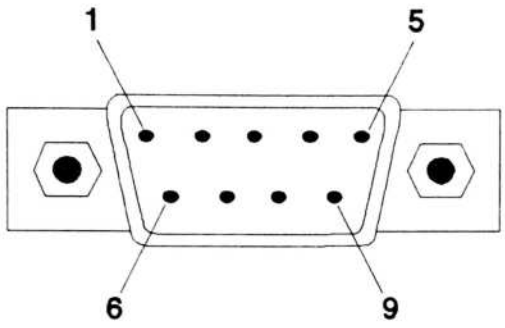


Figure B-5. Serial Connector

Table B-4. Serial Connector Pinouts

Pin	Signal
1	Carrier Detect
2	Received Data
3	Transmitted Data
4	Data Terminal Ready
5	Signal Ground
6	Data Set Ready
7	Request To Send
8	Clear To Send
9	Ring Detect or +5V dc (changeable with **config serial** command)

MS-DOS commands **mode com*n*** and **config serial**. Refer to the *MS-DOS User's Guide and Reference* and the description of the **config serial** command on page 9-29, for further information.

Figure B-5 shows the Serial connector and Table B-4 gives the pinouts for the Serial connector.

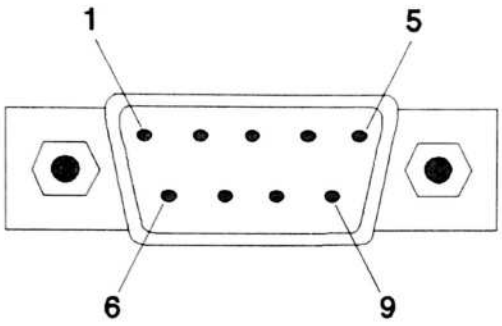


Figure B-5. Serial Connector

Table B-4. Serial Connector Pinouts

Pin	Signal
1	Carrier Detect
2	Received Data
3	Transmitted Data
4	Data Terminal Ready
5	Signal Ground
6	Data Set Ready
7	Request To Send
8	Clear To Send
9	Ring Detect or +5V dc (changeable with **config serial** command)

Keyboard Connector on Keyboard Adapter

The optional keyboard adapter provides a standard size 5-pin DIN jack that accepts the plug from an external IBM XT-compatible keyboard or a GRiD Systems-supplied numeric keypad.

Figure B-6 shows the Keyboard connector and Table B-5 gives the pinouts for the Keyboard connector.

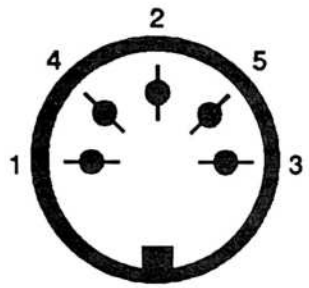


Figure B-6. Keyboard Connector

Table B-5. Keyboard Connector Pinouts

Pin	Signal
1	Keyboard Clock
2	Keyboard Data
3	Keyboard Reset
4	Ground
5	+5V Keyboard Power

Power Connector on Power/Serial Cable, Power Cable, and Battery Cable

The power/serial cable and the optional power cable provide an 8-pin connector that plugs into the power supply. The battery cable provides a power connector at each end to plug into the power supply to recharge the battery when the battery is outside the computer.

Figure B-7 shows the Power connector and Table B-6 gives the pinouts for the Power connector.

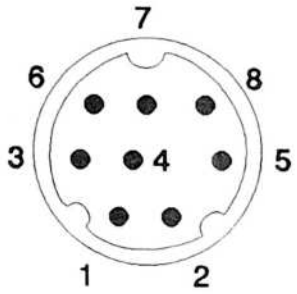


Figure B-7. Power Connector

Table B-6. Power Connector Pinouts

Pin	Signal
1	Ground
2	External Power
3	Ground
4	Battery Charge Enable~
5	External Power
6	Battery Positive Current Sense Voltage
7	Battery Negative Current Sense Voltage
8	Battery Rapid Charge Status~

GLOSSARY

Application program — A program that you use to do a specific task. Examples of application programs include word processors, spreadsheets, databases, communication programs, and custom PenRight! applications designed to gather information or perform other specific tasks.

ASCII — American Standard Code for Information Interchange. A code in which each character (A, B, C, etc.) is assigned a number to facilitate the interchange of data between computer systems. Most computer data is stored as ASCII codes.

Backlight — The lighted panel behind or to the side of the LCD screen. The backlight makes it easier to read the screen in low light conditions. The brightness of the backlight is adjustable using the switch to the left of the PalmPAD screen or with the **config brightness** command. The backlight can be turned on and off using the switch to the left of the PalmPAD screen or with the **config backlight** command.

Bps — Bits-per-second. A measure of data transmission speed commonly used for modems.

Button — The standby button next to the PalmPAD computer screen, or an object displayed on the computer screen that acts like a physical button. A button displayed on the computer screen usually is a small box containing text, such as OK or CANCEL. When you touch the button with the pen, the computer performs some action.

Byte — A unit of computer data that stores a single character. A byte is made up of 8 bits, each of which can be set to one or zero.

CGA — Color Graphics Adapter. An IBM graphics display standard that uses 640 by 200 pixels. On the PalmPAD computer, each row of pixels is doubled, giving a 640 by 400 pixel image that is easier to read.

Conventional memory — Main memory in your computer that MS-DOS uses for itself and for program execution. The PalmPAD computer has 640 kB of conventional memory, the maximum that can be used by MS-DOS.

Default — The initial factory setting of an item. For example, the default setting for standby mode is ON in the PalmPAD computer.

Directory — An area on a storage device that holds a group of related files. This is analogous to a drawer in a filing cabinet, in which related files are stored. Directories have names that can be up to eight characters long. For example, you might have a directory on a SunDisk card called *memos* which contains several memo files.

EMS memory — Expanded Memory Specification memory. EMS, or expanded, memory is additional main memory in your computer that is accessible to certain programs that are designed to take advantage of it. The PalmPAD computer contains 1408 kB of EMS memory. To use EMS memory, you must load the EMS device driver as explained in Chapter 8.

EPROM — Erasable Programmable Read Only Memory. A type of computer memory that can be read from but not written to, except through the use of a special utility. The data in an EPROM is semi-permanently programmed into the device. It does not require any power to maintain data in EPROM. See also ROM.

Field — An area on the computer screen where you enter information. Fields are usually indicated by boxed areas and labelled with labels such as Name, Address, etc. You enter information into a field by writing in it with the pen.

File — A group of data treated and stored as a single unit by the computer. Each file has a name and is stored on one of the computer storage devices. Computer files are analogous to files in a file drawer. For example, a memo that you write with a word processor is stored as a file. The word processor program itself is another file.

File name — The name of a file. A file name can be up to eight characters long with a three character file extension separated by a period. For example, here are some file names: *padkbd.exe*, *autoexec.bat*, *config.sys*, *intersvr.exe*, and *memo.doc*.

Flash storage A type of storage device that uses Flash EPROMs to store data. A flash EPROM is a special type of EPROM chip that can be erased and reprogrammed electrically, while it is installed in the computer.

Font A complete set of characters that have the same style and size. For example, the chapter titles in this book are printed in one font and the body text is printed in another font. There are bold fonts, italic fonts, regular fonts, large fonts, and small fonts.

GRC GRiD Resource Center. The GRC provides support for GRiD computers and software products. If you have questions or problems with GRiD products, call the GRC at 1-800-654-GRID (4743), or write to: GRiD Systems Corporation, GRiD Resource Center, P.O. Box 5003, Fremont, CA 94537-5003. Outside of the U.S., contact your local GRiD Systems representative or distributor.

Kilobyte (kB) 1024 bytes.

Landscape mode Orientation of the screen with the long edge horizontal

LCD Liquid Crystal Display. The type of display screen used on the PalmPAD computer. A thin layer of liquid crystal material reacts to electrical signals which turn individual pixels on and off.

LED Light Emitting Diode. An indicator light. The PalmPAD computer has three LEDs: a green standby indicator, a green backlight indicator, and a yellow battery low indicator.

List A list of choices shown on the computer screen. A list can contain more items than are shown at one time. To scroll a list, touch inside the list with the pen and then drag the pen downwards or upwards, beyond the edge of the list. The list scrolls in the direction you drag.

Megabyte (MB) 1024 kilobytes or 1,048,576 bytes.

MNP Microcom Networking Protocol. This describes a type of communication protocol that is used by the optional internal modem. This communication protocol ensures accurate, error-free transmission of data.

Modem — An acronym for *mo*dulator-*demo*dulator. The optional internal modem translates computer data into audible tones for communication over telephone lines.

MS-DOS — Microsoft Disk Operating System. The basic control program that operates the PalmPAD computer. This is the standard operating system used by all IBM personal computers and compatibles.

Operating system — The basic control program that operates the PalmPAD computer. It is the program that begins running when you turn on the computer. It manages your files, the storage devices, and interprets commands that you issue.

Path — A sequence of directory names describing in which directory a file is stored. Each directory name in a path is separated from the previous one by a backslash (\ ). Each directory is a subdirectory of the one to its left and is contained within it. For example, here are some paths: *\memos\january*, *\programs*, *\finance\audits\qtr1*.

Pixel — A single dot on the screen. The PalmPAD computer screen contains 400 rows of 640 pixels each.

Portrait mode — Orientation of the screen so the long edge is vertical.

RAM — Random Access Memory. A type of computer memory that can be read from and written to. It is extremely fast, but requires a constant source of power to maintain its data. In the PalmPAD computer, RAM is used for the 2 megabytes of main memory and for the storage in the RAM storage cards.

RAM storage card — A credit card-size storage device used with the PalmPAD computer. A RAM storage card is similar to a floppy disk, because it is a permanent storage device for your files. Data is stored in RAM circuits inside the card. In a RAM storage card, the data is preserved by a small amount of electricity flowing from a battery inside the card. The battery must be replaced periodically. For more information, see Chapter 5.

ROM Read Only Memory. A type of computer memory that can be read from but not written to. A ROM chip cannot be erased or overwritten because the data is permanently burned into its circuits. It does not require any power to maintain data in ROM. See also EPROM, which is a special type of ROM chip.

Software A general term describing any programs that run on the computer. A program is a set of instructions written in a computer language that tells the computer how to perform some task.

Standby mode A power-saving mode of operation on the PalmPAD computer. In standby mode, all computer systems are turned off, except for the main memory, where the program and data you are working with are maintained. This mode uses less than 5 percent of the power that the computer normally needs to operate and can greatly extend battery life if you use it frequently. Put the computer into standby mode if you are going to stop using it for a while but do not want to turn it off. To put the computer into standby mode, press the Standby button or use the auto-standby feature. For more information, see the section Standby Mode, in Chapter 4.

Stroke A single mark made with the pen when you are writing on the screen. A stroke begins when you touch the pen to the screen and ends when you lift up the pen. For example, the letter C usually is made with a single stroke, but the letter E often is made with four strokes.

SunDisk card A credit card-size solid-state silicon hard drive card used for data storage. SunDisks are compatible with the 68-pin PCMCIA 1.0/JEIDA connector. For more information, see Chapter 5.

Write-protect To prevent the writing of data to a RAM storage device. Write-protecting a RAM storage device prevents the accidental erasure or overwriting of important files. On the PalmPAD computer, you can write-protect the RAM storage cards. To do so, move the tiny write-protect switch on the end of the card towards the middle of the card (the left).

Index

V

W

GRiD Publications Customer Response Card

GRiD Systems wants to supply you with the finest possible guides and manuals. Therefore, your feedback is important. To help us maintain the highest quality, please use this form to comment on the usefulness and readability of this publication. Suggest additions and deletions, and list specific problems, if any. Be sure to include page numbers where applicable.

PalmPAD Computer User's Guide **May 1992**

Thank you for your cooperation!
GRiD Systems Corporation

tape here

fold here

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 161 FREMONT, CA USA

POSTAGE WILL BE PAID BY ADDRESSEE

GRiD Systems Corporation

Attention: Publications Manager

P.O. Box 5003

Fremont CA 94537-9986

PalmPAD Computer User's Guide

GRiD Systems Corporation
47211 Lakeview Boulevard, Fremont, CA 94538-6599

02350-40
Rev A
GMN-2354

GRiD™

Systems Corporation

- ☐ WORKSTATION
- ☐ PERIPHERAL
- ☐ ACCESSORY
- ☐ SOFTWARE

- ☐ REPAIR CENTER

This item has been tested and inspected to meet or exceed all requirements as established by GRiD Systems Quality Assurance Department.

MODEL NO: G242350

TRACKING NO: GPC04557

OPTIONS: _____

_____

INSPECTED BY: 656

DATE: 6/4/93

The information below is used to provide essential feedback for measuring product performance and can also be used to help resolve any problems encountered. Please fill out this card and return to GRiD.

☐ If you would like to be included on the mailing list for GRiDLetter, our corporate customer newsletter, please check this box.

DATE INSPECTED/SET UP: _____ INSPECTED/SET UP BY: _____

PLEASE CHECK THE APPROPRIATE BOXES BELOW:

- ☐ WORKSTATION/SOFTWARE/PERIPHERAL FUNCTIONS PROPERLY
- ☐ PROBLEMS WITH ONE OR MORE TESTS OR APPLICATIONS
- ☐ PROBLEMS WITH INITIAL SET UP

PLEASE DESCRIBE ANY PROBLEMS BELOW. INCLUDE PHONE NUMBER AND CONTACT FOR FOLLOW UP. INCLUDE ANY SUGGESTIONS OR OTHER INFORMATION THAT WILL HELP GRiD MEET YOUR COMPUTING REQUIREMENTS.

_____

_____

_____

_____

_____

_____

_____

COMPANY: _____

ADDRESS: _____

CONTACT: _____ PHONE: _____

April 1989

P/N 790235-00

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 161 FREMONT, CA 94537

POSTAGE WILL BE PAID BY ADDRESSEE

GRiD™ Systems Corporation
ATTN: DIRECTOR, PRODUCT QUALITY
47211 Lakeview Boulevard
Fremont, CA 94537-5003
USA