EK-PC350-OM-001

# Professional™ 350

## Owner's Manual

Digital Equipment Corporation

**The FCC Would Like Us to Tell You...**
This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with uncertified peripherals is likely to result in interference to radio and TV reception.

**WARNING:** This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, you should try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, you should consult the dealer or an experienced radio/television technician for additional suggestions. You may find help in "How to Identify and Resolve Radio-TV Interference Problems," a booklet prepared by the Federal Communications Commission. This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, stock number 004-000-00345-4.

First Edition, October 1984

# Contents

## CHAPTER 1 OVERVIEW

## CHAPTER 2 SETTING UP THE SYSTEM



## CHAPTER 3 SYSTEMS CONTROL AND INDICATORS



## CHAPTER 4 WHAT TO DO IF YOU HAVE PROBLEMS

FIGURES



TABLES

# Chapter 1

# Overview

This chapter describes the systems in the Professional 300 series and the additional equipment and software that accompanies the systems.

The Professional 300 series consists of three personal computers: the Professional 325, the Professional 350, and the Professional 380. The three main components of these personal computers are the keyboard, the video monitor, and the system unit (Figure 1-1).

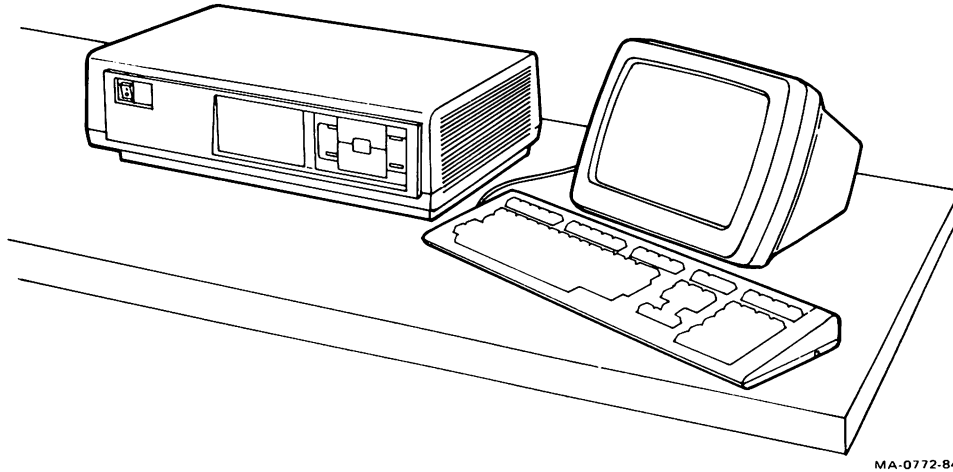



**Figure 1-1 System Components**

The Professional 325 and the Professional 350 use the F11 microprocessor, which is based on the PDP-11/23 minicomputer. The Professional 350 has three option slots for system expansion, while the Professional 325 has one slot for expansion and cannot support hard disk options.

The Professional 380 uses the J11 microprocessor, which is based on the PDP-11/70 minicomputer. The circuitry inside the Professional 380 includes gate arrays for more functions on the system board. The Professional 380 has six option slots for system expansion. This system is available in two configurations, with or without diskette drives. Three optional hard disk drives are also available for the Professional 380 and the Professional 350.

## KEYBOARD

The keyboard keys are arranged into four groups according to the way you use them (Figure 1-2).

Top row function keys
Typewriter keyboard
Editing keypad
Auxiliary keypad

To raise the keyboard to a comfortable angle, you can insert two plastic feet in the rear bottom corners.

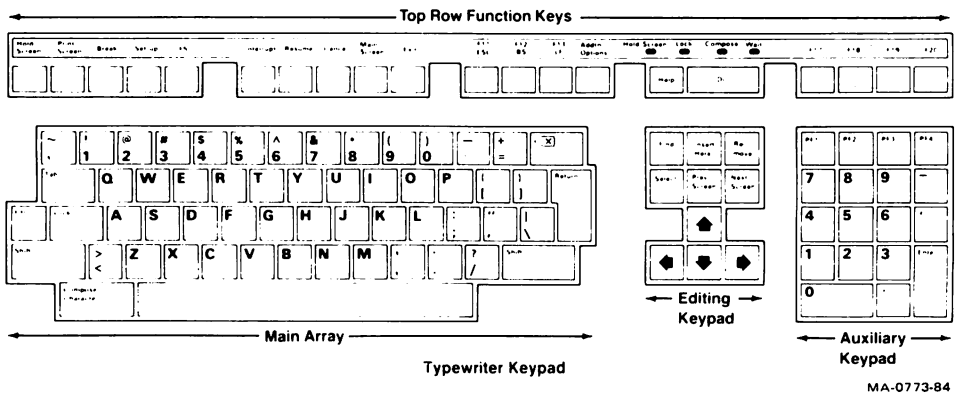



**Figure 1-2 Keyboard**

## VIDEO MONITOR

The monitor can display up to 24 lines of data, with each line containing either 80 or 132 characters. It can also display graphics, with a maximum resolution of 960 pixels by 240 lines. (A pixel is equal to a dot on the monitor screen.) This resolution allows the system to generate very detailed graphics. The monitor has a tilt mechanism and an antiglare screen. A bottle of screen cleaner (PN 49-01607-01) comes with the monitor.

## SYSTEM UNIT

The processor in the system unit is the F11 microprocessor, part of Digital Equipment Corporation's PDP-11 family of minicomputers. The processor includes the floating point processor for precision mathematics. It provides single- and double-precision floating point capability as well as floating-to-integer and integer-to-floating conversion.

The system unit comes with 512 Kbytes of memory.

The basic system unit also contains a dual diskette drive that allows you to work with two diskettes. Each diskette can store up to 400 Kbytes.

The power supply in the system unit provides all of the power for the system unit, keyboard, monochrome monitor, and any additional equipment connected to the system.

## DISKETTES

The Professional system is shipped with the following diskettes.

Maintenance application diskette
Maintenance application diskette #2
P/OS diskette

Use only diskettes certified by Digital in your Professional system.

## PUBLICATIONS

The following publications are shipped with the Professional system.

Installation instructions
Owner's manual

## ADDITIONAL EQUIPMENT

The Professional 350 can accept three additional options. The Professional 380 can accept six additional options. All the options, including the hard disk drive (Professional 350 and 380 only), require an option slot.

### Hard Disk Drive

Digital offers three hard disk drives: 5, 10, and 32 Mbyte. These drives store programs and data for fast access. You can use them on the Professional 350 and the Professional 380.

### Extended Bit Map

The extended bit map adds two bit map planes to the basic system's graphics. Each plane supports 960 pixels by 240 lines. This addition also gives you a color map. The color map allows you to display up to eight colors simultaneously from a range of 256 colors. If you are using a monochrome monitor, the extended bit map allows you to display eight shades of grey. The extended bit map includes the color monitor cable (BCC03) to connect a color monitor.

### Memory Module

The memory module provides an additional 256 Kbytes of memory for the processor. This allows the processor to perform certain operations more efficiently.

### Real-Time Interface Module

The real-time interface module lets you use your Professional computer to monitor and control laboratory processes and instruments. It has two RS-232-C/423s, a IEEE-488, and a 24-bit bidirectional parallel input/output (I/O) connector.

### Telephone Management System

The telephone management system (TMS) permits voice and data communication with automatic answer and automatic dial features over standard telephone lines. It has a built-in 300/1200 baud modem (*mo*dulator-*demo*dulator) for data communication. Programs using special circuits in the TMS can store voice messages in your Professional computer's memory. You can play back these voice messages over a telephone line or the optional voice unit. You can also use the built-in speaker and microphone in the voice unit for hands-free telephone operation.

### Back-Up Battery for Clock

Your Professional computer has a time and date clock that some applications programs use. When you first install the computer, leave it on for 48 hours so the battery charges fully. If you leave the computer powered off for 10 days or more, remember to turn it on for 48 hours to charge the battery fully.

### DECNA

The Digital ethernet CTI BUS network adapter, or DECNA, is the Ethernet communication controller for your Professional computer. With PRO/DECnet or other network software that uses Ethernet, DECNA allows allows your computer to exchange data with other computers and workstations. It comes with a 5-meter (15-foot) transceiver cable to connect to your network.

### DELNI

The Digital ethernet local network interconnect (DELNI) allows up to eight Professional computers with DECNAs and workstations to be grouped together or with other Ethernet devices in local area networks (LAN). This permits the LAN to connect to a wider based Ethernet network. The DELNI has a transfer rate of 10 MBytes per second.

### Mini-Exchange

This option is a communication switch that uses commands from your computer, or appropiate communication software, to connect a total of eight personal computers, printers, or a modem. The Mini-Exchange allows these devices to share each other's capabilities as well as communicate with each other.

### The PRO/Cluster Concept

Clusters are made up of two or more Professional computers running identical operating systems. They are connected by a high-speed bus with one or more mass storage servers and communication links to the user community. These workstations require the DECNA option to make the cluster work.

### Professional 350-I

The Professional 350-I is IVIS, the interactive video and information system. It uses a special videodisc to combine computer-based instructions with audiovisual presentations. It also uses computer-generated text and high-resolution graphics.

### Floor Stand

The system unit mounts vertically in this stand so you can place the system unit next to your desk, rather than on it.

### Color Monitor

The color monitor is a 13-inch monitor for displaying data and color graphic information. It has a high resolution (0.31 mm) and a 240-mm by 150-mm viewing area. The color monitor also has RS-170 compatible RGB input. Its raster scan design complements the extended bit map module for your professional computer.

### Printers

The LA50, LA100-PC, and LQP02 printers are designed to work with the Professional systems. The LA50 and LA100-PC printers are dot matrix printers. The LQP02 is a letter quality printer. To connect a printer to your Professional computer, use the BCC05 cable supplied with your Professional computer.

## OPERATING SYSTEMS

Digital offers seven operating systems for your Professional 380.

### CP/M

The CP/M module lets you use applications programs written for the CP/M-80 operating system. The module has its own Z80 processor and 64 Kbytes of memory. This option requires an option slot in the card cage.

### P/OS

The Professional operating system (P/OS), based on the RSX-11M-PLUS operating system, supports multitasking and DECnet in a single-user system. Its menu system makes P/OS easy to use.

### RS/1

This real-time operating system is on overlay. RS/1 is used extensively for fast mathematic processes commonly found in scientific and engineering environments. Its utilities collectively support data management with high resolution graphics.

### RT-11

RT-11 is a single-user, multitasking, real-time operating system for the PDP-11 series computers. It is fast, efficient, small in block size, and is useful in business, commercial, and scientific environments.

### UCSD P-System

The P-System is a portable environment for developing and executing applications software. It offers a wide choice of programs already written.

### VENIX

This version of the UNIX operating system provides you with the tools for applications development. It has special programs for graphic displays in a multiuser, multitasking environment.

## ADDITIONAL PUBLICATIONS

| | |
|---|---|
| User's Guide for Hard Disk System | AA-N603B-TH |
| User's Guide for Diskette System | AA-U708B-TH |
| For Beginners: Hard Disk System | AA-N604B-TH |
| For Beginners: Diskette System | AA-U707B-TH |
| Reference Card: Hard Disk System | AV-P389C-TH |
| Reference Card: Diskette System | AV-U709B-TH |
| PRO/BASIC Language Manual | AA-N601B-TH |
| PRO/BASIC Reference Card | AV-U706A-TH |
| PRO/DCL User's Guide | AA-Z252B-TH |
| PRO/Application Starter Kit | AA-Z041B-TH |
| PRO/DECnet User's Guide | AA-V446A-TH |
| The Application Starter Kit User's Guide | AA-AG84A-TH |
| PRO/Datatrieve Handbook | AA-Y440A-TH |
| PRO/RT-11 System User's Guide | AA-5279C-TC |
| PRO/Communications Manual | AA-N602B-TH |
| Professional Host Communications Installation Procedures | AA-P412C-TK |

| | |
|---|---|
| Terminal Subsystem Manual | AA-N623B-TK |
| PRO/DECnet User Guide | AA-V445A-TH |
| Introduction to Local Area Networks | EB-22714-18 |
| Ethernet Installation Guide | EK-ETHER-IN |
| CTI BUS Technical Manual | EK-00CTI-TM |
| CP/M-80 User Guide Diskette System | AA-AH32A-TH |
| RS/1 Data management System | QA497-C3 |
| PRO/Videotex | QA497-C3 |
| PRO/NAPLPS | QBA24-A3 |
| PRO/Office Workstation | QBA64-A3 |
| PRO/DECnet V1.0 | QBA44-H3 |

# Chapter 2

# Setting Up the System

This chapter tells you what environment is best for your Professional system.

## SPACE

Figure 2-1 shows the dimensions of the Professional 300 series system.

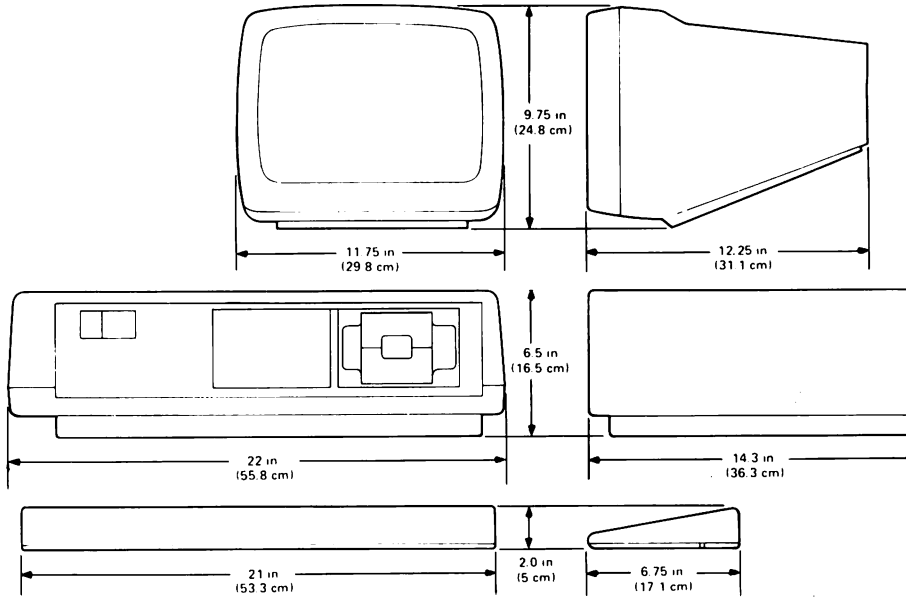



**Figure 2-1 System Dimensions**

When setting up your Professional system, be sure to follow these rules.

- Allow 6 inches on all sides of the unit for adequate airflow.
- Keep the ventilation slots clear.
- Allow room to place any peripheral devices near the system. The cables between the system and a peripheral device, a printer, for example, are usually 6 feet long.
- Place all cables away from traffic areas.

## LIGHTING

The nonglare screens of the Professional video monitors reduce the amount of light reflecting to the operator. Place the system unit and video monitor out of any direct sun to minimize heat and glare.

## POWER

Your Professional system and its equipment needs only normal commercial power. The following list summarizes the system's power requirements.

### Requirements

| | |
|---|---|
| Input voltage | 90 to 128 Vac (115)<br>174 to 256 Vac (220) |
| Line frequency | 47 to 63 Hz |
| Power dissipation | 320 W (maximum) |

Try to use a separate power source for your Professional system. If other devices must use the same branch circuit, avoid those that can cause the voltage to fluctuate, for example, copiers and typewriters.

### Power Cords

Power cords for other voltages are available for your Professional system. See your salesperson for advice on the correct power cord for your system.

## TEMPERATURE

Your Professional system can operate within the following temperature and humidity ranges.

| | |
|---|---|
| Temperature | 10° to 40°C (50° to 104°F) |
| Humidity | 20% to 80% relative humidity<br>Maximum wet bulb of 25°C<br>Minimum dew point of 2°C |

When you install your Professional system, keep it away from direct sunlight, heat registers, and air conditioning vents.

## STORAGE

You need storage space for supplies and diskettes. Keep your diskettes in dust-proof containers, away from magnetic fields that might damage the information stored on them. For security, store backup media away from your work area.

## CABLES AND CONNECTORS

To attach a printer to your Professional computer, connect a BCC05 cable from the PR1 connector on the rear panel. This cable comes with your Professional computer (Figure 2-2).

To attach a color monitor to your Professional computer connect a BCC03 cable from the VIDEO1 connector on the rear panel. This cable comes with the extended bit map module.

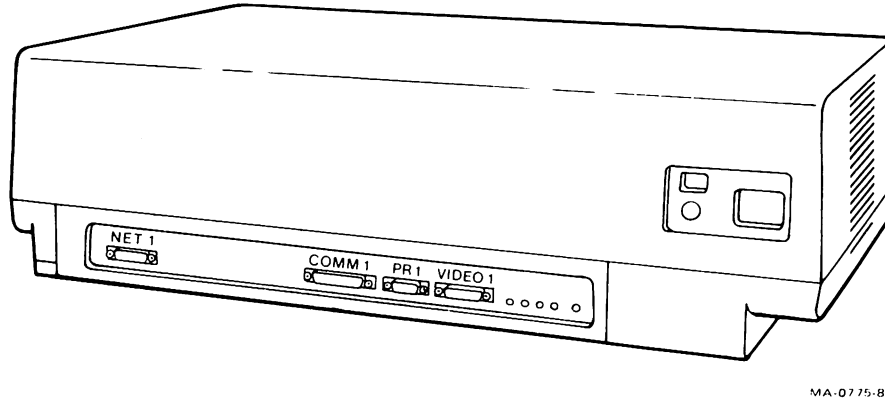



**Figure 2-2 Rear View of Professional Showing Connectors**

# Chapter 3

# System Controls and Indicators

Each of the three main components of the Professional 300 series has a few simple controls and indicators that help in operating the system. The controls and indicators for each system component are described in this chapter as follows.

System unit controls and lights
Video monitor controls
Keyboard controls, lights, and sounds

## SYSTEM UNIT CONTROLS

The system unit has three controls.

System power switch
Voltage selection switch
System circuit breaker

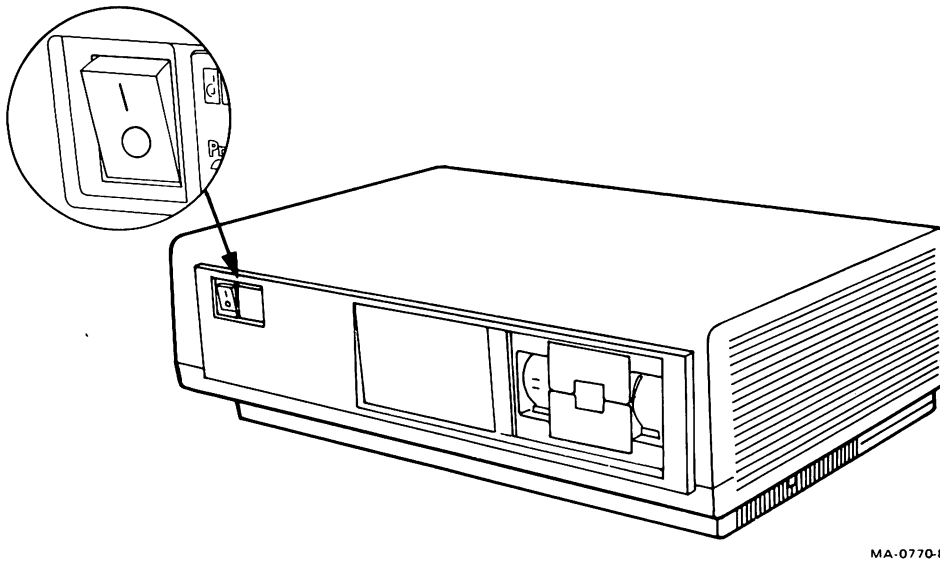



**Figure 3-1 System Power Switch**

## System Power Switch

The system power switch is on the front of the system unit (Figure 3-1). This switch controls the internal power for the whole system. To turn the system on, push on the side of the switch marked 1. To turn the system off, push on the side of the switch marked 0.

## Voltage Selection Switch

The voltage selection switch is on the back of the system unit (Figure 3-2). This switch matches the system's voltage requirements to the voltage available in the wall outlet.

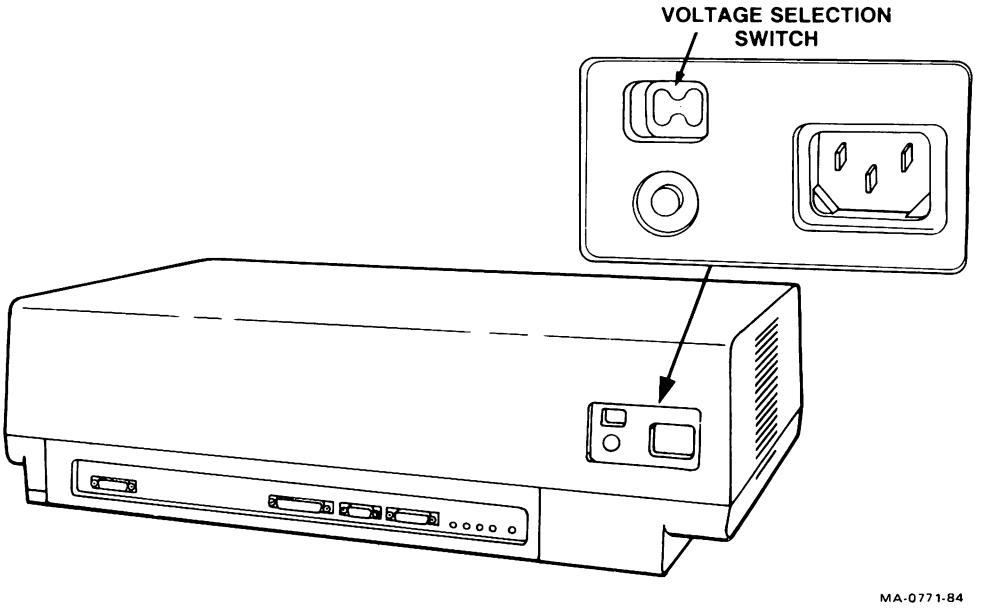



**Figure 3-2 Voltage Selection Switch**

The voltage selection switch is a slide switch. When the number 115 shows, the system is set for 115 volts ac. This voltage is in wall outlets throughout most of the United States and Canada.

When the number 220 shows, the system is set for 220 volts ac. This voltage is used in most of Europe and areas outside the United States and Canada.

## System Circuit Breaker

The system circuit breaker is on the back of the system unit near the ac power cord receptacle and the voltage selection switch (Figure 3-3). The system circuit breaker acts like a fuse to protect the system from electrical damage.

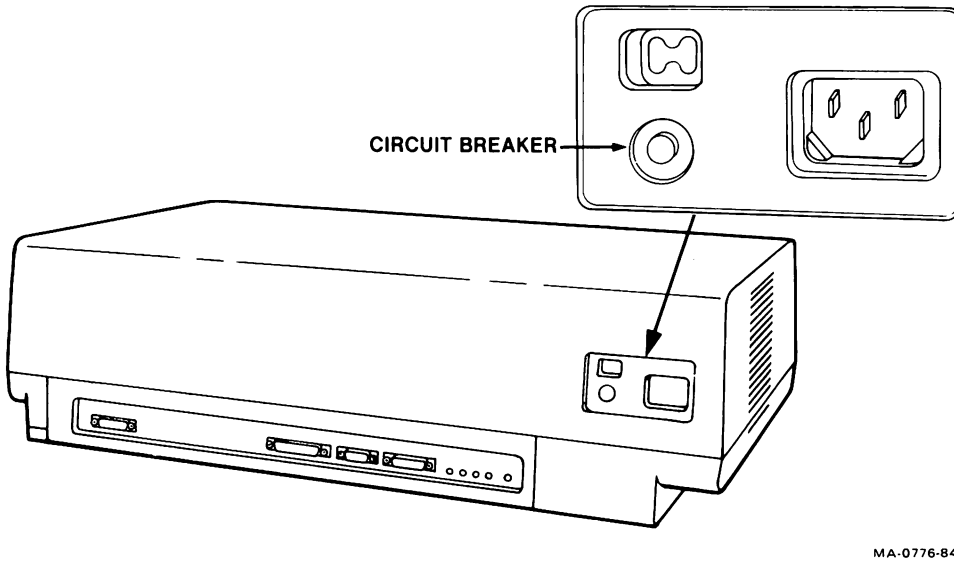



**Figure 3-3 System Circuit Breaker**

If an electrical fault or short circuit occurs, the circuit breaker trips. To reset the circuit breaker, turn the power off, push in the circuit breaker button, then turn the power on.

> **CAUTION:** If the circuit breaker trips after being reset, unplug the system from the wall outlet and contact a service technician. Do not operate the system.

## SYSTEM UNIT LIGHTS

The system unit has indicators, or lights, on the front and back. The diskette drive active group, on the front of the system unit, is next to the diskette drive doors. These lights turn on whenever drives are reading or writing data. Figure 3-4 shows the location of the lights.

> **CAUTION:** Do not open a diskette drive door when a diskette light is on; you may lose some or all of your data. This is especially important if the drive was writing on that diskette when you opened the door.

The set of lights on the back of the system unit is located to the right of the connectors. This group of lights consists of four red lights and one green light (Figure 3-5).

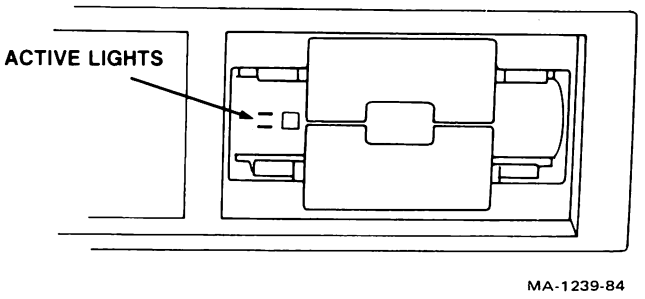



**Figure 3-4 Diskette Drive Active Lights**

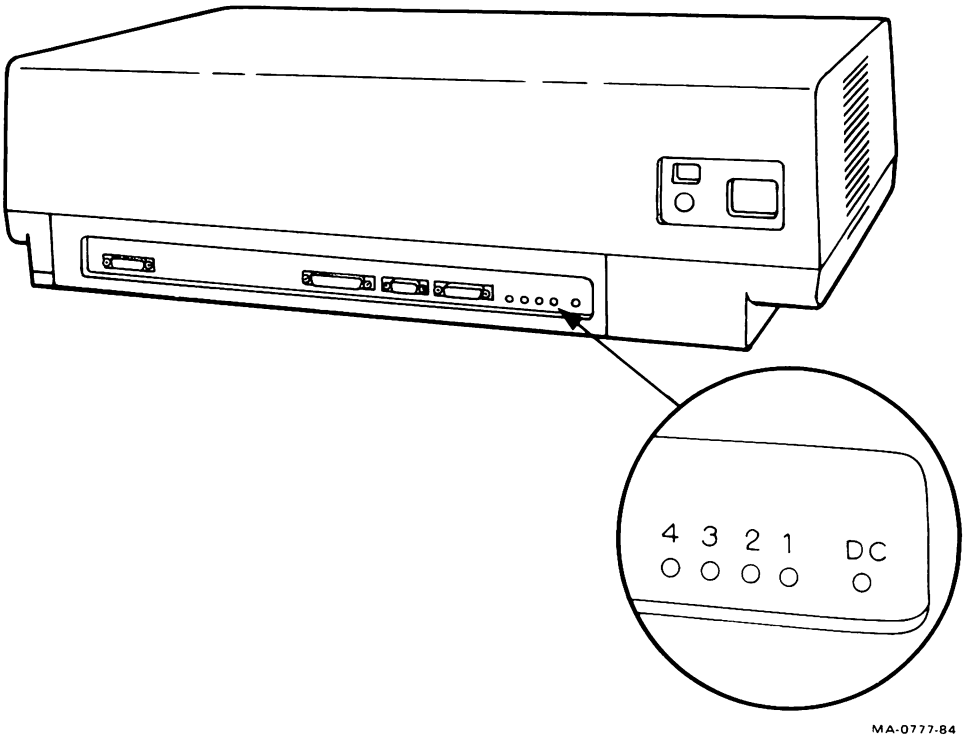



**Figure 3-5 System Unit Lights**

### Lights 1, 2, 3, and 4

Lights 1, 2, 3, and 4 monitor the system's internal test that runs whenever you turn on the system power switch. (Chapter 4 describes this test.) When you turn on the power switch, these lights all turn on and then off. At the end of the test, all four of the red lights should be off.

If any of the lights stay on, the test has found a problem. Chapter 4 outlines the steps you should follow in this case.

### DC Light

The DC light (green) monitors the power inside the Professional system. If this light fails to turn on when the power switch is on, the Professional system will not run. Chapter 4 outlines the steps you should follow in this case.

## VIDEO MONITOR CONTROLS

The video monitor has three controls (Figure 3-6).

Brightness
Contrast
Tilt button

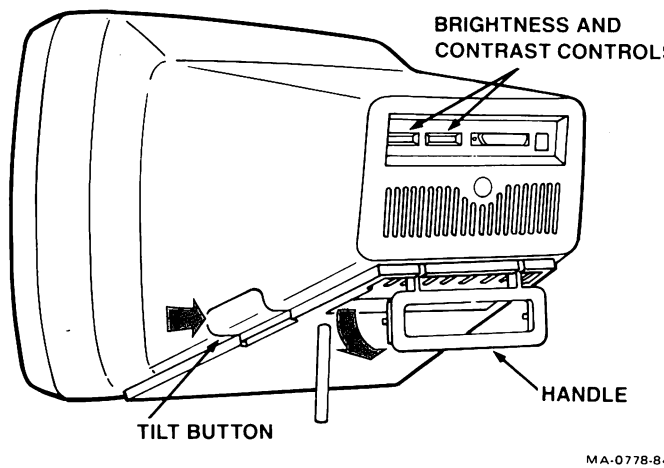



**Figure 3-6 Rear View of Black and White Monitor**

### Brightness

The monitor brightness knob is on the back of the video monitor. Turning the knob clockwise increases the brightness.

### Contrast

The monitor contrast knob is on the back of the video monitor, next to the brightness control. If the control is not adjusted correctly, the characters on the screen blend in with the screen background. Turning the knob clockwise increases the contrast.

Use the brightness and contrast controls together to get the best possible screen presentation.

### Tilt Button

The tilt button allows you to adjust the angle of the video monitor.

> **NOTE:** The top margin of the video monitor appears to be larger than the bottom margin. This feature provides a more comfortable viewing angle.

To use the tilt button, follow these steps.

1. With the monitor screen facing you, place your hands on each side of the monitor.
2. Using your right hand, push the tilt button on the bottom center. A small leg will extend from the bottom of the monitor. Lift the back of the monitor until the angle is correct for you.
3. Release the button.

### Carrying Handle

The bottom of the monitor has a folding handle that can be used for carrying the monitor (Figure 3-6). The handle latches in place while the monitor is in use.

## KEYBOARD CONTROLS

The main keypad has a key arrangement and sculpturing similar to a typewriter's. The auxiliary or numeric keypad, on the right side of the keyboard, is arranged like a calculator. The editing keypad, between the main and auxiliary keypads, groups many of the most commonly used editing keys for easy use.

Along the top of the keyboard is a row of 20 keys. Two of these keys (**Help** and **Do**) are marked, while the remaining keys are blank. These blank keys are the special function keys. The exact function of each key is determined by the program running in your system.

### Legend Strip Storage

The legend strip that comes with your Professional computer defines the functions of each special key. The hinged, plastic window above the special keys opens to allow you to place the legend strip behind it. You can also store other legend strips in this compartment.

You can easily make your own legend strip. The function of each special key is described in the user guide shipped with the system software.

## KEYBOARD LIGHTS

The keyboard has four lights just above the **Help** and **Do** keys (Figure 3-7).

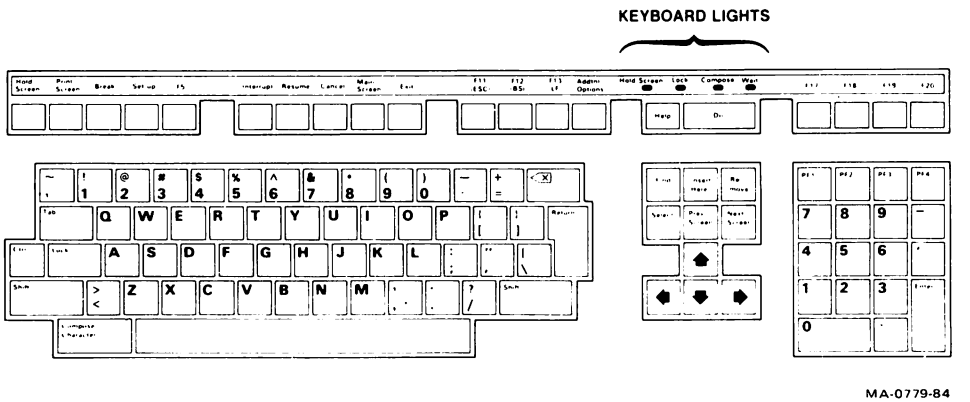



**Figure 3-7 Keyboard Lights**

The lights are there to help you monitor what is happening with the keyboard and system. The four lights, Hold Screen, Lock, Compose, and Wait, turn on when you press a specific key, stop the data on the monitor screen, or lock the keyboard. Your user guide contains more information about these lights.

## KEYBOARD SOUNDS

The keyboard generates a click whenever you press a key, and a tone whenever the system wants to get your attention. When you hear the tone, look at the screen for instructions on what you need to do.

# Chapter 4

# What to Do If You Have Problems

Every Professional system contains a complete set of hardware self-test programs that check all of the major system functions. If a problem is found, the self-test program identifies the problem.

The first part of this chapter outlines the steps you should follow to test your Professional system. This section also gives you all of the test results and what they mean.

The second part of this chapter contains a simple troubleshooting chart that lists common problems that may occur and the steps you take to correct them.

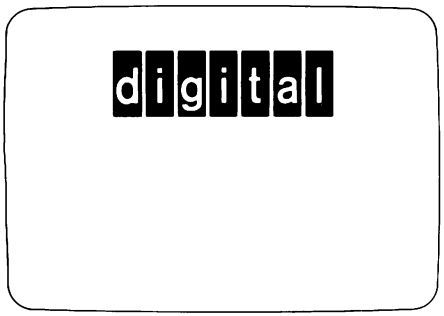
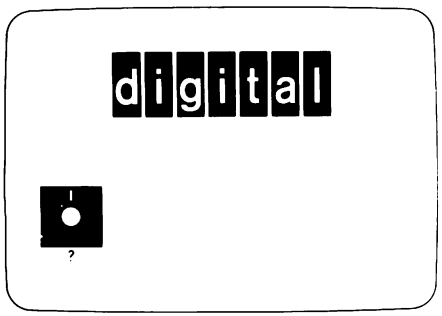
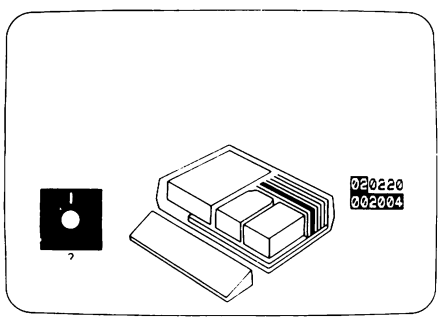
## PART 1 — TESTS AND TEST RESULTS

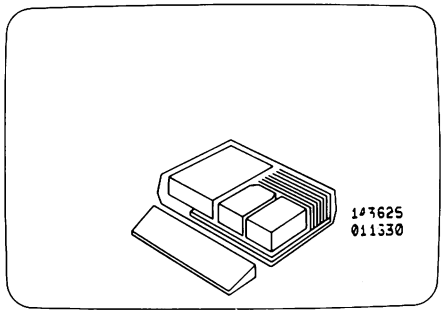
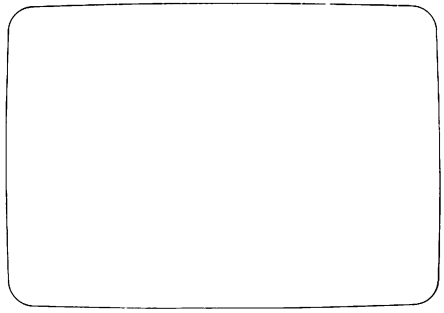
### INTERNAL SELF-TESTS

The internal self-test program runs every time you turn on the Professional system's power switch. The test is completely automatic. You do not need to type any commands or select any programs.

#### Test Messages

The results of the power-up self-test are displayed on the screen in graphic form.

| *Graphic Message* | *Meaning/Advice* |
|---|---|
|  | The system is functioning correctly. |
|  | The system is functioning correctly, but there is no software diskette in the diskette drives or the hard disk is not operating correctly (Professional 350 only). The diskette picture should disappear as soon as you put a self-starting software diskette in the drive. |
|  | The power-up self-test found a problem, but the problem does not affect the entire system. You may have limited use of your system. (See Table 4-2 for instructions.)<br><br>Insert a self-starting software diskette into one of the diskette drives. If the system erases the diskette picture, you may have limited use of your system. (See Table 4-2 for instructions.) |

| *Graphic Message* | *Meaning/Advice* |
|---|---|
|  | The system is functioning correctly, but an error was found in the system software program.<br><br>Restart the system by turning the system power off and then on. If the problem continues, try a different diskette. The diskette that you have may be worn out. |
|  | This does not necessarily indicate a problem with the system. Check and adjust the video monitor controls, and check the cable connection between the video monitor and the system unit.<br><br>If the problem continues, you may have a system problem. (See Table 4-1 for instructions.) |

## Backup Test Messages

In addition to the graphic messages, the system self-test also turns on and off the four red lights on the back of the system unit. Table 4-1 will help you interpret the on/off combinations that form a code to tell you of any problem the self-test found.

> **NOTE:** Be sure the green light is on. If the fan is running and the green light is on, continue with the light codes. If the green light is off, see Table 4-2 for instructions.

The maintenance application diskette contains six programs that run from the diskette.

**Table 4-1 Light Codes**

| *Lights* 4 | 3 | 2 | 1 | *Message/Advice* |
|---|---|---|---|---|
| o | o | o | o | The system is working. |
| ● | o | ● | ● | The video monitor is not present. Make sure the video cable is not broken. Check the cable connections at the video monitor and system unit ends. (The straight connector should connect to the system unit.) |
| ● | o | o | ● | The keyboard has failed. Make sure the keyboard cable is not broken. Check the cable connections at the keyboard and video monitor ends. Check the video cable connections at the video monitor and system unit ends. |
| ● | o | ● | o | The system did not load the program. Check the program diskette. Is the diskette the correct one? Is the diskette inserted correctly in the drive? |
| ● | ● | ● | o | The system memory has failed. Restart the system by turning the system power switch off and then on. If the error remains, call a service technician. |
| ● | ● | o | ● | |
| ● | ● | o | o | |
| o | o | o | ● | The module in slot 1 of the system unit has failed. (See Table 4-2 for instructions.) |
| o | o | ● | o | The module in slot 2 of the system unit has failed. (See Table 4-2 for instructions.) |
| o | o | ● | ● | The module in slot 3 of the system unit has failed. (See Table 4-2 for instructions.) |
| o | ● | o | o | The module in slot 4 of the system unit has failed. (See Table 4-2 for instructions.) |
| o | ● | o | ● | The module in slot 5 of the system unit has failed. (See Table 4-2 for instructions.) |
| o | ● | ● | o | The module in slot 6 of the system unit has failed. (See Table 4-2 for instructions.) |
| ● | ● | ● | ● | The system has failed. Check any connections to a printer, communication modem, or any other device. Restart the system by turning the system power switch off and then on. If the error remains, check connected devices, or call your service technician. |
| o | ● | ● | ● | |
| ● | o | o | o | |

o means the light is off.
● means the light is on.

## MAINTENANCE APPLICATION TEST PROGRAMS

This section describes how to use the maintenance application on the diskette-based system. The maintenance application diskette, shipped with your Professional system, contains eight programs.

System unit test
Keyboard keys test
Printer test
Configuration display
Bar pattern display
Update maintenance services
Bigdisk block check
Minidisk block check

To use the maintenance application programs, follow these steps.

1. Place the P/OS diskette in drive 1 and close the diskette drive door.
2. Turn system power off and then on.
3. Follow the instructions that appear on the monitor:
   a. Remove the P/OS diskette.
   b. Place the maintenance application diskette in drive 1 and close the diskette drive door.
   c. Place maintenance application diskette #2 in drive 2 and close the diskette drive door.
   d. Press **Resume** on the keyboard.
4. Select the test you want to run.

Additional information about the maintenance services and each test program is available. Press the **Help** key on your keyboard after you select maintenance services from the main menu or after you select a test program.

### System Unit Test

The system unit test is a general test for all the system components. The test checks the following components.

- The electronic circuits that read and write data from the diskette drives
- The electronic circuits that read and write data on the hard disk drive (Professional 350 only)
- The system's printer connector circuits (This test does not send data to the printer.)
- The electronic circuits that make up the floating point processor.
- The system's communication connector (comm1) circuits (This test does not send data to or receive data from the communication device.)
- Most optional equipment that is connected inside the system unit

To use the system unit test program, follow these steps.

1. Select the system unit test.
2. Press the **Do** key.
3. Wait for about 2-1/2 minutes while the system runs the test.
4. Press the **Main Screen** key to return to the main menu.

While the test runs, the following message is on the monitor screen.

```
SYSTEM UNIT UNDER TEST
```

A number appears below the message. As the test runs, the number counts down to 0. In the upper-left corner, the word `working` flashes.

### System Unit Test Results

If the system unit test detects an error, the test places a system unit test summary on the screen. Press the **Help** key for more information.

### Keyboard Keys Test

With the keyboard keys test, you check each key on the keyboard to make sure all the keys are working correctly.

To use the keyboard keys test, follow these steps.

1. Select the keyboard keys test.
2. Press the **Do** key.
3. Wait about 5 seconds for the keyboard diagram to appear on the screen.
4. Press each key on the keyboard at least twice. The first time you press a key, the corresponding key on the keyboard diagram should be highlighted. The second time you press the key, it will no longer be highlighted.
5. Press the **Exit** key five times to end the test.

### Keyboard Keys Test Results

If a key fails to produce the results described in step 4 above, contact your service technician.

### Printer Test

The printer test sends data to the printer connected to the system. Use this test if you have trouble sending data to the printer. Before using the test, however, check that the power is turned on, the printer cable is securely connected at both ends and is not damaged, and the controls are set correctly. You can find information about the printer controls in the manual that comes with your printer. Remember that some of the controls may be inside the printer. The Professional users guides contain instructions on how to set the Professional system to work with the printer.

To use the printer test, follow these steps.

1. Select the printer test.
2. Press the **Do** key.
3. Wait for about 15 seconds for the test to print a short pattern on the printer and the screen. The pattern is less than one page long.

### Printer Test Results

The pattern on the screen and the pattern printed by the printer should be the same. If the printer does not print the same pattern or does not print at all, check the cables and printer switch settings. If the printer still does not print the same pattern or does not print, contact your service technician.

### Configuration Display

The configuration display tells you all of the components that are connected to the system. Use the configuration display to determine what modules are connected to the system and the system identification (ID) number.

To use the configuration display, follow these steps.

1. Select the configuration display.
2. Press the **Do** key.
3. Wait for information to appear on the screen. This step takes about 5 seconds.

The following example is a typical display of what you will see when you run this test.

```
Identification number:  000000155069

System Module:

Keyboard interface              Processor - F11
Communications interface        Memory management
Printer interface               Floating point adapter
Clock

512 kilobytes of memory

Option slot 1:  Hard disk 10 megabyte
Option slot 2:  Diskette controller
Option slot 3:  Video controller
Option slot 4:  Extended bit map controller
Option slot 5:  Memory 256 kilobytes
Option slot 6:  EMPTY

Keyboard:  LK201
```

The `Identification number` is the system identification number programmed into the system.

Below `System Module` is a list of all the standard and extra equipment connected to the module. In this case, the Professional system has the standard printer, communication and keyboard interfaces, processor, memory management, and clock. The floating point processor and 512 kilobytes of memory are also connected.

The name of the options in the option slots are displayed. If a number appears next to the option slot, that is the identification code (printed on the handle) of the option. You must use the update maintenance services program from the maintenance services menu to include the name of the option.

`Keyboard` shows the type of keyboard connected to the system.

### Configuration Display Results

The configuration display highlights the system components that did not pass the power-up self-test. If you see any highlights on the display, run the system unit test to verify the problem. If a problem exists, contact your service technician.

### Bar Pattern Display

The bar pattern display is a bar pattern on your screen. Use this display to adjust the operator controls. It works with monochrome and color monitors.

> **NOTE:** The extended bit map module must be installed before you can run the program.

The bar pattern is made up of eight bars. Each bar is a different color or shade of gray. The bars are (from left to right on the screen) as follows.

Black (dark) Blue Red Magenta Green Cyan Yellow White

To use the bar pattern display, follow these steps.

1. Select the bar pattern display.
2. Press the **Do** key.
3. Press the **Resume** key to return to the maintenance service menu when you are finished.

### Update Maintenance Services

Most Professional series options are shipped with a diskette containing test programs. Update maintenance services installs option test programs into the system unit test. This way new options are tested each time you run the system unit test, and the configuration display recognizes the new component.

To use the update maintenance services, follow these steps.

1. Select the update maintenance services.
2. Press the **Do** key.
3. Follow the instructions that appear on the screen. These will guide you through the procedure one step at a time.

After you update the maintenance services, select the system unit test to check the new option. The configuration display shows you the name of the options in their slots.

### Bigdisk Block Check

This routine reads each block on the hard disk to determine if new bad blocks are present and are not logged in the operating system's bad block file.

To use the bigdisk block check, follow these steps.

1. Select `Bigdisk block check`.
2. Press the **Do** key.
3. The words `Bigdisk Block Check` appear in the center of the screen with a number that counts down to zero.
4. Follow the instructions that appear at the end of the test. Press **Help** for more information.

**NOTE:** The bigdisk block check routine runs only on hard disks with P/OS installed.

### Minidisk Block Check

This routine reads each block on a P/OS initialized diskette to determine if new bad blocks are present and are not logged in the diskette's bad block file.

To use the minidisk block check, follow these steps.

1. Select `Minidisk Block Check`.
2. Press the **Do** key.
3. Follow the intructions that appear on the screen.

**NOTE:** The minidisk block check routine runs only on P/OS initialized diskettes.

# PART 2 — TROUBLESHOOTING

## CORRECTING SIMPLE PROBLEMS

This section tells you how to correct simple problems without making a service call.

The information is organized by symptoms. To use this section, follow these steps.

1. Determine what the system is or is not doing.
2. Match that symptom with one in the symptom column of Table 4-2.
3. Check the conditions listed in the second column.
4. Follow the advice given in the third column.

**WARNING:** Do not operate your Professional computer with the system unit cover removed.

**Table 4-2 Correcting Simple Problems**

| *Symptom* | *Conditions* | *Corrective Action* |
|---|---|---|
| Nothing happens when the power switch is turned on. | The power cord is not connected to the system or wall outlet. | Reconnect the power cord to the system and the wall outlet. |
| | The circuit breaker has tripped. | Reset the circuit breaker by turning the power off, pushing in the circuit breaker (Figure 3-3), and turning the power on. |
| | No power is in the wall outlet. | Check the power by plugging a light into the outlet. Call an electrician if there is no power. |
| Nothing appears to happen when the power switch is turned on, but the fan is running. | The green light on the back of the system unit is off. | Check the power cable on the back of the system module. If the problem remains, contact a service technician. |
| | The green light on the back of the system unit is on, and the four red lights are off. | Check the monitor cable connections and adjust the monitor controls. |
| | The green light on the back of the system unit is on and the four red lights are not all off. (See Table 4-1). | Contact a service technician. |
| A picture of the system appears on the screen. | The numbers 00 are the first two numbers of the top line next to the picture. The system module is highlighted. The system module is not working correctly. | Check all cables and connectors on the system module. If the problem remains, contact a service technician. |
| | The numbers 01 are the first two numbers of the top line next to the picture. The module installed in slot 1 of the system is not working correctly. | Check all cables and connectors on the module. With the power off, reseat the module in the indicated slot. Turn the power on again. If the problem remains, contact a service technician. |
| | The numbers 02 are the first two numbers of the top line next to the picture. The module installed in slot 2 of the system is not working correctly. | Check all cables and connectors on the module. With the power off, reseat the module in the indicated slot. Turn the power on again. If the problem remains, contact a service technician. |

**Table 4-2 Correcting Simple Problems (Cont)**

| *Symptom* | *Conditions* | *Corrective Action* |
|---|---|---|
| A picture of the system appears on the screen. | The numbers 03 are the first two numbers of the top line next to the picture. The module installed in slot 3 of the system is not working correctly. | Check all cables and connectors on the module. With the power off, reseat the module in the indicated slot. Turn the power on again. If the problem remains, contact a service technician. |
| | The numbers 04 are the first two numbers of the top line next to the picture. The module installed in slot 4 of the system is not working correctly. | Check all cables and connectors on the module. With the power off, reseat the module in the indicated slot. Turn the power on again. If the problem remains, contact a service technician. |
| | The numbers 05 are the first two numbers of the top line next to the picture. The module installed in slot 5 of the system is not working correctly. | Check all cables and connectors on the module. With the power off, reseat the module in the indicated slot. Turn the power on again. If the problem remains contact a service technician. |
| | The numbers 06 are the first two numbers of the top line next to the picture. The module installed in slot 6 of the system is not working correctly. | Check all cables and connectors on the module. With the power off, reseat the module in the indicated slot. Turn the power on again. If the problem remains, contact a service technician. |
| | The numbers 11 are the first two numbers of the top line next to the picture. The keyboard is highlighted. The keyboard is not working correctly. | Check all cables and connectors on the keyboard and monitor to the system unit. If the problem remains, contact a service technician. |
| | No numbers are next to the picture because the system cannot read the system program into memory. | Run the system unit test on the maintenance application diskette. (See Chapter 4.)<br>Try a different copy of the program diskette. |
| | A picture of a diskette is on the screen next to the picture. | Put a self-starting diskette into the drive. |
| A picture of a diskette is on the screen under the word DIGITAL. | | Put a self-starting diskette into the drive. |

**Table 4-2 Correcting Simple Problems (Cont)**

| *Symptom* | *Conditions* | *Corrective Action* |
|---|---|---|
| The keyboard or some of the keyboard keys do not work. | | Check the cables between the keyboard and video monitor. |
| | | Run the keyboard keys test on the maintenance application diskette (Chapter 4). If the test fails, contact a service technician. |
| The printer does not print. | The cable between the printer and the system unit is not connected. | Reconnect the cable. |
| | The printer controls are not set correctly. | Reset the controls. |
| | | Run any diagnostic programs contained in the printer. See the printer manuals for more information. |
| | | Run the printer test on the maintenance application diskette (Chapter 4). If the test fails, contact a service technician. |
| The communication line is not working. | The cable between the system unit and the communication device is not connected. | Reconnect the cable. |
| | The communication feature settings are not the same as the settings at the other device. | Reset the settings. |
| | | Run the system unit test on the maintenance application diskette (Chapter 4). If the test fails, contact a service technician. |
| The system has trouble reading diskettes. | The diskette is not the correct one to use with the system. | Use a diskette certified by Digital. |
| | The diskette is worn out. | Try a new diskette. |
| | | Run the minidisk block check on the maintenance application diskette (Chapter 4). If the test fails, replace or reinitialize the diskette. |
| | | Run the system unit test on the maintenance application diskette. If the test fails, contact a service technician. |

# Chapter 5

# How to Get Your Professional System Repaired

The first part of this chapter describes the steps you should take before you call one of the telephone numbers listed on the following page. The second part describes the repair and support services available through contractual agreements.

## PART 1 — HOW TO GET SERVICE

Digital has a central service point in your area to help you get your system running with a minimum of trouble.

### BEFORE YOU PHONE

- Step through Chapter 4 of this book. Quite often you can solve a problem yourself.
- Write down the serial number of your Professional system. The serial number is on the rear of the system unit, next to the power cord.
- Summarize the problem. Make a note of what you were doing when the system failed. Also note if any lights are turned on or off, or if you heard any new sounds just before or after the system failed.

## WHEN YOU PHONE

- Be near the system.
- Have all your materials available. The service person may ask you to try and recreate the problem. To do this, use the same diskettes that you were using when the problem occurred.

Call Digital at one of the following telephone numbers.

| | | | |
|---|---|---|---|
| Australia | (02) 4125555 | Japan | (03) 989-7161 |
| Austria | (222) 6776410 | New Zealand | (09) 595-914 |
| Belgium | (02) 2425095 | Norway | (2) 160290 |
| Canada | (800) 267-5251 | Portugal | (1) 725402 |
| Denmark | (2) 889666 | Spain | (1) 7331900 |
| Finland | (0) 423511 | Sweden | (8) 7338000 |
| France | (6) 0778292 | Switzerland | (01) 8169111 |
| Holland | (30) 640293 | United Kingdom | (734) 868711 |
| Ireland | (1) 308433 | United States | (800) 554-3333 |
| Italy | (02) 617961 | West Germany | (089) 95910 |

## REPACKING THE SYSTEM

If you have to return the system to Digital for service, you must repack the diskette drive with the shipping card that was in the diskette drive when you received the system. To do this, follow these steps.

1. Open the diskette drive doors.
2. Turn the system power on for 5 seconds, then turn power off.
3. Insert the shipping card into one of the diskette drives. Do not force the card in. If the card does not go in all the way, repeat steps 1 and 2.
4. Close the diskette drive doors.
5. Disconnect the system and repack it.

Remove the hard disk, if you have one, for shipping separately.

# PART 2 — DIGITAL'S SERVICES

Digital provides a wide range of maintenance and customer services for the Professional system.

### ON-SITE SERVICE

Trained service specialists perform fast, low-cost maintenance at your site. On-site service is provided under a service agreement or on a per-call basis.

### CARRY-IN SERVICE

Digital has 160 Servicenters worldwide that offer fast, dependable service. Carry-in service is provided under a service agreement or on a per-call basis. Call the appropriate service information number from the previous list of telephone numbers for the location of the Servicenter near you.

### DECmailer

If you have troubleshooting expertise, but need assistance for component repair, DECmailer provides a low-cost solution. It provides a repair service for modules and subassemblies with a five-day turnaround at a Customer Return Center.

### SPARE PARTS

Digital's Customer Spares organization provides support in the following areas.

Spare inventory planning
Maintenance test equipment
Documentation

### EMERGENCY SPARE PARTS

For more information on any of Digital's services, call the appropriate service information number from the previous list.

# Appendix

# Professional 325/350 System Specifications

## SYSTEM UNIT

### Functional

| | |
|---|---|
| Microprocessor | Digital's F11 (PDP-11/23) with floating point processor |
| Diagnostics | Built-in, power-up test |
| Memory | 512 Kbytes |
| Standard video output | RS170-compatible, monochrome, bit map graphics |
| Standard communication port | RS232/423 asynchronous/byte synchronous, up to 9600 baud with modem control |
| Standard printer port | Serial, RS232/423 |
| Removable storage | Dual-diskette drive (two 400-Kbyte, 5-1/4-inch diskettes) formatted, dual density |
| System expansion | |
| Professional 325 | One option slot, user-installable |
| Professional 350 | Three option slots, user-installable |
| Professional 380 | Six option slots, user-installable |

### Power

| | |
|---|---|
| Power supply type | Transistor, switch type ac to dc converter |
| AC input | Switch-selectable |
| 115 V nominal | Single-phase, 3-wire, 90 to 128 V rms, 47 to 63 Hz line frequency |
| 220 V nominal | Single-phase, 3-wire, 174 to 256 V rms, 47 to 63 Hz line frequency |
| Line current (maximum) | 6 A at 115 Vac<br>4 A at 220 Vac |
| Power dissipation | 320 W (maximum) |
| Circuit protection | Circuit breaker, externally accessible |
| Temperature | 10° to 40°C (50° to 104°F) |
| Humidity | 20% to 80% relative humidity with a maximum wet bulb of 25°C and a minimum dew point of 2°C |

### Physical

| | |
|---|---|
| Height | 6.5 in (16.5 cm) |
| Length | 22 in (55.8 cm) |
| Width | 14.3 in (34.3 cm) |
| Maximum weight | 35 lb (15.9 kg) |

## KEYBOARD

### Functional

| | |
|---|---|
| Electronics | 8-bit microprocessor, 4 Kbytes of ROM, 256 bytes of RAM, 4 LEDs, speaker |
| Cord | 6 ft (1.9 m), coiled, 4-pin, telephone-type modular connectors; plugs into display monitor |
| Keypad | Sculptured key array |
| Home row key height | 30 mm above desktop |

| | |
|---|---|
| Keys | 103 matte, textured finish |
| Size | 0.5 in (1.27 cm) square |
| Spacing | 0.75 in (1.9 cm) center to center (single-width) |
| Wobble | Less than 0.020 in (0.5 cm) |
| Auxiliary keypad | 18 keys |
| Function keys | 38 keys; firmware- and software-driven |
| Diagnostics | Power-up self-test, generates identification after test is passed |

**Physical**

| | |
|---|---|
| Height | 2.0 in (5 cm) at highest point |
| Length | 21 in (53.3 cm) |
| Width | 6.75 in (17.1 cm) |
| Weight | 4.5 lb (2 kg) |

**MONITOR**

| | |
|---|---|
| Characters | 7 × 10 dot matrix includes 2-dot descenders |
| Format | 24 lines × 80/132 characters |

**Physical**

| | |
|---|---|
| Height | 11.5 in (29.2 cm) |
| Width | 13.75 in (34.9 cm) |
| Depth | 12.25 in (31.1 cm) |
| Weight | 14 lb (6.4 kg) |
| Cord | 6 ft (1.9 m) |
| Adjustable tilt | +5° to ±25° |
| Video format | Monochrome composite |

## DISKETTE SUBSYSTEM

### Performance

| | |
|---|---|
| Capacity per drive | 819 Kbytes |
| Diskettes per drive | 2 |
| Number recorded surfaces | 2 |
| Bytes per track | 5120 |
| Bytes per sector | 512 |
| Sectors per track | 10 |
| Transfer rate | 250 Kbytes per second |
| Average access time | 290 ms |

### Functional

| | |
|---|---|
| Rotational speed | 300 r/min |
| Density | 96 tracks per inch |

### Physical

| | |
|---|---|
| Height | 3.3 in (8.4 cm) |
| Width | 5.8 in (14.7 cm) |
| Depth | 8.5 in (21.6 cm) |
| Weight | 3.8 lb (1.7 kg) |

## HARD (WINCHESTER) DISK SUBSYSTEM (Professional 350)

### RD51 Performance

| | |
|---|---|
| Formatted capacity | |
| Per drive | 10 Mbytes |
| Per surface | 2.5 Mbytes |
| Per track | 8192 bytes |
| Per sector | 512 bytes |
| Sector per track | 16 |
| Transfer rate | 5 Mbytes per second |
| Average access time | 85 ms |

### Functional

| | |
|---|---|
| Rotational speed | 3600 r/min |
| Density | 345 tracks per inch |

### Physical

| | |
|---|---|
| Height | 3.4 in (8.6 cm) |
| Width | 5.9 in (14.9 cm) |
| Depth | 8 in (20.3 cm) |
| Weight | 5 lb (2.3 kg) |