User's Guide

Apple TechStep

Radio and television interference

The equipment described in this manual has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment 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 equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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Contents

Apple TechSte

Getting Started

Getting Started will acquaint you with Apple TechStep and the documentation package.

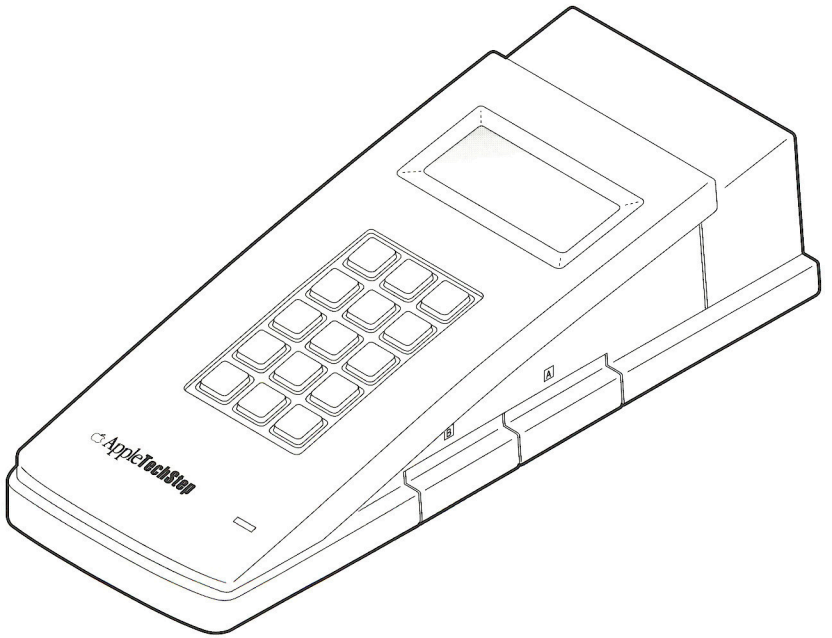


Figure 1-1 **Apple TechStep**

Introduction

What Is Apple TechStep?

Apple TechStep™ is a hand-held tool that tests Apple products via the products' external interface ports. Driven by a Motorola® MC68HC11 8-bit single-chip microcontroller, Apple TechStep displays test options and results on a 4-line-by-16-character LCD display. A 15-key keypad allows the technician to select tests and test options. Apple TechStep runs on an AC adapter or a standard 9-volt battery. Figure 1-1 shows Apple TechStep.

Slide-in ROM packs contain the software for specific computer and peripheral tests. This modular design means that you can easily upgrade Apple TechStep. As Apple releases new products, Apple® Service will periodically release additional ROM packs to support the new products. In addition, a detachable port pack allows you to easily upgrade Apple TechStep to accommodate new interface port connections. The current port pack contains the port connections necessary to diagnose most Macintosh® computers and Apple SCSI hard disk drives: two Apple Desktop Bus™ (ADB) ports, two mini DIN-8 serial ports, one SCSI port, and one stereo audio port.

Apple TechStep logs test results and allows you to save these results in the ROM pack or send them to a Macintosh computer for printing or saving.

Apple TechStep features include:

- Portability facilitates on-site repair.
- Apple TechStep diagnoses most nonbootable computers.
- Removable ROM packs allow for support of future products.
- Removable port pack provides easy access to connectors and allows an upgrade path for new interfaces.
- Memory test permits testing of DRAM SIMMs without opening the case and permits failure isolation to an individual SIMM.
- Looping locates intermittent errors.
- Sleep mode conserves battery power.
- Test result logging and sending to a Macintosh computer allow the user to save and print test logs.
- Individual and grouped test selections allow the user to run individual tests or all tests for a given subsystem.
- Built-in self-tests ensure accuracy.
- Power source can be a 9-volt battery or AC.

What's in the Box

Your Apple TechStep package should contain the following items:

- Apple TechStep
- Standard port pack (installed)

- *CPU Tests, Volume 1* ROM pack (installed)
- *SCSI HD Tests* ROM pack (installed)
- AC adapter (in international versions of Apple TechStep, the AC adapter ships separately)
- Cables:
  - 2 ADB
  - 2 mini DIN-8 serial
  - 1 DB-25-to-DB-25 SCSI
  - 1 stereo audio
- 9-volt alkaline battery
- Carrying case
- *Apple TechStep User's Guide*
- *Apple TechStep Troubleshooting Guide*
- *Getting Started* disk
- *Report Generator and Apple TechStep™ Test* disk
- Registration card
- Limited warranty
- Blank 800K and 1.4 MB floppy disks

If any of the above items is missing, contact your Apple Customer Service Representative.

Apple TechStep Documentation

The Apple TechStep documentation package includes:

- *Apple TechStep User's Guide*

This user's guide discusses:

- Hardware and features
- Keypad and menus
- Set up
- Operation and function of test logs
- *Report Generator* application
- Built-in self-tests and Macintosh-based *Apple TechStep Test* application

- *Apple TechStep Troubleshooting Guide*

The *Troubleshooting Guide* explains how to troubleshoot Macintosh computers and Apple SCSI hard disk drives.

The troubleshooting guide includes:

- Test descriptions, instructions, and test availability by CPU
- Interface port and cable connections for each test
- Symptom/cure troubleshooting tables

The initial release of the troubleshooting guide covers the Macintosh Classic®, SE, SE/30, II, IIx, and IIcx computers and Apple SCSI hard disk drives. Apple will issue additional and updated troubleshooting guides to support future ROM and port pack releases.

- *Getting Started* disk

Getting Started is a self-paced, interactive HyperCard® training stack that includes:

- A guide to Apple TechStep parts
- Instructions for installing the battery and ROM packs
- Rules for connecting Apple TechStep to Macintosh computers and SCSI hard drives
- An interactive guide to Apple TechStep tests and functions
- Descriptions of test logs and how they function
- Information about the Apple TechStep power-on and extended self-tests
- Six troubleshooting scenarios

The *Getting Started* training stack requires HyperCard 2.0 or later. The stack ships on a nonbootable disk without the HyperCard application. To run the stack, you will need a Macintosh computer with a bootable disk containing system software 6.0.7 (or later) and the HyperCard 2.0 program. Apple recommends running the *Getting Started* stack from a hard disk drive.

Other Materials You'll Need

Although this user's guide and the *Apple TechStep Troubleshooting Guide* include all the information you need to troubleshoot using Apple TechStep, neither includes information about performing repairs or adjustments. This information is in *Apple Service Technical Procedures* manuals or on the *Apple Service Source* CD-ROM.

For repair and adjustment information, refer to the following Apple service products:

- *Apple Service Technical Procedures for Macintosh Computers*
- *Apple Service Technical Procedures for Cross-Family Peripherals*
- *Apple Service Guide for Macintosh Computers*
- *Apple Service Source* CD-ROM

Information of Special Interest

This guide uses the following conventions to highlight important information:

Cautions
In some instances, incorrectly using or operating Apple TechStep could damage Apple TechStep or the unit under test. For example:

▲ Caution — Never install or remove a port pack while Apple TechStep is switched on.

Notes and Tips
Notes highlight important information. Tips make Apple TechStep easier or faster to use. For example:

❖ Note — When you use the power switch to switch off Apple TechStep, unsaved test logs disappear.

☛ Tip — Use the AC adapter for extended testing (hard disk tests or looping tests, for example).

Before You Continue

Registering Your Apple TechStep

Be sure to mail the registration card in the Apple TechStep package. If you register, you'll receive announcements from Apple about upgrades and new ROM and port packs.

Backing up Apple TechStep Software

Before using Apple TechStep, make a backup of the *Report Generator and Apple TechStep™ Test* disk. Put the original disk in a safe place.

Where to Go From Here

If you are using Apple TechStep for the first time, run the *Getting Started* training stack. This training stack will provide you with a quick tour of Apple TechStep.

After using the training stack, read this user's guide. It provides valuable information to help you get the most from Apple TechStep.

show
1
2
rom a
3
send
4
5
save
7

Getting Acquainted

2

Getting Acquainted provides an overview of Apple TechStep hardware and features and includes instructions on how to use the keypad and menus.

Product Overview

Before using Apple TechStep, become familiar with the following hardware and features.

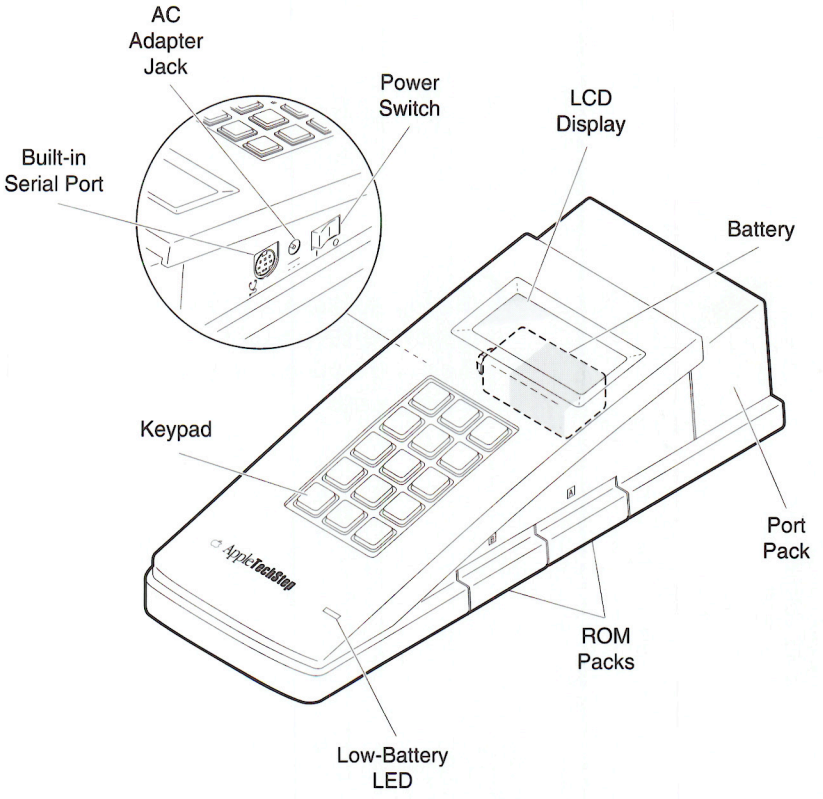


Figure 2-1 **Apple TechStep Hardware**

Hardware Tour

The following are the key hardware components of Apple TechStep. Figure 2-1 shows the location of each component.

Power Switch

The power switch is on the left side of the case. Switch Apple TechStep off whenever:

- Removing or installing ROM or port packs
- Connecting or disconnecting the AC adapter
- Connecting or disconnecting interface cables
- Not using Apple TechStep for an extended time (when the unit is operating from the 9-volt battery)

❖ Note When you use the power switch to switch off Apple TechStep, unsaved test logs erase. (Test log information is in Chapter 4, Test Logs and Reports.)

AC Adapter

Apple TechStep ships with a 9-volt AC adapter. The AC adapter connects to Apple TechStep via a connector at the left side, next to the power switch. To conserve battery life, use AC power whenever possible. See "Battery and AC Adapter" in Chapter 3, Setting Up, for instructions for connecting the AC adapter.

❖ Note When you connect the AC adapter, the 9-volt battery disconnects and the AC adapter must supply power. If the AC adapter is connected to Apple TechStep and the AC adapter is not receiving power (the adapter is unplugged, not connected to a live outlet, etc.), Apple TechStep will not switch on.

▲ Caution The Apple TechStep AC adapter is the only adapter approved by Apple. Using other AC adapters with incompatible voltages or connector polarities can damage Apple TechStep.

Battery

When AC power is not available or convenient, you can operate Apple TechStep on a 9-volt battery. (A battery is included in the Apple TechStep package.) The battery compartment is at the rear of Apple TechStep and is accessible by removing the port pack. See "Battery and AC Adapter" in Chapter 3, Setting Up, for instructions on replacing the battery.

For maximum operating time, Apple recommends an alkaline battery (such as a Duracell® MN1604 or Eveready® 522BP). Although Apple recommends alkaline batteries, other types (such as carbon-zinc and rechargeable NICAD®) will work. However, nonalkaline batteries have different operating characteristics and Apple TechStep won't operate as long. A fresh alkaline battery will provide 90–120 minutes of power.

To conserve battery life while Apple TechStep operates from the battery, Apple TechStep will enter sleep mode after it idles for five minutes. Sleep mode will remove power from most of Apple TechStep. For further information on sleep mode, see "Sleep Mode" later in this chapter.

Low-Battery LED

When power from the battery is low, the low-battery LED below the keypad glows. When the LED glows, save test logs to the ROM pack or send the logs to a Macintosh computer. Replace the battery as soon as possible. You have approximately 10 minutes of battery power after the LED illuminates.

The low-battery LED flashes to indicate failures during the power-on self-tests. See Chapter 5, Troubleshooting & Testing Apple TechStep, for information on the self-tests.

LCD Display
Apple TechStep displays its output on a 4-line-by-16-character supertwist LCD (liquid crystal diode) display.

Keypad
User input to Apple TechStep is via a 15-key keypad. The keypad provides test selection; menu scrolling; test starting and stopping; looping control; test log displaying, saving, and downloading; and ROM pack selection. For information on the keypad, see "Using the Keypad and Menus" in this chapter.

ROM Packs
Apple supplies diagnostic test firmware for Apple TechStep in easy-to-install cartridges called ROM packs. Each ROM pack contains diagnostic tests for a variety of devices.

The initial release of Apple TechStep provides two ROM packs. The *CPU Tests, Volume 1* ROM pack contains tests for the Macintosh Classic, SE, SE/30, II, IIx, and IIcx computers. The *SCSI HD Tests* ROM pack contains tests for Apple HD SC SCSI hard disk drives. Apple will release additional ROM packs to support additional products. See "ROM Packs" in Chapter 3, Setting Up, for ROM pack installation instructions.

Each ROM pack also contains an electrically erasable programmable read-only memory (EEPROM) device. This device allows Apple TechStep to store a test log in the ROM pack without losing the data when power is off.

Port Pack
To facilitate the connection of a wide variety of devices, Apple TechStep has a removable connector block called a port pack. This design allows Apple TechStep to support cur-

rently available Apple interface standards and to readily support future interfaces by releasing new port packs. See "Port Pack" in Chapter 3, Setting Up, for port pack installation instructions.

The standard port pack has one SCSI port, two serial ports, two ADB ports, and one stereo audio port. This port pack will support most existing Macintosh computers and SCSI devices.

Built-in Serial Port

Apple TechStep includes a built-in serial port (next to the AC adapter jack). This port provides communication with Apple TechStep, regardless of the port pack installed. Apple TechStep uses the built-in serial port to communicate with a Macintosh computer to send test logs to the *Report Generator* application and to allow testing by the *Apple TechStep Test* application. Test log and *Report Generator* application information is in Chapter 4, Test Logs and Reports. Chapter 5, Troubleshooting & Testing Apple TechStep, covers *Apple TechStep Test.*

Features

Apple TechStep includes features that enhance operation and reliability. The following list is an overview.

Sleep Mode

To prolong battery life, Apple TechStep sleeps if no activity occurs for five minutes. Apple TechStep does not enter sleep mode if the AC adapter is connected or if a test results screen or test log is on the LCD display.

When Apple TechStep is in sleep mode, power flows to portions of the circuitry to maintain option settings and test logs. Press the * key to take Apple TechStep out of sleep mode.

Test Logs and the Report Generator
Test logs provide a record of test results. A log of the current session remains in the RAM of Apple TechStep until you switch off power. You can save the current log to the ROM pack for later review or you can send the log to the *Report Generator* application on a Macintosh computer. Use the Macintosh computer to save or print the logs.

You can customize the log to include service provider and customer information, date, and time. You can further customize the log by exporting it to a word processing program.

For more information on test logs and the *Report Generator* application, see Chapter 4, Test Logs and Reports.

Self-Tests and Apple TechStep Test
To ensure that diagnostic test results are accurate, Apple TechStep contains a one-second self-test that runs each time you switch on Apple TechStep. You can also initiate an extended self-test by pressing the *1* and *3* keys while switching on Apple TechStep. The extended self-test provides a more-thorough verification.

A message on the LCD display and a flashing low-battery LED indicate self-test failures.

A Macintosh-based application, *Apple TechStep Test*, provides a complete test of Apple TechStep (including the port pack, ROM packs, and interface cables). *Apple TechStep Test* ships with Apple TechStep.

See Chapter 5, Troubleshooting & Testing Apple TechStep, for more information on the self-tests and *Apple TechStep Test*.

Using the Keypad and Menus

The user communicates with Apple TechStep via the 15-key keypad. Apple TechStep responds via the 16-character-by-4-line LCD display. This section explains the keypad and menu system, and describes the dialog, test result, and test log screens that appear on the LCD display.

The Keypad

Figure 2-2 shows the 15-key keypad. The keypad controls test selection; menu scrolling; test starting and stopping; looping control; displaying, saving, and sending of test logs; and ROM pack selection.

Figure 2-2 **The Apple TechStep Keypad**

Number Keys
Use keys *1* through *6* for test selections defined by the current menu page. (Menus are described in "Menu Screens," later in this chapter.) If any of these keys is not defined by the current menu page, then the key has no function (sometimes an otherwise-unused key has an alternate function when you press the * key). Use keys *0* through *9* to enter numbers.

*** (alternate function)**
The * (or *star* key) selects the alternate functions of keys. Yellow lettering designates the alternate functions.

To access an alternate function, press and release the * key and then press the desired alternate function key. After you press the * key, a * appears in the upper-right corner of the LCD display and indicates that the next key you press will select an alternate function. To return to normal function, press * again or press a key that does not have an alternate function.

show
The *show* key (**1*) allows you to select and display the current or saved test log. You can display the current RAM-based test log or the saved test log from the active ROM pack. See "Test Logs" in Chapter 4, Test Logs and Reports, for additional information on the *show* key.

send

The *send* key (**4*) sends the current or saved test log to a Macintosh computer through the built-in serial port of Apple TechStep (next to the AC adapter jack). The *Report Generator* application receives the data on the Macintosh. See "Test Logs" in Chapter 4, Test Logs and Reports, for additional information on the *send* key.

save

The *save* key (** 7*) stores a copy of the current test log in the EEPROM of the currently selected ROM pack.

When you press the *save* key, Apple TechStep prompts you to enter an identification number for the test log. The number can be any combination of up to six digits. This number could be the date, a customer number, or the product serial number. You can save one test log per ROM pack.

See "Test Logs" in Chapter 4, Test Logs and Reports, for additional information on the *save* key.

loop ↻

The *loop* ↻ key (**stop*) allows you to run tests in looping mode. Looping repeatedly executes the selected tests and helps locate intermittent failures. Looping is not available for real-time measurements (such as the power supply voltage, battery voltage, and power-up voltage) or functions (such as CPU power-on/-off and SCSI termination [on/off]). When you select looping, the looping character (↻) appears in the upper-right corner of the LCD display, as Figure 2-3 shows.

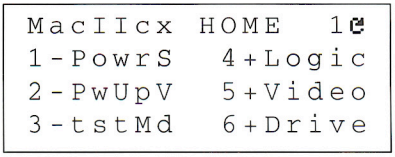


Figure 2-3 **Looping Character**

Tests in looping mode execute continuously until the user stops the test or the test loses communication with the unit under test (UUT).

When the loop character appears, the next test you select will run in looping mode (unless the test is not loopable). To cancel loop mode, press the *stop/loop* key again.

stop

The *stop* key terminates the current test or test sequence.

Some tests stop at once; other tests cannot stop immediately because communications with the UUT are disabled while the test is running.

Pressing *stop* from a menu has no function except to deselect looping (if selected).

rom A* and *rom B

The *rom A* (*3) and *rom B* (*6) keys select the current (active) ROM pack. These keys allow you to switch between the two ROM slots without removing and installing the ROM packs. You can select ROM packs at any time, except when tests are running.

▲ Caution Never remove or insert ROM packs while power is on.

When you select ROM A or ROM B as the active ROM pack, the RAM-based test log corresponding to the active ROM pack becomes the current test log. The contents of the inactive RAM-based log, however, do not change when you change active ROM packs. Your *rom A/rom B* selection determines which test log responds to the *how*, *send*, and *save* keys.

clear

The *clear* (**9*) key erases entries on dialog screens that require the user to enter a multiple-digit number.

home/back

The *back* and *home* (**back*) key navigates through the menus and test results screens.

Pressing *back* displays the previous menu level. From a test results screen, the display returns to the menu from which you chose the test. From a submenu, the display returns to the next higher menu.

Pressing *home* (**back*) displays page 1 of the HOME (main) menu of the current ROM pack.

↑ and ↓ (*up* and *down* arrows)

If a menu has more than one page, the arrow keys move to the previous (↑) and next (↓) pages. If no previous or next page exists, no menu movement occurs.

By pressing the * key before the arrow keys, you can move to the first or last page of the current menu.

Press the *down* arrow key to confirm a numerical entry, such as a SCSI device address or NuBus™ slot number.

*0
Press *0 to check the version numbers of the Apple TechStep internal ROM and the ROM packs.

*2
When the 9-volt battery is the power source, press *2 to place Apple TechStep in sleep mode. Press the * key to wake Apple TechStep.

LCD Display Screens

Apple TechStep uses four types of screens to display information on the built-in LCD display:

- Menu screens
- Dialog screens
- Test Results screens
- Test Log screens

Menu Screens

Menu screens display a list of numbered selections (such as tests). Figure 2-4 shows a sample menu.

```
MacIIcx HOME   1↓
1-PowrS  4+Logic
2-PwUpV  5+Video
3-tstMd  6+Drive
```

Figure 2-4 **Sample Menu Screen**

Menus of more than one page
When a menu contains more selections than fit on one page, additional menu pages handle the overflow. If additional menu pages follow the first page, a page number and a *down* arrow (↓) appear in the upper-right corner of the display, as Figure 2-4 shows. As you de-

scend through the menu levels, the page numbers change and the *down* arrow changes to either an *up* arrow (↑), indicating there are menus previous to the current one, or an *up and down* arrow (↕), indicating there are pages before and after the current one.

Multiple-Screen Test Selections
Some tests require that you provide additional information, such as what floppy disk format test to run (800K, 720K, or 1.4 MB) or which of several NuBus video cards to test. When you choose these test selections, dialog or menu screens appear before the test starts.

Tests that have additional screens and menu items that contain submenus have a + between the test selection number and the test name; examples are the Logic, Video, and Drive tests in Figure 2-4.

Dialog Screens
Dialog screens require user input. Input can be a number (SCSI device address, test log identifier, etc.) or a numbered selection. Figure 2-5 shows two sample dialog screens. The first is a dialog screen that has numbered selections; the second is a screen that requires the user to enter a number.

```
TstMd not found:
1-Start TestMode
2-Cancel
3-Continue
```

```
SAVE log to ROM
Enter log ID no:
↓=accept,bk=cncl
[       ]
```

Figure 2-5 **Sample Dialog Screens**

Test Results Screens

Test results screens display the results of completed tests and measurements. Figure 2-6 shows samples of each type of test results screen.

Real-Time Measurements

```
Classic
Power Supply
Actual=5.00V:ON
Normal=>4.80V
```

Pass/Fail Results

```
MacII
VIA Test
Test PASSED
```

Extended Messages

```
MacIIcx
SCC Test
FAIL:Modem(HSKi)
```

Additional Information

```
MacIIcx
SWIM/IWM Test
Test PASSED
SWIM installed
```

Press 0 for info

```
Classic
RAM test
Test FAILED
Press 0 for info
```

Figure 2-6 **Sample Test Results Screens**

Real-Time Measurements
Displays the results of voltage measurements (battery or power supply, for example).

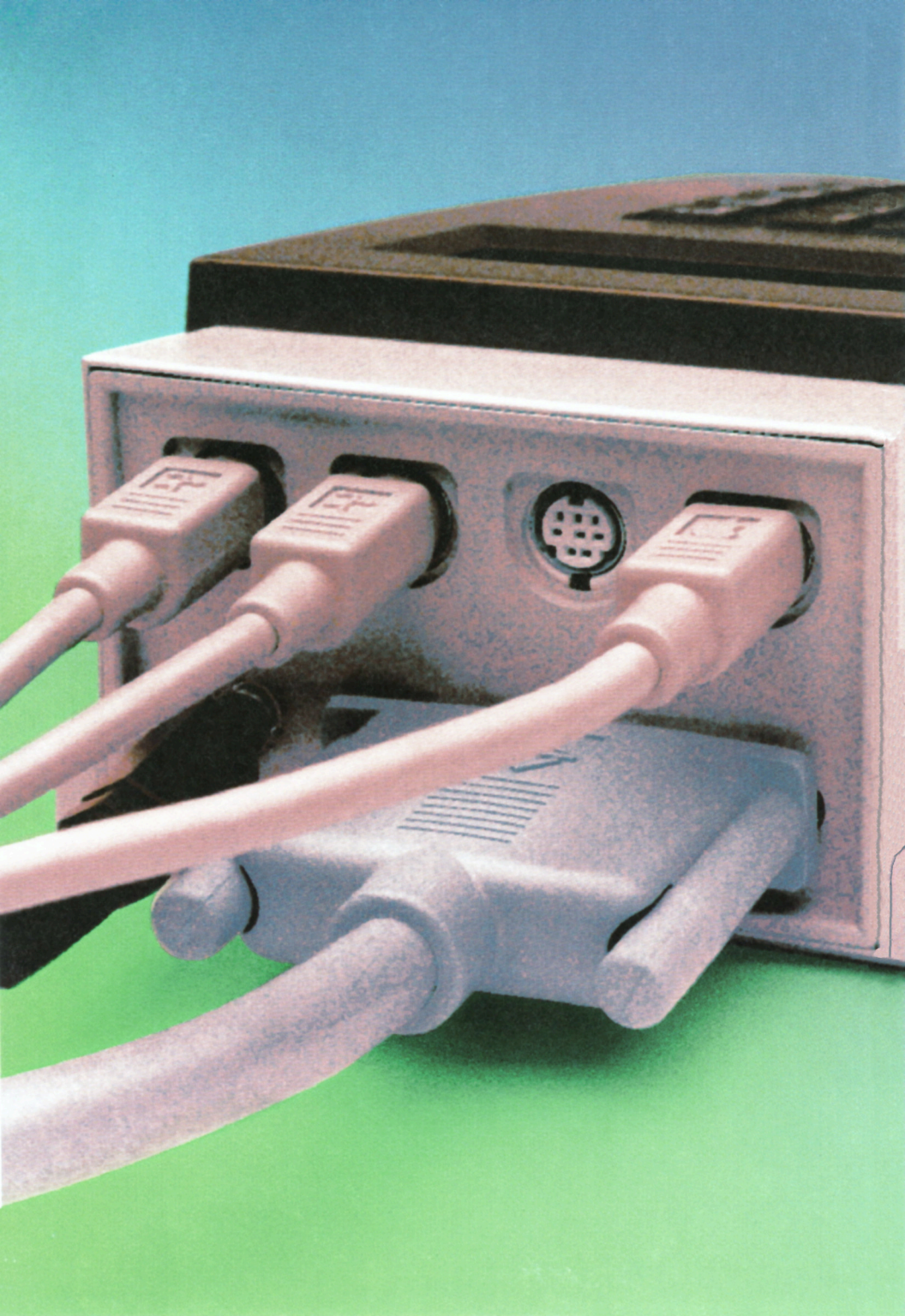
Pass/Fail Results
Indicates whether the test passed or failed.

Extended Messages
Provides additional details about the failure. For explanation of individual messages, refer to the *Apple TechStep Troubleshooting Guide.*

Additional Information
Displays additional information, such as the type of device installed.

Press 0 for info
Provides information that will not fit on one page. Press *0* to display the next page of information.

Test Log Screens
Test log screens display the contents of current and saved test logs. See Chapter 4, Test Logs and Reports, for information on test log screens.



Setting Up

Setting Up explains installation of ROM and port packs, connection of the interface cables and AC adapter, and battery replacement.

ROM Packs

Apple TechStep ships from Apple with the port pack and two ROM packs—*CPU Tests, Volume 1* and *SCSI HD Tests*—installed.

Installing a ROM Pack

To install a ROM pack:

1. Switch Apple TechStep off.
2. Slide the ROM pack, label side up, into the ROM A or ROM B slot at the right side of Apple TechStep, as Figure 3-1 shows.
3. Press the ROM pack firmly into the connector.

☛ Tip

Apple TechStep starts up from the ROM pack in slot A. Install the ROM pack you use most often in slot A. (If slot B has a ROM pack and slot A is empty, Apple TechStep will start up from the ROM pack in slot B.)

Removing a ROM Pack

To remove a ROM pack:

1. Switch Apple TechStep off.
2. Grasp the top and bottom of the ROM pack, and pull the ROM pack straight out.

▲ Caution

Always switch off Apple TechStep before you install or remove a ROM pack.

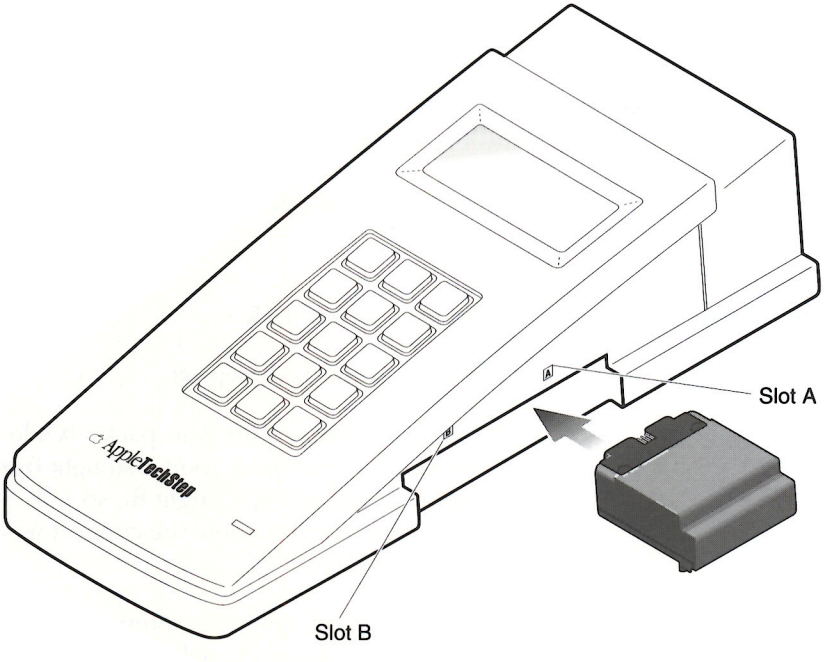


Figure 3-1 **Installing a ROM Pack**

Port Pack

Installing a Port Pack

To install a port pack:

1. Switch Apple TechStep off.
2. Slide the port pack, with the interface port connectors facing away from Apple TechStep, into the port pack connector at the rear of Apple TechStep, as Figure 3-2 shows.

❖ Note Be careful not to pinch the battery cable between the port pack and Apple TechStep.

3. Press the port pack firmly into the connector.

Removing a Port Pack

To remove a port pack:

1. Switch Apple TechStep off.
2. Grasp the sides of the port pack. While rocking the port pack, pull it straight from Apple TechStep. (It's a tight fit, so pull hard. Don't worry about the connector—it won't break.)

▲ Caution Always switch off Apple TechStep before you install or remove a port pack.

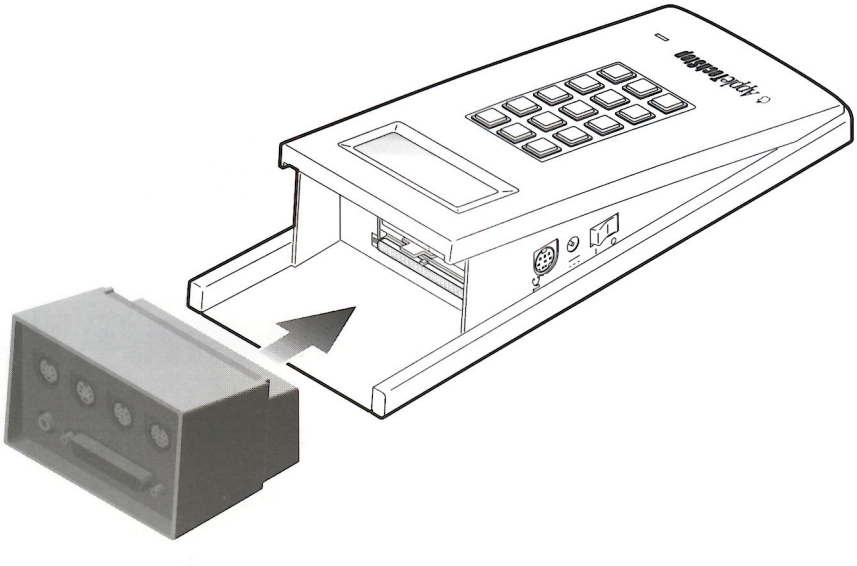


Figure 3-2 **Installing a Port Pack**

Port Pack Cable Connections

You can connect Apple TechStep to a variety of interface ports and devices through the interchangeable port pack. The combination of required cables will depend on the unit under test (UUT) and the tests run. The *Apple TechStep Troubleshooting Guide* specifies the port pack and cables for particular test setups.

Figure 3-3 illustrates the standard port pack and its interface ports.

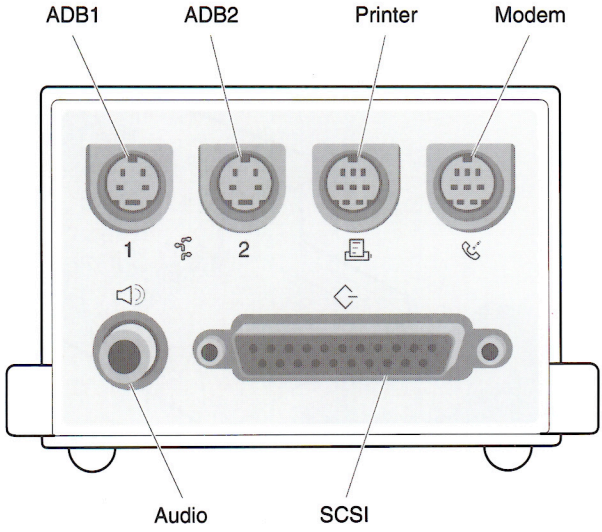


Figure 3-3 **Standard Port Pack Ports**

Battery and AC Adapter

Battery Replacement

When the low-battery LED glows continuously, you have approximately ten minutes of battery power. Apple recommends alkaline batteries, which provide maximum battery life. (Examples are Duracell MN1604 and Eveready 522BP.) To replace the 9-volt battery:

1. Make sure that Apple TechStep is off and the AC adapter unplugged.

2. Remove the port pack. If you need information on removing the port pack, refer to "Port Pack" in this chapter.

3. While you use one index finger to press the plastic tab that holds the battery in place, slide the battery out with your other index finger and thumb. Refer to Figure 3-4.

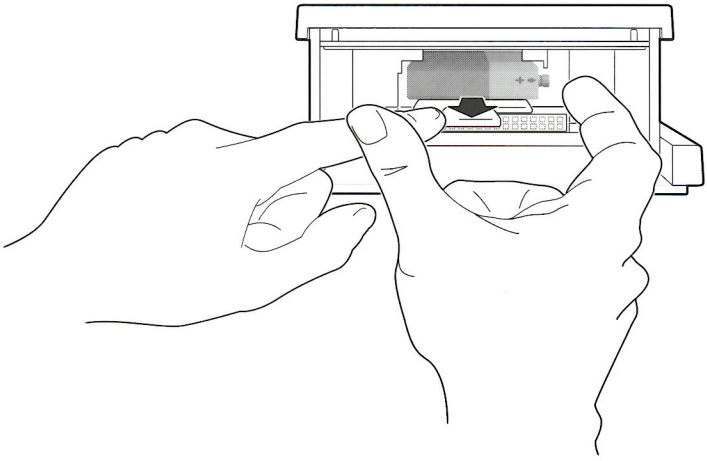


Figure 3-4 **Battery Removal**

4. Grab the connector and unsnap the battery cable from the battery.

❖ Note Be careful not to pull on the battery cable.

5. Snap the battery cable onto the terminals of the new battery.

6. Slide the battery into its compartment until the battery is secure in the plastic tab. Tuck the battery cable inside the battery compartment.

7. If you previously removed the port pack, reinstall it.

AC Adapter

Apple TechStep includes an AC adapter. The AC adapter prolongs battery life and reduces the risk of losing power at a crucial time. Use the AC adapter for extended testing (hard disk tests or looping tests, for example).

With Apple TechStep switched off, connect the AC adapter by inserting the adapter plug into the Apple TechStep AC connector, as in Figure 3-5.

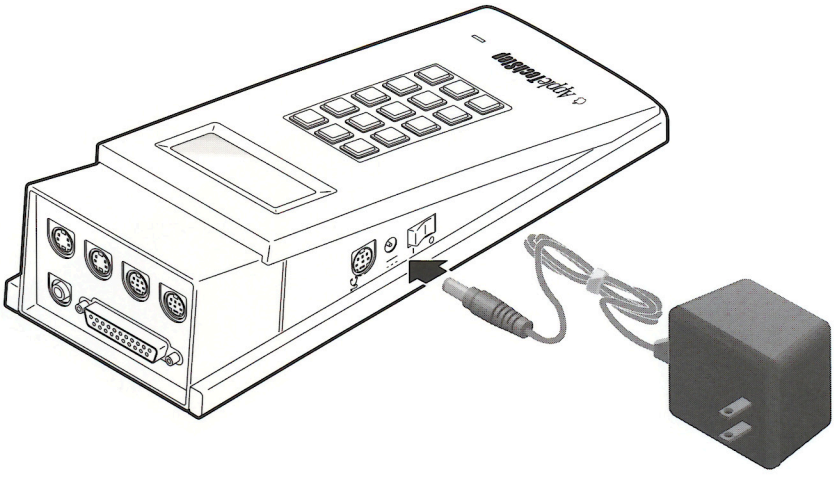
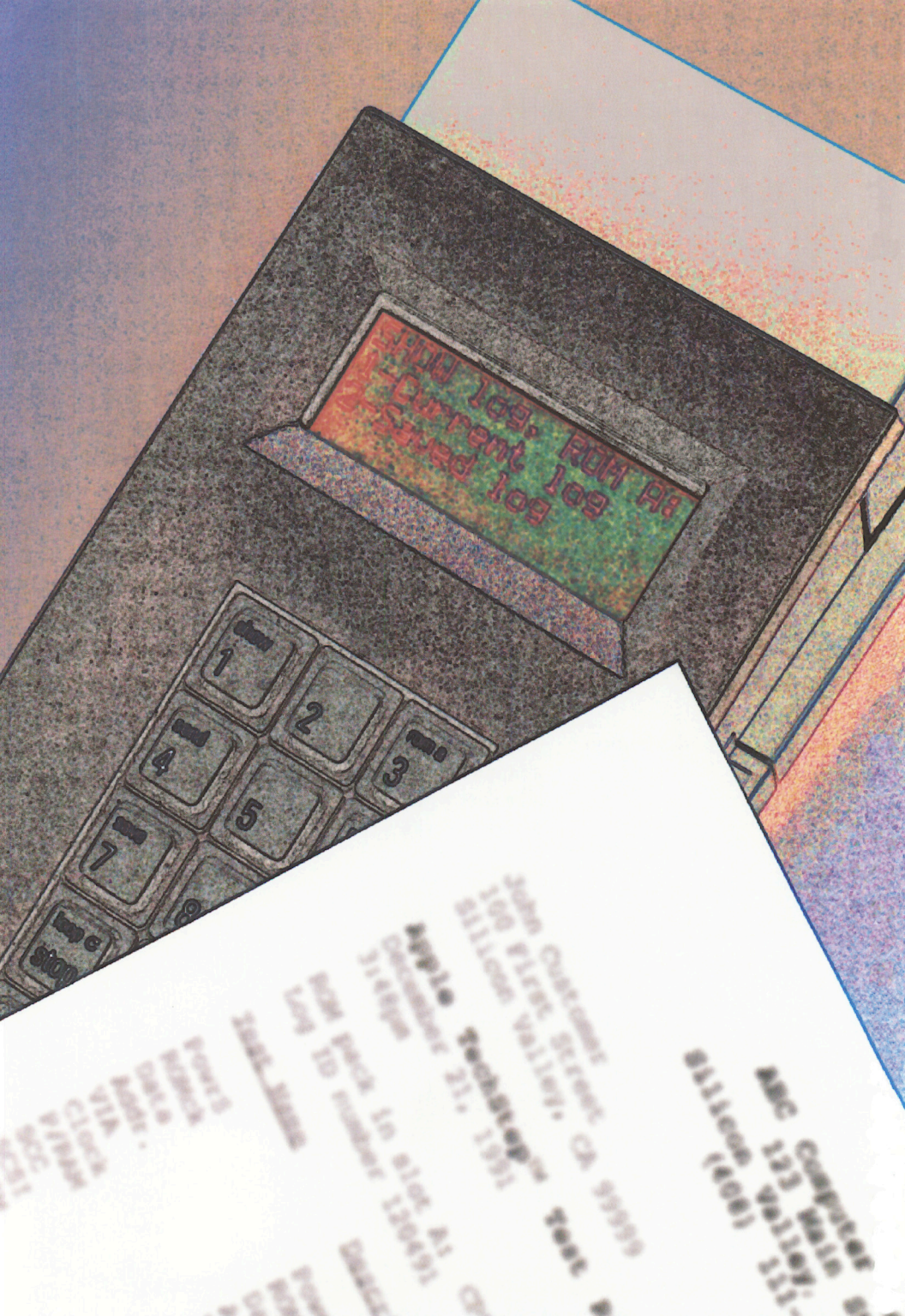


Figure 3-5 **Attaching the AC Adapter**

❖ Note — Make sure Apple TechStep is off and test logs have been saved before attaching the AC adapter—otherwise, Apple TechStep will reset and erase all test logs from RAM.

▲ Caution — The Apple TechStep AC adapter is the only adapter approved by Apple. Using other AC adapters with incompatible voltages or connector polarities can damage Apple TechStep.


Now log. ROM A1
Current log
Saved log

Test Logs and Reports

Test Logs and Reports covers Apple TechStep's test log features and the accompanying *Report Generator* application.

Test Logs

Test logs provide a record of test results. You can view, save, and print test logs. (Printing requires a Macintosh computer.) Use test logs in the following ways:

- Use the current log to review the results of a test session.
- Save the current log to its ROM pack for later review.
- Save and print test logs by sending them to a Macintosh computer that is running the *Report Generator* program.

  Report Generator allows you to customize the log to include service provider and customer information (such as name, address, and telephone number) and the date and time. You can print the log and give it to the customer to provide a detailed analysis of what is wrong with the system.

  By exporting the log via the clipboard, scrapbook, or a saved file, you can further customize the log by using a word processing program—such as MacWrite® II or Microsoft® Word. Use a word processor to include your business logo, choose fonts and styles, and do anything else your word processor supports.

How Test Logs Function

Each time you switch on Apple TechStep, a new test log appears in RAM for each ROM pack installed. One area of RAM holds the test log for slot A, and another area holds the log for slot B.

As tests run from the ROM packs, the results add to the RAM test logs. The test logs remain in RAM until you switch Apple TechStep off.

Although RAM test logs are maintained for both ROM packs, Apple TechStep adds to only one log at a time—the test log for the currently selected ROM pack. If you need to show, save, or send the log for the other ROM pack, you must first select that ROM pack.

Because only a certain amount of RAM is available for each test log (enough to hold approximately 20 pages of results), the log will delete the top (oldest) item in the log each time a new log entry appears. Deletion of old entries begins without warning. You can, however, save the test log to the ROM pack or send the test log to a Macintosh computer before rewriting starts. Saving or sending does not alter the current log—rewriting will still occur, but you will have a copy on the current ROM pack or on the Macintosh computer.

Displaying a Test Log

Press the *show* key (**1*) to display the current test log from RAM or the saved test log from the active ROM pack.

The dialog box in Figure 4-1 appears. (**ROM x** indicates the active ROM pack; your screen will show **ROM A** or **ROM B**.)

```
SHOW log, ROM x:
1-Current log
2-Saved log
```

Figure 4-1 **Show Test Log Dialog Box**

Press *1* to display the current test log (the log in RAM) or *2* to display the saved test log (the log in the EEPROM of the ROM pack).

Figure 4-2 shows a sample test log.

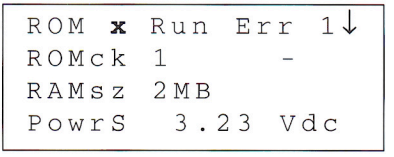


Figure 4-2 **Sample Test Log**

The first line of the test log screen contains:

ROM x – The *x* indicates the ROM slot (active ROM pack) that the log is from.

Run – The number in this column indicates how many times the test ran.

Err – The number in this column indicates the number of errors encountered during the test. A dash (–) indicates no errors.

1 – This number is the page number of the current test log. If additional test log pages follow the current page, a *down* arrow (↓) appears in the upper-right corner of the LCD display. As you descend through the test log pages, the *down* arrow changes to an *up* arrow (↑), which indicates there are pages previous to the current one, or an *up and down* arrow (↕), which indicates there are pages before and after the current one.

The second, third, and fourth lines display the test log contents. If you used a function (such as a real-time measurement or memory size), the result will appear in place of the **Run** and **Err** information.

Saving a Test Log

Press the *save* key (*7) to save the current test log to the active ROM pack.

(You cannot save a test log while a test log or test results window is displayed.)

The dialog box in Figure 4-3 appears.

Figure 4-3 **Save Test Log Dialog Box**

Enter a test log ID number that is from 1 to 6 digits. The ID number can be anything, but you might want to use the ID number to identify the log by date, customer number, or product serial number. If you make a mistake entering the number, press *clear* (*9) to erase and try again. After you enter the number, press the *down* arrow (↓) to implement the number you entered or press *back* to cancel the number and return to the previous menu.

Apple TechStep stores only one test log in each installed ROM pack. If you need to save a number of test logs or if you need to save a log more permanently, use the *Report Generator* program to save logs on a Macintosh computer. See "Report Generator Application" later in this chapter.

Sending a Test Log

The *send* key (*4) sends the current or saved test log to a Macintosh computer.

The following section, "Report Generator Application," discusses sending a test log.

Report Generator Application

You can send test logs from Apple TechStep to a Macintosh computer for saving or for printing. The Apple TechStep *Report Generator* application should be running on the Macintosh computer that receives the logs; however, you can use any communication program—for example, MacTerminal® or Microphone™ II.

This section describes the setup and use of the *Report Generator* program for receiving, saving, and printing test logs.

What You'll Need

To run the *Report Generator* program, you need the following items:

- Copy of the *Report Generator* application
- Macintosh computer (except the 128K, 512K, or 512K enhanced)
- Macintosh system software 6.0.7 or later
- Bootable hard disk drive or **two** floppy disk drives
- Mini DIN-8 serial cable (for receiving logs)
- Macintosh-compatible printer and printing software (for printing test logs)

The procedures below are for installing the *Report Generator* on a hard disk. If you plan to run the *Report Generator* from a floppy disk, skip to "Setting Up."

Installing on a Hard Disk

1. Switch on the Macintosh computer.

2. When the Finder™ appears, insert the *Report Generator and Apple TechStep™ Test* disk into the internal disk drive.

3. When the disk icon appears, double-click the *Apple TechStep™* disk icon.

4. To copy the program to the hard disk, click the *Report Generator* application program icon and drag the icon to the hard disk.

Setting Up

1. If you'll be using the *Report Generator* to receive a log, switch off power to the Macintosh computer. Connect one end of the serial cable to the built-in serial port on Apple TechStep (next to the power switch) and the other end to the printer or modem port on the computer. See Figure 4-4.

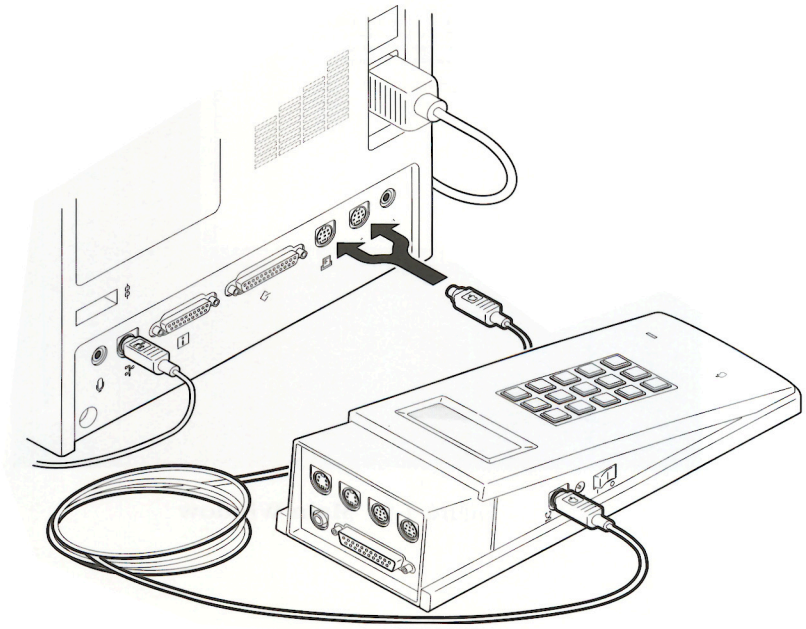


Figure 4-4 **Report Generator Setup**

2. If you are running the *Report Generator* on a floppy-based system, insert a bootable system disk into one disk drive and the disk containing the *Report Generator* program into the other drive.

3. Switch on the Macintosh computer.

4. When the Finder appears, double-click the disk icon of the disk containing the *Report Generator* application.

5. Double-click the *Report Generator* application icon.

   After a few moments, the *Report Generator* main window appears, as in Figure 4-5.

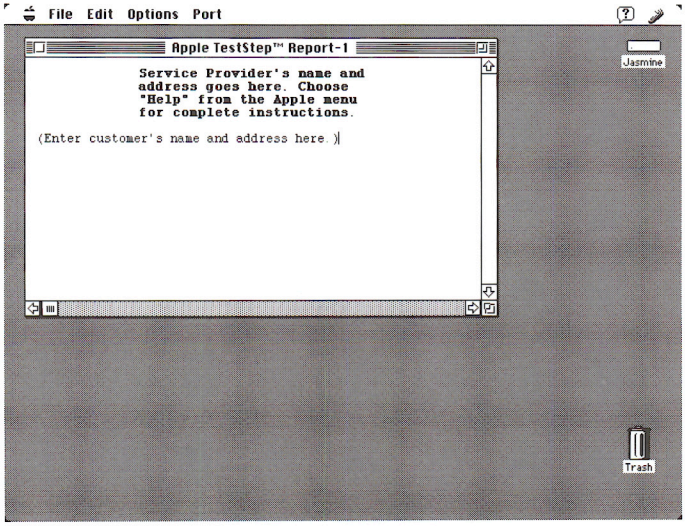


Figure 4-5 **Main Window**

The window shows a blank report with your business's name and address at the top. (The first time you run this program, you can enter your business's name and address. See "Customizing Reports" later in this chapter.)

Receiving a Test Log

1. Use the Port menu to select the port (**printer** or **modem**) to which Apple TechStep is connected.

❖ Note If Apple TechStep is connected to the printer port, use the Chooser to set AppleTalk™ to **Inactive**.

2. Select **Enter customer's name and address here** and type in the customer's name and address.

3. Select **Receive log** (command-R) from the Options menu.

The *Report Generator* will wait to receive the test log from Apple TechStep. The dialog box in Figure 4-6 will appear.

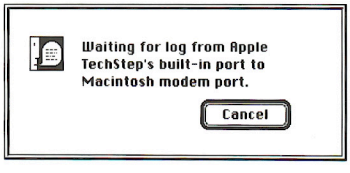


Figure 4-6 **Waiting to Receive a Test Log**

4. Press *send* (**4*) on the Apple TechStep keypad to display the send log options in Figure 4-7. (**ROM x** indicates the active ROM pack; your screen will show **ROM A** or **ROM B**.)

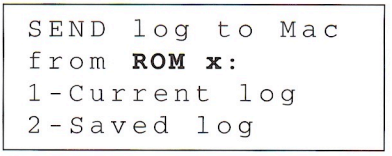


Figure 4-7 **Send Test Log Dialog Box**

Verify that the ROM slot indicated corresponds to the ROM pack from which you want a test log report. (If the slot is not correct, press *back* and press **rom a* or **rom b.*)

5. To send the current log from Apple TechStep RAM, press *1* on the Apple TechStep keypad. To send the log that you saved in the active ROM pack, press *2.*

Apple TechStep will begin sending the selected log, and *Report Generator* will indicate it is receiving the log. The contents of the test log received from Apple TechStep appear on the *Report Generator* report.

Saving a Report

To save the test log report:

1. Select **Save As** (or **Save**) from the *Report Generator* File menu.

2. Edit the file name (if desired) and click **OK** or **Save**.

Printing a Report

To print the test log report:

1. Verify that you selected a printer in the Chooser.

2. Select **Print** from the File menu. The standard print options dialog box appears.

3. Select print options and click **OK**.

Customizing Reports

The *Report Generator* program can include the following information on test logs:

- Service provider information
- Customer information
- Date and time

To change service provider information or to include/remove the date and time, select **Customize report** from the Options menu. The dialog box in Figure 4-8 appears.

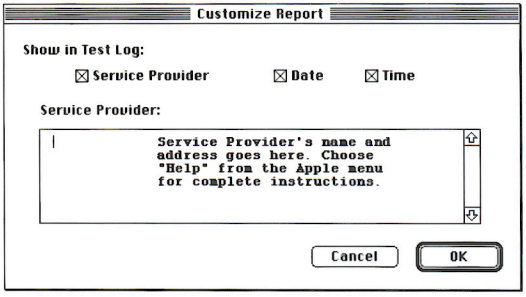


Figure 4-8 **Customize Reports Dialog Box**

Click the appropriate checkboxes to include service provider information, time, and date. (The time and date indicates when the Macintosh received the log, not the time and date of testing.)

You may use standard Macintosh editing, including cutting and pasting from the scrapbook and clipboard, to edit the service provider information.

On-Line Help

Select **Help** (command-?) from the Apple menu for assistance with receiving a report.


Apple TechStep
Apple TechStep Test
Tests
Quick Select:
Set 1
Set 2
•Set 1:
SCSI
ADB1
Modem Port
Built-in Port
Stereo Port
Logic Board
Keypad
Display
Battery
AC Adapter
•Set 2:
ADB2
Printer Port
Start
Stop
Log
Loop
Help
Apple TechStep Ports Needed
(Power off Macintosh and Apple TechStep before changing cables!)
Status
Choose tests, connect cables and press 'Start'

Troubleshooting & Testing Apple TechStep

Troubleshooting and Testing Apple TechStep includes information on Apple TechStep's built-in power-on self-test and extended self-test, use of the Macintosh-based *Apple TechStep Test* application, and troubleshooting information.

Testing Apple TechStep

To provide the technician with a high degree of confidence in the reliability and accuracy of Apple TechStep, Apple TechStep contains a built-in power-on self-test and an extended power-on self-test. Apple also provides a Macintosh-based test application, *Apple TechStep Test.*

The built-in power-on self-test provides a one-second check of Apple TechStep every time you switch power on.

The extended power-on self-test provides a more-thorough verification of Apple TechStep. This extended test takes approximately 10 seconds.

Apple TechStep Test uses a known-good Macintosh computer to test all Apple TechStep hardware, including the logic board, keypad, LCD display, port pack, ROM packs (if installed), interface cables, battery, and AC adapter.

Power-on Self-Test

The power-on self-test runs every time you switch on Apple TechStep. The test checks the microprocessor, built-in serial interface, RAM, and battery voltage. The test takes approximately one second.

If any test fails, Apple TechStep flashes the low-battery LED in a sequence determined by the type of failure, sends a failure code over the built-in serial interface, and displays a failure message on the display. However, some failures may prevent delivery of failure signals.

Power-on Self-Test Results

The chart below indicates the LED patterns and messages that display for each failure.

If a failures occurs, return Apple TechStep to Apple for exchange. Remove the port pack and ROM packs before you return the unit.

Fault	Message on the LCD	Low-Battery LED Pattern
Processor failure	No message	Flashes on for 1/2, off for 1/2 second, repeats
Logic board failure 1	FAIL xx: LOGIC 1	Flashes twice, pauses 1.5 seconds, repeats
Logic board failure 2	FAIL xx: LOGIC 2	Flashes three times, pauses 1.5 seconds, repeats
RAM failure	FAIL xx: RAM	Flashes four times, pauses 1.5 seconds, repeats

Extended Power-on Self-Test

The extended power-on self-test provides a check of the ROM packs and RAM on the Apple TechStep logic board. These tests run after completion of the power-on self-test.

Activate the extended power-on self-test by holding down the *1* and *3* keys when you switch on Apple TechStep. The extended self-test takes approximately ten seconds. When the self-test is complete and successful, the message **All Tests Passed** appears for six seconds and then Apple TechStep begins its normal startup sequence.

Extended Power-on Self-Test Results

The chart below indicates the LED pattern for each failure.

If a RAM failure occurs, return Apple TechStep to Apple for exchange. Remove the port pack and ROM packs before you return the unit.

If a ROM pack failure occurs, return the defective ROM pack to Apple for exchange. (FAIL 41 indicates ROM pack A; FAIL 42 indicates ROM pack B.)

Fault	Message on the LCD	Low-Battery LED Pattern
RAM failure	FAIL XX: RAM	Flashes four times, pauses 1.5 seconds, repeats
ROM pack checksum	FAIL XX: ROMPACK	Flashes five times, pauses 1.5 seconds, repeats

Apple TechStep Test

Apple TechStep Test is a Macintosh-based application that provides a more-thorough verification of Apple TechStep than is possible with the built-in self-tests.

The *Apple TechStep Test* program allows you to test the following:

- Port pack—including the SCSI, ADB1, ADB2, modem, printer, and audio ports
- Built-in serial port
- Interface cables
- Logic board
- Keypad
- LCD display
- Battery
- AC adapter

What You'll Need

To test Apple TechStep using *Apple TechStep Test*, you need the following items:

- Macintosh computer (except the Macintosh 128K, 512K, or 512K enhanced)

❖ Note The *Apple TechStep Test* SCSI port test will not work when you test Apple TechStep on the Macintosh IIfx or PowerBook™ computers. If you need to test the Apple TechStep SCSI port, use another Macintosh computer.

❖ Note You cannot run the *Apple TechStep Test* ADB port test on the Macintosh Classic, Classic II, LC, IIsi, or PowerBook computers (which have only one ADB port) or the Macintosh Plus (which does not have an ADB port).

- Bootable hard disk or **two** floppy disk drives (one drive for a system disk and one for the application disk)
- Macintosh system software 6.0.7 or later
- Copy of the *Apple TechStep Test* application
- The following cables:
  - Two mini DIN-8 serial cable – for communications during any test; also for testing the built-in serial port, port pack printer or modem port, logic board, keypad, LCD display, battery, and AC adapter
  - ADB cable – to test the ADB ports
  - SCSI cable – to test the SCSI port
  - Stereo audio cable – to test the audio port

Setting up

1. With Apple TechStep and the Macintosh switched off, connect the following ports with the appropriate cables.

Apple TechStep Port	Macintosh Port
built-in serial	modem or printer
modem	modem or printer
SCSI	SCSI
audio	audio
ADB1	either ADB

2. Connect the Apple TechStep AC adapter to an AC source.

3. Switch on the Macintosh computer.

❖ Note Before running *Apple TechStep Test*, use the Chooser to set AppleTalk to **Inactive**.

4. When the Finder appears, insert the *Apple TechStep Test* disk into an available disk drive.

5. When the disk icon appears, double-click the disk icon.

6. When the disk window appears, double-click the *Apple TechStep Test* application icon.

   After a few moments, the *Apple TechStep Test* main window appears.

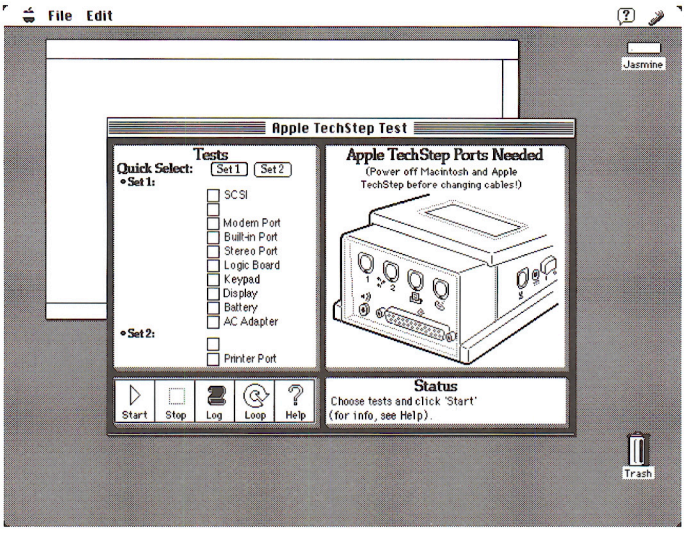


Figure 2-9 **Main Window**

7. Select **test set 1**.

   Because it is not possible to test all of Apple TechStep at once, the tests are in two groups:

   - **Test set 1** tests all items except the ADB2 and printer ports.
   - **Test set 2** tests the ADB2 and printer ports.

   As you select tests, the cabling diagram at the right of the main window on the Macintosh computer highlights the Apple TechStep ports that should be connected to the Macintosh. Verify that you connected the appropriate cables. If you didn't, switch off both the Macintosh and Apple TechStep before changing cable connections.

8. Click **Start**.

9. Switch on Apple TechStep when the message **Looking for Apple TechStep** appears in the status box.

   While the tests run, the test status appears in the test log window at the bottom of the screen. To terminate testing, click **Stop**.

❖ Note Do not move the mouse or press keys on the keyboard during the ADB test. This test is sensitive to ADB activity and may produce invalid results if ADB activity occurs.

10. If you want a record of the test results, save or print the test log before quitting. When testing is complete, quit *Apple TechStep Test.*

11. Switch off the Macintosh and Apple TechStep.

12. Connect the following ports with the appropriate cables:

Apple TechStep Port	**Macintosh Port**
printer	modem or printer
ADB2	either ADB

    Switch on the Macintosh and start up *Apple TechStep Test* again.

13. Select **Test set 2**.

14. Click **Start**.

15. Switch on Apple TechStep when the message **Looking for Apple TechStep** appears in the status box.

Running Individual Tests

To run an individual test, select the test by clicking its checkbox. The diagram in the main window indicates what cable(s) the test requires. Remember to switch off the Macintosh and Apple TechStep before changing cables.

Looping Tests

Click the loop button to run tests in continuous (looping) mode. When you select the loop button, a loop counter appears in a box below the button to tell you how many times the test has run. Looped tests stop when the first failure encountered.

❖ Note

Close the test log window when running tests in looping mode. Otherwise, testing will stop when the test log is full.

Test Results

Except for the battery and AC adapter tests, all tests give pass/fail results. The battery and AC adapter tests display the voltage levels of the battery and AC adapter, respectively. The battery should provide 6.5 volts or more. The AC adapter should provide 8.7 volts or more.

If a Test Fails

If a test fails, verify that the correct interface ports are connected. Refer to the diagram in the main window of *Apple TechStep Test.*

If the cable setup is correct, swap the appropriate modules for the failure indicated: ROM packs, port pack, AC adapter, or battery. If swapping does not solve the problem, return Apple TechStep to Apple for replacement.

If the battery voltage is below 6.5 volts, replace the battery. If the AC voltage is below 8.7 volts, return the AC adapter to Apple.

Saving the Test Log

To save the test log:

1. Select **Save As** (or **Save**) from the *Report Generator* File menu.
2. Edit the file name (if you desire) and click **OK**.

Printing the Test Log

To print the test log:

1. Verify that you selected a printer in the Chooser.
2. Select **Print** from the File menu. The standard print options dialog box appears.
3. Select print options and click **OK**.

On-Line Help

Select **Help** (command-?) from the Options menu for assistance with *Apple TechStep Test.*

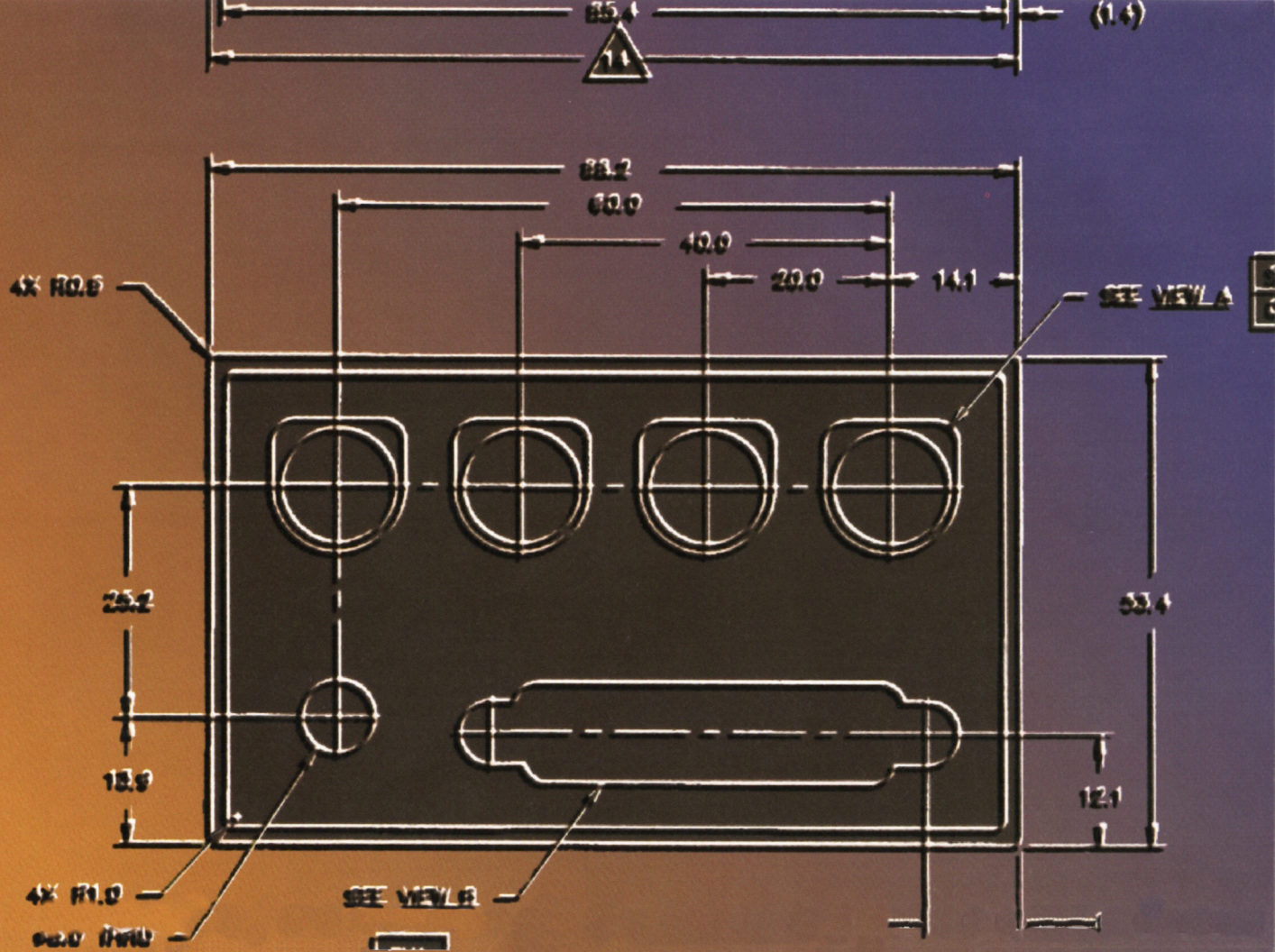
Apple TechStep Problems

If you encounter difficulties using Apple TechStep, refer to the symptom table below. You can use *Apple TechStep Test* to verify that Apple TechStep works correctly. For *Apple TechStep Test* instructions, refer to "Apple TechStep Test" earlier in this chapter.

Message Displayed When You Switch Apple TechStep On	**Action**
No ROMpack found	– Switch power off and insert a ROM pack. If a ROM pack is already inserted, remove and reinsert it. If the **No ROMpack found** message appears again, run the extended power-on self-test. If the ROM pack fails the checksum test, replace the ROM pack.
POST xx: LOGIC 1	– Return Apple TechStep to Apple for exchange.
POST xx: LOGIC 2	– Return Apple TechStep to Apple for exchange.

LED Pattern When You Switch Apple TechStep On	**Action**
LED flashes twice	– Return Apple TechStep to Apple for exchange.
LED flashes three times	– Return Apple TechStep to Apple for exchange.
LED flashes four times	– Return Apple TechStep to Apple for exchange.

LED flashes five times	– Return the defective ROM pack to Apple for exchange.
LED flashes on for 1/2 second, off for 1/2 second	– Return Apple TechStep to Apple for exchange.
LED glows during use	– If you need to keep the current test logs, save the logs to their ROM packs or send the logs to the *Report Generator* program. Replace the battery as soon as possible.


85.4
(1.4)
88.2
60.0
40.0
20.0
14.1
4X R0.6
SEE VIEW A
25.2
33.4
13.9
12.1
4X R1.0
SEE VIEW B

Appendix

The Appendix contains Apple TechStep specifications and a glossary.

Specifications

Technical

Processor
Motorola MC68HC11E9, 8-bit microcontroller

Display
4-line-by-16-character supertwist liquid crystal diode (LCD)

ROM pack
Stored memory device using a 256K PROM (64K x 8-bit) and a 256-byte serial electrically erasable programmable read-only memory (EEPROM) device. Mates with Apple Tech-Step through a 40-pin socket connector.

Port pack
Peripheral port, 80-pin socket connector

Keypad
15-key matrix of custom silicone rubber

Electrical

Power adapter
Input: 120 volts, 60 Hz AC (US and Canada)
100 volts, 50 Hz AC (Japan)
240 volts, 50 Hz AC (Europe)
220 volts, 50 Hz AC (UK)
240 volts, 50 Hz AC (Australia)

Output: 9 volts DC, 500 mA

Battery
9-volt alkaline

Low-battery LED
Light-emitting diode (LED) indicates low-battery condition

Power requirements
2.5 watts maximum

Environmental

Operating temperature: 50° to 122° F (10° to 50° C)

Storage temperature: -4° to 140° F (-20° to 60° C)

Relative humidity: up to 90% at 102° F (40° C)

Physical

Length: 9.5 inches (24 cm)

Width: 4.25 inches (10.5 cm)

Height: 2.18 inches (6 cm) (at rear of case)

Weight: 1 pound, 8 ounces (0.68 kg)

Glossary

Additional information screen – Provides test result information that will not fit on one page. When prompted, press *0* to display the additional information.

Apple TechStep Test – A Macintosh-based application that provides a complete test of Apple TechStep (including the port pack, ROM packs, and interface cables).

Built-in serial port – A serial port that supports communication with Apple TechStep, regardless of the port pack installed. The built-in serial port is located next to the AC adapter jack.

Dialog screen – A screen that asks the user for input. Dialog screens appear when Apple TechStep needs further information to implement a test or function you have chosen.

Extended message – Additional words or error codes on a "test failed" screen that provide details about the failure.

Looping mode – Looping repeatedly executes the selected tests. Looping helps locate intermittent failures.

Low-battery indicator – Indicates when battery power is low. Flashes if Apple TechStep fails a power-on self-test.

Menu screen – Menu screens display a list of numbered selections (such as tests).

Pass/fail test message – Indicates whether the test passed or failed.

Port pack – A removable connector block that interfaces Apple TechStep to the device to be tested.

Real-time measurement – Voltage measurements (battery or power supply, for example). The measurements are taken repeatedly (several times per second) until the user presses *stop* or *back*. The value logged is the last value measured.

Report Generator – Macintosh-based application for printing and saving test logs.

ROM pack – A removable cartridge containing ROM and EEPROM. The ROM contains the software to test specific computers and peripheral devices. The EEPROM provides storage for a test log.

Sleep mode – To prolong battery life, Apple TechStep sleeps if no activity occurs for five minutes.

Test logs – Provide a record of test results.

Test results screen – Displays the results of completed tests and measurements.

Unit Under Test (UUT) – The device being tested.

This Apple manual was written, edited, and composed on a desktop publishing system using Apple Macintosh computers. Proof pages were created on Apple LaserWriter® II printers. Final pages were created on a Linotronic 300. Four-color graphics were created on a Scitex Dolev. The following software programs assisted in the creation of this manual: Adobe Illustrator® and PhotoShop™, Frame Technology FrameMaker®, Microsoft® Word, QuarkXPress®, and Preferred Publishing Exposure Professional™.

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2025 Mariani Avenue
Cupertino, California 95014

Printed in U.S.A.
072-0271-A