

Chapter 1

Product Information

1.1 Introduction

This manual contains information to help you troubleshoot and repair the HP 110 Portable Computer. Using the information in this manual, you can repair the HP 110 at the assembly level or at the component level.

The manual is divided into nine chapters:

- A description of the HP 110 (chapter 1).
- Installation information (chapter 2).
- An explanation of how the HP 110 works (chapter 3).
- Steps for troubleshooting and repair to assembly level and component level (chapter 4).
- Procedures for removing and replacing HP 110 assemblies (chapter 5).
- Lists of replaceable parts (chapter 6).
- Reference information (chapter 7).
- Product updating information (chapter 8).
- Diagrams (chapter 9).

Information about test equipment is included in section 1.6.

1.2 Description

The HP 110 Portable Computer is a battery-powered computer with a full-sized keyboard and a liquid-crystal display (LCD). The display shows 16 80-character lines of alpha information or 480-by-128 dots of graphic information. The display angle can be adjusted by tilting the hinged top case. The display contrast can be adjusted by pressing the contrast key.

Memory consists of 272K bytes of random-access memory (RAM) and 392K bytes of read-only memory (ROM). An "electronic disc" occupies 208K bytes of RAM (the mass storage RAM). (The user can configure the "electronic disc" to occupy more or less RAM.) An EPROM (erasable, programmable ROM) provides 8K bytes of ROM that contains specialized system information.

The HP 110 provides three external connections for input/output (I/O) operations: an HP-IL (Hewlett-Packard Interface Loop) interface, a serial interface (RS-232-C compatible), and a 300-baud direct-connect modem (except version B—see below).

The computer is powered by a sealed 6-volt lead-acid battery. The battery is recharged using an external ac recharger.

The HP 110 is available in several versions (refer to table 1-1). The “A” versions include a 300-baud direct-connect modem. The “B” versions have no modem.

Table 1-1. HP 110 Versions

Version	Order Number*	Keyboard†	Modem
A (U.S.)	45710A	U.S.	Yes
AL (Canada)	45710AL	U.S.	Yes
BK (International)	45710BK	U.S.	No
BD (Germany)	45710BD	German	No
BF (France)	45710BF	French	No
BZ (Italy)	45710BZ	Italian	No
BU (U.K.)	45710BU	U.K.	No

* The order number is shown on the bottom label of the HP 110 for versions A and AL. For all B versions, the bottom label shows “45710B”—press (Shift)/(CTRL)/(Break) simultaneously to momentarily display the version code (at the end of the serial number), which is used to form the order number.

† Keyboard layouts are shown in figures 9-13 through 9-17.

1.3 Specifications

The specifications for the HP 110 are listed in table 1-2.

Table 1-2. HP 110 Specifications

Physical Properties
<ul style="list-style-type: none"> • Dimensions: 33.0 × 25.4 × 7.3 cm (13.0 × 10.0 × 2.9 inches) closed. • Weight: 4 kilograms (8½ pounds) with battery.
Power Requirements
<ul style="list-style-type: none"> • Battery type: 6-volt, sealed, three-cell, lead-acid battery. • Battery voltage: 6.3 to 6.5 volts (fully charged). • Battery capacity: 2½ ampere-hours. • Recharging time: 95 percent charged in 12 hours if turned off, 20 hours if turned on. • Consumption: 160 mA typical (power-up, running). 280 µA typical (power-down).

Table 1-2. HP 110 Specifications (Continued)**Environmental Limits**

- Operating temperature: 0 to 45°C (32 to 113°F).
- Storage temperature: -25 to 55°C (-13 to 131°F).
- Humidity: 5 to 95 percent relative humidity (noncondensing).
- Altitude (unpressurized conditions): 4600 meters (15,000 feet) power-up.
15,000 meters (50,000 feet) power-down.

Display

- Type: liquid-crystal display.
- Area: 24 × 7 cm (9.5 × 2.8 inches).
- Refresh rate: 43.4 Hz.
- Contrast: adjustable via keyboard.
- Alpha formats: 16 lines by 80 characters.
- Graphic format: 480 by 128 dots.

Keyboard

- Design standard: Hewlett-Packard ITF (Integrated Terminal Family).
- Style: full-sized, low-profile keyboard.
- Keys: 76 short-stroke keys.
- Functionality: alphanumeric, display control, edit, special function, function control, and terminal control.

Memory

- ROM: 392K bytes.
- RAM: 272K bytes.
- Display RAM: 8K bytes.

HP-IL Interface

- HP 110 default status: controller.
- Cables: refer to paragraph 1.5.
- Uses: disc drive, printer, plotter, modem, etc.

Serial Interface

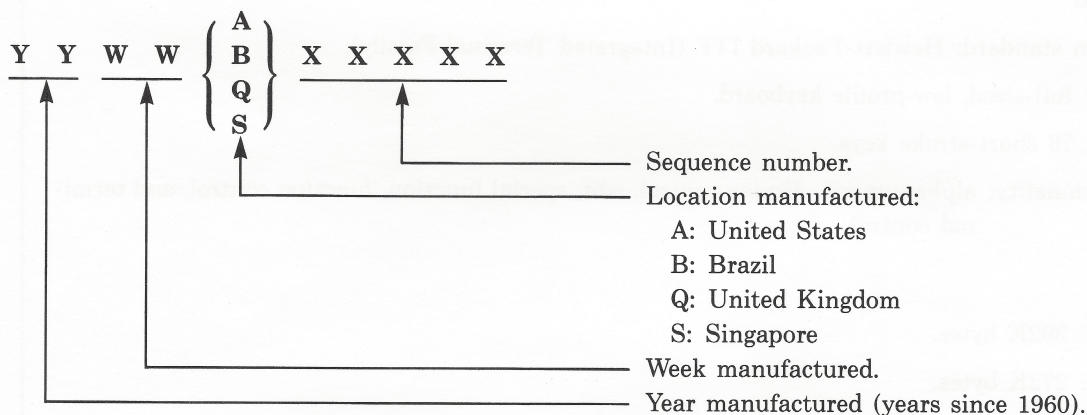
- Compatibility: RS-232-C standard.
- Selections: baud, parity, word size, handshake, echo.
- Baud rates: 50, 75, 110, 135, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, 19200.
- Connector: Female 9-pin D-subminiature.
- Cables: refer to paragraph 1.5.
- Uses: printer, modem, etc.

Table 1-2. HP 110 Specifications (Continued)**Modem ("A" versions only)**

- Compatibility: Bell 103/113 protocol.
- Operation: full-duplex, asynchronous.
- Baud rate: 300.
- Modes: Originate or Answer.
- Dialing: pulse or tone.
- Answering: automatic or manual.
- Ringer equivalence: 1.3B.

1.4 Identification

The serial number of the HP 110 is used for identification and determination of warranty status. It's located on the bottom case. Its format is described below.



1.5 Accessories

The following accessories are available for the HP 110:

- HP-IL cables
 - ½ meter (1½ feet)—model HP 82167A.
 - 1 meter (3 feet)—model HP 82167B.
 - 5 meters (16 feet)—model HP 82167D.
- Serial interface cables (with 25-pin D-subminiature connector)
 - Modem (DCE) cable (male connector)—model HP 92221M.
 - Printer (DTE) cable (male connector)—model HP 92221P.
- Serial interface adapters (25-pin D-subminiature connectors)
 - Female adapter (for converting interface cable)—model HP 92222F.
 - Custom wiring kit (male and female connectors for customizing interface cables)—model HP 92222W.
- Rechargers (refer to table 4-11).

1.6 Test Equipment

Table 1-3 lists tools and equipment needed to repair the HP 110. The list includes the tools you'll need for troubleshooting and for removing and replacing bad assemblies and components, as described in chapters 4 and 5.

Table 1-3. Recommended Tools and Equipment

HP Part/Model Number	Description
00090-60904*	Diagnostic module.
00090-60910*	Keyboard extension cable.
00090-60915*	Service battery assembly.
00090-60905‡	Service disc.
HP 9114	Disc drive.
00090-60914*	RS-232 test connector.
82167-60001*	HP-IL cable, ½ meter.
HP 6216B†	Power supply, 25 Vdc, 50 mA.
HP 5005A†	Signature analyzer—optional.
00090-90044‡	<i>HP 110 Signature Analysis Service Supplement.</i>
HP 180C/1801A/1820C†	Oscilloscope.
HP 10004†	Oscilloscope probe.
8710-1422	Torx® driver, T-8 bit.
8710-1418	Torx® driver, T-10 bit.
8710-1413	Handle for hex bits.
8710-1425	Extension for hex bits—optional.
8710-1220	Hex driver, 5.5 mm.
8710-1590	Hex driver, 10 mm.
8730-0008	Flat-blade screwdriver
8710-0948	Pozidriv® screwdriver
8690-0129	Soldering tool.
8690-0132	Soldering tool stand.
8690-0344	IC desoldering tool—optional.
8700-0003	X-acto® knife.
8700-0006	X-acto® knife blade.
* Included in expensed tool package (00090-67801).	
† Or equivalent.	
‡ Included in service documentation package (00090-60909).	

1.6 Test Equipment

This section lists the test equipment needed to repair the HP 110. The list includes the tools you'll need for troubleshooting and for testing and repairing test equipment and components as described in chapters 1 and 2.

Table 1-1 Recommended Tools and Equipment

HP Part/Model Number	Description
0020-0004	Diagnostic module
0030-0000	Keyboard extension cable
0000-0000	Service battery assembly
0000-0000	Service disc
HP-9113	Disc drive
0030-0001	HP 110 test connector
0010-0001	HP 110 cable 19-pin
HP-0010B	Power supply 15 Vdc 20 mA
HP-0001A	Agilent oscilloscope—optional
0000-0001	HP 110 Diagnostic Assistant Service Guidebook
HP 1000/1001A/1002	Oscilloscope
HP 1000T	Oscilloscope probe
8110-1432	Test driver 1.5-in
8110-1433	Test driver 1.5-in
8110-1434	Transfer test box
8110-1435	Transfer test box—optional
8110-1436	Test driver 1.5-in
8110-1437	Test driver 1.5-in
8110-0000	Flat-plate screwdriver
8110-0001	Rounder screwdriver
8500-0110	Releasing tool
8500-0111	Releasing tool stand
8500-0112	Releasing tool—optional
8100-0000	X-acto knife
8100-0001	X-acto knife blade

* Included in optional test kit (HP-1000T)

† HP suggested

‡ Included in test kit (HP-1000T)