Series 9800 Desktop Computers

HP 9825
Operating and Programming Reference

HEWLETT PACKARD

HP 9825 Desktop Computer
Operating and Programming Reference

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Hewlett-Packard Desktop Computer Division
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Printing History

New editions of this manual will incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged into the manual by the user. Each updated page will be indicated by a revision date at the bottom of the page. A vertical bar in the margin indicates the changes on each page. Note that pages which are rearranged due to changes on a previous page are not considered revised.

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

May 1980...First Edition.
June 1980...Updated pages: D-5, D-6, Disc Programming insert.
November 1980...Second Edition. Revised pages: v, 1-8, 1-10, B-1 thru B-23, C-1 thru C-10, D-9, D-10.
June 1983...Third Edition.

Your Operating and Programming Reference

This reference describes installing, operating and programming an HP 9825A or 9825B Desktop Computer. The 9825B contains all features of its predecessor, the 9825A. In addition, the 9825B has many optional language modules (ROMs) built-in and can be configured with up to 62 Kbytes of read/write memory.

This reference replaces these earlier 9825A manuals:

- 9825A Operating and Programming (09825-90000)
- String Variables Programming (09825-90020)
- Advanced Programming (09825-90021)
- Systems Programming (09825-90027)

Although the information is the same, it's arranged here for easy access and allows us to provide better documentation updating in the future. You'll find a complete index to topics in both this reference and the I/O Control Reference at the back of each binder.

This reference also provides room for the optional language ROM manuals currently useable with the 9825A and 9825B:

- Matrix Programming (09825-90022)
- Disk Programming (09885-90000 or 09825-90220).

Since the 9825A and 9825B are often referred to as calculators, computers and desktop computers, these terms are used interchangably throughout this reference.

We welcome your comments and suggestions for improving HP user documentation. You'll find a card at the back of this reference. If it's missing, address your comments to:

Hewlett-Packard Company
3404 E. Harmony Road
Fort Collins, CO 80525
ATTN: User Documentation

Reference Preview

Chapter 1: Installation

Covers installing your new desktop computer and describes accessories and services available for your computer.

Chapter 2: Keyboard Operations

Introduces you to the keyboard functions including editing keys, math operations, special function keys and system command keys. If you are not familiar with the 9825, please read this chapter before starting to program.

Chapter 3: HPL Programming

Describes the standard 9825 High-speed Programming Language (HPL). Each statement and function is presented, along with typical example program lines. You'll also find a brief introduction to programming in HPL.

Chapter 4: Advanced Programming

Explains the advanced programming language: for-next loops, subprograms with parameter passing, split and integer data storage and program cross-referencing. Each statement and function is covered, accompanied by many example program sequences.

Chapter 5: Tape Cartridge Operations

Shows how to use the built-in tape drive for program and data storage. The statements and commands covered here can also be used to control external 9875A Tape Drives.

Chapter 6: String Variables

Describes the statements and functions available for handling alphanumeric data, using either simple string variables or string arrays.

Chapter 7: Systems Programming

Covers the language extensions available with the large memory (9825T), including remote keyboard operation, terminal emulation, and program self-modification.

You'll find reference tables, a complete list of HPL syntax, all error codes and an index at the back of the reference. For a table of contents to each chapter, look under the appropriate tabbed divider.

9825B User Documentation

The standard set of 9825B manuals is listed here. The first three manuals can be ordered as the 9825B Manual Kit, 09825-87901.

Operating and Programming Reference (09825-90200) – Explains installation, keyboard and tape cartridge operations, and the HPL programming language. Additional chapters cover the Advanced Programming, String Variables and Systems Programming language extensions.

I/O Control Reference (09825-90210) – Describes the interfacing and peripheral-control operations built into the 9825B: General I/O, Extended I/O, and HP 9862A/9872A Plotter control. the 9825 Interfacing Concepts Guide is included with this reference. Space is provided for keeping interface manuals and interface operating notes.

9825A/B Pocket Reference (09825-90012) – Lists all HPL syntax and error codes in a handy, pocket-size format.

9825A/B System Test Booklet (09825-90037) – Explains how to run each mainframe and peripheral test supplied on the 9825 System Test Cartridge.

9825A/B Error Codes Booklet (09825-90015) – Error codes listed in a small booklet kept under the computer's paper-access lid.

Matrix Programming (09825-90022) – Describes the HPL language extensions available with the optional Matrix ROM.

Disc Programming (09825-90220) - Explains controlling HP Disc Drives via the HPL language extensions supplied with the optional 98217A or 98228A Disc ROM. This manual replaces the 9885 Disc Programming Manual, 09885-90000.

Peripheral Operating Notes

Each of the following notes is shipped when you order the appropriate interface card or HP computer peripheral. Each 98032A Interface note shows the interface wiring configuration for a particular interface application. Most notes contain detailed programming instructions for the system application. These operating notes are currently available:

- 9863A Tape Reader Operating Note (09825-90041)
- 9864A Digitizer Operating Note (09825-90042)
- 9866A/B Printer Operating Note (09825-90043)
- 9869A Card Reader Operating Note (09825-90044)
- 9871A Printer Operating Note (09825-90045)
- 9883A Tape Reader Operating Note (09825-90046)
- 9884B Tape Punch Operating Note (09825-90047)
- 9881A Printer Operating Note (09825-90048)
- 6940A Multiprogrammer Operating Note (09825-90049)
- 98035A Real Time Clock Operating Note (09825-90054)
- 9875A Tape Cartridge Memory Operating Note (09825-90075)

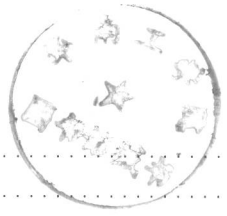
Interface Manuals

These 9800-series interfaces and manuals are currently available:

- 98032A Parallel I/O Interface Installation and Service (98032-90000)
- 98033A BCD Interface Installation and Service (98033-90000)
- 98034A HP-IB Interface Installation and Service (98034-90001)
- 98035A Real Time Clock Installation and Service (98035-90000)
- 98036A Serial I/O Interface Installation and Service (98036-90001)
- HP 9878A I/O Expander Installation and Service (09878-90000)

A brief description of each interface is in your 9825B I/O Control Reference. More complete information can be found in the Interfacing Concepts guide supplied with the I/O Control Reference.

Chapter 1
Table of Contents



Notes

Chapter 1
Installation

Inspection Procedure

The individual parts of your computer system were thoroughly inspected before they were shipped to you. All equipment should be in good operating order. Carefully check the computer, plug-in ROMs and peripheral equipment for any physical damage sustained in transit. Notify HP and file a claim with the carrier if there is any such damage.

Please check to ensure that you have received all of the items which you ordered and that any options specified on your order have been installed. The options installed are listed on a label under the computer's paper-access cover.

NOTE

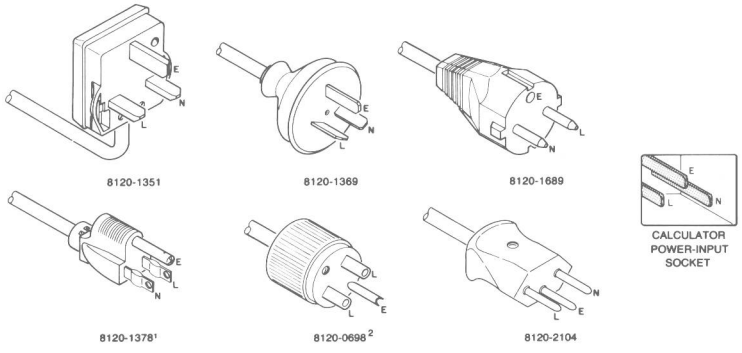
The standard 9825B is configured with 24 Kbytes of read/write memory and 9872 Plotter operation. If you wish to configure the system for 9862A Plotter operation or a larger memory, contact your HP Service Representative for assistance.

Also inventory the items in the Manuals Kit (09825-87901) and the Miscellaneous Kit (09825-80003). A pack list is supplied in each kit.

If you have any difficulties with your system, if it is not operating properly, or if any items are missing, please contact your nearest HP Sales and Service Office.

Power Cords

Power cords with different plugs are available for the calculator; the part number of each cord is shown below. Each plug has a ground connector. The cord packaged with each calculator depends upon where that calculator is to be delivered. If your calculator has the wrong power cord for your area, please contact your local HP sales and service office.



L = Line or active Conductor (also called "live" or "hot").
N = Neutral or Identified Conductor.
E = Earth or Safety Ground.

To protect operating personnel, we recommend that the computer be properly grounded. The computer is equipped with a three-conductor power cable which, when connected to an appropriate power receptacle, grounds the computer. Do not operate the computer from an ac power outlet which has no ground connection.

[1]UL and CSA approved for use in the United States of America and Canada with calculators set for either 100 or 120 Vac operation.

[2]UL and CSA approved for use in the United States of America and Canada with calculators set for either 220 or 240 Vac operation.

Power Requirements

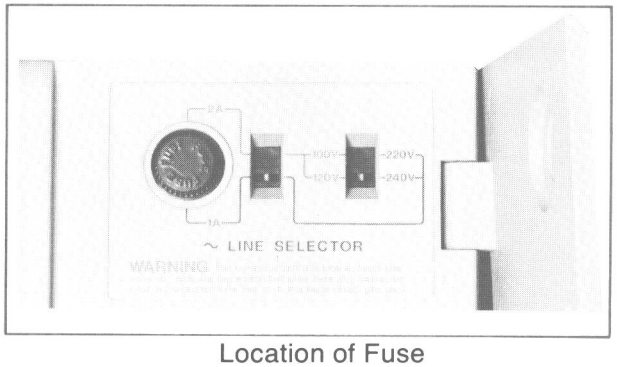
The 9825 Computer has the following power requirements.

- Line Voltage: 100 Vac + 5%, −10%
  120 Vac + 5%, −10%
  220 Vac + 5%, −10%
  240 Vac + 5%, −10%
  } Switch Selectable
- Line Frequency: 48 to 66 Hertz
- Power Consumption: 100V @ 2.0A
  120V @ 1.8A
  220V @ 0.8A
  240V @ 0.8A

Fuses

For 100 or 120 Vac operation, use a 3A fuse; for 200 or 220 Vac operation use a 1.5A fuse.

> WARNING
> TO AVOID THE POSSIBILITY OF SERIOUS INJURY, DISCONNECT THE AC POWER CORD BEFORE REMOVING OR INSTALLING A FUSE.

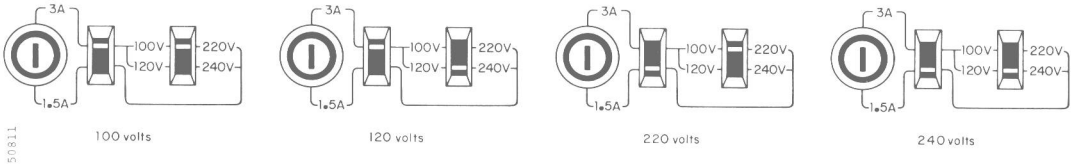


Location of Fuse

The figure shows the location of the fuse under the paper cover. To change the fuse, first disconnect the power cord to the calculator. Then remove the fuse cap by pressing inward while twisting it counterclockwise. Remove the fuse from the cap and insert the correct replacement fuse (either end) into the cap. Finally, put the fuse and cap back into the fuse holder. Press on the cap and twist it clockwise until it locks in place.

Initial Turn-On Instructions

1. With the calculator disconnected from its ac power source, check that the proper calculator fuse has been installed for the voltage in your area (see previous section).
2. Next, ensure that the two voltage selector switches under the paper cover are set for the correct powerline voltage. The figure below shows the correct settings for each nominal line voltage. If it is necessary to alter the setting of either switch, insert the tip of a small screwdriver into the slot on the switch. Slide the switch so that the position of the slot corresponds to the desired voltage, as shown below.

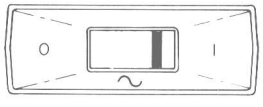


Nominal Line Voltage Settings

3. The operating system module on the right-hand side of the 9825A calculator must be inserted so that it is even with the side of the calculator.
4. Install the desired ROM cards and interface cards. See the next page and refer to the appropriate manual for interface installation.

> CAUTION
> ALWAYS TURN OFF THE CALCULATOR WHEN INSERTING OR REMOVING ROMS AND INTERFACES. FAILURE TO DO SO COULD DAMAGE EQUIPMENT.

5. Connect the power cord to the power input connector on the back of the calculator. Plug the other end of the cord into the ac power outlet.
6. Switch the calculator on using the switch on the right-hand side of the calculator.



Computer Testing

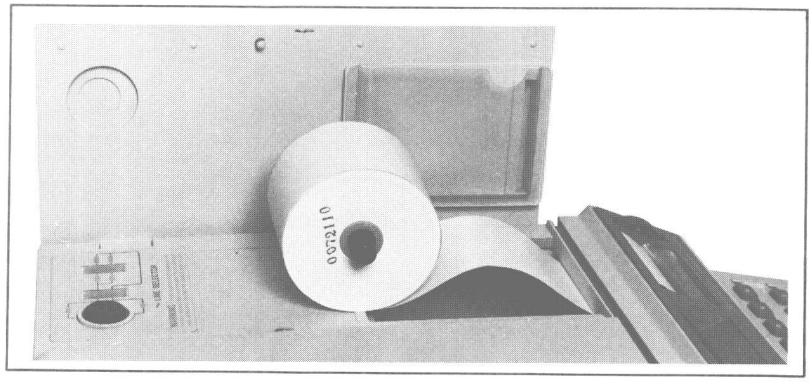
If you wish to test your calculator, or if there is any doubt that your calculator is operating correctly, refer to the System Test Booklet for the calculator test procedure.

Loading Printer Paper

The internal printer uses special heat-sensitive (thermal) paper. When ordering paper, specify the six-roll pack, HP part number 9270-0479.

To load a roll of paper:

1. Lift the paper cover and remove the paper spindle. Discard the old paper core and remove any paper left in the printer using the paper advance wheel.
2. Install the new roll as shown in the following figure.
3. Insert the free end of the paper and advance it through the printer using the paper advance wheel.



Loading Printer Paper

CAUTION

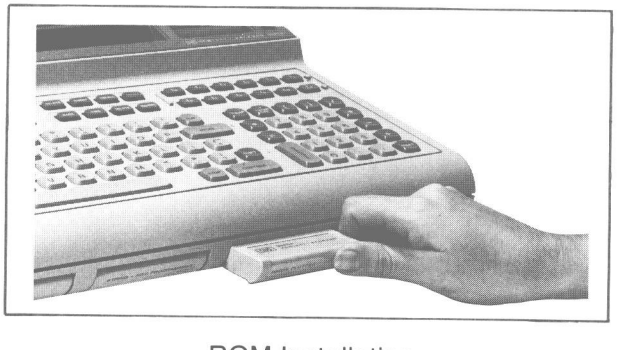
HP THERMAL PRINTER PAPERS ARE DESIGNED SPECIFICALLY FOR USE WITH HP DESKTOP COMPUTERS. USE OF OTHER PAPERS MAY DAMAGE THE PRINTER. TO MAINTAIN A VALID WARRANTY OR SERVICE CONTRACT AND ENSURE PROPER PRINTER OPERATION, USE ONLY HP THERMAL PAPER.

Accessory ROMs

Several ROMs (Read Only Memories) are available for your computer; each provides additional language capabilities to perform specific tasks such as plotting, controlling peripherals or extending the programming capabilities. One or more ROMs are packaged in a ROM card.

ROM Installation

A ROM card can be plugged into any one of the four ROM slots on the bottom front of the calculator as shown below.



ROM Installation

To install a ROM, first turn off the calculator. Then slide the ROM, with the label right-side-up, through the ROM slot door. Press it in so that it is even with the front of the calculator.

The ROMs listed below are an internal part of the 9825B Computer. They can be purchased in various combinations for the 9825A.

String Variables ROM

This ROM enables the calculator to recognize and operate on letters and words ("strings") in much the same way that it recognizes and operates on numbers. Some of the capabilities which are provided include: single strings and string arrays, numeric value of a string of digits, concatenation, and displaying or printing all special characters.

Advanced Programming ROM

This ROM extends the programming capabilities of the 9825 Calculator. For/next looping, split and integer precision number storage, multiparameter functions and subroutines, and the cross reference statement are the operations provided by the Advanced Programming ROM.

9862A and 9872A Plotter ROMs

These ROMs enable the 9825 to control HP 9862A and 9872A Plotters. Axes can be drawn and labeled; functions can be plotted; and in the "typewriter" mode, characters can be printed as you type them from the keyboard. More than one plotter can be operated at the same time with each ROM.

General I/O ROM

The General I/O ROM provides basic I/O capability with formatting. Most 9800 series peripherals (not the 9862A Plotter) can be controlled using this ROM. Binary I/O, status checking, and limited control of instruments via the HP Interface Bus are also provided.

Extended I/O ROM

The Extended I/O ROM extends the I/O capability of the calculator by providing complete HP-IB control, bit manipulation and testing, auto-starting, error trapping, and interrupt capabilities.

These ROMs are available for 9825A and 9825B Computers:

Matrix ROM

The Matrix ROM extends the language to include statements for manipulating matrices and arrays. Addition, subtraction, multiplication, and division of arrays, as well as inversion, transposition, and determinants of matrices are only some of the capabilities provided by this ROM.

Disk ROMs

The HP 98217A Disk ROM adds HPL language statements and functions for controlling HP 9885M and 9885S Flexible Disk Drives. Each 9885 Drive handles a ½ megabyte flexible disk. Both data and programs can be stored in a random-access, file-by-name structure. Up to eight 9885M (master) drives can be accessed. Up to three 9885S (slave) drives can be accessed via each 9885M.

The HP 98228A Disk ROM provides HPL language for controlling both HP 9885 and HP 9895 Disk Drives. Each 9895 handles one or two 1.2 megabyte flexible disks. The 98228A ROM can be used only with a 9825T computer.

Systems Programming ROM

This ROM add capability for remote keyboard operation, program self-modification, intelligent terminal emulation and run-time memory allocation. This ROM is available as the 98224A plug-in card for 9825A. The ROM is added to the 9825B with the large memory option (9825T).

Cleaning the Computer

The computer case has been painted with a long lasting, water-based paint. It is both non-toxic and environmentally safe. It will preserve the appearance of your computer for many years. When you want to clean the case, follow the instructions below to sustain the quality finish. If the case finish should become damaged, ask your local Hewlett-Packard sales and service office for touch-up paints.

CAUTION

CHEMICAL SPRAY-ON CLEANERS USED FOR APPLIANCES AND OTHER HOUSEHOLD OR INDUSTRIAL APPLICATIONS MAY DAMAGE THE CASE FINISH. DO NOT USE DETERGENTS THAT CONTAIN AMMONIA, BENZENES, CHLORIDES OR ABRASIVES.

Before cleaning the computer, disconnect the power cord and any interconnecting cables. Dampen a clean, soft, lint-free cloth in a solution of clean water and mild soap. Wipe the soiled areas of the case, ensuring that no cleaning solution gets inside the unit. For cleaning more heavily soiled areas, a solution of 80% clean water and 20% isopropyl alcohol may be used. Then dry the case with a dry, soft, clean cloth. A non-abrasive eraser may be used to remove pen and pencil marks.