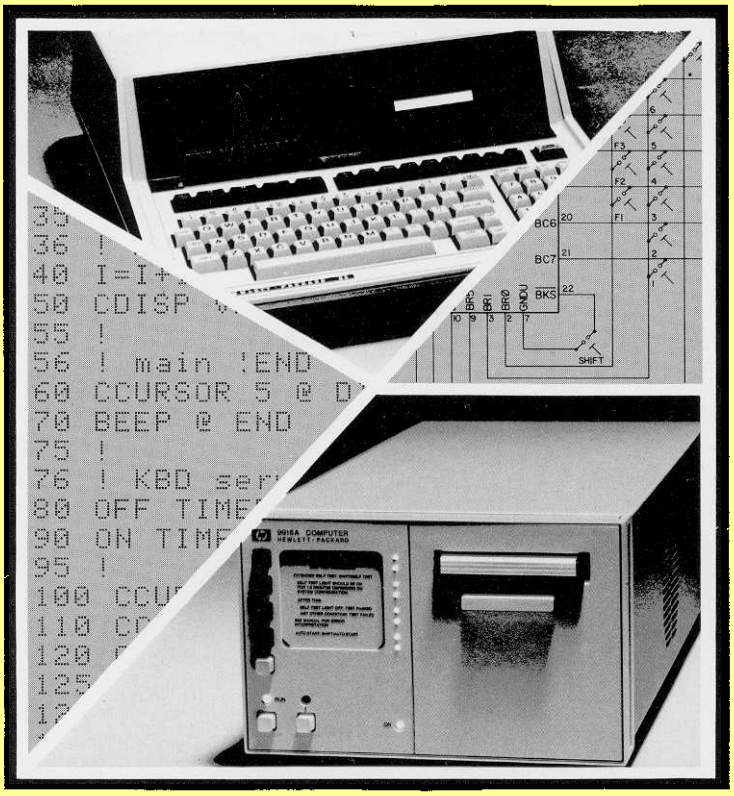
HP 9915
System Development Manual



HEWLETT
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HP 9915A Modular Computer System Development Manual

Manual Part No. 09915-90010
Microfiche No. 09915-99010

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.

January 1981...First Edition

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Introduction

This manual serves as the **main document** of the HP 9915 manual set; it describes each manual in the set and ties the information together. It also describes the language enhancements provided by the Program Development ROM. The other manuals "fill in the details" of the mainframe language, the I/O language, hardware design of keyboards, requirements of an external CRT display, external system control and status line specifications, and additional program-file operations. This manual will guide you through the manual set as you need the information as you are designing your system.

HP-85 Description

The HP-85 computer incorporates an interpretive-BASIC operating system, and a built-in thermal printer, CRT display, tape drive and autostart routine. Optional plug-in I/O modules (or cards) and the supporting I/O language statements in the I/O Option ROM are available for the computer. An optional memory module and ROM drawer are also available. The HP-85 can be equipped with the optional I/O and Program Development (PD) ROMs; this is the minimum ROM configuration used while developing programs for the HP 9915.

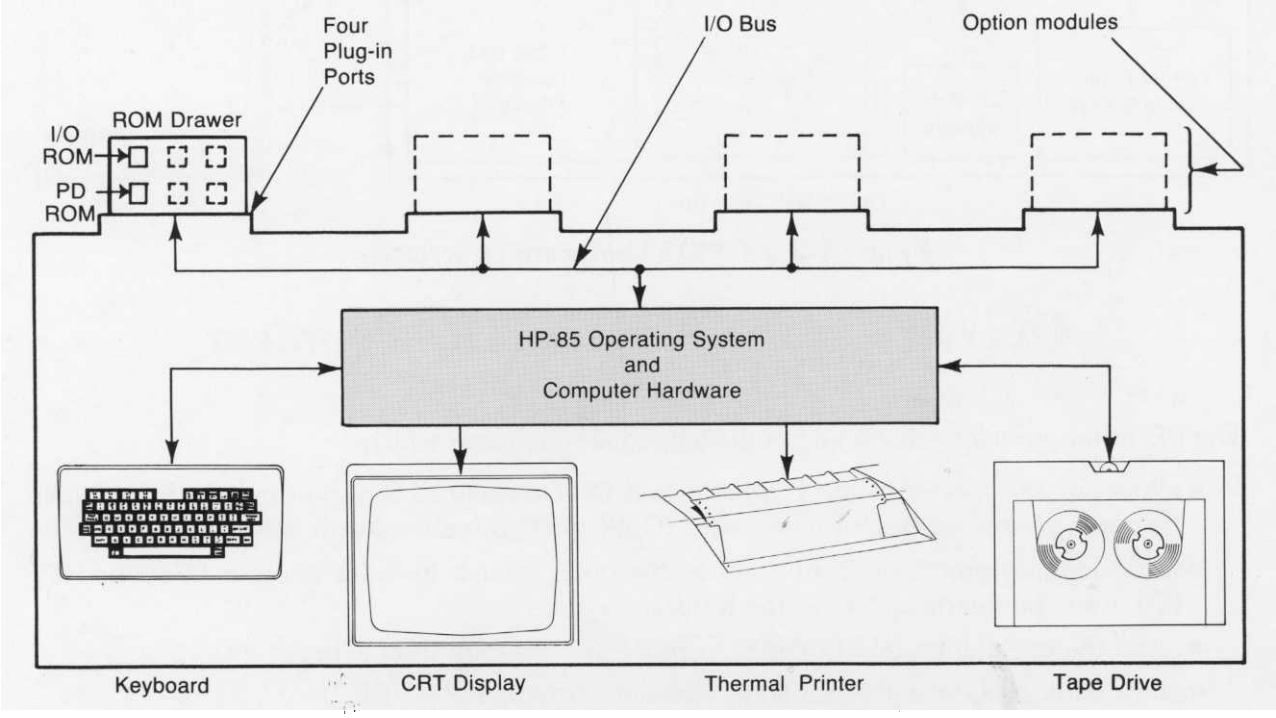

Figure 1-1. HP-85 Computer Block Diagram

HP 9915 Description

The HP 9915, despite its outward differences, has all the capabilities of the HP-85. The 9915 also has features which extend its capabilities beyond those of the HP-85: it is enclosed in a rack-mountable instrument case and has a wider ambient temperature range; it has an extensive, built-in, hardware-test procedure; programs can be stored internally in PROM or externally in other computers; and the 9915 can be controlled by an external computer.

The HP 9915 Modular Computer does not have standard tape drive, CRT, printer, or keyboard. You are free to choose these additional components for your system as needed. The 9915 is shown below to compare it to the HP-85 (see Figure 1-1). Notice that the I/O and PD ROMs are standard features of the 9915.

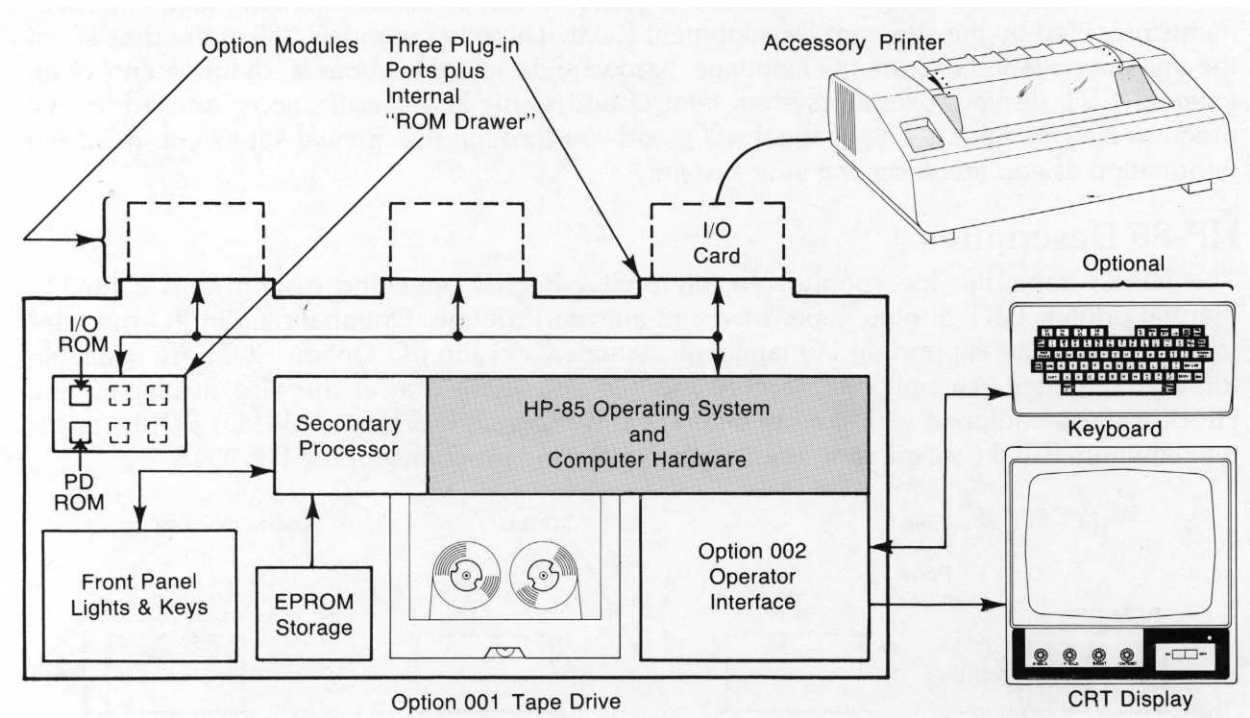

Figure 1-2. HP 9915 Hardware Description

Overview of the Program Development ROM Enhancements

The PD ROM provides additional BASIC-language statements which:

- allow greater control of the keyboard and CRT display so that you may redefine their response characteristics for your needs (Option 002 is required with the 9915)
- allow loading programs from another computer (which includes another 9915 or HP-85), using an interface card as the transfer medium
- allow the use of internal PROM (or EPROM) for program storage in the 9915
- allow control of the eight user lights (simulated on the HP-85 CRT)
- give you lockout control of the SELF TEST and AUTOSTART keys on the 9915
- allow the computer to more completely test its hardware operation

Documentation

This manual describes the following topics: additional language statements provided by the Program Development (or PD) ROM; software development for the 9915 using the HP-85 equipped with the PD and I/O ROMs; hardware and software differences between the two computers; and where to look in the other manuals in the set to find relevant information.

Since the HP-85 and the 9915 have the same operating system, the HP-85 documentation will be used with the 9915. The manual set for the 9915 includes the following 9915 and HP-85 manuals:

- *HP 9915 Installation Manual* [1] (09915-90000)
- *HP 9915 System Development Manual* [1] (09915-90010)
- *Operator Interface Technical Supplement* [1,2] (09915-90021)
- *Networking Technical Supplement* [1,2] (09915-90022)
- *Tape Duplication and EPROM Programming Software Applications Pack* [1] (09915-10010)
- *HP 9915 Service Manual* (09915-90030)
- *HP-85 Owner's Manual and Programming Guide* (00085-90002)
- *HP-85 I/O Programming Guide* (00085-90142)
- Option ROM manuals:
  - *Mass Storage ROM Manual* (00085-90138)
  - *Plotter/Printer ROM Manual* (00085-90140)
  - *Matrix ROM Manual* (00085-90144)
- Interface Card manuals:
  - *HP-IB Interface Card Manual* (82937-90007)
  - *Serial Interface Card Manual* (82939-90007)
  - *GPIO Interface Card Manual* (82940-90007)
  - *BCD Interface Card Manual* (82941-90007)

1 These manuals are available as part no. 09915-87902.

2 These supplements are included in the *System Development Manual* and are available separately.

Manual Contents

HP 9915 Installation Manual — This manual takes the 9915 user from rack-mounting the computer through operational verification procedures. External features, operational specifications, warranty information, rack-mount kits, SELF TEST, and AUTOSTART are some of the subjects covered.

HP 9915 System Development Manual — Again, this manual (which you are reading) is the **main document** of the 9915 manual set. It serves as the guide for system development by describing the Program Development ROM language enhancements and by referencing the other manuals as necessary. Development of 9915 software on the HP-85 is covered, and all differences between the two computers are described.

Operator Interface Technical Supplement — This supplement provides hardware specifications and design examples of components that the designer can add to the 9915 computer system. The components include custom keyboards, CRT displays, external front panel lights and keys, and external speaker. Software examples accompany the designs shown.

Networking Technical Supplement — This supplement provides many examples of using the 9915 as a computer-network element, both as host and node elements. Program transfers (between computers) and use of system status and control lines (accessed with the Operator Interface) are the main topics of this supplement.

Tape Duplication and EPROM Programming Software Applications Pack — This pack, consisting of tape cartridge and documentation, is supplied with both the 98150A and 98150B Program Development kits. The use of the binary programs on the tape cartridge is explained in detail. The binary programs allow duplication of tape files, allow program images to be generated for downloading to other computers and PROM-programming devices, and allow specialized tape-file reading and writing.

9915 Service Manual — This manual describes assembly-level repair of the 9915 computer hardware. The main hardware-diagnosis tool is SELF TEST, which is explained in detail to help service personnel locate hardware failures.

HP-85 Owner's Manual and Programming Guide — Since this manual provides the standard language reference for the HP-85, it serves the same purpose for the the 9915. If you are not familiar with standard HP-85 BASIC, then this is the manual to consult. Fundamentals of computer operation and BASIC programming are described in this manual. Storing programs during development is described here, and is further explained in the *System Development Manual.* Storing programs in EPROMs and other devices is discussed in the *Tape Duplication and EPROM Programming Software Applications Pack.*

Part No. 09915-90010
Microfiche No. 09915-99010

Printed in U.S.A.
First Edition January 1981