

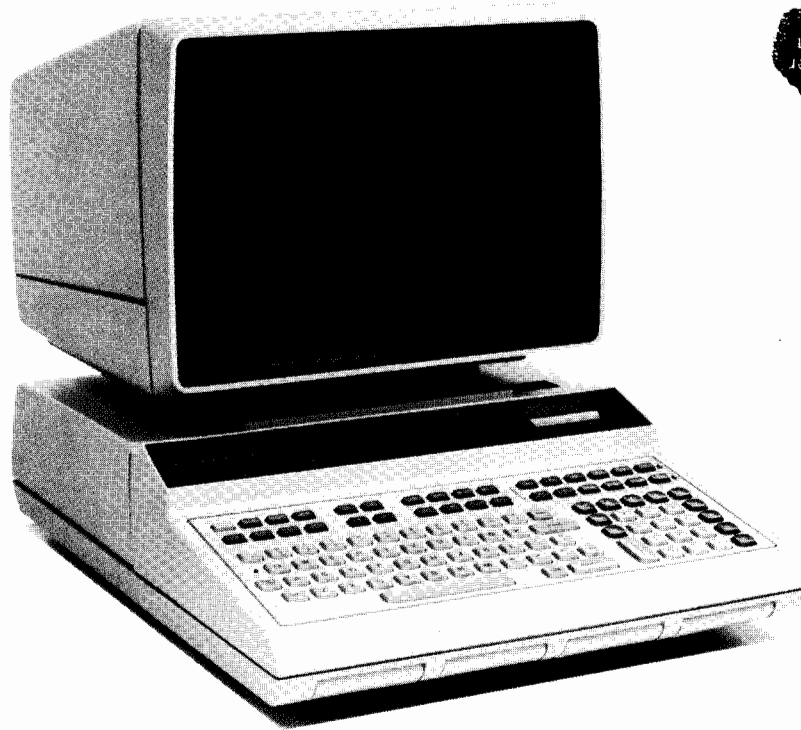
# System 35 Desktop Computer

Owner's Manual



**HEWLETT-PACKARD**

# Owner's Manual



**HP 9835A Desktop Computer**



**Hewlett-Packard Desktop Computer Division**  
3404 East Harmony Road, Fort Collins, Colorado 80525  
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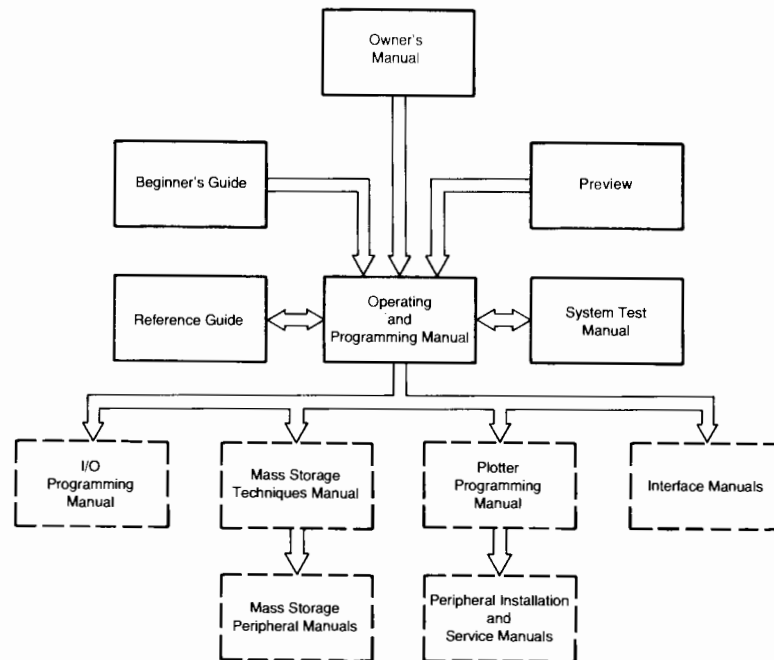
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**For research and education purposes only.**



## System 35 Manual Reference

The following block diagram shows manuals that are included in the System 35 Documentation scheme and suggested progression. Dotted-line borders indicate those manuals available with specific options; solid borders indicate those manuals that are shipped with every System 35.



**Operating and Programming** (09835-90000) for all users. All features of the computer and the language are explained.

**Beginner's Guide** (09835-90001) for the novice programmer. Covers the fundamentals of programming and the BASIC language. The beginner can then progress to the Operating and Programming Manual.

**Preview** (09835-90002) for the experienced BASIC programmer. A brief "demonstration" of the System 35 to introduce the hardware and extensions of the BASIC language.

**Owner's Manual** (09835-90005) for System 35 owners. Covers initial set-up, cleaning the computer, ROMs, the tape cartridge, peripherals, and interfaces.

**Reference Guide** (09835-90010) for all users. A reference to general machine features and all language syntax.

**System Test** (09835-90040) refer to this manual to test your computer or if there is any doubt that it is operating properly.

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# Chapter 1

## About the 9835A/B

### Introduction

The HP 9835A and 9835B Desktop Computers are high-speed, powerful computing and controlling tools. This manual is intended for owners and users of a 9835A or B and contains information concerning the 9835A/B, its options, accessories, maintenance and initial setup. Available peripherals and interfaces are also discussed.

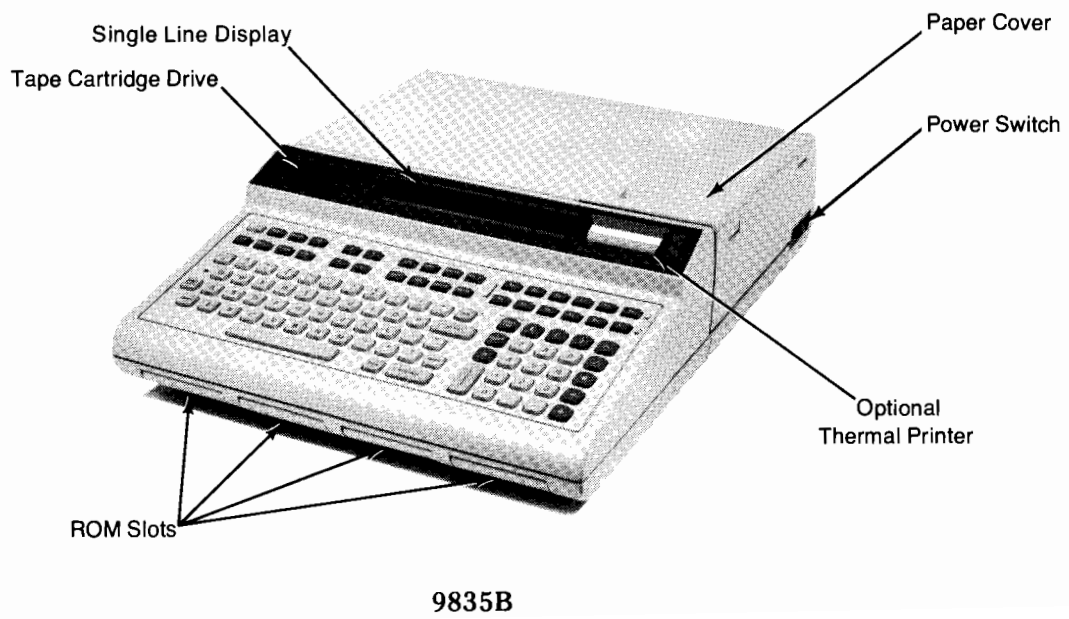
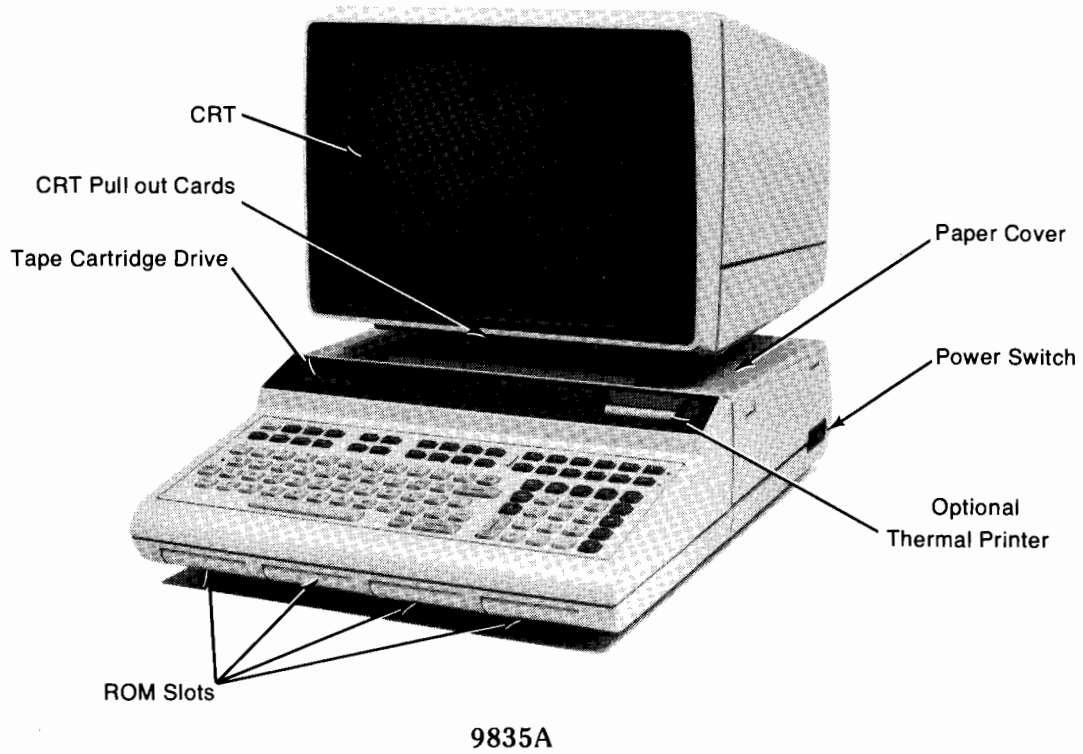
This chapter introduces the features of the basic machine and also covers all options.

\*\*\*\*\*

### Customer Questionnaire

To help us in preparing new manuals, there is a questionnaire in the back of this manual. Your answers to the questions can assist us in producing better, more useful manuals. Your feedback is our only way of knowing the validity of our manuals. Please complete the questionnaire and mail it – postage is already paid in the United States. Thank you.

## An Overview of the 9835A/B



## Options

This section covers options which are available for the 9835A/B computer.

### The CRT (9835A)

The 9835A comes equipped with an 80-character by 24-functional-line CRT (Cathode Ray Tube) display. It is the primary means for viewing data, keyboard inputs, results, program listings, error messages and system comments, and for editing programs. In normal mode, it is divided into four functional areas –

- Printout Area – 20 lines which function similarly to a printing device.
- Display Line – for displayed output and input prompts.
- Keyboard Entry Area – two lines (160 characters) for viewing keyboard entries.
- System Comments Line – used for error messages, system indicators and results of keyboard calculations.



### The Display (9835B)

The 9835B has a 32-character dot matrix LED (Light Emitting Diode) display. Even though only 32 characters can be displayed at one time, up to 160 characters can be keyed in.

### ROMs

There are several plug-in Option ROMs (Read Only Memories) which provide additional language capabilities to perform specific tasks, such as using mass storage devices. For a current listing of Option ROMs available, contact your local Hewlett-Packard Sales and Service Office.

Instructions for installing Option ROMs are contained in Chapter 2.

## Read/Write Memory

The standard Read/Write Memory is 49 962 bytes (9835A), 56 854 bytes (9835B). The following memory options are available –

Option	Number of Bytes <sup>1</sup>	
	9835A	9835B
201 ✓	115 402	122 294
202	180 842	187 734
203	246 282	253 174

## Printer

A 16-character, thermal strip printer is available for hard-copy output of program listings, program results, catalogs, etc. The printer is Option 500.

Blue-printout, heat-sensitive (thermal) paper is used with the printer. The part number can be found in Chapter 2.

## Language

An enhanced form of the BASIC (Beginners All-Purpose Symbolic Instruction Code) programming language is used in the 9835A/B. The fundamental programming unit is the **statement**. A program consists of a numbered sequence of statements, or lines, which are stored in memory. Most statements can also be executed from the keyboard.

The computer also has many math, trigonometric, string, output, and error **functions**, which are used within statements to evaluate expressions or control output. Most functions can also be executed as keyboard operations.

You also have many **commands** for controlling computer operation and editing programs. Commands are executed only from the keyboard; they are not programmable.

More statements and functions can be added to the language by adding option ROMs which are inserted into the drawers in the front of the computer.

<sup>1</sup> These figures are obtained by executing `SCRATCH A, SCRATCH KEY`, then `LIST`. At power on, an additional 82 bytes are used for SFK definitions.

## HP Compatible BASIC

The BASIC language as implemented on the 9835A/B Computer is an enhanced form of HP Compatible BASIC. HP Compatible BASIC consists of statements, functions, operators and commands that will be implemented in new HP BASIC machines. The HP Compatible BASIC is implemented in the 9835A/B as Level I. Level I refers to the highest-performance computational products. Thus, any program consisting entirely of Level I BASIC language can be transported to any Level I BASIC machine.

Below is a list of HP Level I BASIC. Contact your HP Sales and Service Office to obtain information concerning the transporting of programs between machines.

### Operators

+	=	AND
-	>	OR
*	<	NOT
/	≡	EXOR
^	≡	
DIV	<>	&
MOD		

### Functions

ABS	SIN	COL	LIN	LWC\$	TYP
EXP	COS	DET	SPA	REV\$	
INT	TAN	DOT	TAB	UPC\$	
LGT	ASN	ROW	PAGE	CHR\$	
LOG	ACS	SUM		LEN	
MAX	ATN			NUM	
MIN				POS	
RND				RPT\$	
SGN				TRIM\$	
DROUND				VAL	
PROUND				VAL\$	
FRACT					
PI				ERRL	
SQR				ERRN	
				ERRM\$	

**Statements**

ASSIGN	MAT...RSUM	REDIM
BEEP	MAT INPUT	REM
CALL	MAT PRINT	RESTORE
COM*	MAT PRINT#	RETURN
COPY	MAT READ	SHORT
CREATE	MAT READ#	STANDARD
DATA	OFF END	STOP
DEF FN	OFF ERROR	SUB
DEG	ON END	SUBEXIT
DIM	ON ERROR	SUBEND
EDIT	ON...GOSUB	WAIT
END	ON...GOTO	
FIXED	OPTION BASE	
FLOAT	PAUSE	
FN END	PRINT	
FOR	PRINT#	
NEXT	PRINT USING	
GOSUB	PURGE	
GOTO	RAD	
GRAD	RANDOMIZE	
IF	READ	
IMAGE	READ#	
INPUT	REAL	
INTEGER		
LET		
LINPUT		
MAT array = array		
MAT array = array + - * . / < <= > >= = <> array		
MAT...CON		
MAT array = (num. exp.)		
MAT array = (num. exp.)+ - * / < <= > >= <> = array		
MAT array = array + - * / < <= > >= <> = (num. exp.)		
MAT...INV		
MAT...TRN		
MAT...IDN		
MAT...ZER		
MAT...CSUM		

\* The type words INTEGER, SHORT and REAL are the only ones which can be specified in a COM statement or formal parameter list. Dimensionality of arrays is limited to 6 dimensions.

## Using the 9835A/B

To help you in using your 9835A/B computer, there are four manuals related to operating and programming which are supplied –

- **Operating and Programming** – This manual is designed for those of you with programming background. It covers the physical aspects of the computer (keyboard, CRT, etc) as well as 9835A/B BASIC language. All elements of the BASIC language are introduced and explained, but in-depth applications are left for you to discover through programming the computer.
- **Beginner's Guide** – This manual is designed for those of you who have never programmed a computer. The fundamentals of programming concepts, the BASIC language and machine operation are all covered. You may then progress to the Operating and Programming Manual.
- **Preview** – This manual is designed for experienced BASIC Programmers. It is a “hands-on” demo of the physical aspects of operating the computer and introduces enhancements to standard BASIC.
- **Reference Guide** – This manual serves as a “mind-jogger” for 9835A/B programmers. The syntax of all statements, commands and functions are listed as well as a brief description of each. Also included is general information covering such things as keys, range, and operators.

The 9835A, in addition, has four pull-out cards under the CRT which serve as a handy reference for operating the 9835A. They are –

- **Error Messages**
- **Statements**
- **ROM Errors**
- **About the 9835A**





# Chapter 2

## Getting Started

### Introduction

This chapter covers unpacking and setting up your 9835A/B Desktop Computer and contains other information that is important when you first receive your computer.

## 1 Unpacking Your Computer

### Inspecting the 9835A/B

The machine was thoroughly inspected before it was shipped to you. All equipment should be in good operating order. Carefully check the 9835A/B, ROMs, peripheral equipment, and other items 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 in your machine. Refer to the table on the next page and check that all accessories are present. If any items are missing, please contact your nearest HP Sales and Service Office; addresses are supplied in the back of this manual.

## Equipment Supplied

Peripheral devices, ROMs and interface cards are packaged separately from your 9835A/B; each of these has its own manual or operating note and may also have extra items packaged with it. The following items are packaged with each 9835A/B –

Item	Quantity	Part Number
Operating and Programming Manual	1	09835-90000
Beginner's Guide	1	09835-90001
Preview	1	09835-90002
Owner's Manual	1	09835-90005
Reference Guide	1	09835-90010
Quick Reference Guide	1	09835-90015
System Test Manual	1	09835-90040
System Test Cartridge	1	09835-90041
Utility Library	1	09835-10000
Training Program (9835A only)	1	09835-10020
Special Function Key Overlays	5	7120-6452
Blank Tape Cartridges	2	9162-0061
Dust Cover	1	9222-0594 (9835A only) 9222-0495 (9835B only)
Magnetic Head Cleaner	1	8500-1251
Spare Fuses		
1.5 Amp (NB)	1	2110-0043
3 Amp (NB)	1	2110-0003
Fuse Holder Cap	1	2110-0544
Power Cord <sup>1</sup>	1	See footnote
Printer Paper <sup>2</sup>	3	See table below

All the equipment in the table above can be purchased by ordering HP Part Number 09835-87901 (9835A) or 09835-87902 (9835B). Single items can be purchased using the appropriate part number. Contact your Sales and Service Office for ordering information.

The following items are also available –

Item	Part Number
Soft Carrying Case – Computer	98025A
Soft Carrying Case – CRT	09845-64404
Printer Paper (six-roll pack)	9270-0479

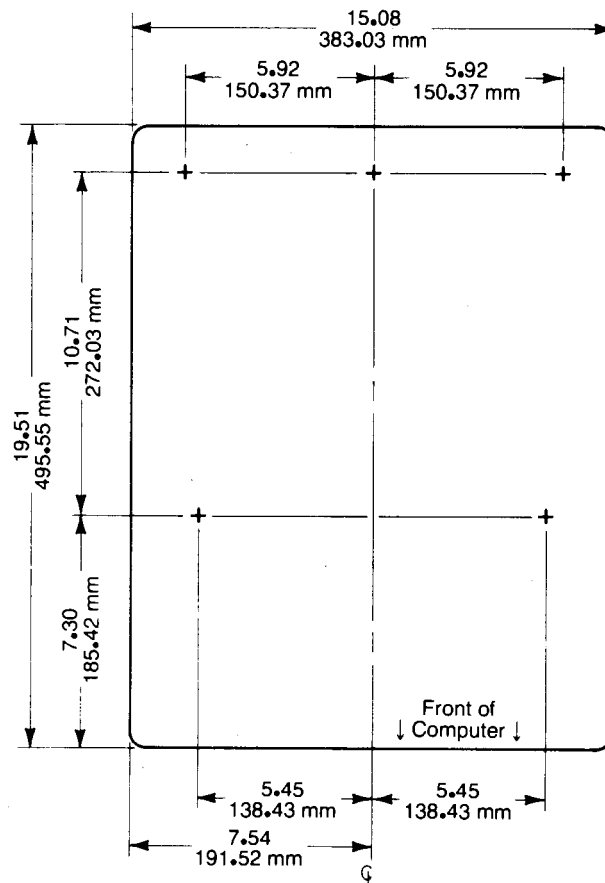
<sup>1</sup> The desktop computer is shipped with the correct power cord for use in your area. See the section on power cords.

<sup>2</sup> Printer paper is supplied only if your 9835A/B has the internal printer, Option 500.

## Table Mounting

The body of your computer can be mounted to the top of a desk or table by following these steps –

1. Drill 5 holes in the top of your desk or table to accommodate #6-32 (National Coarse) screws according to the diagram below.
2. Remove the Phillips head #6-32NC screws that hold the rubber feet to the bottom of the computer.
3. Use screws that are 1/2 inch longer than the thickness of the table top. This 1/2 inch allows for the thickness of the rubber feet and the hole for the screw in the bottom of the computer.



## 2 Checking Fuses, Voltage and Power Cords

### Introduction

The power cord connector is located in the rear panel of the machine. The fuse and voltage selector switches are located under the door in the top of the computer. The power cord must be disconnected before removing or installing a fuse or setting the voltage selector switches.

### Fuses

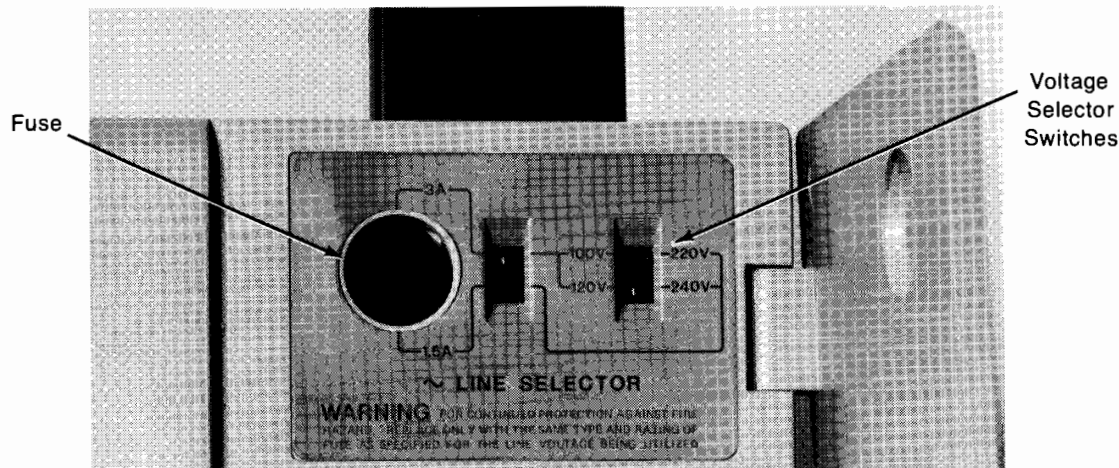
Always be sure that the correct fuse is installed. Failure to do so may result in damage to the computer. When changing the fuse, make sure that the replacement is the proper rating and type.

A different fuse is required for each of the two voltage ranges of 120 Vac and 240 Vac. Be sure that the fuse is the proper type and rating as shown below.

Voltage Setting	Fuse Rating	HP Part Number
100, 120	3A NB	2110-0003
220, 240	1.5A NB	2110-0043

#### WARNING

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



Location of Fuse

The figure above shows the location of the fuse under the door in the top of the computer. If you have a 9835A, you must slide the CRT to the left to gain access to the door. This procedure is covered in the next section which concerns the CRT.

To change the fuse, first disconnect the power cord from the machine. Then remove the fuse cap by pressing downward 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.

## Voltage

Next, ensure that the voltage selector switches are set for the nominal line voltage in your area. These switches are located under the door in the top of the computer, as shown in the previous picture. The figure below shows the correct setting for each nominal line voltage.

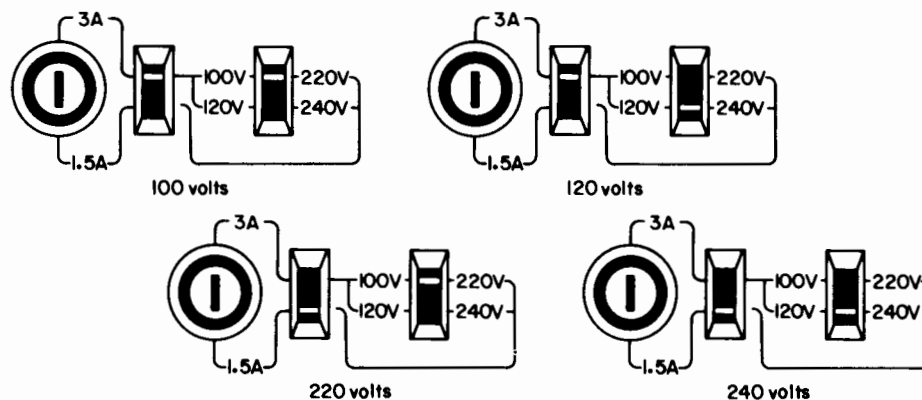
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### WARNING

ALWAYS DISCONNECT THE COMPUTER FROM ANY AC POWER SOURCE BEFORE SETTING THE VOLTAGE SELECTOR SWITCHES.

---

If it is necessary to alter the setting of the switches, disconnect the power cord. Then insert the tip of a small screwdriver into the slot on the switch. Slide the switches so that the position of the slot corresponds to the desired voltage, as shown below.



Nominal Line Voltage Settings

---

### CAUTION

CHECK THE SELECTOR SWITCH SETTING BEFORE APPLYING POWER. DAMAGE TO THE COMPUTER WILL OCCUR IF THE SELECTOR SWITCH IS SET TO 110 VOLTS AC AND 220 VOLTS AC IS APPLIED TO THE POWER INPUT CONNECTOR.

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## Power Requirements

The 9835A/B has the following power requirements –

AC Line Voltage –

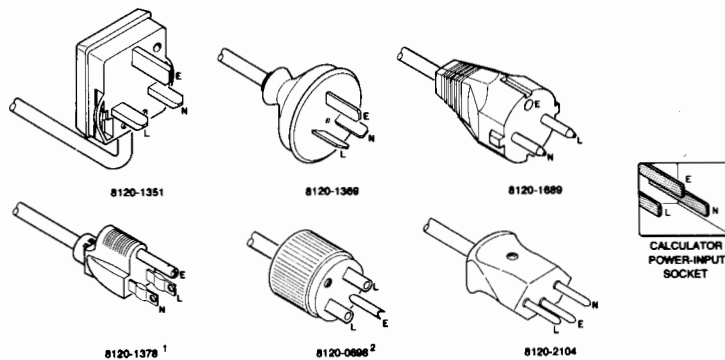
Nominal Voltage	Operating Range –10%, +5% of Nominal
100	90 to 105 volts
120	108 to 126 volts
220	198 to 231 volts
240	216 to 252 volts

Line Frequency – 48-66 Hz

Power Consumption – 220 va

## Power Cords

Power cords with different plugs are available for the 9835A/B; the part number of each cord is shown below. Each plug has a ground connector. The cord packaged with each machine depends upon where that machine is to be delivered. If your equipment has the wrong power cord for your area, please contact your local HP Sales and Service Office.



<sup>1</sup>UL and CSA approved for use in the United States of America and Canada with equipment set for either 100 or 120 Vac operation.

<sup>2</sup>UL and CSA approved for use in the United States of America and Canada with equipment set for either 200 or 240 Vac operation.

Power cords supplied by HP will have polarities matched to the power-input socket on the machine, as shown below.

- L = Line or Active Conductor (also called “live” or “hot”)
- N = Neutral or Identified Conductor
- E = Earth or Safety Ground

---

#### **WARNING**

IF IT IS NECESSARY TO REPLACE THE POWER CORD, THE REPLACEMENT CORD MUST HAVE THE SAME POLARITY AS THE ORIGINAL. OTHERWISE A SAFETY HAZARD FROM ELECTRICAL SHOCK TO PERSONNEL, WHICH COULD RESULT IN INJURY OR DEATH, MIGHT EXIST. IN ADDITION, THE EQUIPMENT COULD BE SEVERELY DAMAGED IF EVEN A RELATIVELY MINOR INTERNAL FAILURE OCCURRED.

---

#### **Grounding Requirements**

To protect operating personnel, the National Electrical Manufacturers' Association (NEMA) recommends that all equipment be properly grounded. The 9835A/B is equipped with a three-conductor power cable which, when connected to an appropriate power receptacle, grounds the machine. To preserve this protection feature, do not operate the machine from an ac power outlet which has no ground connection.

## 3 Installing the CRT

This section covers how to install and move the CRT (Cathode Ray Tube). It applies to 9835A computers only. 9835B owners can skip to the next section (4 The Printer).

The CRT is connected to the computer by a short flexible cable and rests in the groove in the front of the computer body.

### Mounting the CRT

To mount the CRT onto the body of the computer, follow these steps –

1. Place the front edge of the mounting bracket in the groove behind the keyboard.
2. Hold the CRT firmly and lean it forward. Then connect the CRT connecting cable. The connector is keyed and can only be connected one way.
3. Align the left edge (as viewed from the front of the computer) of the CRT mounting bracket with the left edge of the computer body. The picture shows the edges correctly aligned.
4. Ensure that the CRT cable is not pinched and is fitting into the recessed area in the base of the CRT.
5. Gently lower the CRT until it rests flush with the top of the computer body. This may require a slight lateral adjustment until the slots of the CRT base line up with the tabs on the computer body.
6. Slide the CRT firmly to the right until it stops near the center of the computer. Enough room is available on the right side of the CRT to clear the printer paper when the CRT is in position.

### Removing the CRT

The CRT can be removed by sliding it to the left until the left edge of the mounting bracket is even with the left edge of the computer body. It can then be lifted off and the CRT connecting cable detached from the computer. This process is essentially the reverse of the mounting instructions on the preceding page.

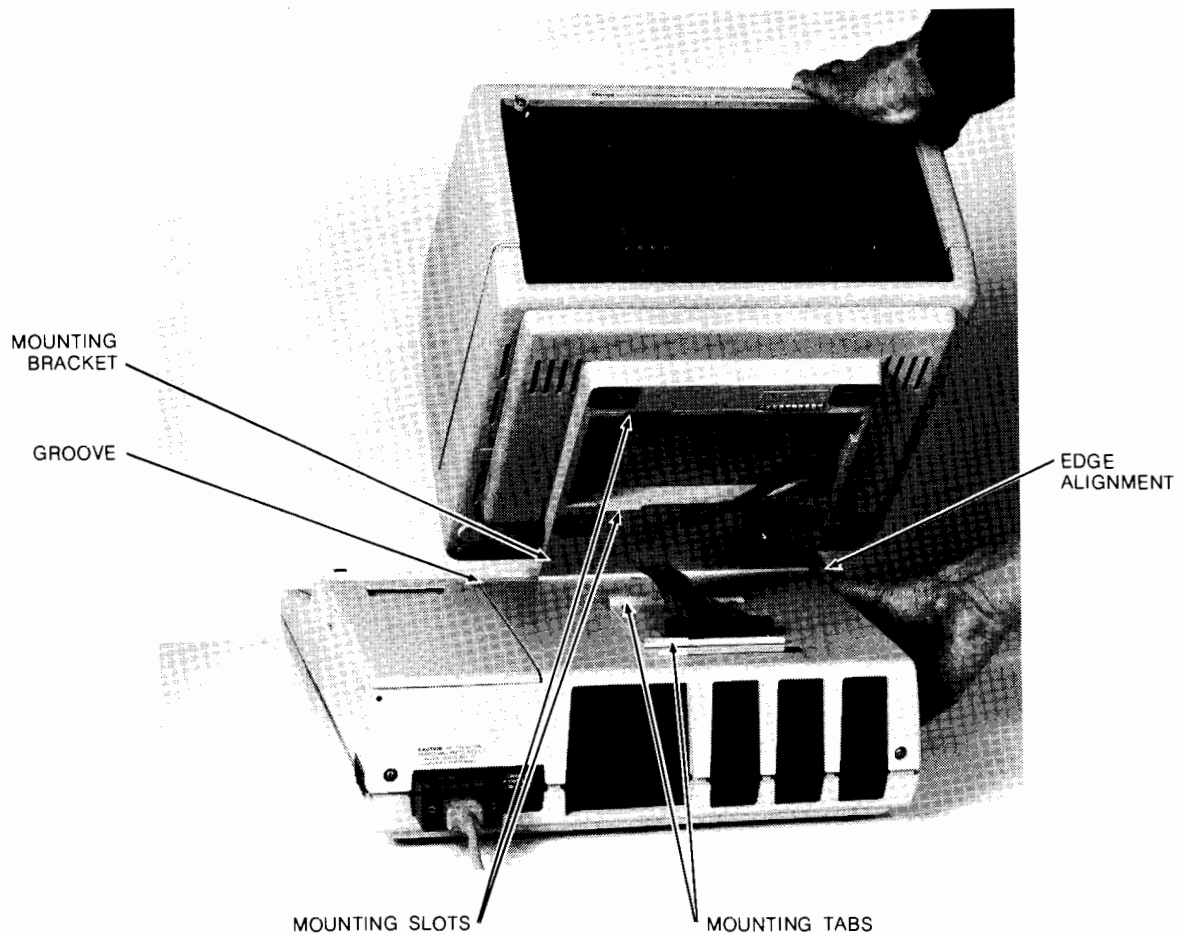
### Moving the CRT

The CRT can be slid to the left to gain access to the fuse, voltage selector switches and printer paper. Simply slide the CRT to the left until it stops, then the access door can be opened. The CRT can be moved back into position by sliding it firmly to the right until it stops.

### CRT Intensity

CRT intensity is controlled by a knob on the lower right-hand corner of the CRT.





---

**CAUTION**

DO NOT CARRY THE COMPUTER BY HOLDING ONLY THE CRT. THE CRT IS DETACHABLE FROM THE COMPUTER BODY, SO CARRYING THE COMPUTER BY THE CRT COULD RESULT IN ACCIDENTAL SEPARATION OF THE COMPUTER BODY FROM THE CRT. SUCH A SEPARATION COULD RESULT IN INJURY TO YOU OR DAMAGE TO THE COMPUTER.

---

When it is necessary to move the computer, it is recommended that the computer / CRT unit be carried by holding the computer body, not the CRT. For longer distances, it is recommended that the CRT be detached from the computer body and the two units transported separately.

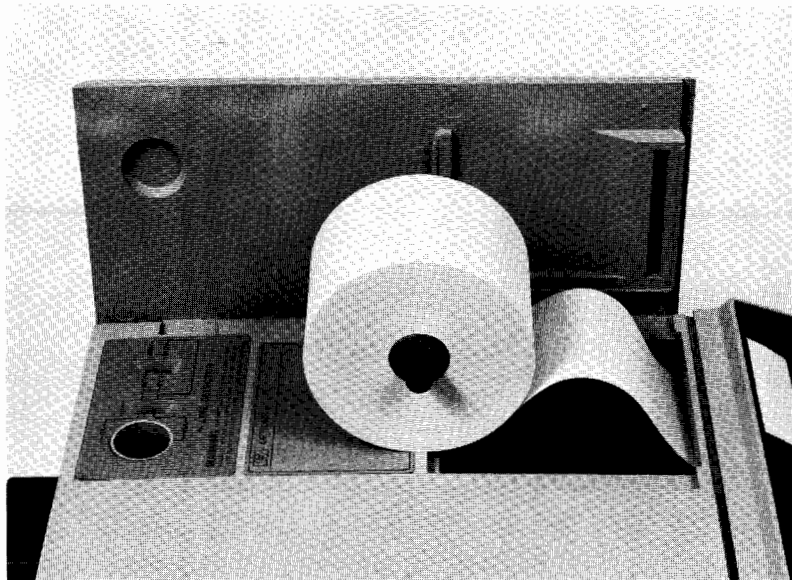
## 4 The Printer

This section discusses the internal printer, option 500. If you do not have a printer, skip to the next section (5 ROMs).

### Loading Printer Paper

To load printer paper, follow these steps –

1. Open the paper door in the top of the computer. If you have a 9835A, you must move the CRT to the left to open the door. This procedure was discussed in the previous section.
2. Remove the paper spindle. Discard the old paper core and remove any paper left in the printer using the paper advance wheel at the right of the printer.
3. Insert the spindle into the roll.
4. Install the new roll as shown in the picture below.



**Loading Printer Paper**

5. Insert the free end of the paper and advance it through the printer using the paper advance wheel.
6. Put the roll of paper into the well.
7. Close the paper cover and slide the CRT back into place, if you have a 9835A.

## 5 ROMs

All desired ROMs should be in place when the computer is switched on. This section covers installing and removing ROMs.

### Installing a ROM

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#### CAUTION

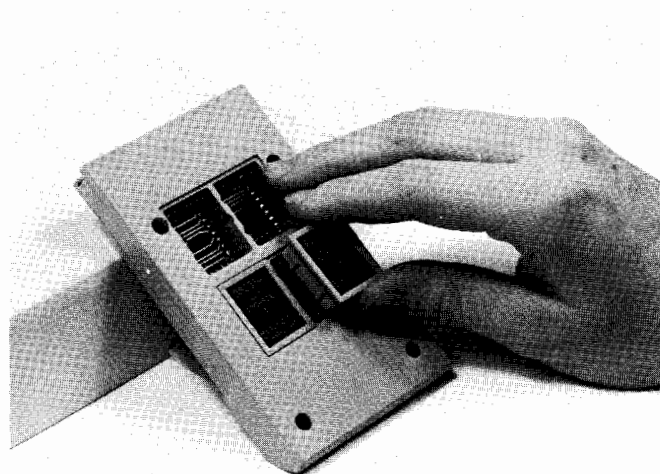
ALWAYS SWITCH OFF THE COMPUTER WHEN INSERTING OR REMOVING ROMS AND INTERFACES. FAILURE TO DO SO COULD DAMAGE EQUIPMENT.

---

The 9835A/B has four ROM slots located in the bottom front of the computer. A ROM can be inserted into any one of the ROM drawers which is then inserted into one of the slots.

To install a ROM –

- Turn off power to the computer.
- Pull out a drawer to find an available slot.
- Align the label on the ROM so that the top is toward the back of the drawer. The sides of the ROMs and slots are keyed so that a ROM can't be put in upside down.
- Push the ROM in until it is even with the top of the drawer.



Inserting a ROM

- Slide the drawer in with the ROMs up. Press it in until the front of the drawer is even with the front of the computer, as shown.

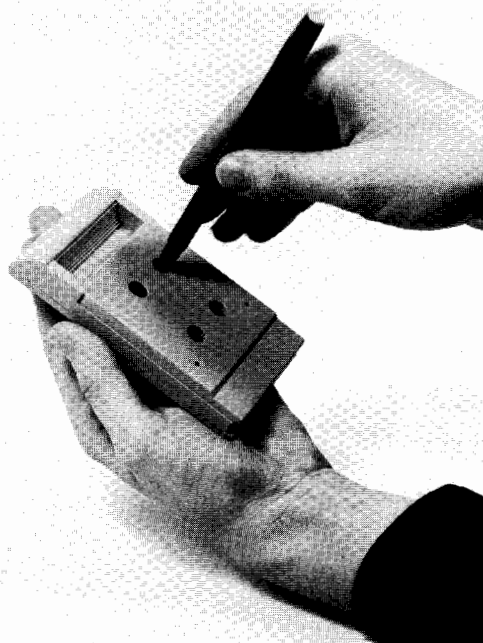


**Inserting a ROM drawer**

## Removing a ROM

To remove a ROM –

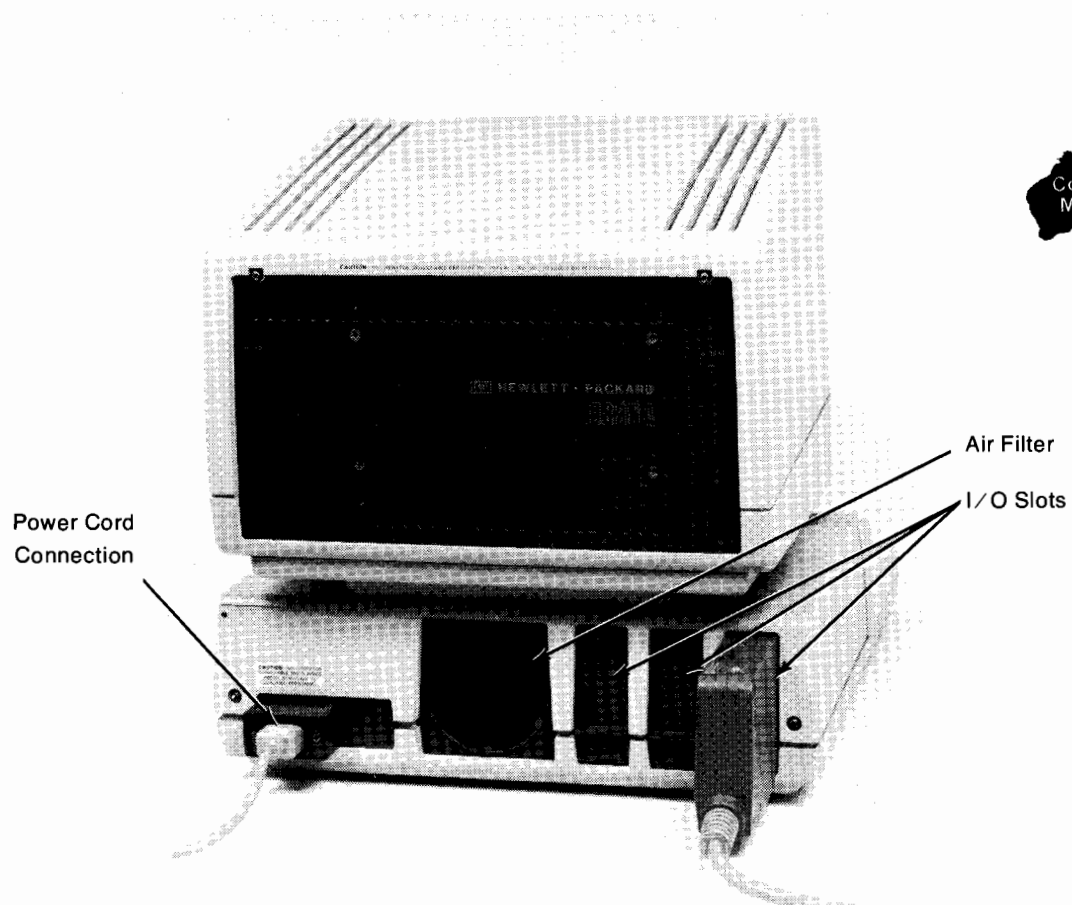
- Turn off power to the computer.
- Remove the proper drawer.
- Turn the drawer over and remove the desired ROM by using a finger, pen, or screwdriver to push on the round removal button which is visible through the small hole, as shown.



**Removing a ROM**

## 6 Connecting Interfaces

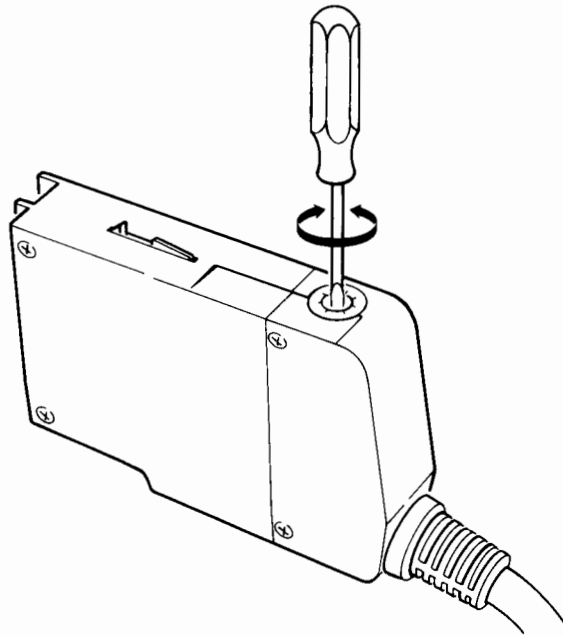
Peripheral devices are connected to the 9835A/B Computer by means of an interface. An interface can be inserted into any of the three I/O slots in the back of the computer as shown in the picture below. The I/O slots each have a “door” in them when you receive your computer. You must remove the door before inserting an interface into a slot. To do this, lift up on the door, then pull out the lower end. When an interface is removed, install a door back into the slot. This can be done by placing the tab on the door into the top of the slot and pushing the door into place.



Before connecting an interface, make sure that the computer and peripheral are switched off. Then insert the interface into any of the I/O slots.

## Select Codes

The select code is set on the interface. To change the select code, use a small screwdriver to rotate the switch which is accessible through the top of the interface rear housing. Do not set more than one interface to the same select code.



The following select codes are permanently reserved by the system and can't be set on an interface –

- 0 – Internal thermal printer
- 15 – Tape cartridge drive
- 16 – CRT (9835A); Optional Internal printer (9835B)

---

### CAUTION

ALWAYS SWITCH OFF THE COMPUTER WHEN INSERTING OR REMOVING ROMS AND INTERFACES. FAILURE TO DO SO COULD DAMAGE EQUIPMENT.

---

## 7 Turn On

Once your computer is set up properly, it is ready to turn on.

Before you “throw the switch”, here are some things to check –

- Is the proper fuse installed?
- Is the proper voltage set?
- Is the operating system module on the right hand side of the computer inserted so that it is even with the side of the computer? This module must **always** be in place to operate the computer.
- Are the desired ROMs installed?
- Are the desired interfaces connected?

Next connect the power cord to the power input connector on the back of the machine. Plug the other end of the cord into the ac power outlet.

Now that your system is set up, set the power switch on the right-hand side of the machine to the “1” position to turn it on.

### What Should Happen

When the power is switched on, the computer beeps and begins its self-test. During the self-test, the computer tests every location in the Read/Write memory. While the self-test is in progress, this message –

```
MEMORY TEST IN PROGRESS
```

is displayed. The complete self-test should take less than thirty seconds. If no memory failures are detected, the computer is ready for use when either –

```
9835A READY FOR USE.
```

or

```
9835B READY FOR USE.
```

is displayed.

If the computer does detect a bad memory location during self-test, it attempts to complete the self-test by ignoring the block of memory which contains the bad location. If this is successful, the computer is ready to use when –

```
PART OF MEMORY FAILED SELF-TEST!
```

is displayed. You can determine the severity of the memory failure by executing –

```
LIST
```

and comparing the amount of available memory shown with the amount of memory that should be present. Call your Sales and Service Office for assistance. If your 9835A/B has the internal printer (and if there is paper in it), one or more lines will be printed if the self-test fails. Save this information; it will help the Customer Engineer pinpoint the source of the memory failure.

If the self-test fails and the computer cannot meet its minimum Read/Write memory requirements, it beeps repeatedly (about once per second) and no message appears in the display. Call your Sales and Service Office for assistance.

If no message appears during the self-test and the computer begins to beep rapidly, check to see if the CRT (9835A) is properly connected. Be sure to turn the power off before connecting the CRT.

CRT intensity can be adjusted using the knob located under the right side of the CRT.

### **Auto Start**

If a tape cartridge is present in the tape drive at power on, the computer automatically performs the following operation –

```
LOAD "AUTOST", 1
```

after the self-test is completed. See the 9835A/B Operating and Programming Manual for more explanation of auto start.

## **8 Testing the System**

If you wish to test your machine, or if there is any doubt that it is operating correctly, refer to the 9835A/B System Test Manual for test procedures.



# Chapter 3

## The Tape Cartridge



### Introduction

The internal tape cartridge drive allows high density, high quality tape cartridges to be used for up to 217K bytes of data and program storage. This chapter covers specifications and care of the tape cartridge and drive.

### Inserting and Removing the Tape Cartridge

Insert the tape cartridge so that its label faces the back of the computer, as shown.

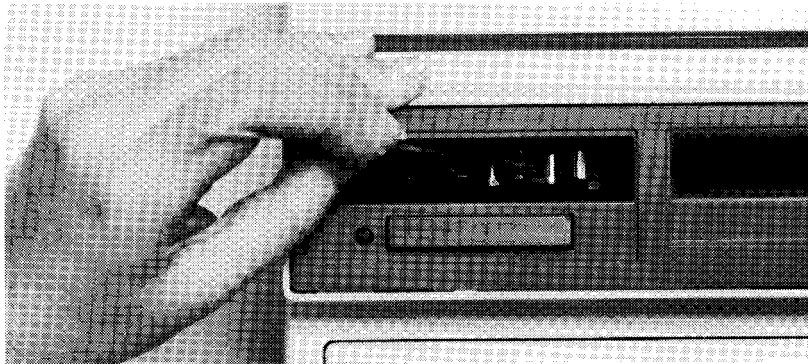


To remove the tape or cartridge, press the eject bar. Do not remove the tape or execute reset while it is moving at low speed; damage to the tape may result.

## Tape Care

A dirty tape drive is the greatest cause of cartridge-related errors. Several basic precautions can greatly reduce such problems –

- Clean the tape head and capstan (drive wheel) of the tape drive at least as often as every eight hours of tape use, or more frequently in dirty environments. Use a cotton applicator dampened with magnetic head cleaner (HP P/N 8500-1251) to wipe the tape head a few times. Be sure the head is dry before inserting a cartridge in the drive. It is a good idea to clean the head before making an important recording.
- Rewind the tape after each use. This also makes the directory easily accessible for the next use.
- Keep the cartridge in the plastic container supplied with it.
- Never eject the tape cartridge while it is moving. Damage to information can be severe if a write or directory operation is in progress.



### Cleaning the Tape Head

Other factors can affect the reliability of the tape cartridge. Strong magnetic fields can erase programs and data stored on the tape. Keeping the cartridge in a metal box, such as a card index, protects it. Physical damage to the tape, such as a wrinkle or fold, can cause recording and loading problems.

---

#### NOTE

A back-up copy of vital programs or data should be maintained on a separate tape cartridge.

---

## Tape Life

The tape cartridge has a typical life span of 50 to 100 hours. Environmental conditions of 25° C (77° F) and 20-50% relative humidity are most favorable for long tape life. A high duty cycle (percent of time the tape is accessed during the total time the computer is in use), high turning resistance and continuous use for long periods of time (greater than ½ hour) all decrease tape life.



## Chapter 4

# Peripherals, Interfaces and Manuals



## Introduction

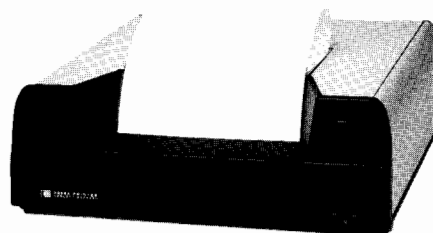
Many HP peripherals are available for use with the 9835A/B. This chapter describes these peripherals and what ROMs, interfaces, and manuals you need to use them. Also covered are all of the interfaces which are used to connect peripherals to the 9835A/B and what manuals you need to use them.

## Peripherals

General programming information for all peripherals can be found in the 9835A/B Operating and Programming Manual, HP P/N 09835-90000. Following the descriptions of the peripherals and interfaces is information detailing the ROMs, interfaces and manuals that are used with the various peripherals.

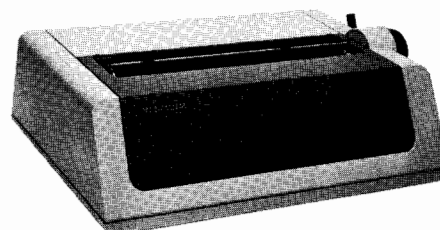
### HP 9866A/B Printer

The HP 9866A/B Thermal Printers are relatively fast (240 lines per minute) printers. The 9866B has a 95-character alphanumeric font with upper and lower case, producing fully formatted text and tables.



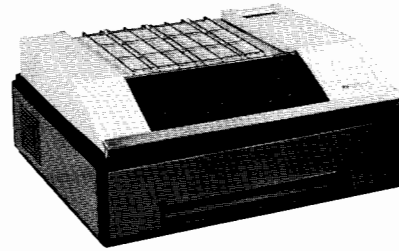
### HP 9871A Printer

The HP 9871A Character Impact Printer provides 132-character wide, multiple-copy output, and a full 96-character font. The average printing speed is 30 characters per second. This printer has additional plotting capabilities.



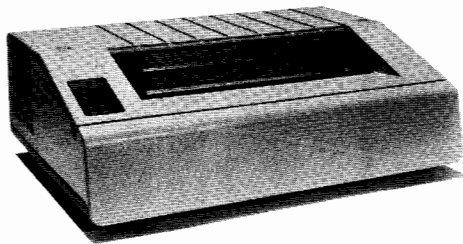
## HP 9881A Printer

The HP 9881A Line Printer provides a reliable 5 x 7 dot matrix printer for such applications as payroll, inventory, accounting and report generation. This printer is a 132-column printer rated at 200 lines per minute. It can provide up to six consistently clean copies.



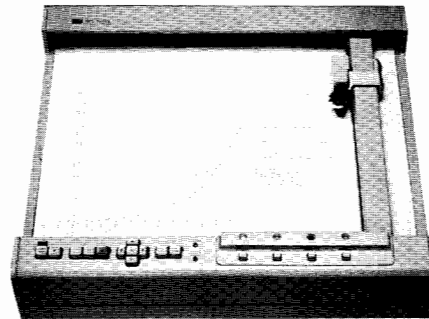
## HP 2631A Printer

The HP 2631A serial dot matrix line printer provides reproducible hard-copy output. Average speed is 180 characters per second. Characters can be normal, compressed or expanded providing 136, 227 or 68 characters per line. Printing is bidirectional and vertical and intercharacter spacing can be programmed.



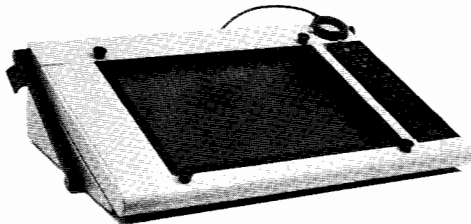
## HP 9872A Plotter

Histograms, pie charts, circuit diagrams, linear, log-log and polar plots – these are a few of the things you can do with the 9872A Plotter. Additional features of the 9872A include programmable selection of four pens, selectable pen speed, point digitizing, window plotting and many more.



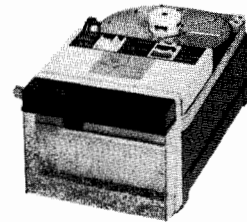
## HP 9874A Digitizer

The HP 9874A Digitizer can be used to enter graphical or pictorial data into the 9835A/B. Because of the backlighting and rear projection capabilities of the 9874A, the data can be input directly from widely differing sources such as strip charts, photographs, X-rays, 35mm slides or blueprints. Analysis of irregularly shaped test results, calculation of areas, volumes or lengths, and manipulation of pictures or figures can easily be accomplished using the 9874A and the 9835A/B.



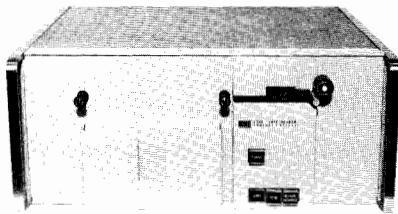
## HP 9884A Tape Punch

Add high-speed output to your 9835A/B with a tape punch. This reliable, compact unit punches tape at 75 characters per second.



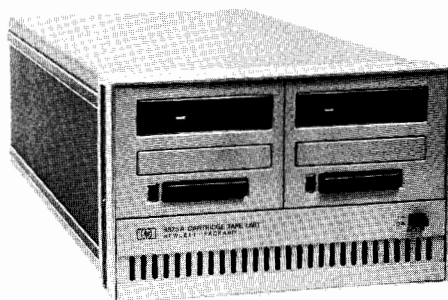
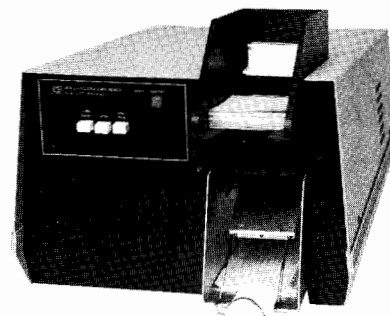
## HP 9883A Paper Tape Reader

Data from analytical instruments, machine tools and computer terminals can be entered directly into the 9835A/B from this paper tape reader. The HP 9883A Tape Reader, designed for high-speed, heavy volume operations, optically reads tapes at up to 500 characters per second.



## HP 9869A Card Reader

The card reader provides a convenient form of data entry from punched or marked cards. Standard 80-column cards can be read at up to 300 cards per minute.

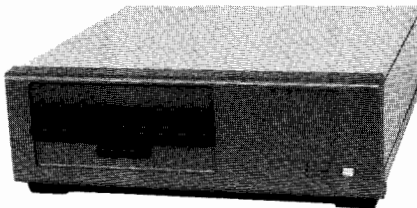
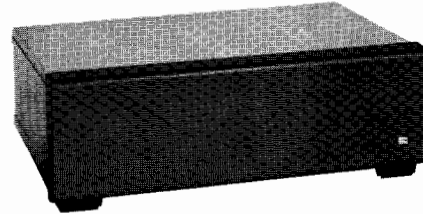


## HP 9875A Cartridge Tape Unit

The HP 9875A Cartridge Tape Unit is a micro-processor-based device that allows storing and retrieving of data and program information. In addition, the 9875A can be used without a controlling device on the HP-IB bus as a data recording unit, or as an output device to a printer or other device. There is also a timing feature that allows unattended readings.

### HP 9878A I/O Expander

The I/O Expander provides six additional I/O slots which can accommodate all the 9835A/B I/O cards. The expander has an integral I/O card connecting it to the computer. This card has a system integrity light to indicate that the computer is turned on, the expander is turned on, and the I/O card is properly connected. Another LED is illuminated when the 9878A power is on.



### HP 9885 M/S Flexible Disk Drives

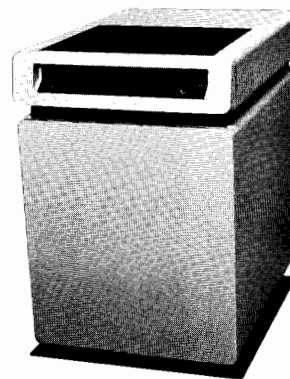
The Flexible Disk Drive provides the 9835A/B user a convenient, reliable method of transferring programs and data to and from the computer. The 9885 is a random access, removable disk mass storage device with a capacity of up to 499 200 bytes per disk.

### HP 7900-Series Disc Drives

The HP 7900-series of hard disc drives provides a wide range of storage capacity for storing programs and data.



7906

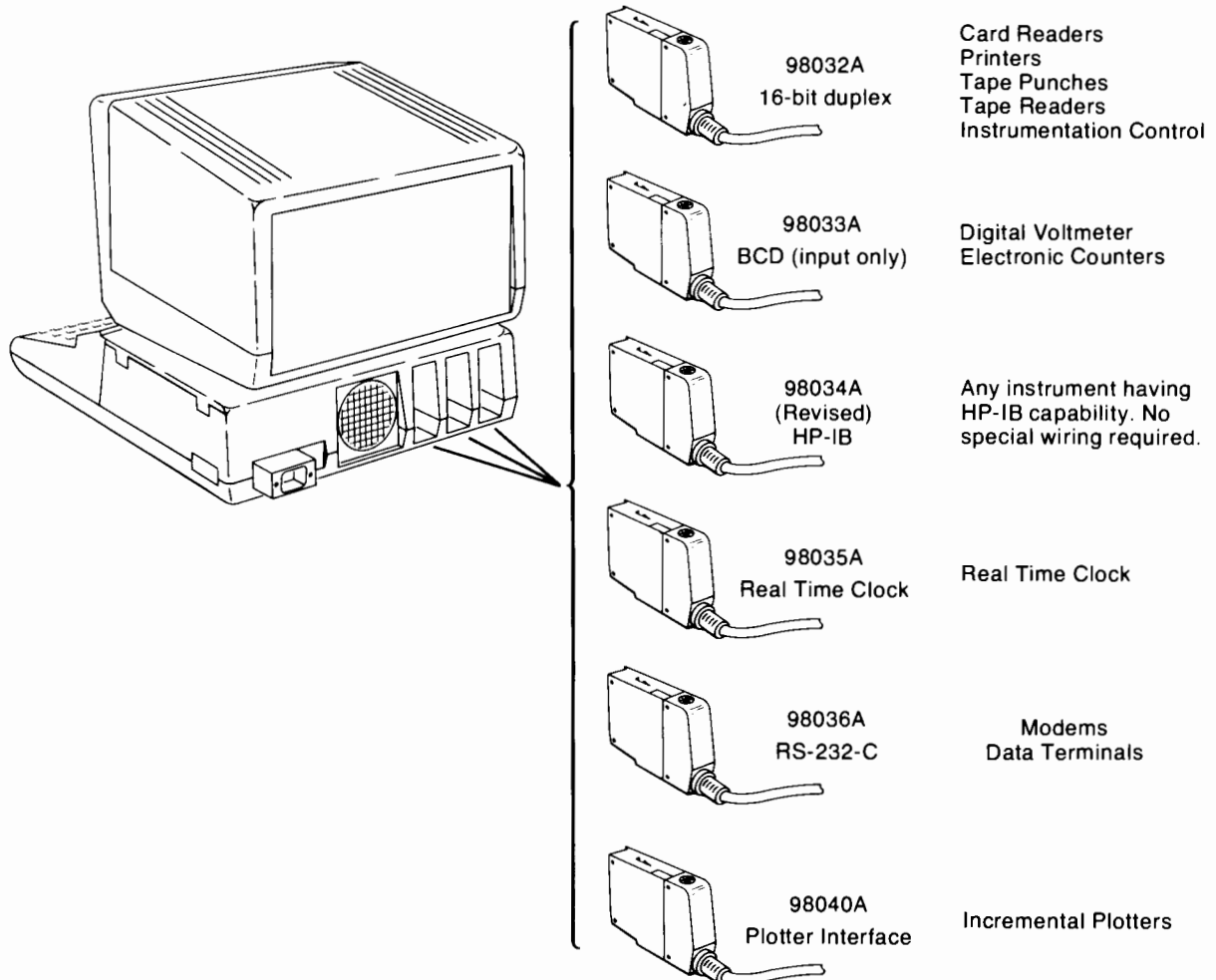


7920A



## Interfaces

Several interfaces are available for the computer to control and exchange data with wide variety of equipment other than the peripherals just described. Each interface has general installation and configuration instructions. Typical applications are shown here –



### 16-Bit Duplex Interface

The HP 98032A Interface is a general purpose card providing a 16-bit parallel, character serial interface. The interface transfers data between the 9835A/B Desktop Computer and a peripheral device in full-duplex; that is, the interface can have valid data on the output lines and be inputting data at the same time. The I/O ROM is needed to use this interface for any operations other than printed output.

## BCD Interface

The HP 98033A BCD Interface allows the computer to take samples from many instruments having parallel, binary-coded-decimal (BCD) output. The interface can input data of up to ten BCD digits, mantissa sign, exponent sign, and overload indication. The I/O ROM is required to use this interface.

## HP Interface Bus

The HP 98034A **Revised** HP-IB Interface allows up to fourteen HP-IB compatible instruments to be connected to the computer at one time. The I/O ROM provides additional control of the interface.

---

### NOTE

The 98034A card has been revised to eliminate certain anomalies that occur when the interface is operated with the System 35. To avoid possible problems, only the 98034A **Revised** interface card should be used with the System 35.

---

## Real Time Clock

The HP 98035A Interface adds real-time reference and time-related control capabilities. This provides real time information, timing units that can be used for interrupt or monitoring and can be synchronized, direct I/O operations on extended lines, and status monitoring. The I/O ROM is needed to use this interface.

## RS-232-C Bit Serial Interface

The HP 98036A Interface provides bit serial communications between the 9835A/B and asynchronous EIA RS-232-C devices such as data terminals and modems. The I/O ROM is required for interrupt, buffered input operations and extended RS-232-C control/status capability.

## Incremental Plotter Interface

The HP 98040A Incremental plotter interface allows the computer to drive certain incremental plotters supplied by manufacturers other than HP. The interface enables high-levels graphics commands to drive these plotters. The Plotter ROM is required to use this interface.

## Peripheral Hardware Requirements

Peripheral	Interface	ROM(s) Required	ROM for Extended Control
9866A/B Thermal Printer	98032A Opt. 366	none	I/O
9871A Impact Printer	98032A Opt. 371	none	I/O
9871A Impact Printer Option 001	98034A	none	I/O
9881A Line Printer	98032A Opt. 381	none	I/O
2631A Line Printer	98034A	none	I/O
9872A Plotter	98034A	Plotter	I/O
9874A Digitizer	98034A	I/O	
9884A Tape Punch	98032A Opt. 384	none	I/O
9883A Paper Tape Reader	98032A Opt. 383	I/O	
9869A Card Reader	98032A Opt. 369	I/O	
9875A Cartridge Tape Unit	98034A	I/O	
9878 I/O Expander	Included	none	
9885 Flexible Disk Drive	98032A Opt. 385	Mass Storage	

## Peripherals and Peripheral Manuals

An interface is required to operate each peripheral. Some peripherals also require a ROM. Interfaces and ROMs were covered in the section on Hardware Requirements.

### Printers

HP 9866A/B Thermal Printer		
9866A/B Printer Peripheral Manual		09866-90001
HP 9871A Impact Printer		
9871A Installation Manual		09871-90035
9871A Operating Manual for HP-IB		09871-90001
HP 2631A Line Printer		
2631A Operator's Manual		02631-90901
2631A Printer Programming Manual		02631-90903
HP 9881A Line Printer		
2607 Operator's Manual		02607-90005

### Plotter

HP 9872A Plotter		
9872A Graphics Plotter Operating and Service Manual		09872-90000
Plotter ROM Manual		09835-90050

### Digitizer

HP 9874A Digitizer		
9874A Digitizer Installation and Service Manual		09874-90000

## Paper Tape

HP 9884A Tape Punch	
9884A Tape Punch Operating and Service Manual	09884-90000
HP 9883A High Speed Paper Tape Reader	
9883A Operating and Service Manual	02748-90032
9883A Operating and Programming Manual	09883-90001

## Card Reader

HP 9869A Card Reader	
9869A Card Reader Operating and Service Manual	09869-90002

## Cartridge Tape Unit

HP 9875A Cartridge Tape Unit	
9875A Installation and Operation Manual	09875-90000

## I/O Expander

HP 9878A I/O Expander	
9878A I/O Expander Installation and Service Manual	09878-90000



## Disc Drives

HP 9885 Flexible Disk Drive	
9885 Flexible Disk Drive Installation Manual	09885-90010
HP 7906A Disc Drive	
7906A Disc Drive Installation Manual	07906-90902
7906 Disc Drive User's Manual	07906-90901
HP 7920A Disc Drive	
7920 Disc Drive Operating and Service Manual	07920-90001

## Interfaces and Interface Manuals

Interfaces are necessary for the 9835A/B to communicate with peripherals. Refer also to the section on Hardware Requirements.

### 98032A 16-Bit Interface

98032A 16-Bit Interface Installation and Service Manual 98032-90000

### 98033A BCD Interface

98033A BCD Interface Installation and Service Manual 98033-90000

### 98034A **Revised** HP-IB Interface (IEEE-488)

98034A HP-IB Interface Installation and Service Manual 98034-90000

### 98035A Real Time Clock Interface

98035A Real Time Clock Installation and Service Manual 98035-90000

### 98036A Serial I/O Interface

98036A Serial I/O Interface Installation and Service Manual 98036-90000

### 98040 Incremental Plotter Interface

98040A Incremental Plotter Interface Installation and Service Manual 98040-90000

# Chapter 5

## Accessories

### Prerecorded Programs

Tape cartridges and flexible disks containing programs for solving problems from many disciplines are available for the 9835A/B. A Utility Library having a collection of commonly used programs and subprograms is supplied with 9835A/B. For a complete list of prerecorded programs and for pricing information, contact an HP Sales and Service Office; addresses are provided in the back of this manual.

### Keyboard Magazine

Keyboard is a magazine containing general information about HP desktop calculators and computers, and related equipment. It includes articles and programs written by calculator and computer users, descriptions of the latest equipment and prerecorded programs, programming tips, and many other items of general interest to calculator and computer users.

To receive your free subscription to Keyboard, complete and mail the order form supplied with the computer.





# Chapter 6

## Maintenance

### Introduction

This chapter covers cleaning and servicing of your 9835A/B Desktop Computer.

### Cleaning

The 9835A/B can be cleaned with a soft cloth dampened either in clean water or in water containing a mild detergent. Do not use an excessively wet cloth nor should you allow water to penetrate the computer. Do not use any abrasive cleaners, especially on the CRT screen or LED display window.

The tape head should be cleaned after a maximum of eight hours of use; for more information on cleaning the tape head, see Chapter 3.

#### Cleaning the Air Filter

There is an air intake filter located in the rear panel of the computer which must be inspected periodically and cleaned if found to be dirty.

The filter can be removed and cleaned by either holding it under running water or by washing it in warm, soapy water, then rinsing it in clear water. Dry the filter thoroughly before putting it back in place.

## Service

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### WARNING

LETHAL VOLTAGES ARE PRESENT INSIDE THE 9835A/B. THERE ARE NO CUSTOMER SERVICEABLE PARTS INSIDE THE 9835A/B.

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### Service Contracts

When you buy a Hewlett-Packard desktop computer, service is an important factor. If you are to get maximum use from your machine, it must be in good working order. An HP Maintenance Agreement is the best way to keep your machine in optimum running condition.

Consider these important advantages –

- **Fixed Cost** – The cost is the same regardless of the number of calls, so it is a figure that you can budget.
- **Priority Service** – Your Maintenance Agreement assures that you receive priority treatment, within an agreed upon response time.
- **On-Site Service** – There is no need to package your equipment and return it to HP. Fast and efficient modular replacement at your location saves you both time and money.
- **A Complete Package** – A single charge covers labor, parts, and transportation.
- **Regular Maintenance** – Periodic visits are included, per factory recommendations, to keep your equipment in optimum operating condition.
- **Individualized Agreements** – Each Maintenance Agreement is tailored to support your equipment configuration and your requirements.

After considering these advantages, we are sure you will see that a Maintenance Agreement is an important and cost-effective investment.

For more information, please contact your local HP Sales and Service Office.

# HEWLETT PACKARD

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Empresa Técnica de  
Equipamentos  
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R. Barbosa Rodrigues, 42-1<sup>o</sup>DT.  
Caixa Postal. 6487  
Luanda  
Tel: 35515/6  
Cable: TELETRIA Luanda

#### AUSTRALIA

Hewlett-Packard Australia  
Pty. Ltd.  
31-41 Joseph Street  
Blackburn, Victoria 3130  
P.O. Box 36  
Doncaster East, Victoria 3109  
Tel: 89-8351  
Tel: 31-024  
Cable: HEWPARD Melbourne  
Hewlett-Packard Australia  
Pty. Ltd.  
31 Bridge Street  
Pymble  
New South Wales, 2073  
Tel: 449-6566  
Tel: 21561  
Cable: HEWPARD Sydney  
Hewlett-Packard Australia  
Pty. Ltd.  
153 Greenhill Road  
Parkside, S.A. 5063  
Tel: 272-5911  
Tel: 82536  
Cable: HEWPARD Adelaide  
Hewlett-Packard Australia  
Pty. Ltd.  
141 Slirling Highway  
Nedlands, W.A. 6009  
Tel: 86-5455  
Tel: 93859  
Cable: HEWPARD Perth  
Hewlett-Packard Australia  
Pty. Ltd.  
121 Wollongong Street  
Fishwick, A.C.T. 2609  
Tel: 95-2733  
Tel: 62650  
Cable: HEWPARD Canberra  
Hewlett-Packard Australia  
Pty. Ltd.  
5th Floor  
Teachers Union Building  
495-499 Boundary Street  
Spring Hill, 4000 Queensland  
Tel: 229-1544  
Cable: HEWPARD Brisbane

#### GUAM

Medical/Personal Calculators Only  
Guam Medical Supply, Inc.  
Jay Ease Building, Room 210  
P.O. Box 8947  
Tamuning 96911  
Tel: 646-4513  
Cable: EARMED Guam

#### HONG KONG

Schmidt & Co. (Hong Kong) Ltd.  
P.O. Box 297  
Connaught Centre,  
39th Floor,  
Connaught Road, Central  
Hong Kong  
Tel: 29 50 21  
Tel: 011-2156  
Cable: SCHMIDTCO Hong Kong

#### INDIA

Blue Star Ltd.  
Kasturi Buildings  
Jamshedji Tata Rd  
Bombay 400 020  
Tel: 29 50 21  
Tel: 011-2156  
Cable: BLUEFROST  
Blue Star Ltd.  
Sahas  
414/2 Vir Savarkar Marg  
Prabhadevi  
Bombay 400 025  
Tel: 45 78 87  
Tel: 011-4093  
Cable: BLUESTAR

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Band Box House  
Prabhadevi  
Bombay 400 025  
Tel: 45 73 01  
Tel: 011-3751  
Cable: BLUESTAR

#### JAPAN

Blue Star Ltd.  
7 Hare Street  
P.O. Box 506  
Calcutta 700 001  
Tel: 93859  
Tel: 021-7655  
Cable: BLUESTAR  
Blue Star Ltd.  
Bhandari House  
7th & 8th Floor  
91 Nehru Place  
New Delhi 110 024  
Tel: 634770 & 635166  
Tel: 031-2463  
Cable: BLUESTAR

#### NEW DELHI

Blue Star Ltd.  
Blue Star House  
11/11A Magarath Road  
Bangalore 560 025  
Tel: 55666  
Cable: BLUESTAR  
Blue Star Ltd.  
Mekashi Mandiram  
xxx/1678 Mahatma Gandhi Rd.  
Cochin 682 016  
Tel: 32069, 32161, 32282  
Tel: 0865-514  
Cable: BLUESTAR

#### Blue Star Ltd.

1-11-117/1  
Sarojini Devi Road  
Secunderabad 500 003  
Tel: 70126, 70127  
Tel: 015-459  
Cable: BLUEFROST  
Blue Star Ltd.  
2/34 Kodambakkam High Road  
Madras 600 034  
Tel: 82056  
Tel: 041-379  
Cable: BLUESTAR

#### INDONESIA

BERCA Indonesia P.T.  
P.O. Box 496/Jkt.  
Jin. Abdul Muis 62  
Jakarta  
Tel: 40369, 49886, 49255, 356038  
Tel: Jkt. 42895  
Cable: BERCACON  
BERCA Indonesia P.T.  
P.O. Box 174/Sby.  
23 Jin. Jimerto  
Surabaya  
Tel: 42021  
Cable: BERCAcon

#### ISRAEL

Electronics Engineering Div.  
of Motorola Israel Ltd.  
16, Kremnetski Street  
P.O. Box 25016  
Tel-Aviv  
Tel: 38973  
Tel: 33569  
Cable: BASTEL Tel-Aviv

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Yokogawa-Hewlett-Packard Ltd.  
Chuo Bldg., 4th Floor  
4-20, Nishinakajima 5-chome  
Yodogawa-ku, Osaka-shi  
Osaka, 532  
Tel: 06-304-6021  
Tel: 523-3624  
Yokogawa-Hewlett-Packard Ltd.  
29-21, Takaido-Higashi 3-chome  
Suginami-ku, Tokyo 168  
Tel: 03-331-6111  
Tel: 232-2024 YHP-TOKYO  
Cable: YHPMARKET TOK 23 724  
Yokogawa-Hewlett-Packard Ltd.  
Nakamo Building  
24 Kami Sasajima-cho  
Nakamura-ku, Nagoya, 450  
Tel: 052 571-5171

#### MOZAMBIQUE

A.N. Gonçalves, Ltd.  
162, 1<sup>o</sup> Apt. 14 Av. D. Luis  
Caixa Postal 107  
Maputo  
Tel: 27091, 27114  
Tel: 6-203 NEGON Mo  
Cable: NEGON

Yokogawa-Hewlett-Packard Ltd.  
Mito Mitsui Building  
105, 1-chome, San-no-maru  
Mito, Ibaragi 310  
Tel: 0292-25-7470

#### NEW ZEALAND

Hewlett-Packard (N.Z.) Ltd.  
4-12 Cruickshank Street  
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Courtney Place  
Wellington  
Tel: 877-199  
Cable: HEWPACK Wellington  
Hewlett-Packard (N.Z.) Ltd.  
Pakuranga Professional Centre  
267 Pakuranga Highway  
Box 51092  
Pakuranga  
Tel: 569-651  
Cable: HEWPACK Auckland  
Analytical/Medical Only  
Medical Supplies N.Z. Ltd.  
Scientific Division  
79 Carlton Gore Road, Newmarket  
P.O. Box 1234  
Auckland  
Tel: 75-289  
Cable: DENTAL Auckland  
Analytical/Medical Only  
Medical Supplies N.Z. Ltd.  
Private Bag  
Norrie and Parumoana Streets  
Porirua  
Tel: 75-098  
Tel: 3858  
Analytical/Medical Only  
Medical Supplies N.Z. Ltd.  
P.O. Box 309  
239 Stanmore Road  
Christchurch  
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TWX: 510-660-2670

## 1 Crossways Park West

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5658 East Molloy Road  
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Tel: (315) 455-2486

## 1 Crossways Park West

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