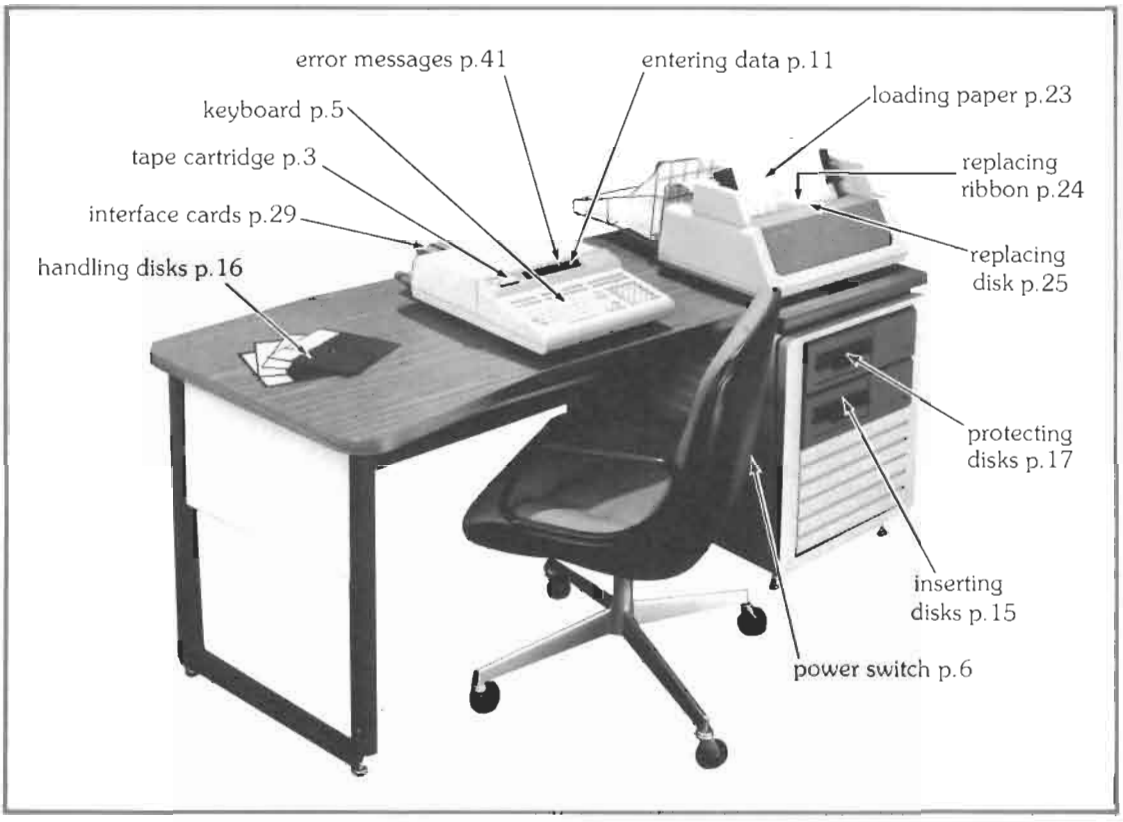
HP 9896

Operator's Guide

Hewlett · Packard Computation System



Index to Operating Instructions

Preface

This guide has the information you need to operate the HP 9896 Computation System. Major topics in this guide are –

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Use the index on the facing page to find instructions on the various system components.

Before switching your system on for the first time, be sure it has been installed correctly: either by an HP Customer Engineer or by following the instructions in the 9896 System Installation and Service Manual.

A reader reply card is included at the back of this guide. If the card is missing, direct your comments about the system manuals to –

HEWLETT-PACKARD CO.
FORT COLLINS DIVISION
POST OFFICE BOX 1550
FORT COLLINS, COLORADO 80522 U.S.A.

ATTN: Customer Support

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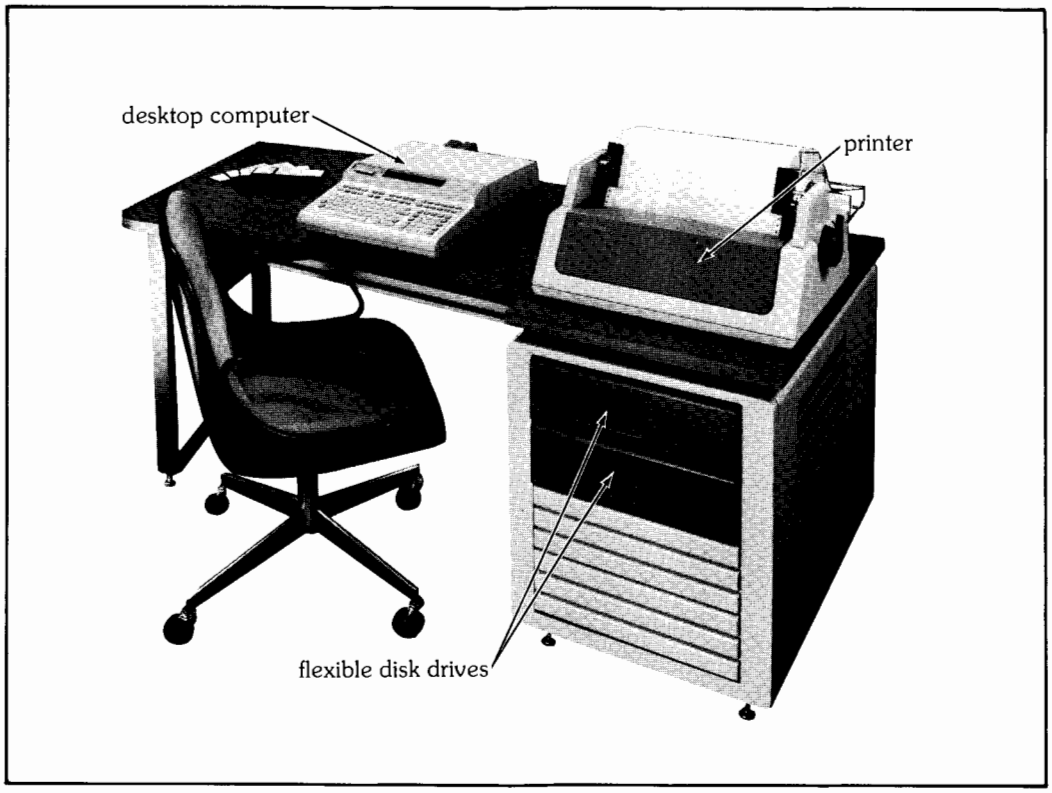

The HP 9896 Computation System

System Overview

The HP 9896 Computation System is an integrated work station for entering data, processing information, and printing the needed business reports and forms. In short, the HP 9896 is a small, but complete, data processing center which is easily controlled by a single operator.

The system consists of three primary components: the desktop computer, the flexible disk drives, and the printer.

The desktop computer is a compact, high-speed processor. Its keyboard will be familiar to you since it resembles a standard office typewriter, combined with a ten-key numeric pad for entering data and doing arithmetic problems.

The additional blocks of keys across the top of the keyboard add editing and system control features. One of those blocks, the special function keys, are automatically defined as you load HP developed software. They are labeled with a program template for your specific business operations such as ADD EMPLOYEE, ENTER HOURS, or CORRECT HOURS. Some keys may also provide access to one or more of the special reports that your system can produce.

The 32-character computer display shows messages and operator instructions, and makes entering data in the right order virtually automatic. As each data item is entered, the next instruction appears for you to follow. You can review each entry in the display and edit it, if needed, before going on.

The built-in tape cartridge is used for loading system test programs and other special routines. Its use is covered in Chapter 6 of the HP 9831A Operating and Programming Manual.

Data storage is handled on two flexible disk drives. Flexible disks are the newest technological answer to business data storage. They're inexpensive, have a large data storage capacity, and provide faster access to your information than ledgers, tab cards, or tape cassettes. HP flexible disks hold nearly 500,000 characters (bytes) of information – about as much as can be stored on 6,000 80-column tab cards.

The standard HP 9896 System has two disk drives, an HP 9885M (master) drive and an HP 9885S (slave) drive. Each drive can handle one flexible disk at a time. The master drive can control up to three slave drives, if your business requires the added data storage capability. Each drive is addressed thru a unique drive number.

The HP 9871A serial impact printer produces high quality reports, account analyses, and personalized form letters at a rate of up to 30 characters per second (equivalent to 360 words a minute on a typewriter). Material can be generated in as many as six copies of varied formats, on either continuous or single forms.

System Power-Up

Before your system can accept and process data, it must be switched on and loaded with the appropriate programs. Before switching the system on, however, check to be sure that it is connected properly (someone may have moved it and jarred something loose) –

- Are the printer and computer power cables plugged in?
- Are the interface cards plugged in tightly?
- Is the printer interface connector on tightly?

Now switch the system on ("1" indicates on) and check these power-up indications –

- The computer should display ⊢.
- Each disk drive's green light should come on. Also, its yellow DRIVE SELECT light should blink as power is applied.
- The 9871A Printer carrier mechanism should move to the left margin and then to its reference (starting) position. If its front cover is not in place, the carrier will not move to the starting position nor be ready to print.

Now you can insert the appropriate disk in the disk drive, load the correct paper or forms in the printer and follow the starting procedure in the software operating manual.

If the system doesn't power up as just described, turn to "In Case of Trouble" later in this guide.

Keyboard Operation

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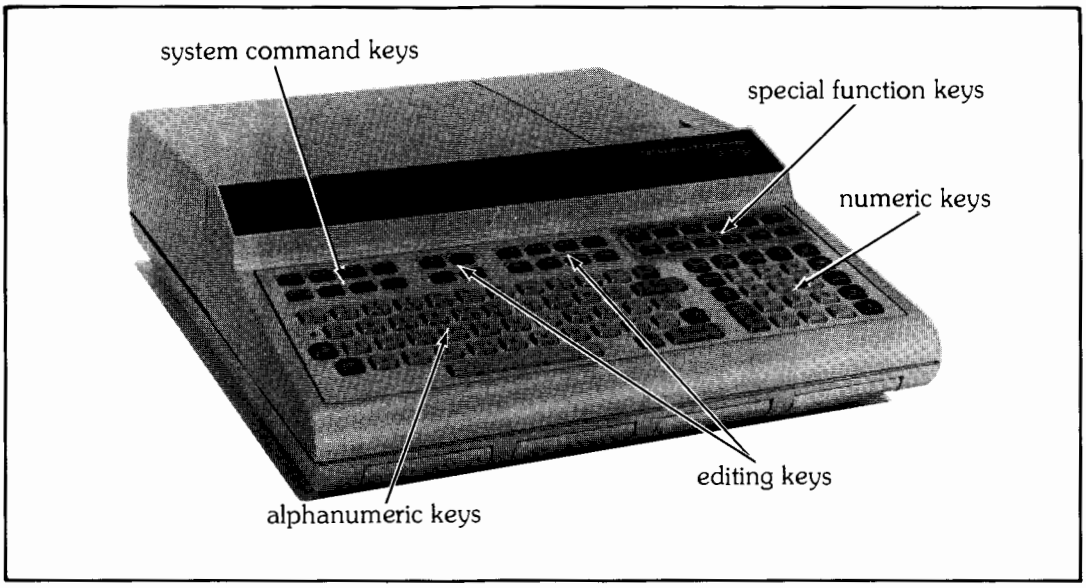
The HP 9831A Desktop Computer is the central processing unit (CPU) in your computation system. The next few pages introduce you to the computer keyboard, showing you how to do arithmetic, enter data when running programs, and correct typing errors.

To learn more about the computer keyboard, programming language and special features, refer to its operating and programming manual.

The Computer Keyboard



As shown above, the computer keyboard has several functional key groups –

- **Alphanumeric Keys** – use this typewriter-like keyboard for entering both alphabetic and numeric data. The (SHIFT) key allows you to enter data in uppercase letters.

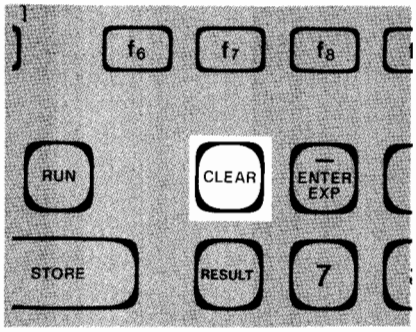
- **Numeric Keys** – all the keys needed to enter numbers and do arithmetic are located here. The top row of alphanumeric keys can also be used to enter numbers.

- **Special Function Keys** – as you load an HP software package into the computer, these 12 keys are automatically defined to run separate programs. (The daily startup procedure is described in the software manual.) A plastic template is then placed over the special function keys to identify their current definitions.

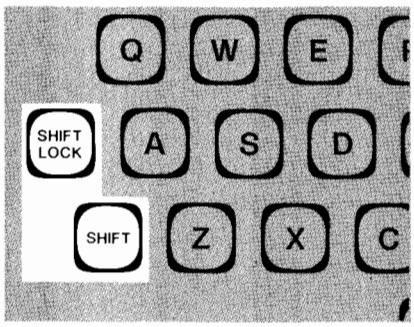
- **System Command Keys** – these keys are permanently defined to enter or execute often used commands and statements. Most of these keys are used by the system programmer, as described in the next section.

- **Keyboard Editing Keys** – the bottom six keys help you correct typing mistakes. The six editing keys above them are for the programmer's use in editing programs; the system operator has little use for them.

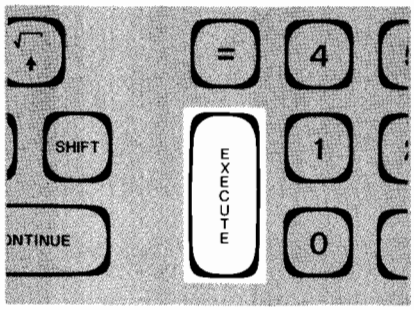
Control Keys



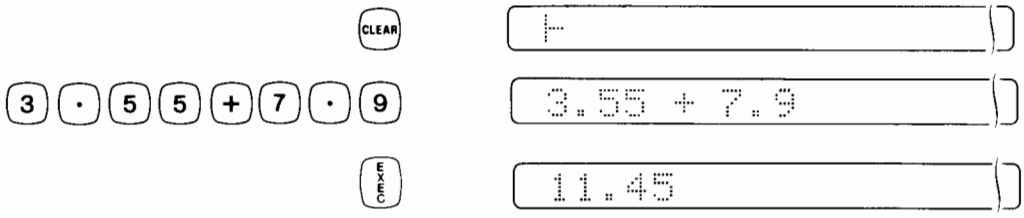
Use the CLEAR key to erase the display. If the ⊢ appears, the computer is ready for new instructions. If the ? appears, the computer is waiting for you to re-enter the previously requested data item and press EXEC.



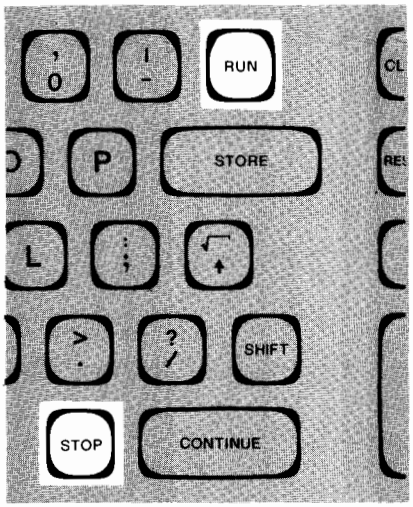
Use SHIFT and SHIFT LOCK to enter uppercase (capital) letters and to access the shifted special function keys (f12 thru f23). The yellow light above SHIFT LOCK shows when the keyboard is shift-locked (press SHIFT to unlock it).



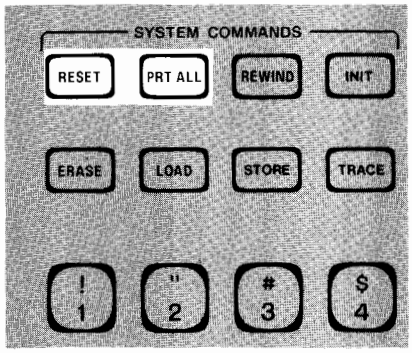
Press EXEC to perform the current operation in the display. For example, add $3.55 + $7.90 by pressing –



Press RUN EXEC to begin running the program in the computer memory. If needed, press STOP to halt the computer. When you stop a program, the computer displays the program line number to have been executed next.



Pressing RESET allows you to immediately halt the system, without erasing programs or data. Use RESET only when STOP will not bring the computer to a ready state.

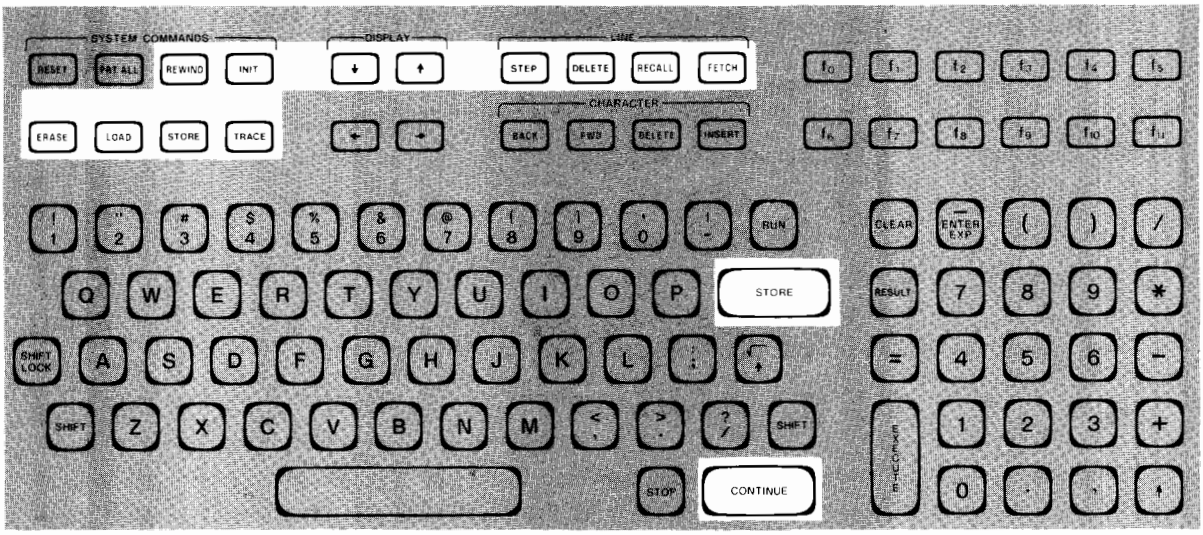


NOTE

Pressing STOP or RESET while the system is in an update routine will erase valuable data! Refer to your software operating manual for restrictions on use of STOP and RESET when running those programs.

When you wish to keep a printed record of all displayed messages and data entries, press PRT ALL EXEC to switch ON the print-all mode. Later, you can press PRT ALL EXEC again to switch print-all OFF.

Programming Keys



The keys highlited above are used mainly by the system programmer for storing and editing (debugging) programs. The system operator should not use these keys unless directed to do so in operating instructions.

For information on programming the desktop computer, see its operating and programming manual.

Keyboard Arithmetic

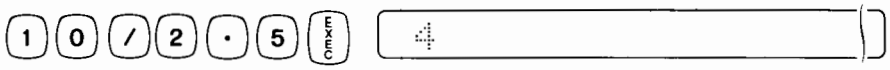
The arithmetic operations on the 9831A are addition (+), subtraction (−), multiplication (*), division (/), and exponentiation (↑).

To perform an arithmetic operation, such as 8 x 2, first you key in the expression –

Press (8) (*) (2) → 8*2

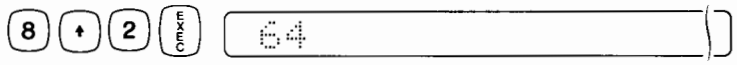
Then press (EXEC) → 16

Now divide 10 by 2.5 –

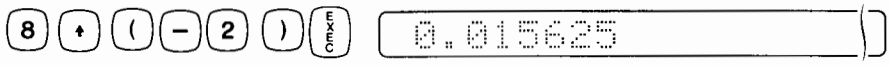


To find 5.5% of 19.60 –

Finally, to raise a number to a power, like 8^2 (8 squared) –

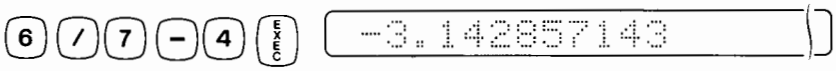


Notice, however, that 8^{-2} (1 over 8 squared) must be keyed in as 8↑(-2); that is, parentheses are required to separate the minus sign from the ↑ (exponentiation) symbol –



Parentheses are also used with complex arithmetic problems to indicate which operation is to be done first. For example, if you wish to divide 6 by the result of 7 - 4, you should place 7 - 4 in parentheses like this –

If the parentheses were not used here, the division would be done automatically before the subtraction –



This automatic order of execution for arithmetic operation is called math heirarchy and is explained in Chapter 2 of the Operating and Programming Manual.

Whenever you are in doubt as to the order of execution for any math operation, simply use parentheses to indicate the order. The computer will ignore any sets of parentheses not needed.

Entering Data

When the computer is running a program, it requests data from you by pausing and displaying ?. A message or "prompt" usually accompanies the ?. The operating instructions for each program tell you what to enter at each point in the program. Here are some general examples.

When running a program, you'll be asked to enter only one number, letter, or name at a time. For example, this request appears when the HP developed Payroll Program is run –

```
ENTER EMPLOYEE NO. (0 TO END)?
```

You have a choice of entering an employee number, such as [1][2][3][EXEC], or entering 0 to end the program – [0][EXEC].

As another example, after starting the Add Employee Routine (payroll program), you are asked –

```
ENTER EMPLOYEE NAME?
```

In this case you enter the new employee's name, using both uppercase and lowercase letters if you prefer, like this –

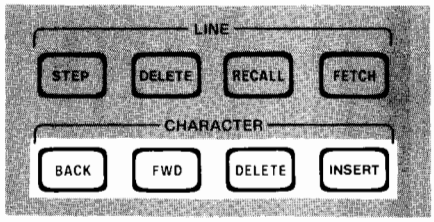
```
Lisa Jackson
```

Then press [EXEC].

The Payroll Manual lists the maximum number of letters which can be entered for each data item (29 letters are allowed here).

If the ? display reappears after you've entered a data item, it means that the previous item has been rejected. To continue, enter the item correctly. If you make a mistake while typing in a data item, just press [CLEAR] and re-enter the item again.

Correcting Typing Errors



It's easy to correct a mistake made while entering data into the display; just use the Character Editing keys to change the line before you press [EXEC].

For example, suppose you want to enter this name – Lisa Jackson

but instead you type – Kisa Jacckson

To correct this, simply press [BACK] until a flashing cursor appears over the K. Then type in an L. To delete the extra c, press [FWD] until the cursor is over either c and then press character [DELETE].

When you get the line the way you want it press [EXEC], regardless of where the flashing cursor is located.

As another example, maybe you want to execute this line – 10 + 18 + 22

But you typed this – 10+8+22

To insert a 1 in front of the 8, press the [BACK] key 4 times. The flashing cursor will be positioned on the 8. Next, press [INSERT] once. This opens up a character space at the cursor.

Now type in the 1. The display will be – 10+18+22

Remember that the line can be executed immediately, regardless of the position of the editing cursor.

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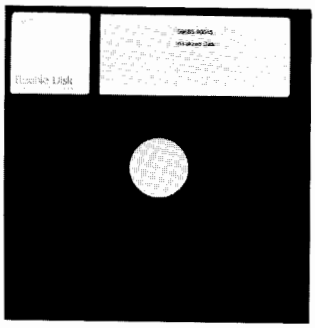
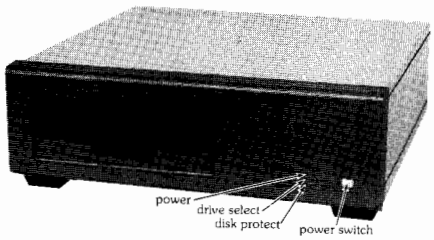
For more information on flexible disk structure and disk operations, refer to the 9885 Disk Operating and Programming Manual.

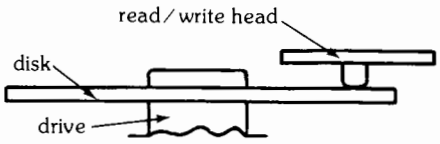
Flexible Disks



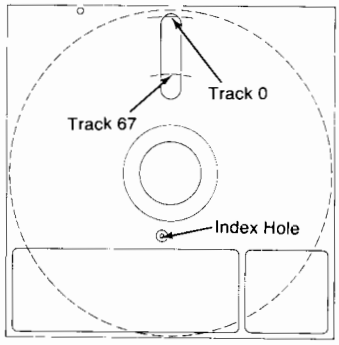
The 9896 System uses flexible magnetic disks as the primary storage media for both programs and data. Each disk is permanently enclosed in a sealed jacket and also has an envelope for storage.



The standard system has two disk drives; each is assigned a unique drive number and can hold one disk at a time. Be sure that all disk drives are switched on before running a program.

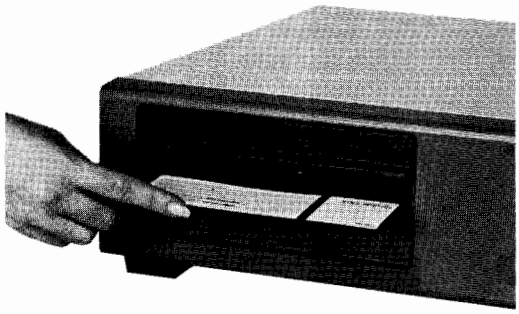


The disk drive reads and writes data and programs from the disk by passing a read / write head over the disk surface as it spins in the drive. The yellow DRIVE SELECT light indicates when the read / write head is in motion.



Since the disk is spinning as data is written on it, the data is recorded in concentric circles or tracks. For operating convenience, the data is organized into groups called files. Each file is assigned a unique name which is recorded in a directory on the disk. You load programs from the disk by specifying the file name in a keyboard command. The program, in turn, accesses data and other programs by specifying other file names.

To Insert a Disk

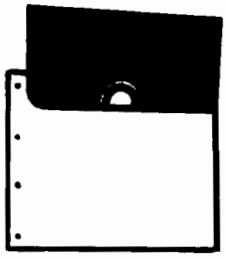


Press the bar below the disk drive door to unlock the door. If needed, remove the disk currently in the drive and put it in its storage envelope.

Slide the new disk into the drive until it locks in place (you'll hear a click). Be sure to insert the disk with the label facing you as shown.

Close the door by sliding it down until it latches. Be sure that all disk drives are switched on and their doors are closed before continuing to run the program. If not, an error message will result.

To Remove a Disk



Press the bar below the disk drive door to unlock the door.

Slide the disk out and place it in its storage envelope. Be sure to close all disk drive doors before resuming program operation.

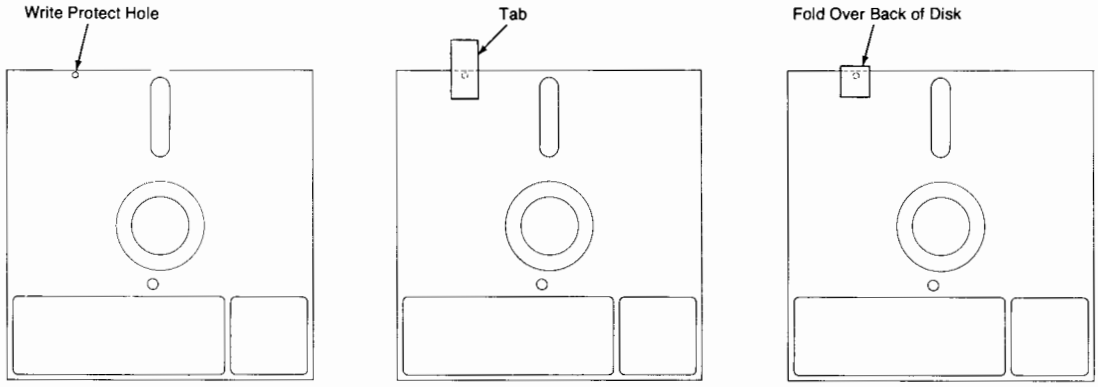
Handling Disks

Following these guidelines will ensure that your disks remain error free for as long as possible –

- Replace worn disk envelopes and always return disks to their storage envelopes after removing them from the drive. Replacement envelopes can be ordered from HP.
- Since fingerprints on the disk can cause loss of data, handle the disk only by its label area. NEVER touch the surface of the disk showing through the protective sealed jacket.
- Never write on the sealed plastic jacket with a lead pencil or ball-point pen. Use a soft felt-tip pen and write on the label only. Don't erase titles; instead apply a new label.
- Although the disk is flexible, don't bend or fold it since this, too, can cause damage to the disk.
- Never subject disks to temperature or humidity extremes.
- Contamination from dust, ashes, smoke, etc. can damage disks.
- Avoid placing disks in strong magnetic fields like transformers or magnets, since this can cause loss of data.
- Never remove disks from their sealed protective jackets.
- The inside surface of the sealed protective jacket is coated with a special material that cleans the disk as it rotates. Any other method of cleaning may scratch the disk and cause loss of data.
- Use only disks approved by HP – others are likely to impair data integrity or damage the disk drive. A list of approved disk manufacturers is available thru your HP sales representative.

Write-Protecting the Disk

The data and programs on a disk can be protected from being written over (rerecorded) by uncovering a hole in the sealed protective jacket. When the write protect hole is uncovered, nothing can be recorded on the disk. When the write protect hole is covered, as shown next, recording is allowed again on the disk. The yellow WRITE PROTECT light on the drive indicates when a write-protected disk is inserted.



A package of opaque WRITE tabs is supplied with each disk drive. Any opaque tape, such as black electrical tape can also be used.

Initializing Blank Disks

Each blank disk must be initialized before it can be used with your system. (Disks containing software programs or data are already initialized and ready to use.) Once this procedure is complete, the disk remains initialized and does not have to be reinitialized each time it's used.

Remember, however, that a disk left in a drive can be accidently erased via the Pattern Test or the 9885 Self Test, as described in the 9885 Disk Operating and Programming Manual.

The initialization routine writes addresses on the disk so that specific locations may be referenced by the system. During initialization, test patterns are also written on the disk then read for verification. This takes less than five minutes per disk. Once initialization starts, all pervious information on the disk is lost.

The routine described here is available on the Utility Routines Disk (Part No. 09885-10014), which is supplied with the 9885M Disk Drive.

Follow this procedure to initialize a blank disk –

Insert the Utility Routines Disk into drive 0 and close the door.

Key in and execute – `GET BIN "INIT"`

Remove the Utility Routines Disk, insert the blank disk to be initialized, and close the door. The disk must have a WRITE tab on it.

Key in and execute – `INIT`

The routine now asks for the drive (unit) number holding the blank disk –

```
KEY IN UNIT NUMBER
```

Key in (but don't execute) the drive number of the drive you are using to initialize your disk (0,1,2 or 3). The message will return if an incorrect key is pressed. If you wish to abort the routine at this time, press (STOP) or (RESET).

After a valid drive number has been entered, the routine asks you to verify the drive and select code –

```
UNIT=n, SC=n? HIT CONTINUE IF OK
```

If the unit (drive) number is correct, press (CONT). The routine assumes that your drive interface is set to select code 8.

Now the track-by-track initialization and verification routine is done. This takes less than five minutes. If six or less tracks are defective, the next message indicates the number of defective tracks –

```
n DEFECTIVE TRACK(S)
```

If more than six tracks are defective, the routine stops and ERROR 200 is displayed. If this occurs, the disk cannot be used. If six or less of the tracks are defective, initialization of that disk is complete and the disk is ready to use.

Printers

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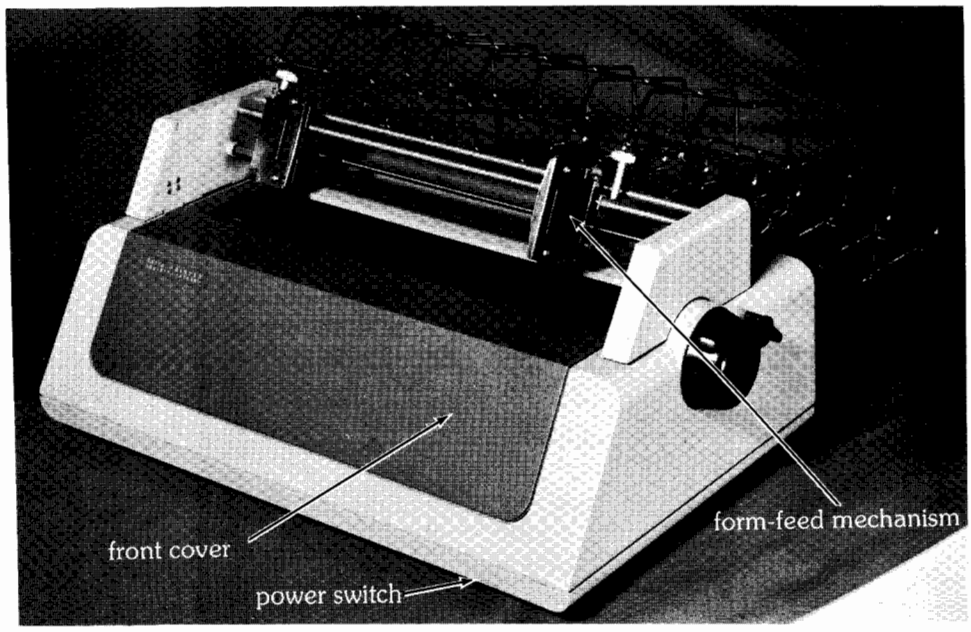
The Serial Impact Printer

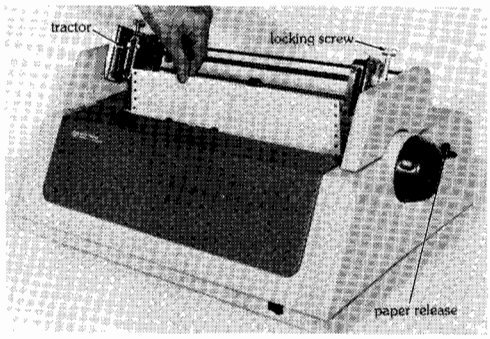
The HP 9871A Serial Impact Printer produces highly readable reports, account analyses, and personalized form letters at a rate of 30 characters per second (equivalent to 360 words a minute on a typewriter). Material can be generated in as many as six copies of varied formats, on either single or continuous forms.



NOTE

If the 9871A Printer "beeps" when the system is switched on, an internal memory error is indicated. Switching the printer off and on again may clear the problem. If the beep persists, call HP for assistance.

Loading Continuous Forms

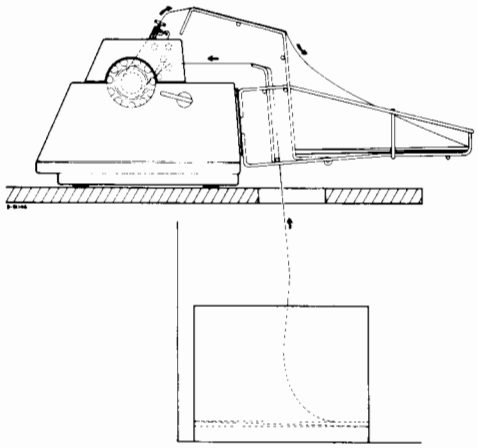


Move the paper release lever forward.

Insert the paper behind the platen and push the paper in so that it travels around the platen.

As the edge of the paper comes around the front of the platen, pull the paper up until it is near the tractors.

Open the hinged paper hold-down on each paper tractor. Engage the feed holes of the form with the feed pins on the tractors.



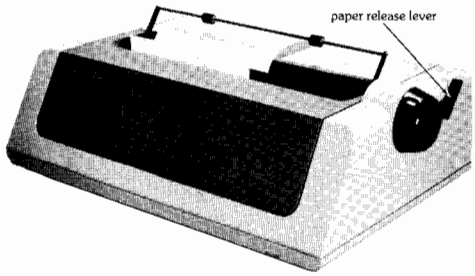
Either tractor may be adjusted for the width (or position) of the form by loosening its locking screw and sliding it to the desired position. Be sure that the paper is **not pulled taut** between the tractors – a little slack in the paper will prevent skewing to one side and torn forms.

Close the paper hold-downs and tighten the tractor locking screws. Be sure that the paper is not skewed in the printer.

Always leave the paper release lever in its forward position when the form-feed mechanism is used.

Loading Single Forms

Move the paper guide back away from the printer.



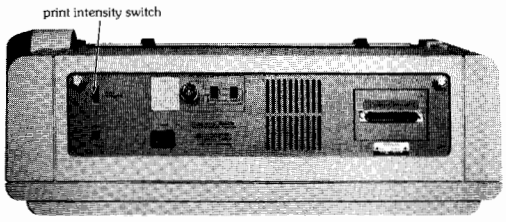
Move the paper release lever back as shown.

Place the paper behind the platen with the left edge of the paper at the desired position. Lift the paper bail up, then turn the platen knob clockwise to feed the paper around the platen.

Push the paper bail down to hold the paper.

Adjusting Print Intensity

The striking force of the print mechanism is controlled by a three-position switch on the rear panel. To darken the printout use the **H** position, for normal printing use the **M** position, and to lighten the print use the **L** position. When printing multicopy forms, use the **H** position to ensure that all copies are printed.



The condition of the ribbon cartridge and character disk also affect print intensity. If the print begins to fade and the print intensity switch does not help, first replace the ribbon cartridge. If the problem still persists, change the character disk. If neither of these operations remedy the problem, call HP for assistance.

Replacing the Ribbon Cartridge

Switch the printer off and remove its front cover.

Slide the carrier to the center of the printer to better access the ribbon cartridge.

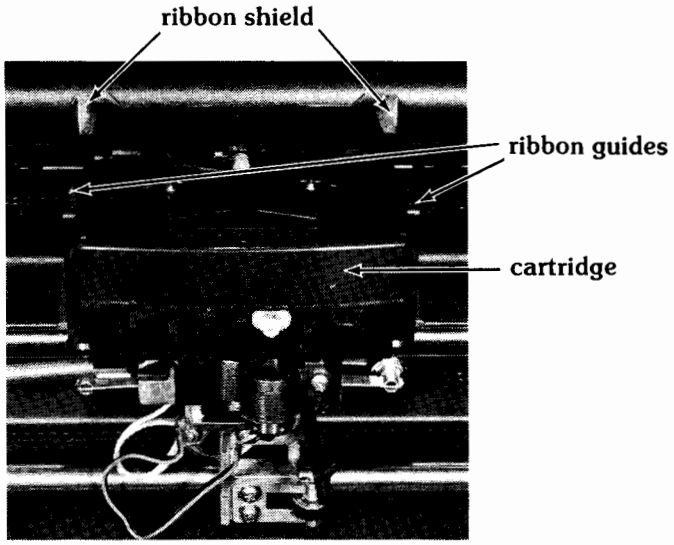
Remove the old cartridge by lifting it straight up and off of the carrier.

Place the new cartridge on the two ribbon spindles and press it into place.

Place the ribbon on the outside of the two ribbon guides on the carrier. The ribbon must pass between the character disk and the metal ribbon shield.

Remove any slack in the ribbon by turning one of the ribbon spindles. The ribbon should be straight and not twisted.

Replace the front cover and switch the printer on.

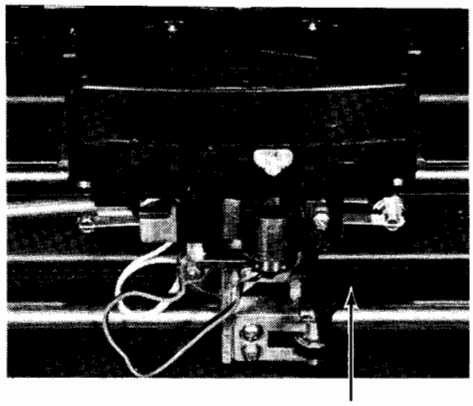


Replacing the Character Disk

With the front cover in place on the printer, switch it off and then on again; this aligns the carrier so that the character disk can be installed or removed.

Switch the printer off and remove the front cover by pulling it forward and off the printer.

To release the old character disk, press down on the character disk release lever. Then remove the old disk.



disk release lever

A small round container of character disks is supplied with the printer. Hold one of the disks so that its locating tab is up and facing you.

Slide the disk down into the carrier assembly, between the hammer and the metal ribbon shield. Gently push the disk down until it locks in place; the locating tab fits into a slot on the carrier mechanism.

Replace the front cover and switch the printer on.

9871A Printer Self Test

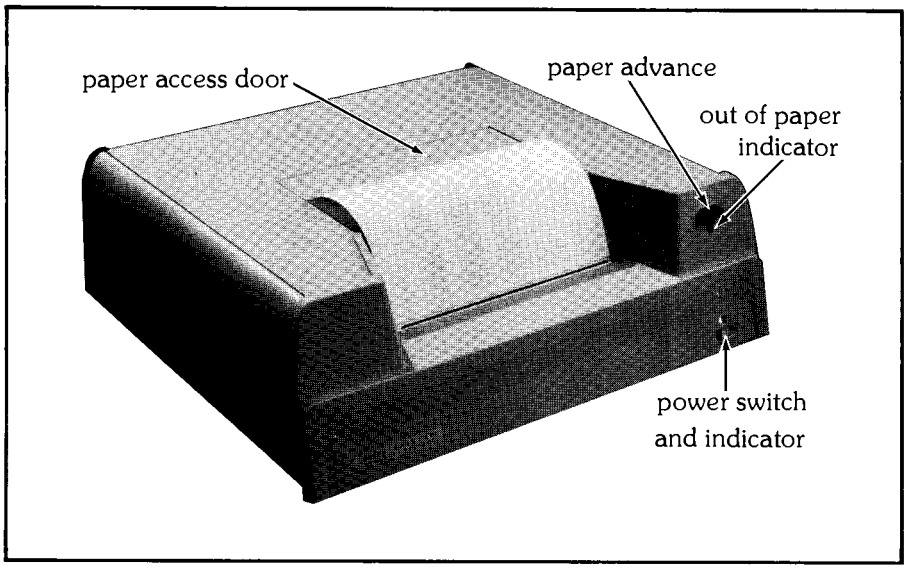
The 9871A Printer can be tested without the use of the desktop computer. To run the self test, switch the printer on, load it with 14⅞ inch wide paper and press the TEST button on the printer's back panel. The printer should print the line shown next. Then the printer checks its internal memories. An error in the memory test is indicated by one or more beeps.

If the printout is incorrect or if the printer beeps, switch it off and on again; then press the TEST button again. If the printer test fails again, call HP for service.

```
M.M.M.M.M.M.M.M.M.M.M!"#$%&´()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ

                                                [√]^_`abcdefghijklmnopqrstuvwxyzπ|÷~M.M.M.M.M.M.M.M.M.M.M
```

The Thermal Line Printer



The HP 9866B Printer is a fast, thermal-printing line printer which can output up to 240 lines per minute. The line width is 80 characters wide (223 mm or 8¾ inches). The printer has a 95-character dot matrix font of both uppercase and lowercase. Paper is available for either blue or black printout. Paper rolls are 72 m (250 feet) long.

Loading Paper

The yellow light below the PAPER button indicates when the printer is out of paper.

Switch the printer on and lift the access cover on the top of the printer.

Remove and discard the paper core of the old roll. If the remaining roll is small and a new roll is to be used, remove the old roll by first lifting it out of the printer and tearing it off. Then press PAPER to remove the paper end.

Remove the first layer of paper from a new roll. Be sure that the paper has a cleanly torn or cut edge, as paper with a ragged edge may not load properly.

Insert the new roll such that the free end is positioned as shown on the back of the access cover. Press the PAPER button until paper appears at the front of the printer.

In Case of Trouble

You can greatly reduce system down time – the time you cannot operate the system because of problems – if you are able to find the problem and take the appropriate recovery action. By checking the system yourself, you may be able to avoid calling for service, or at least minimize the time needed to get your system back into operation. If you can't avoid calling for help, you should know which person to call. This decision is based on what kind of problem you find.

System problems are caused by either an operator or a program error or by a hardware failure. Many errors are indicated by error messages. When the system stops processing and displays an error code, refer to the list of Error Messages at the back of this guide. From that list, you'll be able to tell whether it's an error or a hardware failure.

You can determine if a hardware (equipment) failure has occurred by first checking system interconnections and then following the System Test Procedure described in the System Installation and Service Manual. If one of the system tests fails, you should call HP for service. You may be able to disconnect a defective peripheral device and use the rest of the system in the meantime. If the system tests run OK, but you still have a problem, a software error could be the cause.

A software error is caused by an error or "bug" in a program which is run on the system. A software error will occur repeatedly for the same set of operating conditions, and will occur only when the offending program is loaded and run. A software bug may only cause minor operator inconvenience or it may erase valuable data. It could also "lockup" the system, requiring you to press RESET to regain control.

If a software error is indicated, you should note all conditions which caused the error (what key sequence was pressed, any error messages, incorrect program output, etc.). To help pinpoint the cause of the error, switch print all on by pressing PRT ALL (EXEC) and then repeat the key sequence which preceded the error. Then contact the person or firm who supplied the software. If you are using HP developed software, call your HP sales representative for assistance.

System Checklist

When you have a system problem, use this checklist to locate the cause. Remember that you'll save time and money by locating the exact problem before calling for help.

Power On

- If the entire system will not power up, check its power cable. Is it plugged into an ac outlet? Is the outlet "live"?
- Check the circuit breaker located at the back of the system, behind the rear door. It should be in the ON (up) position. If it does not stay ON, call HP for service.
- If all components power up but one, check its power cable, switch, fuse, and line voltage switches (refer to the System Installation and Service Manual for details). If needed, call HP for service.

Display and Lights

- The ⊢ should be displayed after the desktop computer is switched on, and also immediately after RESET is pressed.
- Each 9885 Disk Drive's green LINE indicator should be lit.
- The 9866B Printer's LINE indicator should light. The amber PAPER indicator lights when the printer is out of paper.

Disk Drives

- Press RESET; each disk drive's yellow DRIVE SELECT light should flash and you should hear a soft metallic click. If not, check the drive's interface cable connections.
- Be sure you are using the correct disk in the correct drive (refer to the software user instructions).
- Are all disk drives switched on?
- Is the door on each drive closed and latched?

9871A Printer

- The front cover must be in place before the printer will print.
- Check the character disk and ribbon cartridge. The ribbon must pass between the character disk and metal ribbon guide.

- Check the setting of the PRINT INTENSITY switch. If the switch is set to H but the printout is too light, replace the ribbon cartridge (see page 24).

- Are the proper forms used and aligned? The supply of forms must be positioned exactly below the printer to prevent them from skewing to the side as they pass through the printer.

- If the printer beeps as it's switched on, a hardware failure is indicated. Switching the printer off and back on again may clear the problem. If not, call HP for service.

Interface Cards

- Check the interface cables on the back of the printer and the computer: they must be connected securely.

- Check the select code switch setting on each interface: the disk drive interface should be set to 8 and the printer interface should be set to 2. If you have a second printer, its interface should be set to 6.

If you cannot locate the problem, follow the System Test Procedure in the System Installation and Service manual. Should the system pass the system tests, but you still have a problem, call HP for service. In the meantime, note any error messages which occurred or incorrect program output. This may reduce the down time while your system is being serviced.

Operating Supplies

Order these items from your HP sales and service office.

Item	Qty / Pkg	Part Number
Flexible Disks[1]	5	09885-80004
	25	09885-80005
Disk Storage Envelopes	1	9230-0420
9871A Printer Ribbon[1]	3	9282-0561
9871A Printer Disks –		
Standard Characters	3	1530-0697
European Characters	3	1530-1810
ASCII Characters	3	1530-1811
Katakana (Japanese)	3	1530-1851
Cyrillic (Russian)	3	1530-1895
APL Characters	3	1530-2022
9866A Printer Paper –		
Blue Printout	2 rolls	9281-0414
Black Printout	2 rolls	9281-0488
9831A Tape Cartridge (blank)	1	9162-0061
9831A Special Function		
Key Templates (blank)	5	7120-4802
Utility Routines Disk	1	09885-10014
System Test Cartridge	1	09831-90035

1 Be sure to use disks and printer ribbons which are approved by HP. If not, the system components could be damaged. Call your HP sales and service office for a list of recommended substitutes.

System Manuals

Each component of the HP 9896 Computation System has its own operating manual(s). They are kept in two binders titled **Operating & Programming Manuals** and **Installation & Service Manuals**. If you have a question about any of the system components which is not answered in this guide, turn to the component's manual.

Operating & Programming Manuals

The **9831A Operating & Programming Manual** (09831-90000) describes all keyboard and programming operations for the desktop computer, including using variables, operating the built-in tape cartridge, defining the special function keys, and controlling a printer.

The **9831A Peripheral Control Manual** (09831-90020) covers all standard input / output operations and controlling many of the current HP 9800-series peripherals.

The **9831A BASIC Reference** (09831-90010) lists each statement, function, and command in the desktop computer's BASIC programming language. Error codes are also listed.

The **9831A System Test Manual** (09831-90031) has user instructions for running test programs on the 9831A System Test Cartridge. Programs are available for testing the desktop computer and each of it's current HP peripherals.

The **Flexible Disk Operating & Programming Manual** (09885-90050) shows how to install and operate the 9885 Flexible Disk Drives. All disk operations available with the 98218A Flexible Disk ROM and the Utility Routines Disk are covered.

Installation & Service Manuals

The **9896 System Installation & Service Manual** (09896-90030) covers site preparation, receiving, installation, and testing your 9896 System.

The **9871A Installation Manual** (09871-90035) shows how to install the 9871A Printer.

The **98032A Interface Installation & Service Manual** (98032-90000) and its **Installation Notes** contain technical information on the interface cables for the printer and disk drives.

The **9866A / B Peripheral Manual** (09866-90001) covers installing the optional 9896B Printer.

The **9885S Operating Note** lists the accessories supplied with a 9885S (slave) Disk Drive.

Software Manuals

If you are using HP developed software on your 9896 System, you have these manuals –

The **Conversion Manual** (09896-12551) is a step-by-step approach to converting data from a manual bookkeeping system to the format used in the 9896 System.

The **User's Operating Manual** (09896-12552) explains how to load the accounting software, enter data, balance the system, and output reports on daily, weekly, and monthly bases.

In addition, step-by-step operator instructions for running each software package are listed in manuals furnished with the software –

- **Payroll Manual** (09896-12531)
- **Inventory Control Manual** (09896-12521)
- **Accounts Receivable Manual** (09896-12511)
- **Accounts Payable Manual** (09896-12501)
- **General Ledger Manual** (09896-12541)

Glossary

array variable – an area of read / write memory assigned for storing a group of data items under one name. Each item is accessed by using subscripts with the array name.

availability table – a table in the disk's systems area that monitors the amount and location of remaining disk space.

backup – to duplicate the contents of an entire disk onto a second disk for safekeeping.

backup track – track 1 of an initialized disk contains the same information as track 0: the systems table, the file directory and the availability table.

BASIC – Beginners All-purpose Symbolic Instruction Code – a popular easy-to-use programming language used by the HP 9831A Desktop Computer.

BIMS – Business Information Management System – a system for handling business problems such as payroll, inventory, accounting, etc.

bug – an error in a computer program.

byte – the smallest unit of memory in the desktop computer. Two bytes equal one word of memory.

character disk – a plastic wheel holding the character set for the HP 9871A Printer.

checkword – a unique 16-bit word automatically written on the disk at the end of each record during a write operation.

checkword error – when a disk record is read, a checkword is generated and is compared to the checkword at the end of the record for data validity. If not identical after 9 rereads, ERROR 85 is displayed.

commands – operation which can be executed only from the computer keyboard; they cannot be programmed.

CPU – Central Processing Unit – the HP 9831A Desktop Computer is your system's CPU.

core processing – using a common area in the computer memory as a workspace to hold programs and data for the current job.

data conversion – converting the data (bills, receipts, etc.) used with a manual bookkeeping system to the format used with an automatic system.

defective track – a track on the disk where the reading and writing of data is not possible, usually because of a scratch, dirt, or lack of magnetic oxide on the surface of the disk. The number of defective tracks is identified during initialization and is recorded in the systems table.

disk – the flexible disk (or diskette) is the storage medium for the HP 9896 System. Data is written on a thin magnetic oxide film coated on plastic. The disk is enclosed in a sealed plastic jacket for protection.

display – a screen for outputting data, messages, and other information to the system operator.

drive – the 9885M and 9885S are referred to as disk drives. The computer has a built-in tape drive.

drive number – the disk drive number (0 thru 3) is selected by the DRIVE SELECT switch on the drive's rear panel.

double density – the type of recording techniques used by out disk drive, giving twice the storage capacity over standard flexible disk systems.

edit – to correct a line of data before it is entered.

EOF mark – a mark automatically placed in the first word of each record when a disk file is opened and at the end of the data in a file when the END parameter is used. Data cannot be read past this mark, although it can be written.

EOR mark – marks automatically placed after the last data item in each disk record.

error code – a number displayed when the computer detects an error, indicating the cause of the error.

FICS – Financial Information and Control Software is a set of programs for handling business financial accounting problems.

file – a file is one or more user records written on the disk. A file can contain one block of memory information, such as a group of programs or data.

file directory – a directory in the disk systems area containing entries for every file on the disk indicating file name, size, type and location.

flexible disk – the disk is also referred to as a flexible disk or diskette.

function (special) keys – a block of 12 keys, f0 thru f11, defined to run programs or input special data.

function – BASIC language operations which can be executed from the keyboard or included in programmable statements.

hard error – a hard error usually indicates that the disk is damaged and some data is lost. A software error-recovery routine may can be used to try to recover from the error. See Appendix C of the 9885 Disk Operating & Programming Manual.

hardware – the equipment in your computation system.

head – the read / write head contains the read, write, and erase elements (coils) encased in ceramic. The head is in contact with the lower surface of a disk (disk drive) or tape (tape drive) when data is transferred.

header – a unique bit pattern representing the address of the record, written at the beginning of each record during disk initialization.

initialize – when a disk is initialized, addresses are written on it, it is tested by writing and reading patterns from the disk, and the systems area is set up.

interface – a signal cable and circuits connecting the computer to a peripheral device.

label – an alphanumeric name assigned to each disk.

logical file access – a method of storing and retrieving disk data items separately, item by item, independent of where the data is located on the disk.

multirecord strings – long string variables are automatically stored in successive disk records.

null strings – a string variable containing no characters.

peripheral – each input, output, and storage device connected to a computer, such as the printer and disk drive in your system.

precision (data) – the number of digits allowed per data element. Full precision allows 12 digits, split precision allows 6 digits, and integer precision allows numbers from –32767 thru 32767.

random file access – a method of storing and retrieving data items on disk, record by record.

read / write memory – circuits which can hold programs or data and can be read from many times. The system read / write memory is erased when power is switched off.

record – a block of 128 data words written on the disk, following a header and followed by a checkword.

ROM – Read Only Memory is a circuit which is permanently programmed to hold data, routines, or elements of a computer language.

soft error – disk errors usually caused by dirt in the air or on the disk, random electrical noise, or small defects on the disk. Re-reading the data will usually clear the error.

select code – the address to which each interface card and its peripheral device responds. In your 9896 system, each 98032A Interface must be set to a different select code. The standard printer is set to 2, the disk is set to 8, and a second printer should be set to 6.

serial file access – a method of storing and retrieving data items on disk in a block instead of individually. Also called sequential access.

simple variables – memory locations for holding single data items; each is assigned a unique letter or alphanumeric name.

software – programs which are loaded into your system from either disk or tape. As the program is run, it tells each part of your system what to do at the correct time.

standard printer – the system automatically outputs reports and other data to the printer set to respond to select code 2.

statements – BASIC language operations which can be assigned line numbers and stored in the computer memory as a program.

storage area – disk tracks 2 thru 66 are available for data storage.

string variable – a memory location for holding a series of alphanumeric characters enclosed in quotes and assigned a special variable name from A$ thru Z$.

systems area – the systems area consists of disk tracks 0 and 1. It contains the systems table, file directory, availability table, and backup track.

systems table – table in disk systems area indicating the computer used to initialize the disk, number of defective tracks, beginning of user area, and an optional disk label (name).

system test cartridge – a tape cartridge having test programs for the computer and each system component. The System Test Manual describes how to run each test.

track – any one of 67 concentric circles on the surface of the disk, about 0.3 mm wide and numbered 0 thru 66. The internal tape cartridge has two tracks, numbers 0 and 1, for data and program storage.

transition – a flux reversal caused by writing on the disk producing an electrical transition during a read that is decoded into bits (0 or 1).

tight margin – a restriction in the time allowed for a read operation on disk, during which a flux transition can be interpreted as a bit (a 1 or 0).

update – to add new data to an existing disk or tape file.

variables – names of memory locations for storage of data such as numbers, alphanumeric strings, and numeric arrays.

verify error – when automatic data verification (VERIFY) is on, each PRINT# or MAT PRINT# disk operation is reread under tight margin to ensure accuracy. If an error is found during a write operation, ERROR 59 is displayed.

word – The standard unit of disk storage and equivalent to a word of read / write memory. A word can hold one integer precision number or two alphanumeric string characters. Short program statements can be stored in as little as three words.

WRITE tab – an opaque tab which permits writing on the disk. When the WRITE tab is removed, writing on the disk is not allowed.

Error Messages

The computer stops processing, beeps and displays a message when it detects an error. The message contains a code indicating the cause of the error. You cannot usually continue program operation until the error is corrected.

Errors arise from one of three causes: **operational** (operator) errors, **software** (programming) errors, or **hardware** (equipment) errors. Operational errors are ones which you can correct. For example –

```
ERROR 4
```

indicates that you pressed the wrong key after entering data for a program. To correct (recover from) this error, type in the data again and press the correct key.

A software error is caused by a mistake (bug) in the program you are running. For example –

```
ERROR 100 IN LINE 30
```

indicates that a computation in line 30 of the program results in a number outside of the computing range. Notice that a line number is included in the message when the error occurs in a program.

An error message which has a line number may not always be a software error. For example –

```
ERROR 59 IN LINE 3000
```

Error 59 usually indicates that a tape drive or disk drive encountered an error while reading data. This is called a hardware error, in this case indicating a defective tape or disk, or a tape drive which needs cleaning. But error 59 may also occur directly after you insert a tape cartridge, but forget to press REWND to orient the tape drive to the tape's position. In this case, error 59 indicates an operator error.

The following pages list the error codes available with the 9896 System. The letter to the right of each error code indicates whether it is usually an operator (**o**) error, a software (**s**) error, or a hardware (**h**) error.

Remember that the operator can correct most operator errors and even some hardware errors, but when a software error occurs, call the programmer or firm responsible for the programs you are running. If you are using HP developed software, call the HP sales and service office for assistance.

Error	Meaning
1	Plug-in ROM missing – attempt to run a program without having the ROM installed. (o)
2	Insufficient memory – the 9831A needs more memory than is available. (s)
3	Statement cannot be executed from the keyboard. (o)
4	Missing line number, or integer missing or out of range – caused by pressing (STORE) instead of (EXEC), or by using a variable where an integer constant must be used. (o)
5	Statement or command not recognized – caused by pressing (STORE) instead of (EXEC), or vice versa. (o)
6	Improper arithmetic expression. Also, missing number or expression. (o)
7	Extra characters or parameters not allowed. (o)
8	Missing punctuation in program statement. (o)
9	Invalid command (unless in special function KEY mode). (o)
10	Special function key is undefined. (o)
11	Exponent is out of range. (o)
12	Two decimal points in number. (o)
13	Sign given without number. (o)
14	Missing comma. (o)
15	Missing left parenthesis. (o)
16	Missing right parenthesis. (o)
17	Missing subscript from array or string variable name. (o)
18	String operation not permitted. (o)
19	No opening quote or missing string variable. (o)
20	No closing quote. (o)
21	Missing or improper function name. (o)
22	Missing function parameter. (o)
23	Missing or incorrect DATA item. (s)
24	Improper IF statement. (s)
25	Missing OF in computed GOTO statement. (s)

26	Missing variable. (s)
27	Missing or improper FOR variable. (s)
28	Missing TO in FOR statement. (s)
29	Missing STEP, or illegal characters following FOR statement. (s)
30	Missing assignment (=) operator. (o)
31	Missing or improper assignment. (o)
32	Improper FORMAT specification. (s)
33	COM statement rules not followed. (s)
34	Improper COM declaration. (s)
35	Array or string variable is doubly dimensioned. (s)
36	Precision of variable is doubly defined. (s)
37	Inconsistent dimensions are given. (s)
38	Array has unknown dimensions. (s)
39	Dimensions are either ≤0 or too large. (s)
40	Variable of function is undefined – often caused by using a variable which does not have a value. (s)
41	Array or string has not been initialized – check for COM for DIM statement. (s)
42	Subscript exceeds bounds. (s)
43	Select code out of range of 2 thru 15. The range is extended to q thru 15 for TAPE and 0 thru 15 for ENTER and RBYTE. (s)
44	Line not found – often caused by incorrect branching statements. (s)
45	Improper statement type referenced. (s)
46	Improper statement nesting in multiline function. (s)
47	Improper RETURN. (s)
48	FOR statement has no matching NEXT. Also incorrect FOR nesting. (s)
49	Out of DATA. (s)
50	Last statement is not END. (s)

(o) indicates an operator error – recall the line, correct it and re-execute it.

(s) indicates a software error – call HP or the person or firm responsible for the software (programs) you are running.

51	LOG or LT of negative number. (o)
52	SQR of negative number. (o)
53	Zero raised to zero power. (o)
54	Non-integer power of negative number. (o)

Tape Cartridge Errors

55	Syntax error in tape cartridge statement. (o)
56	Wrong file or file not found. (o)
57	Improper operation on secured (SEC) program. (o)
58	Tape cartridge status error: no cartridge in transport; tape is write protected (RECORD slide); external tape drive is switched off. (o)
59	Tape verification error – tape head is dirty or tape is damaged. Also, tape position is unknown (execute REWIND or FIND to re-establish position). ERROR 59 also indicates a data verification error during PRINT# and MAT PRINT# (flexible disk) operations. (h or o)
60	Incorrect file size. Also caused by an attempt to STORE DATA without an allocated memory area. (o)
61	Wrong precision or data type. (o)
62	Wrong file type. (o)
63	Cartridge LOAD or MERGE operation would overlay new program over old one – operation not performed. (o)

String Variable Errors

64	Incomplete IF statement. (s)
65	Incorrect LEN, POS, or VAL syntax. (o)
66	Current string length exceeded. (o)
67	Operation is on a non-continuous string. Substring requested is beyond the logical boundary for the string and is undefined. (o)
68	Maximum string length exceeded. Additional string length must be specified in the DIM statement. (s)

(o) indicates an operator error – recall the line, correct it and re-execute it.

(s) indicates a software error – call HP or the person or firm responsible for the software (programs) you are running.

69	Illegal DATA encountered during READ statement execution. Character data found; numeric data expected. (s)
70	Illegal argument in VAL function. (s)
71	Illegal characters entered by INPUT statement. (s or o)

I / O Errors

72	End of data reached or data contains more than ten blanks in a row. (s)
73	Invalid FORMAT specification. (s)
74	Numeric input has syntax error: multiple decimal points; more than one E; other non-numeric input. (s)
75	Conversion table or code not found. Check for integer initialization in DIM or COM statement. (s)
76	Select code does not match interface card. For example, select code without HP-IB address code addressed to HP-IB Interface, or vice versa. Also, I / O operation not allowed with select code 1 (internal tape cartridge). (s)
77	Interface card either not connected or not set to correct select code. (h)

Flexible Disk Drive Errors

78	I / O interrupt. For example, an interface card is plugged in while power is on. (h)
79	All disk drives not switched on. (o)
80	Disk drive door open. (o)
81	Disk not installed or specified drive number not set. (o)
82	Write-protected disk (WRITE tab removed). (o)
83	Disk drive record header error. (h)
84	Disk track not found. (h)
85	Disk data checksum error. (h)
86	Disk drive hardware failure. Press RESET to regain system control. (h)
87	Read-data error: try to reprint the data. (h)

(o) indicates an operator error – recall the line, correct it and re-execute it.

(s) indicates a software error – call HP or the person or firm responsible for the software (programs) you are running.

(h) indicates a hardware error – check the specified system component for the cause, then continue. If the error is repeated, run the appropriate system test by using the System Test Cartridge. If a hardware failure is indicated, call HP for assistance.

Flexible Disk ROM Errors

88	Miscellaneous Disk ROM syntax error. For example, storing an incorrect IF END# statement. (s)
89	Incorrect disk drive number or select code. Also, incorrect record pointer or word pointer. (s)
90	Incorrect disk file name or file not found. (s)
91	Available disk file space exceeded. Directory or availability table is full. (s)
92	File name already exists on drive. (s)
93	EOF (end of file) mark reached or physical end of file encountered. (s)
94	Disk file format error. For example, a multirecord string not intact. (s)

Recoverable Errors

These errors indicate that the computing range has been exceeded. If an error occurs for a keyboard operation, recall the line, correct it, and re-execute it. If an error occurs while running software, consider it a software error.

100	Numeric overflow (assumes + or − ∞).
101	Numeric underflow (assumes 0).
102	LOG or LGT of zero (assumes − ∞).
103	Division by zero (assumes + or − ∞).
104	Zero to negative power (assumes + ∞).
105	Integer variable overflow (assumes + or − 32767).
106	Split variable overflow (assumes + or − 9.99999E+63).
107	Split variable underflow (assumes 0).

NOTE

The computer approximates + and − infinity (∞) by 9.99999999999E+99 and −9.99999999999E+99, respectively.

(o) indicates an operator error − recall the line, correct it and re-execute it.

(s) indicates a software error − call HP or the person or firm responsible for the software (programs) you are running.

(h) indicates a hardware error − check the specified system component for the cause, then continue.

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