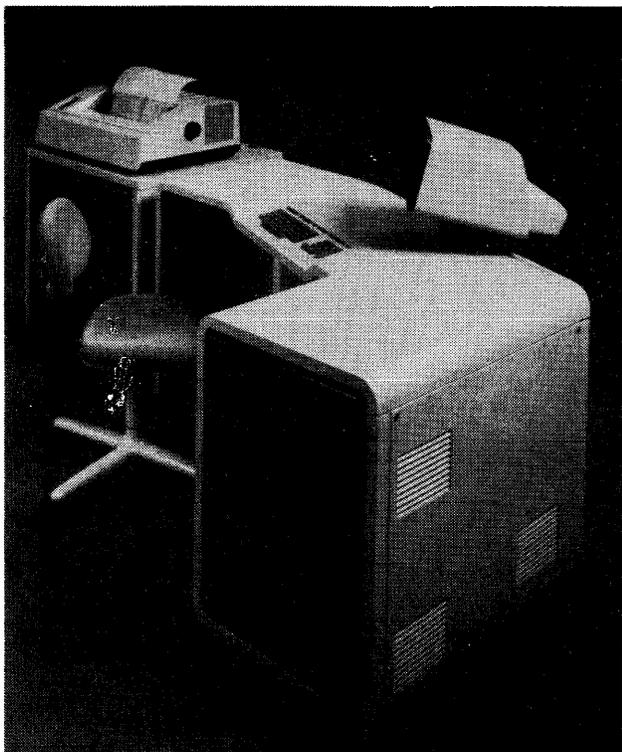


Hewlett-Packard HP 250



The basic HP 250 consists of an operator's console with keyboard and adjustable display screen (center) and disk storage (right), all housed in a compact desk enclosure. The system shown also includes (left) a 2631A serial printer.

MANAGEMENT SUMMARY

Hewlett-Packard's HP 250 is the lowest priced member of HP's family of business computers. The system uses the same microprocessor as the HP 9835 and HP 9845 and includes full built-in data base management capability (IMAGE/250).

The basic HP 250 system package includes a standard typewriter-like keyboard, a 1920-character CRT display, 128K bytes of system memory, 32K bytes of user memory, a 1.2-megabyte flexible disk, interface and power cables for printer, and all operating system software including the IMAGE/250 data base management package. Available options include a 12.1-megabyte Winchester disk and a 19.2-megabyte fixed/removable cartridge disk, and 30 cps, 180 cps, and 400 lpm printers.

The HP 250 was initially offered as a flexible-disk-based system that could accommodate up to three diskette units. In May 1980, Hewlett-Packard repackaged the offering, dropping the options for adding a second and third diskette and adding the Winchester disk option. An HP 250 with the 12.1 Winchester disk is priced the same as the earlier version with three diskettes, thus the user now gets the increased capacity, reliability, and speed afforded by ➤

The Hewlett-Packard HP 250 includes a built-in data base manager and several software packages and is designed for use by small companies and divisions of large firms. The entire basic system is housed in a desk enclosure. The basic HP 250 package is priced at \$17,000 without a hard disk or printer.

MAIN MEMORY: 32K or 64K user memory per terminal, 128K to 160K system memory; maximum total memory 512K bytes.
DISK CAPACITY: 13.3 to 52.5 megabytes.
WORKSTATIONS: System plus up to 5 REMOTE/250 consoles.
PRINTERS: 30 cps, 180 cps, 400 lpm.
OTHER I/O: None.

CHARACTERISTICS

MANUFACTURER: Hewlett-Packard Company, General Systems Division, 19447 Pruneridge Avenue, Cupertino, California 95014. Telephone (408) 725-8111.

Hewlett-Packard is one of the foremost manufacturers of sophisticated laboratory test equipment and specialized process control instrumentation. In addition to conventional laboratory equipment such as signal generators, oscilloscopes, and voltmeters, HP also manufactures more exotic instruments such as gas chromatographs, digital thermometers, network analyzers, and spectrum analyzers. Related products include both digital and analog graphic recorders, analytic instrumentation systems, and medical electronic instrumentation systems. Other Hewlett-Packard products are hand-held and desk-top calculators, both programmable and nonprogrammable.

The Computer Groups organization includes the General Systems Division that is responsible for the HP 250 computer system; the Computer Systems Division that is responsible for new product research; the Information Systems Division that is responsible for the HP 300, HP 3000, and data communications products in the U.S.; the Computer Marketing Group that is responsible for the coordination and monitoring of sales efforts across HP's entire computer line; the technical computer group that includes the Desktop Computer Division that is responsible for the HP 9800 family and the Data Systems Division responsible for the HP 1000 line; the Computer Peripheral Group that includes the Disc Memory Division, the Boise Division (tape drives), and the Vancouver Division (printing terminals); and the Data Terminals Division that is responsible for the company's computer operations in Grenoble, France, as well as terminal operations in the U.S.; and the Böblingen, West Germany General Systems Division responsible for the HP 250, 300, and 3000 in Europe.

Hewlett-Packard products are sold by 135 sales offices and serviced by 160 offices in 37 countries and are manufactured in facilities in the U.S., United Kingdom, Germany, France, Japan, and Malaysia. The company employs about 40,000 persons worldwide, with about 14,100 involved worldwide in computational products. ➤

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➤ the Winchester disk at no increase in price over the three-diskette version.

System programs, the operating system, and test programs are stored on disks. The CPU is controlled by the operator through the keyboard. Up to five REMOTE/250 consoles can be added to the basic system, each of which requires an additional 32K- or 64K-byte block of memory. Through these remote consoles, other users can share the CPU, store and retrieve information on the disks, print reports, develop programs, and perform all functions of the main console but from remote locations.

When a system includes one or more remote consoles, the CPU is continually switched between user memory blocks. Program operations for each console take place when that console's block of memory is connected to the CPU. However, it appears to each user (at either a remote console or at the main console) that he has exclusive use of the system. All users may see some degradation in response time when several users are executing CPU-intensive jobs concurrently. Either of two printers can be attached to each remote console.

Eight "softkeys" on the main console display and eight similar special function keys on the remote consoles can be assigned to call predefined programs or routines stored in memory. In addition to the eight softkeys, the HP 250 keyboard has eight special function keys which can have both shifted and unshifted definitions. The HP 250 can therefore have up to twenty-four predefined functions, subprograms, or routines active and callable at any time. Display control and line drawing sets are part of the standard system.

The operating system is loaded into memory from disk when the operator powers on the system and after a hardware test has been performed on each of the system's components (including any remote terminals) and every memory location.

HP offers Business BASIC/250 for use with the HP 250. Business BASIC/250 is a form of HP Business BASIC which supports multi-dimensional numerical and string arrays, complete subprogram capability, variable names and labels up to fifteen characters long, data and program files, structured programming, and flexible output formatting.

IMAGE/250, a built-in data base management software system, provides true data base management facilities. Features of IMAGE/250 include find and sort operations across data sets, multi-volume data base capability, utilities which add or delete data items and data sets, password protection at the data set level, and compound data items.

The standard system also includes three software modules. QUERY/250 uses IMAGE/250's data base management capability to allow unprogrammed access ➤

➤ **MODEL: HP 250.**

DATE ANNOUNCED: June 1978.

DATE OF FIRST DELIVERY: September 1978.

NUMBER DELIVERED TO DATE: Not available.

DATA FORMATS

BASIC UNIT: 16-bit (2-byte) word.

INSTRUCTIONS: The HP 250 instruction set consists of assembly language instructions for the NMOS Hewlett-Packard microprocessor.

INTERNAL CODE: Binary Coded Decimal (BCD) up to 12 digits; ASCII.

MAIN STORAGE

TYPE: MOS.

CYCLE TIME: 833 nanoseconds.

CAPACITY: 128K bytes to 192K bytes of system memory and 32K bytes to 64K bytes of user memory in 32K-byte, 64K-byte, and 128K-byte increments (up to six users).

CHECKING: One parity bit per byte.

STORAGE PROTECTION: None.

CENTRAL PROCESSOR

The HP 250 processor, the same processor used in the HP 9835 and HP 9845, controls and buffers signals to and from an LSI NMOS-II microprocessor. It is a hybrid chip consisting of a Binary Processor Chip, an Extended Math Chip, Input/Output Controller, and four Bidirectional Interface Buffers.

CONTROL STORAGE: None.

REGISTERS: Index registers are software-assigned.

INDIRECT ADDRESSING: 1-level.

INSTRUCTION REPERTOIRE: The HP 250 uses a version of HP Business BASIC which includes features and capabilities found in COBOL, APL, and FORTRAN and provides for sophisticated matrix operations, multi-character variables, mass storage operations, and subprogram capability.

INSTRUCTION TIMINGS: The following are representative timings only and are given in approximate microseconds. The routines all use full 12-digit floating point data.

Add	0.27
Subtract	0.33
Multiply	0.89
Divide	2.30

INTERRUPTS: Two external interrupt levels.

PHYSICAL SPECIFICATIONS: The console is 42.4 inches high, 61.4 inches long, 46.7 inches wide and weighs 335 pounds. The HP 2631 printer is 8.5 inches high, 18.5 inches long, 25.2 inches wide and weighs 51 pounds. Two standard 15A, 110V outlets are required. Maximum power consumption for a standard system is 7.51A at 100V, 6.20A at 120V, 3.40A at 220V, and 3.15A at 240V. Operating temperatures can range from 50 to 104 degrees F. with a ➤

Hewlett-Packard HP 250

PERIPHERALS/TERMINALS

DEVICE	DESCRIPTION & SPEED	MANUFACTURER
INTEGRAL WITH PROCESSOR		
Flexible disk drive	1.2-megabyte per disk capacity, 62.5K bytes per second	HP
CRT	Display/keyboard (console), 1920 characters (24 lines by 80 characters), eight user-definable softkeys, adjustable brightness, inverse video, blinking, underline, line drawing and display control character sets	HP
PRINTERS		
2631A	Dot matrix, 7 x 9, 136 positions, 128-character set, 10 characters per inch, 6 or 8 lines per inch, 1.2- to 15.75-inch paper, 8-channel VFU, 180 cps (bi-directional)	HP
2608A	Comb matrix, 5 x 7 dot matrix (5 x 9 for lower case in 128-character set), 132 positions, 64/129-character sets (up to 13 sets; any two in same line), 10 characters per inch, 6 or 8 lines per inch, 4- to 14.9-inch paper, 16-channel VFU, 400 lpm	HP
9871A	Serial printer; 96-character interchangeable disk, 132 positions, 30 cps (bi-directional)	HP
TERMINALS		
2649D	REMOTE/250 console; display/keyboard, 1920 characters (24 lines x 80 characters), keyboard available in different languages, adjustable brightness, inverse video, blinking, underline, eight programmable softkeys	HP

➤ to information. It retrieves, updates, or modifies data without recourse to additional programming. QUERY/250 can also be used as a comprehensive design and debugging aid. FORMS/250 consists of utilities for creating and modifying customized forms for inputting and outputting information to the CRT. It also provides a programmable means of displaying and erasing forms on the CRT and for entering and retrieving data. REPORT WRITER/250 is a set of commands which aid in producing reports. Included are automatic paging controls and built-in restart and pause capability for the CRT or single-sheet printout. Run-time options permit the generation of full-length reports or summaries.

In addition to the above bundled software, HP offers two applications packages through Hewlett-Packard OEM's. These are MFG/250 for manufacturing applications and OM/250 for distribution and manufacturing applications.

USER REACTION

Datapro interviewed ten HP 250 users selected at random from a list supplied by Hewlett-Packard. One of the ten users had two systems, and the other nine had one each.

All of the systems had 64K bytes of user memory and at least two flexible disk drives with 1.2 megabytes of storage. Two systems had three floppy disk drives, and four users had a 7906 disk drive as part of their configurations. Only one HP 250 had more than one CRT display, but one user plans to increase his system to include the maximum five remote terminals which the system ➤

➤ relative humidity (noncondensing) of 8% to 80% (which can vary for flexible disk media).

CONFIGURATION RULES

The basic HP 250 single-user configuration consists of the processor with 128K bytes of system memory, 32K bytes of user memory, display screen with user-definable softkeys and U.S. keyboard, integrated 1.2-megabyte flexible disk drive, peripheral interface channel, interface and power cables for printer, operating system (with HP Business BASIC, IMAGE/250, FORMS/250, REPORT WRITER/250, and QUERY/250), and operating and programming manuals. This hardware and software is integrated into one console. The keyboard, documentation, and operating system are also available in languages other than English.

For multi-user configurations, adding REMOTE/250 capability increases memory requirements. The main system requires 160K bytes of system memory and user memory from 32K to 64K bytes. Each REMOTE/250 console added to the system requires the addition of 32K bytes of user memory (or an optional 64K bytes maximum). The maximum 512K-byte memory configuration requires the 128K memory boards. For a system consisting of the main console and five remote consoles (total of six consoles maximum), memory can be allocated as follows: system memory, 160K bytes; any five consoles at 64K bytes each, 320K bytes; and one console at 32K bytes.

WORKSTATIONS: Up to five REMOTE/250's or other RS-232-C devices can be attached via the HP 45/20A Asynchronous Serial Interface.

DISK STORAGE: 1.2 megabytes of flexible disk in basic package; system requires one hard disk unit, either 12.1-megabyte Winchester disk or 19.6-megabyte fixed/removable disk model. The HP 250 system can support one flexible disk, one Winchester, and up to two fixed/removable units, thus ➤

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➤ will support. Business data processing and data base management were the only applications mentioned.

The ten users included three manufacturing companies, two wholesalers, a fuel oil supplier, a real estate office, a management consulting and accounting firm, a general contractor, and a company engaged in railroad construction. One user also processes mailing lists on his 250. In-house personnel were cited as the source of applications programs in five cases, while contract programming houses had been used by four of those interviewed. One user was running programs furnished by an OEM, and another was using "ready-made" programs from the manufacturer.

The following table shows how the ten users rated the HP 250. Several chose not to rate the system in all categories.

	Excellent	Good	Fair	Poor	WA*
Ease of operation	8	2	0	0	3.8
Reliability of mainframe	6	4	0	0	3.6
Reliability of peripherals	3	5	2	0	3.1
Maintenance service:					
Responsiveness	7	2	1	0	3.6
Effectiveness	7	2	1	0	3.6
Technical support	3	2	1	0	3.3
Manufacturer's software:					
Operating system	6	4	0	0	3.6
Compilers and assemblers	5	3	0	0	3.6
Ease of programming	4	2	0	0	3.7
Ease of conversion	1	1	1	0	3.0
Overall satisfaction	8	2	0	0	3.8

*Weighted Average on a scale of 4.0 for Excellent.

From the above ratings, it is easy to conclude that these ten users are happy with their choice. In fact, even the one user who was responsible for four of the six "fair" ratings gave the system a "good" rating in overall satisfaction and said that the "hardware is really quality."

Among the complimentary comments, two of the most typical were from one user who said that the 250 was the "easiest to operate and hardest to screw up" and that the "softkeys are very powerful." There was almost universal praise for HP's software, with particular mention being given to the data base management system, IMAGE and QUERY, the report writer/forms package, operating system, and the utility programs.

Negative comments were expressed by only four of the ten users. One said that it has "taken a long time to get programs up and running," while another claimed that "terminal problems have caused lost time." One user would like "to be able to have larger floppy disk storage," and another had trouble with the REPORT WRITER/250 program but added the trouble had been "relatively minor, however."

All in all, the opinions of the ten users seemed best summed up by the one who said, "Perhaps there is less costly equipment on the market now, but we are quite satisfied with our choice." □

➤ affording a maximum capacity of 52.2 megabytes of disk storage.

MAGNETIC TAPE UNITS: None.

PRINTERS: Each workstation can support one character or one line printer.

MASS STORAGE

INTEGRATED FLEXIBLE DISK DRIVE: Housed in the HP 250 console, this unit features a double-sided, double density flexible disk with a storage capacity of 1.2 megabytes per disk. Average seek time is 91 milliseconds, and the transfer rate is 62.5K bytes per second. The controller recognizes disk and recording format.

45012A WINCHESTER DISK DRIVE: The 45012A has a 12.09-megabyte formatted storage capacity on a fixed disk. The drive mounts in the system console just below the flexible disk and can be ordered only as a factory-installed option. The disk has two recording surfaces with 735 tracks per surface, 32 sectors per track, and 256 bytes per sector. Average random seek time is 70 milliseconds, and the data transfer rate is 937.5K bytes per second.

7906H DISK DRIVE: The 7906 has a capacity of 19.6 megabytes stored on one fixed and one removable cartridge disk. The fixed disk has a single recording surface of 800 tracks, and the cartridge disk has two surfaces with 400 tracks per surface. Data is stored on 48 256-byte sectors per track. Average seek time is 25 milliseconds, and the data transfer rate is 937.5K bytes per second. The drive is packaged in its own stand-alone, low-profile cabinet. A second 19.6-megabyte cartridge disk drive can be attached.

INPUT/OUTPUT UNITS

See the Peripherals/Terminals table.

COMMUNICATIONS CONTROL

The 45120A Interface provides an asynchronous serial interface for connecting the processor to REMOTE/250 consoles, to RS-232C/V24 and/or 20 ma current loop interfaces, and to HP 3000 data links. Five ports are available with data rates varying from 110 to 9600 bits per second. The REMOTE/250 capability features fixed-partition multi-programming, memory partitioning (32K to 64K bytes of memory required per remote console), direct or modem connection to REMOTE/250 consoles, concurrent program execution, access to all system commands and system software, console-to-printer interface, and full display enhancements (128 ASCII characters, line drawing characters, and special HP 250 control characters).

The Intelligent Network Processor (INP/250) lets the HP 250 communicate mainly with IBM-compatible mainframes using RJE capabilities. The heart of the INP/250 is a micro-processor with its own control and memory circuits, amounting to a second computer handling only data communication activities. This allows the main processor to devote almost full time to other jobs. The INP/250 provides synchronous RS-232C (CCITT V.24/V.28) interface, error detection and retransmission (under bisync protocol), and modem connection, full or half duplex (switched lines at 1200 to 4800 bits per second; private or leased lines at 2400 to 19,200 bits per second). The program tailoring the INP board for communication with IBM-compatible computers is RJE/250, which permits HP 250 connection to any computer supporting the IBM 2780/3780 batch terminal. The HP 250 emulates a batch terminal to the host computer, making it capable of sending jobs, receiving output files, and entering host commands. RJE/250 also allows communication with other 2780/3780-compatible

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The HP 250 is controlled from a desk-like console with keyboard and a display screen which tilts, swivels, and slides from left to right to virtually any position desired by the operator. Eight programmable "softkeys" below the screen can be used for calling in routines and programs and for communications between the operator and the system.

- ▶ batch terminals for transfer of files. RJE/250 capabilities also include auto answer/auto call, background processing, diagnostic and trace utilities (including loop-back testing), and file concatenation for transmission.

SOFTWARE

OPERATING SYSTEM: Two copies of the operating system disk, each labeled OPERATING SYSTEM, are furnished with the HP 250 (one to be held in reserve as a backup). At "turn on," the system automatically initiates a hardware self-test on each of the processor's registers, the block switch, and the I/O channels, as well as every memory location. The results of the hardware self-test, which takes approximately five seconds, are displayed on the CRT. As the test is performed, a listing of system components is shown on the display. If any component has failed its test, the system will be inoperable. If no problems have occurred, a message in the form of SYSTEM LOADING followed by LOADING DROMS is shown, and the 250 initializes its I/O and loads the system software into the protected main memory area reserved exclusively for it and where it resides ready for instant use (no disk swapping).

The message remains on the screen for about 30 seconds, and the cursor (a blinking underscore) appears on the display to indicate the completion of the loading process.

The operating system uses 128 to 160 bytes of the system's memory. The printer is "powered on" simultaneously with the system.

PROGRAMMING LANGUAGE: The programming language used with the HP 250 is a form of HP Business BASIC.

Business BASIC/250 features subprograms, multiple-character variable names, and flexible output formatting and is further enhanced with system software such as IMAGE/250 Data Base Management, REPORT WRITER/250, and FORMS/250 data-input software. HP 250 BASIC will also run ANSI BASIC programs.

The HP Business BASIC language consists of statements, functions, operators, and commands. Operators and functions are used with variables and numbers in creating numeric and string expressions. Expressions can be included in statements and executed from the keyboard. Each statement can also be preceded by a line number and stored as a program line. Commands can be executed only from the keyboard; they are not programmable.

Hewlett-Packard has overcome some major criticisms of standard BASIC by including in HP 250 Business BASIC: 1) variable names composed of up to fifteen characters, 2) data and program files, 3) multi-dimensional (six) numerical and string arrays, and 4) complete subprogram capability. In addition, HP 250 Business BASIC allows any valid HP 250 Business BASIC statement (except THEN) to follow THEN, permits labels to be used as line identifiers, and permits documentary remarks to be appended to any program line by starting the remark with an exclamation point (!).

IMAGE/250 DATA BASE MANAGEMENT SYSTEM: The HP 250 is the first computer system in its price range to provide complete data base management capability. IMAGE/250 consists of a collection of utility programs and BASIC language statements and is patterned after HP's IMAGE/3000 Data Base Management System with a few significant differences.

Like its predecessor, IMAGE/250 is composed of three subsystems: Data Base Definition Subsystem (DBDS), used to define a data base; Data Base Utilities Subsystem (DBUS), used to create and maintain a data base; and Data Base Management Subsystem (DBMS), used to access a data base via programs.

The IMAGE/250 Data Base Definition Subsystem consists of three elements: Data Base Definition Language, Schema Text Editor, and Schema Processor. The Data Base Definition Language defines a data base by using BEGIN DATA BASE; PASSWORDS; ITEMS; SETS, Name, Entry, Capacity; and END as key words. Where IMAGE/3000 must interface with five programming languages, IMAGE/250 relates to only one. A Schema Text Editor is included with IMAGE/250 as the HP 250 has no general purpose text editor. The editor is used to build a text file for subsequent input to the Schema Processor. Each IMAGE/250 data base has one ROOT file, which is created by the Schema Processor program (SCHEMA) and contains all of the data base structural information. A portion of the ROOT file is copied into user memory each time the data base is opened for access. In addition to the ROOT file, a data base may have one or more data set (DSET) files, which are created by the data base utilities and may reside on separate volumes. Placing data sets on separate volumes allows set capacities to be less dependent on on-line mass-storage capacity (only the ROOT file and the data sets involved need be on-line during an operation) and provides an additional level of security by allowing sensitive data to be stored on separate volumes and kept under lock and key. ROOT files and DSET files are created, accessed, and maintained only through IMAGE/250 operations.

The Data Base Utilities Subsystem of IMAGE/250 supports the following utilities:

- DBCREATE creates and initializes data base files on the specified media as described in a ROOT file. ▶

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- ▶ • **DBERASE** reinitializes data base files.
- **DBUNLD** creates and fills a backup file containing the contents of master data sets and detail data sets.
- **DBLOAD** reloads a data base from a backup created by **DBUNLD**.
- **DBSTORE** creates and fills a backup file with an exact copy of a data base including **ROOT** file, data and structure information.
- **DBRESTORE** restores a data base to the state that existed during **DBSTORE** execution.
- **DBPURGE** removes data base file names from the disk's directory (purges the data base).

IMAGE/250 creates all backup files on disk.

The Data Base Management Subsystem of **IMAGE/250** supports the following data base commands: **DBOPEN**, **DBLOCK**, **DBPUT**, **DBFIND**, **DBUPDATE**, **DBCLOSE**, **DBUNLOCK**, **DBGET**, **DBDELETE**, and **DBINFO**. The HP 250 has no generalized sort routine but incorporates an additional set of commands with **IMAGE/250** to conduct high speed **FIND** and **SORT** operations on data base files.

IMAGE/250 provides controlled access to data sets by allowing the definition of up to 31 user classes. Each user class is associated with a password during data base definition. When initiating access to a data base, a password must be supplied to establish a user class. The user class is then used to determine the data sets which may be accessed and the type of access permitted (read only or read/write). The user-class capability is defined during data base definition. Security on an item level is not provided (user classes granted access to a data set may access all items within the data set's record). Data access methods are serial, directed, chained, or calculated.

IMAGE/250 allows 255 items per data base, 50 data sets per data base, 127 data items per data set, 65,534 records per data set, 8 paths (keys) from master to detail, 15 characters in data-set item name, and 31 available passwords. The maximum size in bytes of data entries is 1,018 for a master and 1,022 for a detail.

UTILITIES: Hewlett-Packard offers **QUERY/250**, **FORMS/250**, and **REPORT WRITER/250** for the HP 250.

The **QUERY/250** system software provides a means to access and edit an **IMAGE/250** data base without the time and expense of developing a special program for a one-time data base inquiry. This software is a basic program with subprograms. The software is not configured into the system. **QUERY** is a design and debug aid that helps determine if programs are working correctly. It can be used to verify a data entry program by enabling immediate examination of the data to see if it was entered correctly.

QUERY also allows for quick implementation of a data base. This can then be used as a design aid for experimentation with the data base structure without extensive programming effort. A programmer can use **QUERY/250** to interrogate a data base, comparing its contents to the expected contents to verify the proper functioning of an application program under development.

By making extensive use of the HP 250's softkeys and **FORMS/250**, the user need know only the data base, data set, and data item names and how they are related to be able to add new information, modify or delete existing information, find data which satisfies user-defined search

criteria, sort data on one or more key items, and list the located and sorted data in a report.

Although some of its features require preparation by a programmer, **QUERY/250** is operator-oriented with many aids for composing commands.

FORMS/250 gives the HP 250 user the ability to draw and display on the screen user-designed form images with video-enhanced input fields, output fields, and fields that can serve in either capacity. Input and output fields can be specified as well as the order in which these fields are to be accessed by an operator or a program. Once a program has been written that uses a form, that form can be modified without the necessity of modifying the using program.

By employing the HP 250's special line drawing character set, forms already familiar to users may be reproduced on the CRT. This serves to decrease data entry confusion, to speed up data entry, to cut down on data entry errors, and to reduce data entry costs. Creating or modifying a form is an easy procedure because all I/O field specification is done via softkeys, all I/O field positioning is accomplished with the cursor control keys, all labels and special symbols are simply entered on the screen where they are to appear, input order and tab order may be altered interactively, and no lines of programming need be written.

Multiple programs can use the same form since each form is stored in its own disk file, separate from any program that may use it. This method of storing the forms also permits forms to be customized to a customer's specifications.

REPORT WRITER/250 is a set of BASIC commands which collectively produce reports with a minimum of programming effort by the user. Special run-time options enable selected portions of a report to be suppressed during execution, omitting unnecessary details. A stock clerk can therefore receive a detailed inventory report while a supervisor receives only a summary report, both produced by the same **REPORT WRITER/250** program. If a report is interrupted during execution, a restart feature can suppress the reprinting of those pages already produced.

REPORT WRITER/250 consists of three types of programmable entries: Report Definition Statements, Report Execution Statements, and Report Functions. Together these entries provide automatic control of page numbering, page length, width, and margins; headers and trailers for the report, for each page, and for each grouping; report groupings; creation of new variables; and subtotals, averages, and grand totals.

APPLICATIONS SOFTWARE: HP-developed applications packages for manufacturing, **MFG/250**, and for order management, **OM/250**, are available through Hewlett-Packard OEM's.

MFG/250 is an automated method of capturing and maintaining critical information about parts, inventory status, and costs which allows control over engineering, stock, accounting, production, and materials information. It includes ABC analysis (a method which separates vital items from less important ones) and cycle counting (a means of maintaining accurate inventory records throughout the year). Both of these capabilities are built-in. **MFG/250** gives the operator step-by-step directions on the display screen, at the bottom of which are eight softkeys. A video label of each key's current function appears above it on the screen. The keys thus allow the user to choose the next operation to be performed.

For engineering applications, **MFG/250** maintains central bills of material 30 levels deep, issues materials lists and ▶

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► “where-used” reports, maintains inventory, and relates engineering changes to stock, accounting, and production. For stock applications, the system prints actual or simulated picking lists, shows backorder reports and parts shortages, issues stockroom activity reports, and provides ABC analysis and cycle counting. For accounting, there are provisions for current and “what-if” product costing, for analyzing inventory by categories, for tracking materials transactions, and for validating data as entered.

OM/250 is composed of four modules: Inventory Control, Accounts Receivable, Sales Analysis, and Order Entry. The system works in an integrated mode, making it necessary for an operator to enter information only once for use by all four modules. For example, when an item is ordered and released in the Order Entry module, an invoice is created in Accounts Receivable, and on-hand inventory is reduced in Inventory Control.

The Order Entry module handles entering, picking, and releasing orders; relates all partially and totally fillable back orders, calculates expected profit for each, monitors their ages forward and backward, summarizes them with or without line items, and offers a choice of how they are filled; and handles normal and drop sales plus over-the-counter sales. A credit check is run at the beginning and end of each order, and other features such as exception posting and five types of markups, discounts, and price breaks are also included.

The Accounts Receivable module conforms to standard accounting principles and provides control over receivables, prints statements, computes finance charges, generates past due letters, provides complete audit trails from the time an order is entered until it is posted, and summarizes and issues reports about new and old invoices, credit memos, and cash receipts. It also furnishes tax information about taxable and non-taxable sales.

Inventory Control can categorize an inventory using ABC analysis and then execute a cycle count. It also reports profitability by individual item and compares replacement costs to actual costs to show which items need price adjustments. Any one of three valuation methods may be used: LIFO, FIFO, or weighted average. A calculated reorder point feature shows the best time to order items.

Sales Analysis can report the true net profit of each salesperson, customer, or product class and point out if new or existing product lines are being sold. This module produces some 140 graphic reports showing sales, quotas, and profits and also details factors affecting each salesperson's commission such as bad debts and returns.

PRICING

POLICY: Hewlett-Packard offers the HP 250 for purchase or lease with terms ranging from three to five years through

the HP leasing program. HP's standard OEM system discount schedules also apply. Specific rental and leasing information is available on request from local HP sales offices.

SUPPORT: All HP systems are warranted against defects in material and workmanship for 90 days following the installation date. HP will repair or replace, at no charge, products which prove to be defective during the warranty period. Maintenance, training, and other services are available on an individual-contract basis.

HP's customer support and service includes:

- System software consulting, which provides on-site assistance on how to apply HP 250 system software to specific customer application problems. The charge is \$500 per day.
- Training, which provides a comprehensive 5-day introduction to the HP 250 system. If held at an HP Technical Center, the course costs \$625 per student; if held at a customer's site, the charge is \$6,000 for a maximum of ten students.
- Software Notification Service covers the HP 250 system software and provides information on software utilization, problem resolution, and updates. The charge is \$10 per month for a minimum of twelve months.
- Software Subscription Service provides HP 250 system software and manual updates and includes the Software Notification Service. The charge is \$50 per month for a minimum of three months, and there is a \$10 charge per month per system for multiple system support.
- Customer Support Services provide:
 - 1) system software coverage, which includes all services of the Software Subscription Service (a three-month minimum) plus phone-in consulting service and on-site system engineering assistance for a monthly charge of \$150. A training course at an HP Technical Center or at the customer's site is a prerequisite.
 - 2) synchronous serial interface coverage, which consists of phone-in consulting service and on-site system engineering assistance for \$35 per month. The system software coverage (a three-month minimum) is a prerequisite.

In addition to these two coverages, there is a \$70 charge per month for an additional authorized caller to the phone-in consulting service for a three-month minimum and a \$10 charge per month per system for adding multiple system support to Customer Support Services.
- Manual Update Service provides updates for HP 250 operating system documentation. The charge is \$20 a month with a twelve-month minimum.■

EQUIPMENT PRICES

PACKAGED SYSTEM		Purchase Price	Monthly Maint.
45251A	HP 250 System (110V, 60 Hz); includes processor, display screen, U.S. keyboard, 128K-byte system memory and 32K-byte user memory, 1.2-megabyte flexible disk system, peripheral interface channel, interface and power cables for printer, operating system (with IMAGE, QUERY, FORMS, REPORT WRITER), operating and programming manual sets, palm brown accent panel	\$17,000	\$132

Hewlett-Packard HP 250

		<u>Purchase Price</u>	<u>Monthly Maint.</u>
FACTORY-INSTALLED OPTIONS			
Opt. 012	Winchester disk drive; 12.1 megabytes fixed-disk storage, installed in system desk	6,000	26
Opt. 002	Replace 32K-byte board with 64K-byte board	1,050	5
Opt. 004	Replace 32K-byte board with 128K-byte board	1,600	15
ADD-ON OPTIONS			
MEMORY			
45001A	32K-byte board	1,250	5
45003A	64K-byte board	1,900	10
45004A	128K-byte board	2,500	15
MASS STORAGE			
45012U	Winchester disk drive update kit; 12.1 megabytes, field installed	6,750	26
45012U-001	Trade-in one diskette drive	1,500	—
45012U-002	Trade-in two diskette drives	3,000	—
7906H	Fixed/removable cartridge disk drive; 19.6 megabytes	13,000	75
PRINTERS			
9871A/001	Impact printer, full character, 30 cps; 132 positions	3,600	28
98021A	Form feed for 9871A	275	—
26318/250	Serial printer dot matrix, 180 cps; 136 positions	3,650	31
26097A	Pedestal stand for 2631A	275	—
2608A	Line printer, dot matrix, 400 lpm; 132 positions	10,175	62
Opt. 044	HP-IB interface for local printer	600	—
Opt. 050	Extended async. interface	240	—
1818-7068	HP-IB ROM; necessary for HP-IB interface	100	—
TERMINALS			
2649D	REMOTE/250 console	4,250	28
13296A	HP-IB interface; provides 2649D local printer capability	500	—
1818-7068	HP-IB ROM; necessary with HP-IB interface	100	—
13250B	Extended async. interface; provides current loop interface for 2649D	275	—
COMMUNICATIONS			
45120A	Asynchronous serial interface; provides five ports for REMOTE/250, RS-232C/V24, and/or 20 ma current loop interface, or HP 250 to HP 3000 data link	2,100	10
45122A	Intelligent network processor; allows HP 250 to emulate IBM 2780/3780	3,000	15
45111A	RS-232C modem; for connecting REMOTE/250, terminals, or HP 3000 to HP 250	125	—
45112A	20 ma DC current loop cable; for connecting REMOTE/250 and terminals to HP 250	100	—
45113A	Direct connection (RS-232C) cable; required for attaching HP 250 to HP 3000	125	—
45115A	Modem or autocal cable for INP/250	225	—
45116A	Direct connection cable for INP/250	225	—

SOFTWARE PRICES

		<u>Purchase Price</u>
45180A	MFG/250; for inventory control, bills of material, and product costing	\$ 7,500
49190A	OM/250; order management software package, for automating and simplifying accounts receivable, order entry, sales analysis, and finished goods inventory	10,000
45200A	FIN/250; automated accounts payable, general ledger, and accounts receivable; includes source code, utilities, and technical documentation	7,500