Olivetti P6060

MANAGEMENT SUMMARY

Introduced to the American market in December 1976, the P6060 is a general-purpose personal minicomputer that combines a keyboard, display, printer, and dual floppy disk drives in a desktop-sized unit. It is programmable in BASIC, and although it is designed primarily for users who plan to develop their own applications, mathematical and statistical software and specific industry packages are available, and more are being developed.

The configuration utilizing the CPU 6602 processor with dual floppy disk drives is considered basic. The P6060 can also be configured with a moving-head disk unit consisting of two disks, one fixed and one removable, with a total capacity of 9.8 megabytes. If the moving-head disk unit is employed, the DMA 6608 direct memory access channel and the DCC controller are required, and the CPU 6601 processor, which has only one floppy disk drive, can be used; otherwise, the single-drive processor is available only for special applications and only with the approval of Olivetti's Business Products Division.

To maximize the small system's performance, the architecture of the P6060 is modular in concept. Memory modules allow the internal memory to be increased from 48K to 80K bytes (user memory from 16K to 48K bytes) in 8K increments. One disk is designated as the system disk and stores the 186K-byte operating system; the other 70K bytes can be used to store user programs and data. The extended modules of the operating system are brought into the internal memory only when specifically required.

The machine can be fitted with one or two IPSO (Olivetti Standard Peripheral Interface) boards for data management and exchange between central memory and IPSO peripheral units. The IPSO peripherals include high-speed impact printers, punched tape readers, cassette tape units, and plotters. Up to four peripherals

The Olivetti P6060 is a general-purpose minicomputer that combines keyboard, display, printer, and dual floppy disk drives in one desktop unit. Purchase price for the minimum configuration with 16K bytes of user memory and a 80 cps printer is $10,250.

MAIN MEMORY: 48K to 80K bytes

DISK CAPACITY: 9.8 megabytes

WORKSTATIONS: Single-station system

PRINTERS: 80 cps to 200 cps

OTHER I/O: None

CHARACTERISTICS

MANUFACTURER: Olivetti Corporation of America (subsidiary of Ing. C. Olivetti & C., S.p.A.), 500 Park Avenue, New York, New York 10022. Telephone (212) 371-5500.

Olivetti is a worldwide manufacturing and sales organization with 17 factories, 20 affiliate companies, 500 branch and sales centers, general agents in 113 countries, and 70,000 employees. In the U.S., there are 90 district offices, 71 of which are for office and system products. The company's manufacturing operations are broad in scope and include typewriters, teleprinters, accounting machines, calculators, industrial data collection equipment, supply products, numerically controlled machine tools, copying machines, terminals, and minicomputers. At least 75 percent of Olivetti's business is outside of Italy.

MODELS: P6060 Models 6602 and 6601. (The single-floppy-drive Model 6601 is available only for special applications and with the approval of Olivetti's Business Products Division.)

DATE ANNOUNCED: Spring 1974 in Europe; December 1976 in U.S.

DATE OF FIRST DELIVERY: January 1977.

The desktop P6060 includes a 32-character visible display, an 80-column, 80-cps thermal matrix printer with plotting capabilities, a full ASCII alphanumeric keyboard with BASIC verbs, a floppy disk unit, and an operating console and lights. The basic unit can be supplied with one or two peripheral interfaces, each allowing up to four I/O units to be connected. A moving-head disk unit can also be added.

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can be connected simultaneously by means of each board. The machine can also accommodate one or two EIA (RS-232C) interface boards which support compatible I/O devices or can be dedicated to a time-sharing connection via an acoustic coupler or modem.

P6060 prices begin at $10,250 for a 6602 processor with dual floppy disk drives, integral PR 6610 thermal printer, and 16K bytes of user memory. Software can be purchased for a package price or in separately priced modules.□

NUMBER INSTALLED: NA.

DATA FORMATS

BASIC UNIT: 8-bit byte.

INSTRUCTIONS: The P6060 processor executes macro-level operations generated by the BASIC compiler. BASIC programs can also be compiled from TEXT files, and source statements can be retrieved from compiled programs. The user does not have an assembler-type language available to him.

INTERNAL CODE: ASCII.

MAIN STORAGE

TYPE: MOS (metal oxide semiconductor).

CYCLE TIME: 0.562 microsecond.

CAPACITY: The P6060 has a minimum capacity of 48K bytes, of which 32K bytes are reserved for the operating system. The remaining 16K bytes are available to the user for program and data storage. The internal memory capacity can be increased to 80K bytes (or 48K bytes of user storage) in 8K increments.

CHECKING: A full range of system error checks and messages is provided.

STORAGE PROTECTION: None for internal storage. Individual programs and data stored on floppy disk can be secured against listing and other system commands. Entire libraries can be protected against alteration.

RESERVED STORAGE: The P6060 reserves 32K bytes of memory for system functions.

CENTRAL PROCESSOR

GENERAL: The Olivetti P6060 is a general-purpose personal minicomputer, programmable in BASIC. A typical configuration offers a full ASCII alphanumeric keyboard with BASIC verbs, 10-key numeric pad, command keys, and user-definable function keys; a 32-character visual display; an 80-column/80-cps thermal matrix printer with plotting capabilities; dual floppy disk drives (in Model 6602; Model 6601 includes a single floppy disk drive and is available for special applications only); and an operating console and lights. All of these features are integrated into the same housing.

The architecture of the P6060 system is modular in concept. Memory modules, for example, allow the internal memory capacity to be increased from 48K to 80K bytes (user memory from 16K to 48K bytes) in 8K increments. One disk is designated as the system disk and stores the 186K-byte operating system; the other 70K bytes can be used to store user programs and data.

CONTROL STORAGE: A ROM loader, consisting of bipolar LSI circuits, calls the operating system into the reserved area in main memory. Loading occurs automatically when the system is activated. ROM access time is 350 nanoseconds. In configurations which include a DCU unit, this ROM must be replaced by the RODMA board.

REGISTERS: Machine registers are not directly available to the user.

INDIRECT ADDRESSING: Assembly-level programming is not available to the user.

INDEXING: Assembly-level programming is not available to the user.

INSTRUCTION REPERTOIRE: The instruction repertoire is effectively that of the BASIC language. The high-level language permits symbolic addressing of data values, loop control, and program flow structuring, along with procedure-oriented facilities for numeric computation. Alphanumeric strings can be handled for display or printing of table heads, interactive prompting, error or display conditions, etc.

INTERRUPTS: All interrupts are handled by the operating system.

PHYSICAL SPECIFICATIONS: The P6060 occupies a space 8.5 by 24 by 26 inches; it weighs 88 lbs. It operates on conventional 115-volt, 60-Hz, grounded AC power. An automatic transformer is standard for adaptation to other power supplies such as 220-volt, 50-Hz. The P6060 can operate in temperatures from 50 to 104 degrees F., and relative humidity tolerance is 20 to 80 percent, noncondensing. No air conditioning is required.

INPUT/OUTPUT CONTROL

The basic machine has an integrated keyboard, visual display, thermal matrix printer, and floppy disk unit, all of which are multiplexed internally for simultaneous I/O.

Optionally, the machine can be fitted with one or two IPSO (Olivetti Standard Peripheral Interface) boards for data management and exchange between central memory and IPSO peripheral units. Each interface enables up to four input, four output, or four input/output units to be connected. Also, the machine can accommodate one or two EIA (RS-232C) interface boards (asynchronous line control units). Each of these will support two EIA-compatible I/O devices, either plug-to-plug or via modems if the devices are separated from the P6060 by more than 32.18 feet. Alternatively, any of these four EIA channels can be dedicated to a time-sharing connection via an acoustic coupler or modem.

CONFIGURATION RULES

The minimum system recommended by Olivetti consists of a CPU 6602 with dual floppy disk drives, integral PR 6610 thermal printer, and 16K bytes of user memory. For special applications, it is possible to install a single-floppy-drive CPU 6601, or to substitute an external printer in place of the PR 6610. However, these situations should be considered exceptions. Purchase of the single-drive Model 6601 requires special permission from Olivetti's Business Products Division. In no case should a machine with less than 16K bytes of user memory be installed.

The keyboard (six sections), console, 32-character plasma display, and processor with 32K bytes of system memory are standard with the CPU. The CPU electronic package (ECU) consists of 13 board positions, of which eight are always taken by the processor and five are left free for the addition of user memory and the various interface boards or controllers which extend the basic unit. No more than five board positions can be used for memory and interfaces. Board requirements are as follows:

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PERIPHERALS

MODEL	DESCRIPTION AND SPEED
INTEGRAL WITH PROCESSOR	
PR6610	Thermal serial printer; two 80-character buffers, 5 x 7 matrix, 80 characters per line; 80 characters per second
Keyboard	Alphanumeric keyboard with 10-key pad, 8 user-definable keys, 8 single-key commands, and 26 BASIC words on single keys
Display	32 alphanumeric characters, 5 x 7 dot matrix, 80-character buffer, upper and lower case ISO
MAGNETIC TAPE EQUIPMENT	
CTU 1000, CTU/CTD 1000	Single or dual magnetic tape cassette units; 2 recording tracks, 800 bpi, phase-encoded, 256 bytes/track, 10 ips, 2 to 256 bytes plus 2 cyclic redundancy characters per record, inter-record gap of 0.9 to 2.0 inches nominal; 1000 bytes/second
LINE PRINTING EQUIPMENT	
PR 1220	Matrix printer; 7 x 7 dot matrix, 6 lines/inch, 96-character set, 10 characters/inch, bidirectional horizontal tab; 100 cps
PR 1230	Matrix printer; 7 x 7 dot matrix, 6 lines/inch, 96-character set, 10 or 12 characters/inch, bidirectional horizontal tab; 175 cps
PR 1240	Matrix printer; 7 x 7 dot matrix, 6 lines/inch, 96-character set, 10 characters/inch, bidirectional horizontal tab; 350 cps (140 lpm)
PR 1350	Matrix printer; 90 cps, bidirectional
PR 1370	Matrix printer; 200 cps, bidirectional
PAPER TAPE EQUIPMENT	
PN 20	Punch; 8-bit code, 1-inch tape, spooler; 24 cps
LN 20	Reader; 8-bit code, 1-inch tape, spooler; 20 cps
PUNCHED CARD EQUIPMENT	
CR 300	Card reader; 300-card stacker and hopper; 300 cpm

- **User memory—one or two boards.**
- **IPSO Interface—one board per interface (two IPSO's are possible).**
- **EIA Interface—one board per interface (two EIA's are possible).**
- **DCU Interface—two boards (plus replacement of ROMCA board in the processor section with RODMA board).**

MASS STORAGE

INTEGRATED DUAL FLOPPY DISK UNIT: Provides 256K bytes of storage on each disk for a maximum storage capacity of 512K bytes. Each platter is formatted into 77 tracks, and each track is divided into 26 sectors of 128 bytes each. The system disk stores the 186K-byte operating system, leaving 70K bytes available to the user for application programs and data. The user disk provides 237,130 bytes of data and program storage.

DCU 7200 SERIES CARTRIDGE DISK UNITS: These top-loading units utilize IBM 5440-type cartridges. The DCU 7201 is composed of one fixed and one removable disk cartridge mounted on a single spindle. Rotational speed is 2400 rpm. Recording density is 2230 bits/inch. There are two tracks per cylinder, 400 tracks per cartridge surface (plus eight spares), 200 tracks per inch, 2 surfaces per cartridge, and 400 cylinders per cartridge. Each track has 24 sectors of 256 bytes each. Both the fixed and removable cartridges have a capacity of 4.9 megabytes each; total drive capacity is 9.8 megabytes. Average head positioning time is 41 milliseconds, and average rotational delay is 12.5 milliseconds. The DCU 7202 is a subsystem composed of two DCU 7201's. The manufacturer is Diablo.

INPUT/OUTPUT UNITS

See the Peripherals table.

COMMUNICATIONS CONTROL

SIC 6629 ASYNCHRONOUS INTERFACE: Supports two EIA-compatible I/O devices. Connects to a modem, RS-232C-compatible device without the use of a modem, or 20-ma current loop interface.

SOFTWARE

OPERATING SYSTEM: The P6060 Operating System resides on floppy disk and is modular in structure to allow dynamic loading into central memory. The basic operating system compiles programs; interprets and executes compiler object programs; interprets and executes system commands; compiles statements in calculator mode; manages the I/O units; handles, under program control, data files resident in external memory; and executes utility programs. Extended features handle string and matrix manipulation, peripheral control, plotting functions, and terminal manipulation. The extended modules of the operating system are brought into internal memory from disk only when specifically required.

LANGUAGES: The P6060 uses an extended version of BASIC that is compatible with the proposed ANSI and ECMA standards. It provides such enhanced facilities as random file handling, string manipulation, MAT statements, and built-in subroutines and functions. Error diagnostics are provided for syntax errors committed during entry of a line of BASIC code. Global error diagnostics are provided upon execution of the PREPARE command.

UTILITIES: The P6060 provides a set of service routines, stored on the system floppy disk, including:

- **FDCOPY—copies the contents of one floppy disk onto another.**
- **FLCOPY—copies a file from one part of a floppy disk to another.**
- **FLPRINT—prints the contents of a data file.**

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- **LBCREATE—initializes a floppy disk.**
- **LBPROTECT—protects part of a floppy disk from being altered.**
- **LIBCOPY—copies part of the contents of one floppy disk onto another.**

APPLICATIONS: Although the P6060 is primarily designed for users who plan to develop their own applications, a number of mathematical and statistical routines and specific industry packages are available. Additional packages are under development. These packages operate in conversational mode, with prompts on the visual display guiding the user through the necessary steps in the operating procedure. The pacakges include: Statistical Analysis Series, Numerical Analysis Series, Scientific Subroutine Library, Numerical Control Series, Printing Estimating Series, and Optical Layout Series.

PRICING

POLICY: The P6060 is offered for purchase only. Quantity purchase prices are available upon request from the home office.

All deliveries of equipment are from Bridgewater, New Jersey. All systems sold directly to the customer or to an agent are FOB Bridgewater. Rates for delivery are by geographical freight zone. Presently, there are seven zones established for the United States including Alaska and Hawaii.

SUPPORT: Maintenance is available through Olivetti's 71 systems district offices and 150 authorized systems agents in the U.S. Prime-shift maintenance is provided from 9 a.m. through 5 p.m., Monday through Friday. Rates for other times are negotiable. The indicated maintenance rates are for locations within 30 miles of an Olivetti office. Contact Olivetti for rates in other locations.

TYPICAL P6060 CONFIGURATIONS: Includes a 6602 processor with dual floppy disk drives, integral PR 6610 thermal printer, 16K bytes of User Memory, and system software. The keyboard (six sections), console, 32-character plasma display, and processor with 32K bytes of system memory are standard with the CPU. Total system price, exclusive of freight charge and application programs, is $8,950.■

EQUIPMENT PRICES

		Purchase Price	Annual Maint.
CENTRAL PROCESSORS			
CPU 6601	Central unit with 32K bytes of RAM memory reserved for operating system, keyboard, console, display, and one floppy disk drive (no user memory). This system is available for special applications only, and purchase requires the approval of Olivetti's Business Products Division	$5,600	$564
CPU 6602	Central unit with 32K bytes of RAM memory reserved for operating system, keyboard, console, display, and two floppy disk drives (no user memory)	6,600	660
MEMORY*			
MEM 2208	8K RAM Dynamic Master	900	54
MEM 2108	8K RAM Dynamic Slave	900	54
MEM 2216	16K RAM Dynamic Master	1,800	96
MEM 2116	16K RAM Dynamic Slave	1,800	102
MEM 2124	24K RAM Dynamic Slave	2,700	144
MEM 2132	32K RAM Dynamic Slave	3,600	198
OPTIONS FOR UNITS INTEGRAL TO PROCESSOR			
IPSO 6600	Standard interface board	400	39
MASS STORAGE			
DCU 7201	Disk cartridge unit; 9.8 megabytes	11,060	957
DCU 7202	Disk cartridge subsystem; two 9.8-megabyte drives	20,645	1,875
PRINTERS			
PR 6610	Thermal printer, integrated into basic unit	1,850	186
PR 1220	Serial matrix printer, 100 cps, 132 columns; requires IPSO	3,800	312
PR 1230	Serial matrix printer, 175 cps, 140 lpm, 132 columns; requires IPSO	4,700	384
PR 1240	Bi-serial matrix printer, 350 cps, 140 lpm, 132 columns; requires IPSO	5,400	444
PR 1350	Matrix printer; 90 cps, bi-directional; requires IPSO interface	3,800	384
PR 1370	Matrix printer; 200 cps; bidirectional; requires IPSO interface	5,980	612
COMMUNICATIONS			
SIC 6629	Asynchronous interface for EIA and modem cables	500	54

*CPU RAM memory serves as dynamic master, so that a single slave memory board can be inserted for user memory. Any additional slave board must be paired with a master.