

Cii Honeywell Bull Series 60, Level 61

MANAGEMENT SUMMARY

Designed to serve either as small business systems or distributed processing systems, the Level 61 systems offer a wide choice of configurations and operating modes, ranging from a batch-oriented, single-terminal system up a 16-terminal system that can support batch, transaction processing, time-sharing, and data communications.

Standard equipment includes a microprogrammed processor, a 4.6-million-byte fixed/removable disk subsystem, and a console with keyboard, display, serial printer, diskette drive, and its own processor and memory. This basic configuration can be enhanced with a data communications processor (DCP), additional disk storage up to 182 million bytes, a second diskette drive, a variety of printers and terminals, and a synchronous data communications adapter. The DCP is a front-end processor with its own keyboard, display, dual cassette drives, and memory.

Level 61 systems can be programmed in Mini-COBOL, standard COBOL, FORTRAN, or BASIC. CII-HB offers packaged software for sales order processing, distribution inventory management, inventory management, production scheduling and control, and other applications.

The Level 61 family currently includes the Model 61/40, announced in December 1975, and the Model 61/60, enhanced in September 1976. The Model 61/58 and the earlier version of the 61/60, both announced in April 1974, are no longer actively marketed.

The 61/40 Monostation is a batch processor that can be used as a stand-alone system or a remote batch terminal. Its diskette console serves as an off-line data entry device, an input/output device, a system console, and a printer controller. When equipped with two diskette

The French-built Level 61 systems are the smallest members of the broad Series 60 family marketed by CII-HB and Honeywell Information Systems. Extremely versatile, they can serve as small business systems or as elements in a distributed data processing network. Prices range from 233,700 FF for a basic 61/40 to 780,091 FF for a medium-sized 61/60 with 10 workstations.

CHARACTERISTICS

MANUFACTURER: Cii Honeywell Bull, 94, avenue Gambetta, B.P. 33, 75960 Paris, Cedex 20, France. Telephone 355 44 33. Telex 220 898 F.

MODELS: Level 61 Models 61/40 and 61/60.

DATA FORMATS

BASIC UNIT: 8-bit byte (plus parity bit). Each byte can represent 1 alphanumeric character, 2 packed BCD digits, or 8 binary bits.

FIXED-POINT OPERANDS: Arithmetic operations are performed on data held in registers, in packed decimal form. A single-register field is 5 bytes long and can hold up to 9 digits and sign; a double-register field is 10 bytes long and can hold up to 18 digits and sign. Other operations, including move, compare, pack, and unpack, are performed on variable-length fields ranging from 1 to 99 bytes.

FLOATING-POINT OPERANDS: 6 bytes, consisting of a packed decimal 9-digit mantissa, 4-bit sign and implied decimal point, and an 8-bit exponent.

INTERNAL CODE: EBCDIC (Extended Binary Coded Decimal Interchange Code).

MAIN MEMORY

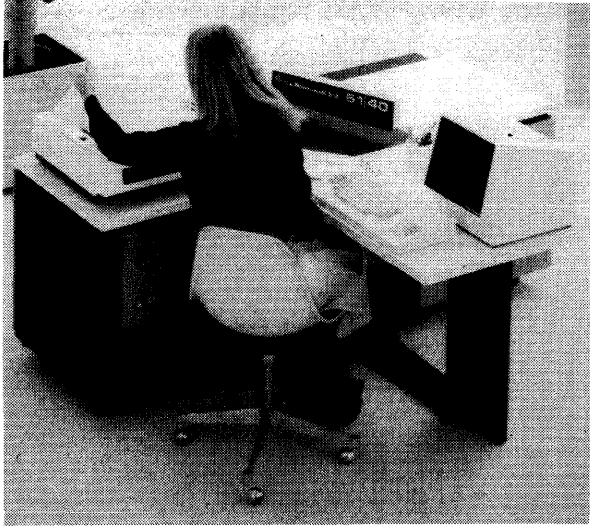
TYPE: Metal oxide semiconductor (MOS).

CYCLE TIME: 715 nanoseconds per 1-byte access.



On this large 61/60, the Data Communications Processor (foreground) serves as the console, allowing the operator to use the diskette processor as either a key-to-diskette data entry device or as an interactive display terminal. This configuration includes 96K bytes of memory, a serial printer, four disk drives, and a line printer, and can support up to 16 terminals.

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This basic 61/40 includes a serial printer, a disk drive with fixed and removable cartridges, 32K bytes of memory, and a Diskette Console. This configuration can serve as a batch processing system with real-time inquiry capability or as a remote batch terminal.

► drives, the console allows the system to read from or write to one diskette while the second diskette is being used for off-line data entry. The batch program can be rolled out to allow the operator to retrieve information from the disk file.

The 61/40 and 61/60 Multistation systems provide batch processing, interactive transaction processing, time-sharing, and data communications. These systems include a data communications processor that relieves the central processor of communication, control, and scheduling tasks, thus effectively boosting its power.

Level 61 systems run under either GCOS 61.4 or Extended GCOS. Both are subsets of the General Comprehensive Operating System used on all Series 60 systems. GCOS 61.4 provides two operating environments: MONO and MULTI. All 61/40 Monostation systems run under MONO, and multistation systems run under MONO during the compilation of COBOL and FORTRAN programs and when certain system housekeeping activities are conducted. MULTI is the normal, mixed-mode operating environment for the multistation systems.

GCOS 61.4 provides a flexible file management system that supports random and sequential access to variable-length records. GCOS maintains a primary index that is automatically kept in sequential order. Up to 10 additional indexes can be created to meet user requirements.

Under MULTI, GCOS supports up to 16 terminal programs running concurrently or up to 8 terminals running BASIC programs. The batch partition can be used to run a 17th terminal program from the diskette console, a communications program, or a batch job stream.

► **CAPACITY:** 32,768 bytes divided into a 16K system memory and a 16K time-shared memory. On the 61/60-2, memory can be expanded to 64K or 96K by adding special memories for file handling and batch processing.

CHECKING: An Error Detection and Automatic Correction (EDAC) system provides automatic correction of single-bit errors and detection of all double-bit and most other multiple-bit errors.

MEMORY PROTECTION: The user-accessible instruction set operates with indexed decimal addresses that limit access to a 10,000-byte paged area of memory. The supervisor, when running in master mode, operates with binary addresses that can reference any area of memory. On the 61/60-2, this protection is extended to the specialized memories.

CENTRAL PROCESSORS

Both Level 61 models use the same microprogrammed processor with 32K bytes of main memory. The central processor includes an integrated disk controller, but other data transfers are handled by either the diskette processor or the front-end processor.

REGISTERS: The Level 61 has 100 5-byte registers located in a reserved area of main memory.

INSTRUCTION REPERTOIRE: 91 instructions.

CONTROL STORAGE: 12K bytes (4096 24-bit words) of MOS read-only memory with a cycle time of 350 nanoseconds per 24-bit word.

PROCESSOR MODES: The processor operates in master and slave modes. User instructions can only be executed when the processor is in slave mode, and some instructions, reserved to GCOS, can only be executed when the processor is in the master mode.

INTERRUPTS: Interrupts are handled by microprograms activated by a timer.

COMPATIBILITY FEATURES: User software can be transferred from a Level 61 to a Level 62 system by using a translator that converts source programs from Level 61 COBOL or MiniCOBOL to Level 62 COBOL. Files can be transferred without modification.

INPUT/OUTPUT CONTROL

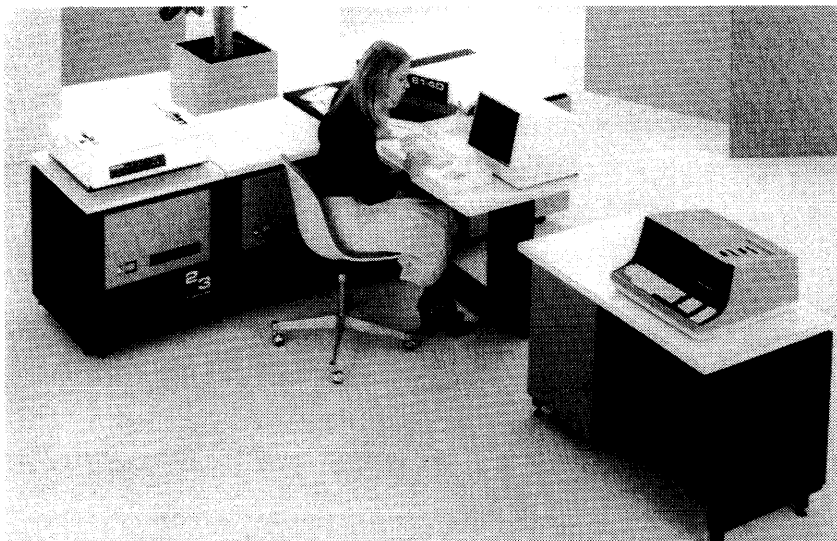
CONFIGURATION RULES: A minimum 61/40 system consists of a central processor with 32K bytes of memory, 4.6 million bytes of fixed and removable disk storage, and a diskette processor with 8K 11-bit words of read-only memory and 8K bytes of user memory. The basic configuration of the diskette processor includes a keyboard, video display, one floppy disk drive, and a 40 character per second printer.

This configuration serves as the basis of all Level 61 systems. When the system is running in "monoprogramming" mode, the video display serves both as a control console and as a data entry device. When a system runs in multiprogramming mode, the display terminal is used only for data entry; control console duties are assumed by a separate data communications processor (DCP).

The DCP, optional on the 61/40 and standard on the 61/60, is a front-end processor with 8K to 16K bytes of memory, a keyboard, a video display, and two cassette drives. The DCP controls communications lines and the optional tape drives.

► The maximum configuration of a 61/60 would include 184 million bytes of disk storage, a second diskette drive, two ►

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This 61/40 includes a serial printer, two disk drives with fixed and removable cartridges, a 32K byte memory, a Diskette Console, and a Data Communications Processor. This configuration can support eight terminals.

➤ Extended GCOS, available only on the 61/60-2, provides a number of powerful extensions to GCOS 61.4 that work in conjunction with special hardware and firmware. These extensions include a resident file management system that directly executes input/output macro instructions, a disk cache memory that reduces disk accesses, a resident batch memory that reduces swapping, and a multi-line print memory that improves printer performance. Because input/output macros don't have to be compiled, the size of object programs is reduced up to 40%. These added features also allow compilations and housekeeping functions to be handled in MULTI mode.

Hardware extensions available include a 16K-byte memory for the file management system, a 16K or 32K-byte memory for the disk cache, and a 16K-byte memory for the batch partition.

When equipped with a synchronous line adapter, a Level 61 system can communicate with another Series 60 system, with a CII-HB IRIS system, or with an IBM System/360 or 370. The maximum transmission rate is 4800 bits per second. BSC 2780 procedures are used to talk to a Level 61, 62, or 64; RC 115 procedures to talk to a Level 66; TMM.RB procedures to talk to an IRIS 40, 50, 60, or 80; and BSC 2780, 3780, or Multileaving procedures to talk to an IBM 360 or 370. Transmissions are transparent to the programmer, who treats messages as though they were records being read from or written to a local peripheral device.

Through the use of various combinations of dedicated, switched, and multipoint lines, a Level 61 system can serve as the host to a network of local and remote asynchronous and synchronous terminals, including displays, printers, teleprinters, key-to-diskette units, and intelligent multifunction terminals.

COMPATIBILITY

All Level 61 systems are compatible with each other and upward compatible with the earlier Honeywell Bull Model ➤

➤ printers, a tape drive, 16 asynchronous terminals, and a synchronous line connected to another computer. In addition to the above features, a maximum 61/60-2 would include 96K bytes of main memory.

I/O CHANNELS: The Level 61 central processor has one channel that links it to the disk controller, the diskette processor, the line printer, and the data communications processor. The maximum transfer rate is 400 kilobytes per second.

SIMULTANEOUS OPERATIONS: The central processor, the disk controller, and the peripheral processors operate independently and simultaneously. Data transfers are buffered into blocks of 256 bytes and the central processor moves the blocks from one buffer to another in the same manner as a memory-to-memory move.

MASS STORAGE

MSU0100 MASS STORAGE UNIT: The MSU0100 provides from 4.6 million bytes to 18.4 million bytes of storage on various combinations of fixed disks and removable disk cartridges. Average seek time is 32 milliseconds for single-density disks and 40 milliseconds for double-density disks. Average rotational delay is 12.5 milliseconds. The transfer rate is 312,500 bytes per second. Both the 200 track and 400 track disks have a capacity of 5760 bytes per track. Features include a write-inhibit switch and various interlocks to protect the disks and heads from power failures and operator errors.

The basic configuration consists of a MSA1307 addressing attachment and a MSU0106 disk drive with 2.3 million bytes of fixed storage and 2.3 million bytes of removable storage. Total storage capacity can be doubled to 9.2 million bytes by adding the MSA 1302 double capacity feature. Total storage can be further increased to the maximum configuration of 18.4 million bytes by adding an MSU0108 unit with 4.6 million bytes of fixed storage and 4.6 million bytes of removable storage.

MSU0311 MASS STORAGE UNIT: Each drive uses a disk pack with 11 platters that provide 20 recording surfaces. Total capacity is 15 million bytes when attached to a 61/40 and 23 million bytes when attached to a 61/60. Average access time is 46.5 milliseconds, including an average rotational delay of 12.5 milliseconds. The transfer rate is 312,500 bytes per second. Up to two drives can be connected to a 61/40 for a total storage capacity of 30 million bytes, and up to four drives can be connected to a 61/60 for a total capacity of 92 million bytes. ➤

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➤ 58 systems. Users moving from Level 61 to the larger Level 62, 64, and 66 systems can transfer their COBOL and FORTRAN programs to the new systems by recompiling them.

COMPETITIVE POSITION

The 61/40 Monostation and the 61/40 and 61/60 Multi-station systems are viable alternatives to the IBM System/32 and System/34, respectively. The CII-HB systems offer a much wider choice of configurations, allowing users to tailor the systems to their specific needs.

Because they are direct descendents of similar systems, the Level 61 systems offer thoroughly tested and field-proven software.

The broad range of Series 60 systems provides users with an almost unlimited growth path, and the worldwide CII-HB/Honeywell Information Systems organization assures continued maintenance and support for the systems.

USER REACTION

In January 1978, Datapro surveyed 14 Level 61 users in France, Germany, and Switzerland by mail. Four usable responses—one each from France and Germany and two from Switzerland—had been received at the time this report was written.

The German user had the smallest system, a 61/40 Monostation with 18.4 million bytes of disk storage. Installed for six months, the system was rented from CII-HB. Under system strengths, the user listed easy conversion and easy operation. Under disadvantages, he said that there weren't enough system messages and objected to the fact that interrupt messages were not displayed until the console was switched from input mode to console mode. With three exceptions, he rated the system "good" in all categories. He rated "technical support," "compilers," and "ease of programming" as "fair."

The French user had a 61/60-2 with 46 million bytes of disk storage and three remote batch terminals. Installed for six months, the system was on third-party lease. With two exceptions, he rated the system "good" in all categories. He did not rate "ease of conversion" because he had not made a conversion, and he rated the COBOL compiler as "fair."

The first Swiss user had a 61/60 with 46 million bytes of disk storage and three interactive terminals. Installed for nine months, the system was rented from CII-HB. This user was the only one who was writing programs in BASIC as well as COBOL. Under system strengths, he listed simplicity of use, automatic program segmentation, and multiprogramming. Under disadvantages, he listed slow compilation. He rated the system "excellent" in two categories and "good" in five other categories. He rated "reliability of mainframe," "technical support,"

➤ **MSU0314 MASS STORAGE UNIT:** Each drive uses a disk pack with 11 platters that provide 20 recording surfaces of 400 tracks each. Total capacity is 46 million bytes. Average access time is 42.5 milliseconds. The transfer rate is 312,500 bytes per second. Up to four drives can be connected to the 61/60 for a total storage capacity of 184 million bytes.

INPUT/OUTPUT UNITS

DISKETTE CONSOLE: On a 61/40 system without a communications processor, this unit serves both as an input device and as the system console. On 61/40 systems with a communication processor and on 61/60 systems, the diskette console normally serves only as an input device or as a display terminal. It serves as a console, however, when the system is running in "monoprogramming" mode.

The diskette console (DC) includes a processor with 8K 11-bit words of read-only memory and 8K bytes of random access memory. Attached devices include an alphanumeric keyboard, numeric pad, and control keys; a video display formatted in 12 lines of 80 characters each; and a floppy disk drive with a capacity of 242,944 bytes. Options include a serial printer and a second diskette drive.

In data entry mode, the DC operates off-line. However, if the DC is equipped with a second drive or a serial printer, the central processor can transfer data to or from the second diskette or to the printer while data entry continues.

When the DC is in console mode, it can converse interactively with the GCOS Level 61.4 operating system. If the system needs attention while the DC is in data entry mode, it signals the operator with a "beeping" sound and displays a row of exclamation marks on a reserved line of the video display.

Standard data entry features permit reading and modifying the diskette index, entering records, updating records, searching for records, verifying records, and correcting records. The Extended Function Group provides facilities for verifying previously entered records, correcting fields within records, inserting records, accumulating production statistics, creating field totals, validating check digits, and validating ranges of numeric fields.

The DC also can be used to read diskettes prepared on other equipment and to write diskettes for transfer to other equipment.

PRU0020 SERIAL PRINTER: This table-top matrix printer operates at 40 characters per second on fanfold forms ranging in width from 4 to 15 inches and in depth from 3 to 17 inches. Printing is at 10 characters per inch and 6 lines per inch. Maximum line length is 132 positions. Vertical format is controlled by software. The printer connects to the system via the diskette console's processor, which serves as the controller and buffer.

PRU0030 SERIAL PRINTER: This is a 120 character per second version of the PRU0020.

PRU0105 BELT PRINTER: This buffered line printer operates at 100 lines per minute. Formatting is 10 characters per inch and 6 lines per inch. Maximum line length is 132 positions. Forms widths can range from 2 to 15 inches and form depths to 10.5 inches. Vertical format is software controlled. The printer connects to the system via the I/O channel.

➤ **PRU0205 BELT PRINTER:** This is a 200 line per minute version of the PRU0105.

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▷ and “compilers” as “fair.” He did not rate “ease of conversion.”

The other Swiss user had the largest system, a 61/60-2 with 69 million bytes of disk storage and 16 interactive terminals. Installed for 16 months, the system was purchased. Very happy with the system, the user noted that he was running programs of more than 100K bytes from each of 12 terminals “all day long.” He was the only one of the four who was running a data base management system. Under system strengths, he listed easy operation and programming and excellent restart. Under disadvantages, he listed slow compiling of large (100K) COBOL programs. He rated the system “excellent” in seven categories and “good” in other categories.

The following table summarizes the ratings given by the four users.

	Excellent	Good	Fair	Poor	WA*
Ease of operation	2	2	0	0	3.5
Reliability of mainframe	1	2	1	0	3.0
Reliability of peripherals	0	4	0	0	3.0
Maintenance service:					
Responsiveness	1	3	0	0	3.3
Effectiveness	0	4	0	0	3.0
Technical support	0	2	2	0	2.5
Manufacturer's software:					
Operating system	1	3	0	0	3.3
Compilers	1	0	3	0	2.5
Application programs**	—	—	—	—	—
Ease of programming	1	2	1	0	3.0
Ease of conversion	1	1	0	0	3.5
Overall satisfaction	1	3	0	0	3.3

*Weighted Average on a scale of 4.0 for Excellent.

**None of the users had acquired application software from CII-HB.

These ratings indicate a good level of user satisfaction in all categories except technical support and compilers. Note, however, that these ratings were pulled down by the three users who had had their systems for less than a year—a very short time—and even they rated their overall satisfaction as “good.” The fourth user, with 16 months of experience, was very happy with his system.□

▶ **PRU0305 BELT PRINTER:** This is a 300 line per minute version of the PRU0105.

PRU0441 BELT PRINTER: Attachable only to Model 61/60 systems, this 400 line per minute buffered printer operates at 10 characters per inch and 6 or 8 lines per inch under software control. Line width is 120 positions or, optionally, 136 positions. Form widths can range from 4 to 19 inches and form depths from 4 to 16 inches. Vertical format is under software control. The printer attaches to the I/O channel.

PRU0641 BELT PRINTER: This is a 600 line per minute version of the PRU0441.

PRU0841 BELT PRINTER: This is an 800 line per minute version of the PRU0441.

COMMUNICATIONS CONTROL

DATA COMMUNICATIONS PROCESSOR: The DCP, optional on the Model 61/40 and standard on the Model

61/60, is a front-end processor with 8K to 16K bytes of memory. The DCP includes a video display of 12 lines of 80 characters, a keyboard, and two cassette drives. The DCP always serves as the system console when a Level 61 system is running in multiprogrammed mode.

On the Model 61/40, the DCP includes a multiport adapter that supports a maximum of eight asynchronous lines. An optional synchronous adaptor supports a single synchronous line.

On the Model 61/60, the DCP includes a multiport adapter that supports a maximum of eight asynchronous lines. An optional synchronous adapter supports a single synchronous of eight more lines, for a total of 16. An optional synchronous adapter supports a single/synchronous line and requires an 8K byte extension to the DCP's memory, expanding it to the maximum of 16K bytes.

The DCP contains two 256-byte buffers. The Level 61 central processor reads from one buffer and writes to the other buffer, addressing them as though they were blocks of main memory.

The two cassette drives are used during generation and loading of the DCP's part of the GCOS operating system.

SYNCHRONOUS TERMINALS: Two types of terminal are available: the MTS 7500 Multi-Function Terminal System and the KDS 7255/7256 Key-Diskette Systems. Each is an intelligent terminal able to support its own peripherals.

ASYNCHRONOUS TERMINALS: In addition to the MTS 7500 operating in asynchronous mode, available terminals include Teletypes, teleprinters (Terminet 300 and 1200, TTU 8124 and 8126), and video display terminals (DTU 7170). Video display terminals can support a hard-copy printer (Terminet or TTU).

SOFTWARE

OPERATING SYSTEMS: Level 61 systems run under GCOS Level 61.4 or under Extended GCOS. Both are subsets of the General Comprehensive Operating System (GCOS) used on all Series 60 systems.

GCOS LEVEL 61.4 OPERATING SYSTEM: GCOS supports batch and real-time inquiry functions on the 61/40 Monostation systems and batch and time-sharing functions on the 61/40 and 61/60 Multistation systems.

On the Model 61/40 Monostation, GCOS supports a single batch job stream. When file inquiries are made from the diskette console, the batch job is rolled out to disk and resumed after the inquiry has been handled.

On the Model 61/40 Multistation system, GCOS supports a single batch job stream and up to eight terminal programs.

On the Model 61/60, GCOS supports a single batch job stream and up to 16 terminal programs, with the terminal programs receiving priority.

GCOS provides disk file management, program segmentation, recovery, and restart facilities on all models.

On the multistation models, GCOS also provides swapping and control of front-end communications processing. Supervisory functions are shared by the central processor and the Data Communications Processor (DCP), thus freeing the central processor to concentrate on actual processing. The DCP controls the movement of terminal messages, user program priorities, terminal activity, and the central processor/DCP dialog. ▶

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► GCOS provides two operating environments, MONO and MULTI. MONO, the only environment available for the Model 61/40 Monostation, is also used on the multistation systems while COBOL and FORTRAN programs are being compiled and certain other system maintenance and house-keeping activities are being conducted. MULTI, the multiprogramming environment, is used the rest of the time on the multistation systems.

Under MULTI, the batch partition can be used to run a batch job stream, to allow the diskette console to be used as a terminal, or to support a synchronous communications line. In addition, each terminal can be running a program or compiling and running a BASIC program.

Disk files are organized as follows. The basic unit of data transfer is one "page," consisting of two sectors or 576 bytes. Each disk file consists of a variable number of records and occupies a whole number of disk cylinders. Each record, in turn, is composed of a variable number of fixed-length elements, up to a maximum record length of one page (576 bytes). The "principal element" in each record contains an identifying key from one to 15 bytes in length. Any other elements in the record are called "complementary elements."

The structure of the disk files is "indexed random." Each file consists of the data records, written in random sequence, and an index, which lists the keys of all the data records and their physical addresses. Whenever a new record is added to the file, its key and address are added to the index. Each time the file is opened, the index is resorted into the proper sequence if any changes have been made. Thus, the index can be read either sequentially or at random, and the corresponding data records can be accessed directly.

In addition to the primary index described above, it is possible to create up to ten "secondary indexes" for each disk file. Thus, a single data file can have up to 11 indexes, each keyed to a different element in the data records. Each index can be sorted and then accessed either sequentially or randomly. Therefore, in most applications there is no need to sort the data records themselves.

Segmentation—the division of a program into logical parts so that it can fit into the available main memory—is performed automatically by Level 61 GCOS when necessary. Programs are divided into "pages," and the pages not required in main memory at any given time are stored on disk. The segmentation process is completely transparent to the programmer. Although segmentation invariably reduces the efficiency of object program execution, it enables a Level 61 computer to execute programs which would otherwise be too large to process at all.

To improve the efficiency of segmentation, GCOS gives the COBOL programmer the option of assigning priorities to the segments. Further efficiency can be gained by experimenting with different program structures and different priorities.

GCOS includes a recovery-restart procedure that restores the contents of main memory and of the registers after accidental interrupts. After each transaction, a check-point is established by storing the contents of registers in a push-down stack assigned to each program. This information is used by the time-sharing mechanism to restart programs after both normal and abnormal interrupts.

EXTENDED GCOS OPERATING SYSTEM: Available only on the 61/60-2, Extended GCOS provides all of the facilities of GCOS Level 61.4 plus a number of powerful extensions that work in conjunction with special hardware and firmware. These features include:

Resident file management system: Resident in a special 16K-byte memory, this firmware controls the sharing, updating, and protection of disk files. The system improves performance in two ways. First, it reduces the size of user object programs by more than 40% because the I/O macros are executed directly, not compiled. The smaller size of the user programs improves performance by reducing the amount of swapping necessary. Second, the system provides automatic file updating. Under both GCOS Level 61.4 and Extended GCOS, updates are stored in a work file. (Users are unaware of this because all file inquiries are automatically made against the work file as well as the master file.) Under standard GCOS, master file updating is performed as a batch job under operator control. Under Extended GCOS, master file updating is performed automatically every time the executing program stops to wait for an I/O operation.

Disk cache memory: This 16K-byte block of memory, expandable to 32K bytes, provides a common data I/O area for user programs. It reduces the size of user programs by eliminating the need for I/O areas and reduces swapping. When programs are swapped out, they don't have to be written back to disk because the code is never modified. Under Extended GCOS, the data doesn't have to be written back to disk because it can remain in the cache memory until it's needed again.

Resident batch memory: This 16K-byte memory is assigned to the program running in the batch job slot, making it unnecessary to swap it in and out. The resulting reduction in overhead makes it practical to compile COBOL or MiniCOBOL programs or to perform other housekeeping functions that under standard GCOS can only be performed in MONO mode.

Multi-line print memory: This first-in, first-out buffer stores up to 20 print lines and smooths the transfer of data from the processor to the line printer. Controlled by Extended GCOS, the buffer allows the printer to run at optimum speed without hindering the execution of other programs.

LANGUAGES: The Level 61 systems can be programmed in MiniCOBOL, ANS COBOL-68, FORTRAN, and BASIC.

MINICOBOL: Whereas the full COBOL language offers numerous alternative techniques for handling most coding problems, MiniCOBOL has been stripped down to the essential elements. The language, while less powerful, is easier to learn and use than standard COBOL.

COBOL: This compiler conforms with ANS COBOL-68 specifications.

FORTRAN: This compiler meets all of the specifications of FORTRAN-66, basic version, and also includes some of the features found in the intermediate and full versions of FORTRAN.

BASIC: A conversational compiler language designed for time-shared problem-solving applications, BASIC runs only on Level 61 Multistation models. Individual programs are limited to 310 statements each, but programs can be chained together.

APPLICATION PROGRAMS: Packaged programs available for Level 61 systems include Sales Order Processing (order entry, billing and shipment, inventory accounting, and sales analysis), Distribution Inventory Management (data base management, inventory accounting, and inventory management), Inventory Management System (inventory reporting, bill of materials processing, and material requirements planning), and Production Scheduling and Control (production data management, capacity requirements planning, and production control reporting). In addition to ►

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► these packages, which are available everywhere the Level 61 is sold, locally developed packages are available in individual countries. To obtain a list of all the packages available in your country, contact the local CII-HB or Honeywell Bull office.

PRICING

Pricing and policies may vary slightly from country to country, but the information below, although specifically applicable only to France, may be considered a guide to CII-HB's worldwide marketing of the Level 61.

SOFTWARE: The basic operating system, basic job management and file systems, programming tools such as linking and debugging aids, the control languages, and conversion aids are provided to all Series 60 users at no additional cost. A basic kit of documentation is also provided with the system. Monthly license fees are charged for language processors, utilities, application packages, communications software, and advanced job management and file systems. Extra charges are also levied for customer services, such as education, program development, system design, implementation and conversion, and network design.

CONTRACT TERMS: 61/40 and 61/60 equipment is available under purchase, rental, leasing, and full-payout-leasing plans.

Under the purchase plan, one year of maintenance on the central processing unit and three months on peripheral devices are provided without additional charge. Maintenance beyond these initial periods is provided under a separate contract.

The rental plan entitles the user to 182 hours of central processor usage per month and includes maintenance in the monthly fee. The user pays 10 percent of 1/182 of the basic monthly fee for each additional hour of usage beyond this 182 hour period.

The leasing plan entails a fixed equipment fee and a separate maintenance contract that allows maintenance rates to vary on a quarterly basis. Five and six-year leases are available. For a five-year lease, the monthly charge including maintenance is approximately 93 percent of the monthly charge under the rental plan. For a six-year lease, the charge is approximately 89 percent of the rental plan charge.

The full-payout-lease (FPL) is available as a five or six-year plan. ■

EQUIPMENT PRICES

Configuration	Purchase Price (FF)	Monthly Maint. (FF)	Installation and training (FF)
BASIC 61/40 MONOSTATION SYSTEM: Diskette Console, 4.6 million bytes of fixed and removable disk storage, and 40 character/second printer	233,682	1,280	6,679
EXPANDED 61/40 MULTISTATION SYSTEM: Diskette Console, Data Communications Processor, 30 million bytes of fixed and removable disk storage, 180 line/minute printer, and four DTU 7170 display terminals	441,402	2,942	13,618
SMALL 61/60 MULTISTATION SYSTEM: 32K of main memory, Diskette Console, Data Communications Processor (8K), 46 million bytes of disk storage, 300 line/minute printer, and six DTU 7170 display terminals	597,046	4,130	18,854
LARGE 61/60 MULTISTATION SYSTEM: 96K of main memory, Diskette Console, Data Communications Processor (16K), 92 million bytes of disk storage, 800 line/minute printer, and sixteen DTU 7170 display terminals	1,166,892	7,991	37,058
Extended GCOS	—	—	260