

## Honeywell Series 6000

### MANAGEMENT SUMMARY

The Series 6000, introduced on February 17, 1971, constitutes a strong Honeywell bid to maintain and extend the prominent position in the large-scale computer market that it obtained by acquiring the General Electric Company's computer equipment business in 1970.

The Series 6000 is a logical successor to the third-generation GE-600 Series computer line (now called the Honeywell Series 600). The newer line is fully compatible with the Series 600 and uses most of the same peripheral equipment and software. Within this framework, Honeywell has made noteworthy hardware and software improvements, and—most significantly—has boosted the line's price/performance to a level that makes it fully competitive with the current equipment from IBM and the other leading suppliers of medium-to-large-scale computer systems.

In June 1972, Honeywell significantly enhanced the capabilities of the Series 6000 computers by increasing the main memory capacities of four of the six processor models, introducing a Bulk Store Subsystem that provides up to 33 million bytes of high-speed "swapping" memory, and announcing a variety of new peripheral devices, communications features, and software facilities. ➤

Impressive price/performance levels and an unusually effective operating system are the main attractions of this line of six medium-to-large-scale computers. The Series 6000 is fully compatible with the earlier GE-600 Series, uses most of the same peripheral equipment and software, and is well suited for both business and scientific applications.

### CHARACTERISTICS

**MANUFACTURER:** Honeywell Information Systems, Inc., 200 Smith Street, Waltham, Massachusetts 02154. Telephone: (617) 891-8400.

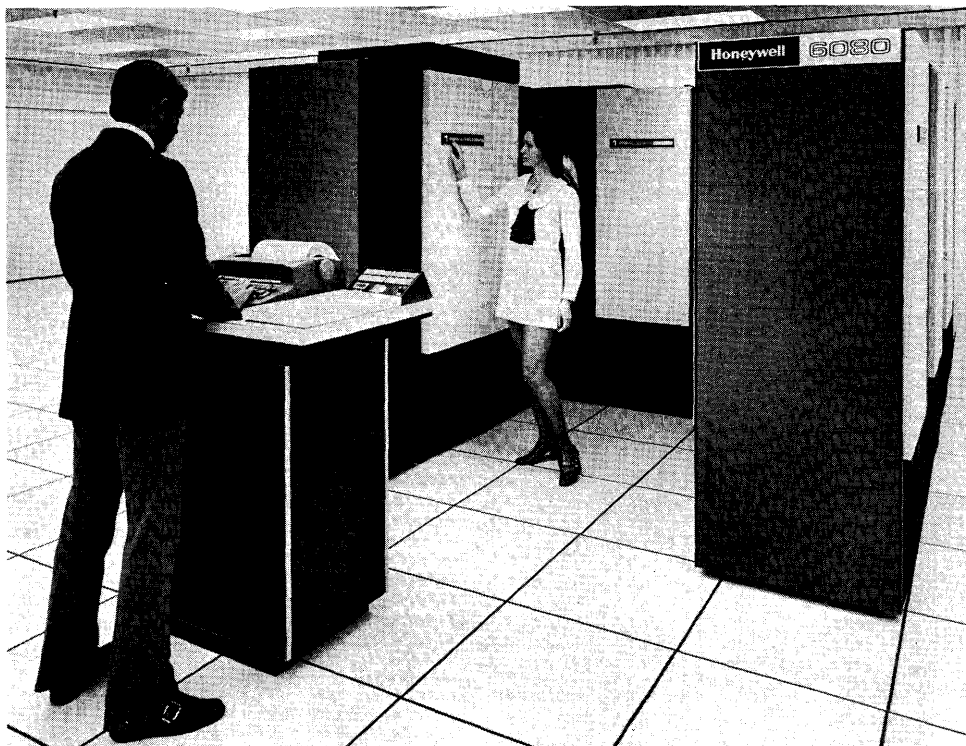
**MODELS:** Series 6000, Models 6030, 6040, 6050, 6060, 6070, and 6080.

#### DATA FORMATS

**BASIC UNIT:** 36-bit word (plus parity bit).

**FIXED-POINT OPERANDS:** One word (36 bits), two words (72 bits), or one half-word (18 bits). In addition, partial words of 6 or 9 bits can be transferred into and out of the arithmetic and control registers. Models 6040, 6060, and 6080 also include facilities for performing decimal arithmetic and a variety of other operations on variable-length character strings.

**FLOATING-POINT OPERANDS:** One word, consisting of 27-bit-plus-sign fraction and 8-bit exponent; or two words, consisting of 63-bit-plus-sign fraction and 8-bit exponent. ➤



*Model 6080 is the most powerful of the six processor models in the Honeywell Series 6000. The Master Console is in the foreground.*

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▷ Customer acceptance of the Series 6000 computers has been quite gratifying; by June 1972, Honeywell had received orders for more than 200 systems. Deliveries to both U. S. and European users began in September 1971, and 25 systems had been shipped by the end of 1971. Series 6000 equipment is being manufactured in Phoenix, San Diego, Oklahoma City, and Newhouse, Scotland.

### BACKGROUND

To give prospective buyers a full understanding of what the Series 6000 is and how it got that way, a brief history of its predecessor, the GE-600, seems appropriate. Introduced in May 1964, immediately after the IBM System/360, the GE-600 Series computers were designed primarily as replacements for the IBM 7090 and 7094, the most widely used large-scale scientific computers of the second generation. The line originally consisted of the GE-625 and GE-635, which were largely identical except for their core cycle times: 2 microseconds per 2-word access for the 625 and 1 microsecond for the 635. Both models offered up to 262K 36-bit words of core storage in multiple independent modules, with input/output operations controlled by independent I/O controllers. GE placed a strong emphasis on efficient multiprogramming and data communications under an integrated operating system called GECOS.

In 1968 GE introduced the GE-615, a lower-priced version of the GE-625 with the same 2-microsecond storage and slightly lower execution speeds. Then, in December 1969, GE unveiled the faster, integrated-circuit GE-655, which offered full upward compatibility plus up to 262K words of four-way-interleaved core storage with a 500-nanosecond cycle time.

Meanwhile, the GE-600 Series software and peripheral equipment, which had been plagued by far more than the normal rash of development problems, were being steadily improved in both reliability and performance. GECOS III, introduced in November 1967, became one of the few third-generation operating systems that really delivered the promised benefits of efficient performance in complex, "multi-dimensional" operating environments. As a result, more GE-600 Series orders were booked during 1969 than during the first four years after the line's introduction.

Thus, by the beginning of 1970, GE had finally developed a strong, proven large-scale computer line—only to see its performance outclassed by the IBM System/370 and other recently announced computer systems from companies such as Burroughs and UNIVAC.

After acquiring the GE computer business, Honeywell assigned a high priority to the introduction of an improved large-scale computer family that would retain the GE-600 customer base and appeal to as many new buyers ▷

▷ **INSTRUCTIONS:** Most instructions occupy one word and consist of an 18-bit address field, a 9-bit operation code, a 6-bit tag field that defines the address modification to be performed, a 1-bit interrupt inhibitor, and two unused 1-bit fields.

**INTERNAL CODE:** A 6-bit BCD code is standard and is used in all currently announced software, but the central processors are not code-sensitive and can conveniently manipulate data in any 6-bit or 9-bit code.

### MAIN STORAGE

**STORAGE TYPE:** Magnetic core.

**CAPACITY:** See table.

**CYCLE TIME:** See table. (interleaved accessing of the multi-module storage in Models 6050 through 6080 results in effective cycle times which are considerably faster than the indicated figures.)

**CHECKING:** Parity bit with each word is checked whenever storage is referenced.

**STORAGE PROTECTION:** The base address register indicates the base address and the number of 1024-word blocks assigned to the slave-mode program currently being executed. Any attempt to reference an address beyond these limits causes an interrupt.

### CENTRAL PROCESSORS

**CONFIGURATION RULES:** Model 6030 and 6040 systems have a single central processor. Model 6050, 6060, 6070, and 6080 systems can have a maximum of four central processors. Each Series 6000 Central System also includes 1 or 2 System Controllers, as required by the main memory size.

**REGISTERS:** The processor registers that are accessible to the program include: one 72-bit accumulator (A and Q registers), eight 18-bit index registers, one 18-bit base address register, one 18-bit indicator register, one 18-bit instruction counter, one 27-bit timer register, and one 8-bit exponent register.

**INDEXING:** Operand addresses can be modified by adding the contents of any of 15 registers, including the 8 index registers, the instruction counter, or the high-order or low-order 18 bits of the A or Q register. Indexing normally causes no increase in instruction execution times. The 8 index registers can also be used as additional 18-bit accumulators for half-precision operations.

**INDIRECT ADDRESSING:** Possible to any desired number of levels, with full indexing capabilities at each level. Indexing can be performed either before or after the indirect word is obtained. An "indirect then tally" address modification capability facilitates character sequencing and progressing through tables in ascending or descending order.

**INSTRUCTION REPERTOIRE:** All models have a comprehensive set of about 185 single-address instructions for performing data movement, binary arithmetic, shifting, logic, and control operations on 36-bit single-precision, 72-bit double-precision, and 18-bit half-word operands. The basic instruction set also includes complete arithmetic facilities for single- and double-precision floating-point operands.

In addition, Models 6040, 6060, and 6080 include an Extended Instruction Set (EIS) containing over 100 additional instructions oriented toward efficient processing of ▷

**Honeywell Series 6000**
**CHARACTERISTICS OF THE SERIES 6000 PROCESSOR MODELS**

	Model 6030	Model 6040	Model 6050	Model 6060	Model 6070	Model 6080
<b>SYSTEM CONFIGURATION</b>						
No. of Central Processors	1	1	1 to 4	1 to 4	1 to 4	1 to 4
No. of I/O Multiplexers	1	1	1 to 4	1 to 4	1 to 4	1 to 4
No. of System Controllers	1	1	1 or 2	1 or 2	1 or 2	1 or 2
<b>MAIN STORAGE</b>						
Minimum capacity, 36-bit words	65,536	65,536	98,304	98,304	131,072	131,072
Maximum capacity, 36-bit words	131,072	131,072	524,288	524,288	1,048,576	1,048,576
Increment size, 36-bit words	32,768	32,768	Varies	Varies	Varies	Varies
Cycle time, microseconds	1.2	1.2	1.2	1.2	0.5	0.5
Words fetched per cycle	2	2	2	2	2	2
Storage interleaving	No	No	2-way	2-way	2/4-way	2/4-way
<b>CENTRAL PROCESSOR</b>						
Extended (business) Instruction Set	No	Standard	No	Standard	No	Standard
Instruction overlap	No	No	Standard	Standard	Standard	Standard
Typical speed, instructions/second:						
Single processor	250,000	250,000	500,000	500,000	1,000,000	1,000,000
Dual-processor system	NA	NA	900,000	900,000	1,800,000	1,800,000
<b>INPUT/OUTPUT CONTROL</b>						
Channels per I/O Multiplexer	8 to 16	8 to 16	8 to 24	8 to 24	8 to 24	8 to 24
Maximum data rate per I/O Multiplexer, characters/second	1,300,000	1,300,000	3,700,000	3,700,000	6,000,000	6,000,000
<b>TYPICAL SYSTEM RENTAL</b>	<b>\$24,846</b>	<b>\$26,211</b>	<b>\$44,944</b>	<b>\$46,519</b>	<b>\$63,362</b>	<b>\$65,252</b>

➤ as possible. Honeywell naturally took full advantage of the GE development work that was in progress at the time of the acquisition. The result is the Series 6000, a strongly GE-flavored product line that blazes no new technological trails but exploits the current state of the art in a highly cost-effective manner.

**SYSTEM ARCHITECTURE**

The Series 6000 consists of six central processors: Models 6030, 6040, 6050, 6060, 6070, and 6080. Their basic characteristics are summarized in the accompanying table. All electronics are of the integrated-circuit variety, and conventional magnetic cores are used for the main storage.

Models 6030, 6050, and 6070 have essentially the same scientifically-oriented instruction repertoire and processing facilities as the GE-600 Series processors. They are well suited for scientific computation and for mixed business/scientific workloads. Deliveries of these three models began in September 1971.

Models 6040, 6060, and 6080 have all the facilities of the other three models plus a new Extended Instruction Set (EIS). The EIS adds over 100 instructions oriented toward business data processing functions: decimal arithmetic, byte processing, editing, bit string manipulation, etc. ➤

➤ character strings and bit strings. Included are edited moves, moves with code translation, and complete decimal arithmetic operations in both 2-address and 3-address formats.

**INSTRUCTION TIMES:** Representative execution times for the Series 6000 processors, in microseconds, are tabulated below. The times assume the use of interleaved storage in Models 6050 through 6080. Honeywell states that interleaving (currently available only in systems with at least 131K words) results in a 15 to 20 percent speed improvement.

Model:	6030/ 6040	6050/ 6060	6070/ 6080
Fixed-point add to register	2.95	1.51	0.71
Fixed-point add to storage	4.29	3.29	1.78
Multiply	13.53	3.61	3.61
Divide	15.73	7.28	7.28
Floating-point add	6.83	1.95	1.73
Floating-point subtract	6.73	1.93	1.70
Floating-point multiply	11.82	3.15	3.12
Floating-point divide	26.34	7.48	7.48
Load register	2.95	1.51	0.71
Store register	2.68	1.70	0.95
Compare register	2.95	1.51	0.71
Decimal add (5 digits)*	10.55	5.93	4.53
Decimal subtract (5 digits)*	10.55	5.93	4.53
Decimal multiply (5 digits)*	13.95	9.38	7.98
Decimal divide (5 digits)*	18.55	13.98	12.58
Alphanumeric move (5 chars)*	11.97	7.34	5.66
Alphanumeric compare (5 chars)*	7.75	6.06	4.56
Edited move (5 chars)*	11.87	7.30	5.90

\* EIS instructions, in Models 6040, 6060, and 6080 only. ➤

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➤ Many of the individual EIS instructions accomplish functions that require numerous instructions in Models 6030, 6050, and 6070, as well as in most of the competitive computers. As a result, the EIS yields significant reductions in both the execution times and memory requirements for most business-oriented programs. These performance improvements make Models 6040, 6060, and 6080 well worth their modest additional cost over Models 6030, 6050, and 6070, respectively, for most installations with any significant volume of business data processing. Deliveries of the three business-oriented models began in the first half of 1972.

In typical applications, Honeywell expects a Model 6040 system to deliver approximately 15 percent more throughput than a GE-635, while Model 6060 should deliver approximately twice the throughput of the GE-635. The Model 6070 central processor has essentially the same specifications and performance characteristics as the GE-655, while Model 6080 is essentially a GE-655 with the EIS facilities added for increased commercial processing power.

The Series 6000 systems employ a memory-oriented architecture. One or two System Controllers associated with the core storage modules regulate all communication between storage and the system's central processors, I/O Multiplexers, and communications processors. The I/O Multiplexer (IOM) is a hard-wired controller that coordinates all input/output operations over 8 to 24 independent data channels. The Series 6000 IOM's offer more flexibility and considerably higher throughput capacities than their GE-600 Series counterparts.

A Model 6030 or 6040 system is limited to a single central processor, one IOM, and up to 131K words of core storage. The four larger Series 6000 systems can include up to four central processors, four IOM's, and 524K words (in Models 6050 and 6060) or 1048K words (in Models 6070 and 6080) of main core memory.

The Bulk Store Subsystem (BSS), introduced in June 1972, is designed primarily for use as an auxiliary "swapping" memory to increase the throughput of input/output-bound systems. BSS storage capacities can range from 1,048,576 to 33,554,432 bytes, in 1,048,576-byte increments. Data is transferred between the BSS and main memory at a speed of over 10 million bytes per second in Models 6070 and 6080 and 6 million bytes per second in the four smaller models.

Virtual memory capabilities are not a standard part of the Series 6000 product line at this writing. But now that IBM has turned the spotlight on virtual memory by featuring it in the System/370 Model 158 and 168 computers, it is unlikely that Honeywell will be far behind. The GE-645, developed in conjunction with MIT and Bell Laboratories, was one of the first large-scale computers to utilize virtual memory techniques. Honeywell is currently installing a ➤

➤ **PROCESSOR MODES:** There are two modes of processor operation: master and slave. The master mode, used only by GECOS 6000, allows unrestricted access to all of core storage, permits initiation of I/O operations, and permits setting of control registers. The slave mode is used by all user programs and also by GECOS 6000 when appropriate. In the slave mode, all storage references are relative to the base address register's contents and are restricted to assigned boundaries; program execution times are limited by the timer register; and input/output and certain control operations cannot be executed.

**INTERRUPTS:** Interrupt signals are generated by conditions such as successful completion of I/O operations, I/O errors, arithmetic overflow, timer runout, attempts to reference out-of-bounds storage locations, etc. Every interrupt results in the setting of a specific interrupt cell in the System Controller. This causes the processor to take its next instruction from a predetermined storage location, which normally results in storage of the processor's status and a transfer to the appropriate interrupt servicing routine. In multiprocessor systems, a single "control" processor, determined by a manual switch setting, services all interrupts.

**CONSOLE:** The Series 6000 Master Console is a free-standing unit that provides direct communication between the operator and GECOS 6000. It permits data entry via the standard typewriter keyboard and prints computer-generated messages at 15 characters/second. A small display panel keeps the operator informed of the system's operating status. The console connects to a data channel on an I/O Multiplexer and is controlled like a peripheral subsystem. An optional Auxiliary Console, similar to the Master Console except for a different display panel, can be used to print specific types of operator messages.

**SC6000 SYSTEM CONTROL CENTER:** A free-standing console consisting of control panel, typewriter keyboard, serial printer, Operator's Interactive Display, and System Status Display. The Operator's Interactive Display is a 12-inch CRT with a data capacity of 1920 characters in 24 lines of 80 characters each; it is used in conjunction with the keyboard for interactive communication between the system and its operator. The System Status Display is used for specially formatted displays such as job status and system resource utilization; it offers all the capabilities of the basic interactive display screen. The printer provides hard copies of displayed information at a speed of 30 cps. Remote display units with 23-inch screens can be connected to either or both of the standard display screens and located up to 1000 feet from the console.

### INPUT/OUTPUT CONTROL

**CONFIGURATION RULES:** Model 6030 and 6040 systems have one Input/Output Multiplexer (IOM), while Model 6050, 6060, 6070, and 6080 systems can include from one to four IOM's. The IOM is a microprogrammed controller that coordinates all data transfer operations between peripheral subsystems and core storage. Each IOM in a Model 6030 and 6040 system has 8 data channels, expandable to a maximum of 16. Each IOM in a Model 6050, 6060, 6070, or 6080 system has 8 data channels, expandable to a maximum of 24.

Each data channel normally accommodates one peripheral device or subsystem. Dual-channel control units, which permit simultaneous read/write operations, are available for all tape and most disk subsystems. ➤

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- ▷ Model 6080 computer equipped with similar virtual memory facilities at MIT and is offering it to other users on a special-order basis.

Although it lacks the automatic error-correcting capabilities of the IBM System/370, the Series 6000 includes a number of hardware and software features that should enhance its reliability and minimize its down-time. Hardware maintenance features include programmable voltage and timing margins to convert intermittent failures into "solid" ones that can easily be located, history and fault registers to aid in diagnosing malfunctions, and the ability to simulate I/O operations without actually engaging the peripheral devices. The 16 history registers permit automatic retries of most central processor operations. The Total On-Line Testing System (TOLTS), an integral part of the GECOS 6000 operating system, performs on-line tests and diagnostics on any or all system components while normal processing continues. Moreover, the hardware modularity of Models 6050 through 6080 permits "fail-soft" configurations with two or more processors, I/O Multiplexers, and other critical components.

### PERIPHERALS AND COMMUNICATIONS

The Series 6000 offers most of the same peripheral equipment as the older Series 600. In addition, Honeywell has introduced a number of significant new devices:

- The DSS181 Disk Storage Subsystem is an effective Honeywell response to the IBM 2314/2319 subsystem, which the DSS181 outperforms in both speed of access and maximum storage capacity per subsystem. Average head positioning time is only 34 milliseconds for the DSS181, versus 60 milliseconds for the 2314/2319 drives. A DSS181 subsystem can include from 3 to 16 on-line disk drives holding from 83 to 443 million 6-bit characters, versus a maximum of 8 on-line drives holding 233 million bytes in the 2314/2319 subsystem.
- The DSS190 is a fast-access, high-capacity disk storage system whose specifications closely parallel those of the IBM 3330. A DSS190 subsystem can include up to 16 disk drives and store up to 1.46 billion 6-bit characters.
- The MTH502 and MTH505 Magnetic Tape Units read and write on 9-track tape at either 800 or 1600 bits per inch, at data transfer rates ranging from 80,000 to 266,000 characters per second. They offer most of the features of the IBM 3420 tape drives while delivering significantly more performance per dollar than the earlier Series 600 tape drives. As a result, nearly all Series 6000 systems will probably utilize the MTH 500 Series drives.
- The URC001 and URC002 Unit Record Controls, introduced in June 1972, are multifunction control ▷

- ▶ The minimum Series 6000 system configuration includes one central processor, one IOM, one console, one card reader, one card punch, one printer, one magnetic tape control and four drives, and 30 million characters of mass storage (any type).

**SIMULTANEOUS OPERATIONS:** One input or output operation on each data channel can occur simultaneously with computation in each processor. All installed processors and IOM's can operate simultaneously and independently, with interference occurring only when two or more of those units simultaneously attempt to access the same 65K-word core storage module.

**MAXIMUM I/O DATA RATES:** The maximum aggregate data rate that can be handled by each IOM is 1,300,000 characters/second in Models 6030 and 6040, 3,700,000 characters/second in Models 6050 and 6060, and 6,000,000 characters/second in Models 6070 and 6080. The optional IOM Throughput Expansion feature, for Models 6030 and 6040 only, increases the maximum IOM data rate to 2,800,000 characters/second by adding a scratchpad memory (which is standard in the larger systems).

Each standard data channel is rated at 650,000 characters/second. When a peripheral subsystem with a higher data rate is connected, Honeywell supplies a special Peripheral System Interface at no extra charge; this results in a corresponding increase in the total throughput capacity of the IOM.

### MASS STORAGE

**BULK STORE SUBSYSTEM (BSS):** The BSS, introduced in June 1972, is a high-speed data storage subsystem designed primarily for use as an auxiliary "swapping" memory to improve the throughput of input/output-bound Series 6000 systems. Storage capacities range from 1,048,576 to 33,554,432 bytes, in 1,048,576-byte increments. Cycle time is 1.5 microseconds per 16-byte (4-word) access. The BSS connects to the System Controller(s) in any Series 6000 system. Data is transferred between the BSS and main memory at a speed of over 6 million bytes/second in Models 6030 through 6060 and over 10 million bytes/second in Models 6070 and 6080. An optional dual-channel capability provides a nonsimultaneous data transfer path to a second Bulk Store Control. The BSS can serve as an intercomputer communication path among up to four separate systems, though this capability is not currently supported by software. Customer deliveries of the BSS will begin in the third quarter of 1973.

**DSS181 REMOVABLE DISK STORAGE SUBSYSTEM:** Provides fairly rapid random access to large quantities of data stored in 11-disk packs which are physically compatible with the IBM 2316 Disk Pack. The basic subsystem consists of a Microprogrammed Peripheral Controller (MPC) and three disk pack drives. A maximum of 16 drives can be connected. Each disk pack stores 27,648,000 six-bit characters in the formatted mode which is used by the standard Series 6000 software, so the total on-line capacity of a DSS181 subsystem can range from 83 million to 443 million characters. There are 200 data tracks on each of the 20 recording surfaces, and each track is divided into 18 sectors of 384 characters (64 words) each. Up to 138,240 characters (20 tracks) can be read or written at each position of the comb-type access mechanism. Average head movement time is 34 milliseconds, average rotational delay is 12.5 milliseconds, and data transfer rate is 416,000 six-bit characters per second. A second data channel of either the simultaneous or nonsimultaneous (switched) type is optional. ▶

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- ▷ units that can connect up to seven I/O devices to a single Series 6000 channel. A URC can control up to two 1050-cpm card readers, up to two 100-to-400-cpm card punches, and up to three 1100-lpm drum printers or 1150-lpm train printers.
- The PRT303 Printer uses interchangeable horizontal-train cartridges, similar to those of the IBM 1403 Model N1, to produce high-quality printing at up to 1150 lines per minute with the standard 48-character set.
  - The 765, 775, and 785 Visual Information Projection (VIP) systems are new CRT display systems that can be used with the Honeywell Series 200, 400, and 600 computers as well as with the Series 6000. Based on the widely used GE DATANET-760 terminals, they feature larger screens, faster response times, and larger display capacities than previous Honeywell CRT equipment. All three models have a 14-inch (diagonal) screen and a full alphanumeric keyboard. Types 765 and 775 display up to 1012 characters of data in 22 lines of 46 characters each, while Type 785 displays up to 2024 characters in 22 lines of 92 characters each. Type 765 transmits asynchronously at 120 characters per second (1200 bps), while Types 775 and 785 transmit synchronously at 250 or 300 characters per second (2000 or 2400 bps).

For data communications control functions, the Series 6000 buyer can choose either of two new front-end communications processors: the DATANET 305 or 355. The DATANET 355, introduced with the GE-655, is a stored-program processor capable of handling large communications loads. The DATANET 305 is a comparatively low-cost processor that will supersede the long-lived DATANET-30 in installations where the communications traffic is lighter.

### SOFTWARE AND COMPATIBILITY

All of the Series 6000 software revolves around GECOS 6000, the successor to GECOS III. GE's persistence in debugging and improving the GECOS software eventually resulted in one of the very few third-generation operating systems whose overall performance has satisfied a high proportion of its users. This proven software support is unquestionably one of the biggest advantages the Series 6000 offers to prospective users.

GECOS is designed to provide a "multi-dimensional" user environment in which local batch jobs, remotely entered batch jobs, on-line transaction processing, and time-sharing can be processed concurrently. Moreover, programs of all these types can access a single common data base. The GE-developed Integrated Data Store (I-D-S) system is a particularly useful tool for creating and managing a multi-function data base. ▷

- ▶ **DSS190 REMOVABLE DISK STORAGE SUBSYSTEM:** Provides fairly rapid random access to extremely large quantities of data stored in interchangeable 12-disk Honeywell M4050 Disk Packs. The basic subsystem consists of a controller and 2 disk pack drives and is expandable, in single-drive units, to a maximum of 16 drives. Each disk pack stores 91,400,000 six-bit characters in the formatted mode which is used by the standard Series 6000 software, so the total on-line capacity of a DSS190 subsystem can range from 183 million to 1.46 billion characters. (In the unformatted mode, each disk pack can store up to 133 million characters.) There are 404 data tracks on each of the 19 recording surfaces, and each track is divided into a maximum of 45 sectors of 384 characters (64 words) each. Up to 328,320 characters (19 tracks) can be read or written at each position of the comb-type access mechanism. Average head movement time is 30 milliseconds, average rotational delay is 8.3 milliseconds, and data transfer rate is 1,074,000 six-bit characters/second.

### INPUT/OUTPUT UNITS

**MAGNETIC TAPE UNITS:** Honeywell offers a wide range of tape drives for the Series 6000. All models read and record on standard 1/2-inch tape in IBM-compatible formats. Their data formats, tape speeds, recording densities, and data transfer rates (expressed in 6-bit characters per second) can be summarized as follows:

MTH200: 7 tracks, 37.5 ips, 200/556 bpi, 7,500/21,000 char/sec.

MTH300: 7 tracks, 37.5 ips, 200/556/800 bpi, 7,500/21,000/30,000 char/sec.

MTH201: 7 tracks, 75 ips, 200/556 bpi, 15,000/42,000 char/sec.

MTH301: 7 tracks, 75 ips, 200/556/800 bpi, 15,000/42,000/60,000 char/sec.

MTH372: 7 tracks, 150 ips, 200/556, 30,000/83,000 char/sec.

MTH373: 7 tracks, 150 ips, 200/556/800 bpi, 30,000/83,000/120,000 char/sec.

MTH402: 9 tracks, 37.5 ips, 200/556 bpi, 10,000/28,000 char/sec.

MTH403: 9 tracks, 37.5 ips, 200/556/800 bpi, 10,000/28,000/40,000 char/sec.

MTH404: 9 tracks, 75 ips, 200/556 bpi, 20,000/56,000 char/sec.

MTH405: 9 tracks, 75 ips, 200/556/800 bpi, 20,000/56,000/80,000 char/sec.

MTH492: 9 tracks, 150 ips, 200/556 bpi, 40,000/111,000 char/sec.

MTH493: 9 tracks, 150 ips, 200/556/800 bpi, 40,000/111,000/160,000 char/sec.

MTH501: 7 tracks, 75 ips, 200/556/800 bpi, 15,000/41,700/60,000 char/sec.

MTH502: 9 tracks, 75 ips, 800/1600 bpi, 80,000/160,000 char/sec. ▶

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➤ In addition to the existing Series 600 software, Honeywell has developed a number of significant new software facilities for the Series 6000. These include a full ANS COBOL compiler, a fast FORTRAN compiler that combines the facilities of the older batch and time-sharing FORTRAN compilers, new PL/1 and JOVIAL compilers, and several extensions of the GECOS operating system.

The Series 6000 is fully upward-compatible with the earlier Series 600 computers, so present Series 600 users can move up to the new line with little or no difficulty. But there is no direct program compatibility between the Series 6000 and any other Honeywell or competitive computer line.

Honeywell's Conversion Aids Programming System (CAPS) includes routines designed to aid users of the Honeywell Series 200 and 400, IBM System/360, and UNIVAC Series 70 computers in converting their COBOL programs and data files to Series 6000 formats. These routines, together with Honeywell's ANS COBOL and FORTRAN compilers and other software aids such as the Indexed-Sequential Processor, make conversion to the Series 6000 a fairly straightforward task for most COBOL- and FORTRAN-oriented installations.

### COMPETITIVE POSITION

System rentals for practical Series 6000 configurations span a wide range, from about \$20,000 to well over \$100,000 per month. Thus, the Series 6000 is competing against such impressive performers as the IBM System/370 Models 145, 158, and 168, the Burroughs B 6700, the Control Data Cyber 70 Series, and the UNIVAC 1106, 1108, and 1110.

In performance, the Honeywell Models 6040 and 6060 are closely comparable with the System/370 Models 145 and 155, respectively, and the Honeywell systems offer modest price advantages. The Model 6080 ranks considerably lower in both price and performance than the System/370 Model 165, though Honeywell expects a dual-processor Model 6080 system to outperform the Model 165.

In similar model-to-model comparisons with the other systems mentioned above, the Series 6000 computers turn out to be fully competitive in both price and performance. They lack some of the impressive technological innovations of the IBM System/370 and other recently announced equipment. But for many installations this possible drawback will be outweighed by the Series 6000's proven, efficient software and Honeywell's fully bundled support policy. After all, what really counts is still the total cost of getting the job done—and on this basis, many prospective users will find the Series 6000 hard to beat. □

➤ MTH504: 7 tracks, 125 ips, 200/556/800 bpi, 25,000/69,500/100,000 char/sec.

MTH505: 9 tracks, 125 ips, 800/1600 bpi, 133,000/266,000 char/sec.

All models use a single-capstan drive mechanism in which the tape's oxide surface touches only the read/write head. Both single-channel and dual-channel tape controllers are available. Each single-channel controller handles up to 8 tape drives, while each dual-channel controller handles up to 16 tape drives and permits simultaneous read/write operations on any 2 drives.

Most Series 6000 systems will utilize the new MTH500 series tape units. These units feature automatic tape threading, an optional cartridge loading capability, power windows, precision tape cleaners, and a radial subsystem configuration that facilitates maintenance. The 9-track MTH502 and MTH505 models offer phase-encoded recording at 1600 bpi.

**UNIT RECORD CONTROLS:** These microprogrammed control units, introduced in June 1972, connect from one to seven unit record devices to a single Series 6000 I/O channel. The Unit Record Control is available in two models: Type URC001 is physically integrated into a Series 6000 Input/Output Multiplexer (IOM), while Type URC002 is a free-standing unit. Either model can control up to two CRZ301 Card Readers (1050 cpm), up to two CPZ300 Card Punches (100 to 400 cpm), and up to three PRT203 Drum Printers (1100 lpm) or PRT303 Train Printers (1150 lpm). Either URC model can optionally be equipped with up to three additional IOM channels, which enable the unit record subsystem to be shared by up to four central systems. Honeywell believes that in most new Series 6000 orders the URC's and their associated peripheral devices will be used in preference to the older unit record devices with integrated controllers.

**CRZ201 CARD READER:** Reads 80-column cards serially by column at 900 cpm, or 51-column cards at 1200 cpm. The input hopper and normal output stacker hold 2000 cards each, and a program-selectable auxiliary stacker holds 1000 cards. Hollerith and binary cards can be read in intermixed fashion. Cards are read at two independent read stations, and the results are compared automatically. A character validity check is also performed on Hollerith cards. The CRZ201 includes an integrated control unit.

**CRZ301 CARD READER:** Reads either 80-column or 51-column cards serially by column at 1050 cpm. Connects to a URC001 or URC002 Unit Record Control. Has a 3000-card input hopper and a single 2500-card stacker. Hollerith and binary cards can be read in intermixed fashion.

**CPZ201 CARD PUNCH:** Punches 80-column cards in Hollerith or binary code at 300 cpm, with read-after-punch checking. Has a 1200-card input hopper, a 1200-card main stacker, and a 100-card reject stacker. Includes an integrated control unit.

**CPZ300 CARD PUNCH:** Punches 80-column cards in Hollerith or binary code at a speed of 100 to 400 cpm, depending upon the number of columns punched in each card. Connects to a URC001 or URC002 Unit Record Control. Has a 1600-card input hopper and a single 1600-card stacker. Mispunched cards are offset-stacked. ➤

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► **PTS200 PAPER TAPE SUBSYSTEM:** Consists of a 500-cps reader, 150-cps punch, and control unit in a free-standing cabinet. Can be used for on-line reading at 500 cps, on-line punching at 150 cps, off-line tape verification at 500 cps, or off-line tape duplication at 150 cps. Handles tape with 5, 6, 7, or 8 channels, in widths of 11/16 inch, 7/8 inch, or 1 inch. Includes tape spoolers for standard 10.5-inch reels. A plugboard provides flexibility in codes and parity checking (odd, even, or none).

**PRT201 PRINTER:** Prints at 1200 lpm using 46 contiguous characters on the rotating print drum, and at 938 lpm when all 64 characters are used. Has 132 print positions. Skipping speed is 27.5 inches/second. Handles continuous forms from 3 to 19 inches in width. Prints 6 or 8 lines per inch, with vertical format controlled by a paper tape loop and by control characters in the data. Has an integrated control unit.

**PRT203 PRINTER:** Prints at 1100 lpm using 42 contiguous characters on the rotating print drum, and at 825 lpm when all 63 characters are used. Has 132 print positions. Skipping speed is a maximum of 50 inches/second. Handles continuous forms from 4.75 to 17.75 inches in width. Vertical format is controlled by a paper tape loop. Connects to a URC001 or URC002 Unit Record Control.

**PRT300 PRINTER:** Features a horizontal-train print mechanism utilizing interchangeable train cartridges. Various character sets containing from 16 to 63 printable characters are available. Prints at 1150 lpm using a 48-character set or 1052 lpm using a 63-character set. Burst rates of up to 2500 lpm are possible for all-numeric printing. Has 136 print positions. Skipping speed is up to 70 inches/second. Handles continuous forms from 3 to 21 inches in width. Prints 6 or 8 lines per inch, with vertical format controlled by a paper tape loop and by control characters in the data. Has an integrated control unit.

**PRT303 PRINTER:** Prints at a nominal speed of 1150 lpm using a 48-character set. Uses interchangeable train cartridges, which yield high-quality printing and accurate vertical registration. Standard print trains are the PTC308, a 63-character BCD set, and the PTC303, a 94-character, upper-and-lower-case ASCII set. Other arrangements are available on special request. Printing speeds vary with the size and utilization of the character set. Has 136 print positions. Skipping speed is up to 70 inches/second. Handles continuous forms from 3 to 21 inches in width. Prints 6 or 8 lines per inch, with vertical format controlled by a paper tape loop and by control characters in the data. Connects to a URC001 or URC002 Unit Record Control.

**DES6000 DOCUMENT ENTRY SUBSYSTEM:** Permits a Series 6000 computer to accept input data from magnetically or optically encoded documents. A DES6000 subsystem consists of a DEC6000 Data Entry Controller and from one to six MRS200, DRD200, or DRD236 document handlers in various combinations.

The MRS200 MICR Reader-Sorter is a 12-pocket unit that reads and sorts up to 1200 documents per minute. The documents can vary from 5.25 to 9.0 inches in length and from 2.5 to 4.1 inches in width. The E-13B font is standard, and COC-5 code recognition is optional. Other standard features include off-line sorting, resettable document counters, sequence checking, multiple-digit selection, and zero kill.

The DRD200 COC-5 Document Reader is a 2-pocket unit that reads documents encoded in the COC-5 font at up to 1200 documents per minute. An optional Mark-Sense Module permits hand-written marks to be read optically; the marks and COC-5 data can be intermixed and read from the same side or opposite sides of a document.

The DRD236 High-Speed Document Reader reads MICR documents printed in the E-13B font at up to 1625 documents per minute. The standard 16-pocket unit is expandable in 4-pocket modules to a maximum of 32 pockets. Documents can vary from 6.0 to 9.5 inches in length and from 2.5 to 4.25 inches in width. (With an optional feature, documents as short as 4.8 inches can be read.) Off-line sorting is an optional capability.

**PSC200 PERIPHERAL SWITCH:** Permits manual switching of a peripheral system from one I/O Multiplexer to another. Can also be used to select either of two peripheral devices or subsystems connected to a single I/O channel. The basic PSC200 is a free-standing console containing one peripheral switch. Up to 15 additional switches can be added if desired.

### COMMUNICATIONS CONTROL

**DATANET 355:** An independently programmed computer designed to relieve the Series 6000 central processors of data communications control functions. Handles simultaneous communications with approximately 200 teletypewriters at 110 bps, or 32 remote batch terminals at 2400 bps, or 16 broad-band lines at 40,800 bps, or with various mixes of the three classes. Controls all interaction with remote terminals, including line control, message buffering, and code conversion. Includes either 16,384 or 32,768 18-bit words of core storage with a 1-microsecond cycle time. Has a repertoire of 98 single-address instructions. Operates in binary mode on data fields of 6, 9, 18, or 36 bits. Has 16 priority interrupt levels, each with 16 sublevels.

The DATANET 355 bypasses the Series 6000 I/O Multiplexers and connects directly to one or more System Controllers via an ICA355 Intercomputer Adapter with up to four memory ports. A maximum of three DATANET 355's can be used in a Series 6000 system. In systems equipped with dual DATANET 355 processors, an optional Line Transfer Device permits either manual or program-controlled switching of the communications lines from one DATANET 355 to another. Card readers, printers, MICR sorter-readers, disk subsystems, and a teletypewriter control console can be connected directly to the DATANET 355 if desired.

A DATANET 355 can be equipped with up to three High-Speed Line Adapters and up to six Low Speed Line Adapters. Each High-Speed Line Adapter (HLA) is a communications controller that can be equipped with up to 32 subchannels and can control up to 32 lines; both single-line and dual-line subchannels are available in various models to handle transmission speeds up to 50,000 bps in synchronous mode, 9600 bps in BSC mode, and 1800 bps in asynchronous mode. Local terminals can be connected directly to an HLA subchannel. Each Low-Speed Line Adapter (LLA) is a time-division multiplexer that can be equipped with up to 52 independent subchannels and can control up to 52 terminals operating at 110 bps or below, or 26 terminals operating at up to 150 bps, or 17 terminals operating at up to 300 bps. ►



## Honeywell Series 6000

- Terminals supported by the DATANET 355 and the associated software include the Honeywell Series 100 computers, the 765/775/785 VIP display terminals, the IBM System/360 and 370 computers and BSC-mode terminals, the GE TermiNet 300 teletypewriter, the IBM 2741, the Teletype Model 28, 33, 35, and 37 terminals, and other compatible devices. The supported codes are ASCII, EBCDIC, Baudot, and IBM Selectric.

**DATANET 305:** A stored-program communications processor designed to handle basic communications control functions (line control, message buffering, code conversion, etc.) in smaller Series 6000 systems. The DATANET 305 interfaces with the central processor via a data channel on an Input/Output Multiplexer. A maximum of two DATANET 305's can be used in a system, and they can be combined with DATANET 355 and/or DATANET 30 front-end processors. The DATANET 305 has a word length of 18 bits (or 2 bytes), a repertoire of 78 single-address instructions, and a 16,384-word core memory with a 7-microsecond cycle time; its functional specifications are very similar to those of the venerable DATANET 30.

The DATANET 305 is now offered in ten fixed system configurations. The various models are capable of controlling up to 20 low-speed asynchronous lines at up to 300 bps, up to 8 voice-grade synchronous lines at 2000 or 2400 bps, or various combinations of low-speed and voice-grade lines. The low-speed lines can accommodate GE TermiNet 300, IBM 2741, or Teletype Model 33, 35, or 37 teletypewriters, and the voice-grade lines can accommodate Honeywell Series 100 computers used as remote batch terminals or Honeywell 775 or 785 VIP display terminals.

### SOFTWARE

**GECOS 6000:** This integrated operating system is the basis for all of the Series 6000 software. Usable on all Series 6000 hardware configurations, it controls concurrent local batch processing, remote batch processing, on-line transaction processing, and time-sharing. GECOS 6000 is an improved version of the GECOS III operating system that has been performing effectively in Honeywell Series 600 installations for several years.

GECOS 6000 handles local and remote batch jobs in the same manner except for the input and output routines they use. User jobs can enter the system simultaneously from multiple local and remote peripherals. A System Scheduler can be used to classify, validate, and schedule a number of incoming job streams. Users can assign priorities to their jobs-including an option to defer processing until a later time. Each incoming job is placed in the job queue in accordance with its relative priority; for jobs without pre-assigned priorities, GECOS calculates priorities on the basis of their resource requirements.

The allocation phase of GECOS 6000 assigns peripheral equipment and core storage to each activity of a job in accordance with its priority and resource requirements. Storage is allocated in 1024-word blocks. All blocks allocated to an activity must be contiguous, and GECOS performs storage compaction operations when necessary to ensure effective storage utilization. Lower-priority jobs are "swapped" out of core storage when necessary to make room for high-priority activities. When the required storage has been allocated to it, each activity is placed in the dispatcher queue, a dynamic list of all the activities in core which are ready for execution.

All activities are executed under the supervision of the GECOS 6000 dispatcher. The dispatcher attempts to keep as many system components as possible in simultaneous use by continually transferring control to the highest-priority activity that can effectively utilize the processor and/or peripheral subsystems. All input/output operations are performed under the control of the GECOS File and Record Control routines, which provide the usual facilities for logical record processing and error handling.

The execution of an activity or job may terminate either normally or abnormally under GECOS 6000. Upon normal termination, GECOS writes an accounting record on the System Output File, itemizing the system resources used by the activity. Successive compilations of the same type are automatically run as a single activity to avoid repetitive de-allocation and re-allocation of the same system resources. Abnormal termination occurs when an activity tries to execute an illegal operation; it can be accompanied by a memory dump and/or by special abort actions specified by the programmer.

GECOS 6000 includes an output collection mechanism and an output disbursing function. The output files generated by all activities are collected within the GECOS file system and then batched on multiple printers and/or card punches. Printing and punching are performed concurrently with the processing of other jobs and entry of still other jobs into the system. GECOS can handle a maximum of 63 concurrent jobs.

GECOS 6000 is designed for use in both single-processor and multiprocessor configurations. In multiprocessor systems, the dispatcher collects activities for all processors from a single queue. All processors can execute both GECOS and user programs, but only the one designated to be the control processor responds to interrupts.

Remote access is a featured capability of GECOS 6000 in each of its processing dimensions: batch, transaction, and time-sharing. The communications control functions are performed by DATANET 305, 355, or 30 Communications Processors. Any Series 6000 program that can be entered at the central computer site can also be entered remotely via either a Series 100 batch terminal or a keyboard terminal. A Communications Mass Store Link permits remote batch terminals to communicate directly with mass storage via a DATANET 355, bypassing the central processor and main storage. A Transaction Processing System causes the submission of transactions from remote terminals to trigger the loading and execution of the appropriate application programs.

**NETWORK PROCESSING SUPERVISOR:** The Series 6000 NPS is a compatible extension of the Remote Terminal Supervisor (formerly called GERTS) used with the earlier Series 600 computers. It controls these five types of remote processing, in any combination: remote batch, transaction processing, time-sharing, message switching (NPS/355 only), and direct program access. The fully extended version, called NPS/355, runs on a Series 6000 system equipped with one or more DATANET 355 Communications Processors and a disk storage subsystem. Subsets of NPS are available for use with a DATANET 305 or DATANET 30. In each case, portions of the NPS reside in both the central processor and the communications processor. ►

## Honeywell Series 6000

► **TIME-SHARING:** The GECOS 6000 Time-Sharing System, in connection with a DATANET 305, 355, or 30 Communications Processor, provides time-sharing computing service to multiple users at remote terminals. The system resources allocated to time-sharing can be dynamically varied under operator control. The time-sharing executive, operating as a single slave activity under GECOS, suballocates storage and subdispatches the processor to the programs of individual time-sharing users. It also performs various services for the time-sharing programs, including I/O control, file creation, cataloging, storage protection, and resource accounting.

GECOS 6000 Time-Sharing users have a choice of five programming languages: Extended BASIC, FORTRAN, JOVIAL, ALGOL, and ABACUS (which causes the time-sharing terminal to function as a desk calculator). Time-sharing users can also communicate directly with batch-mode software facilities, permitting the development and testing of COBOL programs from remote terminals. A Text Editor permits terminal users to create a body of text, edit it, save it, retrieve it, and print it in a specified format. Data Query is a system that permits selective retrieval of data from a data base structured and maintained by I-D-S. The Time-Sharing Debug/Trace program facilitates analysis and debugging of time-sharing programs from remote terminals. The Time-Sharing Activity Report program provides dynamic management reports showing the status and usage of the time-sharing subsystem. An extensive library of time-sharing application programs is also available to Series 6000 users.

A time-sharing batch mode enables terminal users to create jobs, enter them in the batch job stream for processing, check their status, and receive all or part of the resulting output at their terminals. Also available to time-sharing users are a conversational debugging facility, a file inspection and maintenance facility, a conversational file management subsystem, media conversion routines, and a large library of application programs. The Time-Sharing System has an open-ended design that enables users to add commands or subsystems, or to replace the standard time-sharing executive with one of their own design.

**FILE SYSTEM:** The GECOS 6000 File System provides powerful file management capabilities, including multilevel user catalogs, file sharing, and access control. The system employs a hierarchical, "tree-structured" design. A System Master Catalog lists the various User Master Catalogs, and each user may in turn define one or more levels of subcatalogs. Users may permit general sharing of their files or specify individual users who may access them, on either a read/write or read only basis. Password access control can be imposed at any or all levels of the file structure. From the programmer's viewpoint, all file processing is performed at the logical level, with GECOS handling all physical I/O operations. If desired, users can request that their files be stored on specific types of devices. The File System will accommodate files organized under the I-D-S concept, described below.

**FILE MANAGEMENT SUPERVISOR:** FMS provides a number of new facilities to aid in the management and utilization of permanent files. It provides a variety of file protection features designed to ensure the security of critical files. FMS also permits two or more programs to access a single data base concurrently, facilitates restoration of files from backup copies, permits program testing without the creation of special test files, and provides dynamic accounting of mass storage usage.

**INTEGRATED DATA STORE:** I-D-S is a GE-developed technique for describing, creating, and managing a data base. It provides a convenient method for describing and processing complex information structures through meaningful association of the contents of the data records. This record association is achieved through the use of chains, which provide cross-reference linkages between the records. A chain contains all the information about a particular function (e.g., all the purchase order records for a specific order). Each chain contains one master record and any number of detail records. A single record may be a member of numerous chains, and a master record in one chain can be a detail record in another. A data base organized in this manner can be conveniently interrogated by all functions of the business, with each individual data item stored only once and linked to all the logically related items.

I-D-S uses a set of COBOL-like statements to describe, create, and process a data base. The I-D-S language is processor- and device-independent. It permits a single data base to reside in a mixture of random-access storage devices. I-D-S provides file protection for concurrent users of the same data base and automatically maintains a journal that provides an audit trail. A set of related utility routines facilitates initialization, loading, and unloading of the data base as well as recovery and restarting.

An I-D-S data base can be accessed from remote terminals by means of the Data Query System. Users can retrieve specific information without concerning themselves with the characteristics of the file structures. The Data Query System receives and analyzes inquiries from terminals, retrieves the requested information, and transmits the resulting output to the requesting terminal, a central-site printer, and/or a permanent file.

**INDEXED-SEQUENTIAL PROCESSOR:** ISP supports the widely used indexed-sequential file organization and access method, which permits mass-storage files to be accessed in either random or sequential fashion. For each logical file, ISP maintains a data file and an independent key file, which serves as an index. The key file may be placed on a faster random-access device to speed up the access process. ISP records are blocked into 320-word pages, and the data records within a page can be up to 256 words in length. The key field can be located anywhere in the data record and is unrestricted in length. ISP should facilitate the conversion of indexed-sequential programs written for other computer systems by making it unnecessary to redesign the associated files or data bases.

**TOTAL ON-LINE TESTING:** TOLT is an on-line test and diagnostic system that runs under GECOS 6000. Its objective is to improve the system's reliability and availability through the use of on-line preventative and corrective maintenance techniques. TOLT monitors and saves all error status information, makes periodic surveillance checks of various hardware modules, and calls in specific diagnostic tests and on-line troubleshooting programs. TOLT and GECOS 6000 are designed to take full advantage of the various maintenance facilities of the Series 6000 hardware: programmable voltage margins, programmable timing strobes, history registers, programmable channel wrap-arounds, parity and sequence checks, snapshot channel hardware, and a fault register.

The Honeywell Error Analysis and Logging System (HEALS) is a software system that works in conjunction ►

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- ▶ with TOLT, GECOS, and the Series 6000 fault recovery hardware. It manages and reports on the error monitoring, detection, logging, analysis, and recovery functions.

**COBOL:** The Series 6000 COBOL compiler is a new implementation of the full American National Standard (ANS) COBOL language. It provides the maximum level of each of the functional modules of ANS COBOL, including the Sort, Report Writer, and Segmentation facilities, as well as certain extended capabilities. Computational formats include decimal, single- and double-precision binary integer, and single- and double-precision floating point. In addition, packed decimal and ASCII data handling capabilities are provided for Models 6040, 6060, and 6080, which have the Extended Instruction Set. Extensions include an expanded COPY facility and a source-language debugging feature. The COBOL compiler operates under GECOS 6000 in a full multiprogramming environment.

**FORTRAN:** The series 6000 FORTRAN compiler is designed for operation under GECOS 6000 in local batch, remote batch, or time-sharing mode. It combines the features of the earlier GE-600 Batch and Time-Sharing FORTRAN compilers. The language is FORTRAN IV, consisting of the full American National Standard FORTRAN language plus numerous useful extensions. Among the extensions are arrays of up to seven dimensions, nonstandard returns from subroutines, multiple entry points, ENCODE and DECODE (for memory-to-memory conversions), generalized expressions, octal format conversion, NAMELIST, a PARAMETER statement, and an extended TYPE statement. The compiler offers a variety of input and output options and promises exceptionally fast compilation—up to 20,000 statements per minute.

**ALGOL:** The series 6000 ALGOL compiler operates under GECOS 6000 and permits programs to be compiled and executed in local batch, remote batch, or time-sharing mode. It encompasses the ALGOL-60 language, including recursive processing and dynamic storage allocation. Useful extensions include extended-precision real (floating-point) numbers, an extended integer division operator, debugging aids, segmentation facilities, character-handling capabilities, and a set of input/output functions for both physical and logical records.

**BASIC:** Series 6000 Extended BASIC is a fast, one-pass, conversational compiler that operates under the GECOS 6000 Time Sharing System. It implements an improved version of the easy-to-learn BASIC language. Language facilities include built-in mathematical functions, a matrix package, a string manipulator, BCD file input/output, subroutine CALL, formatted printing, and chaining.

**JOVIAL:** The Series 6000 JOVIAL compiler is an implementation of the U.S. Air Force J3 programming language as described in AFM 100-24. It runs under GECOS 6000 and permits programs to be developed and executed in time-sharing as well as local and remote batch environments. JOVIAL data formats include integer, fixed-point, floating-point, Boolean status, literal, bit-string, byte-string, characteristic, mantissa, and table entry. The JOVIAL language enables the programmer to utilize the Series 6000 machine registers, assembly-language instructions, and other specific hardware characteristics.

**PL/1:** The Series 6000 PL/1 compiler runs under GECOS 6000 on systems with at least 131K words of memory. The language conforms to the American National Standard which is currently in preparation. The full ASCII character

set is used, and the smaller Series 6000 BCD character set can also be utilized through transparency features. PL/1 programs can utilize subroutines written in other Series 6000 programming languages, and programs written in other languages can call PL/1 subprograms.

**GENERAL MACRO ASSEMBLY PROGRAM:** GMAP is a two-pass assembler that translates programs from symbolic assembly language into absolute or relocatable binary machine language. The symbolic instructions permit full utilization of the Series 6000 hardware facilities, and a large complement of pseudo-instructions provides control of location counters, symbol definition, data generation, program linkages, conditional assembly, and the assembler output. GMAP also provides facilities for defining, cataloging, and calling user-defined macros. Series 6000 GMAP operates under GECOS 6000 and is upward-compatible with Series 600 GMAP under GECOS III.

**UTILITY PROGRAMS:** Routines available for the Series 6000 include a Sort/Merge program that can utilize any combination of mass storage or magnetic tape units, a Bulk Media Conversion (BMC) program designed to handle high-volume input or output transcription functions, a System Editor that generates and maintains various types of library files, and a Utility program for copying, comparing, positioning, and printing tape or mass storage files.

The Conversion Aids Programming System (CAPS) is a library of routines designed to facilitate conversions to Series 6000 systems from Honeywell, IBM, or UNIVAC computers. COBOL program translators, tape file conversion routines, and program flow analyzers are available for Honeywell Series 200, Honeywell Series 400, IBM System/360, and UNIVAC Series 70 programs. These routines should significantly reduce the time required to convert and test COBOL programs and their associated data files. A translation routine is also available for programs written in MAP assembly language for the Series 400.

**APPLICATION PROGRAMS:** The Series 6000 application programs currently available from Honeywell include:

- Accounting and Report Generation System
- Advanced Numerical Control APT (ANC-APT)
- Bank Information System Network (BISNET)
- Biomedical Statistical Programs
- Civil Engineering Package
- dataBASIC (time-sharing data base management)
- Document Entry Subsystem
- Inventory Management System
- Linear Programming System (LP 6000)
- MATHPAC System
- Parts Explosion System
- PERT/COST
- PERT/TIME
- Production Scheduling and Control
- Proof and Transit System
- SIMSCRIPT (simulation language)
- Time-Series Forecasting Program

Also available to Series 6000 users is an extensive library of time-sharing programs in the following categories: engineering, business and finance, geometric and plotting, optimization and networks, mathematics, curve fitting and regression, statistical, demonstration, educational and tutorial, and utility and information. ▶

## Honeywell Series 6000

### ► PRICING

**EQUIPMENT:** The following configurations are typical of the Series 6000 systems that are expected to be widely installed. All are fully supported by the GECOS 6000 software. All necessary control units and features are included in the indicated prices, and the quoted prices include equipment maintenance.

**TYPICAL MODEL 6030 SYSTEM:** Consists of Model 6030 Central Processor, 98K words of core storage, I/O Multiplexer with 8 channels, console, DSS180 Disk Storage Subsystem with 6 drives (166 million characters), six MTH502 Magnetic Tape Units (80/160KC) and single-channel control, PRT300 Train Printer, CRZ201 Card Reader, and CPZ201 Card Punch. Monthly rental and purchase prices are \$24,846 and \$1,089,590, respectively.

**TYPICAL MODEL 6040 SYSTEM:** Same as above, with Model 6040 Central Processor in place of Model 6030. Monthly rental and purchase prices are \$26,211 and \$1,152,990, respectively.

**TYPICAL MODEL 6050 SYSTEM:** Consists of Model 6050 Central Processor, 196K words of core storage, I/O Multiplexer with 9 channels, System Control Center, DSS190 Disk Storage Subsystem with 4 drives (533 million characters), twelve MTH505 Magnetic Tape Units (133/266KC) and dual-channel control, two PRT300 Train Printers, two CRZ201 Card Readers, and CPZ201 Card Punch. Monthly rental and purchase prices are \$44,944 and \$1,972,990, respectively.

**TYPICAL MODEL 6060 SYSTEM:** Same as above, with Model 6060 Central Processor in place of Model 6050.

Monthly rental and purchase prices are \$46,519 and \$2,046,190, respectively.

**TYPICAL MODEL 6070 SYSTEM:** Consists of Model 6070 Central Processor, 196K words of core storage, I/O Multiplexer with 11 channels, console, DSS190 Disk Storage Subsystem with 6 drives (800 million characters), twelve MTH505 Magnetic Tape Units (133/266KC) and dual-channel control, three PRT300 Train Printers, two CRZ201 Card Readers, and CPZ201 Card Punch. Monthly rental and purchase prices are \$63,362 and \$2,794,740, respectively.

**TYPICAL MODEL 6080 SYSTEM:** Same as above, with Model 6080 Central Processor in place of Model 6070. Monthly rental and purchase prices are \$65,252 and \$2,882,540, respectively.

**SOFTWARE AND SUPPORT:** The Honeywell Series 6000 is being marketed as a fully "bundled" system. The equipment prices listed in this report include all the Honeywell software and all normal educational courses and professional assistance.

**CONTRACT TERMS:** All Series 6000 equipment is available on a 1-year, 3-year, or 5-year lease. The basic rental agreement entitles the customer to use the equipment during a Principal Period of Maintenance (PPM) consisting of the same 9 consecutive hours each day, Monday through Friday. Unlimited operation with appropriate maintenance will be provided on Monday through Friday for a premium of 50% of the basic maintenance rate. Unlimited operation with appropriate maintenance will be provided on Saturdays and/or Sundays at a premium of 20% of the basic maintenance rate for each day. Preventive maintenance will be performed outside the PPM for a premium of 10% of the basic maintenance rate. ■

## Honeywell Series 6000 EQUIPMENT PRICES

		<u>Purchase Price</u>	<u>Monthly Maint.</u>	<u>Rental (1-year lease)*</u>	<u>Rental (5-year lease)*</u>
<b>6030/6040 PROCESSORS &amp; CORE STORAGE</b>					
CS6032	6030 Central System with 65K words**	521,800	1,091	11,235	10,054
CS6033	6030 Central System with 98K words**	619,300	1,295	13,335	11,935
CS6034	6030 Central System with 131K words**	716,800	1,500	15,435	13,813
CS6042	6040 Central System with 65K words**	585,200	1,226	12,600	11,288
CS6043	6040 Central System with 98K words**	682,700	1,430	14,700	13,157
CS6044	6040 Central System with 131K words**	780,200	1,634	16,800	15,036
IC6001	Additional I/O Multiplexer Channel	14,630	31	315	278
<b>6050/6060 PROCESSORS &amp; CORE STORAGE</b>					
CS6053	6050 Central System with 98K words**	877,700	1,838	18,900	16,916
CS6054	6050 Central System with 131K words**	950,900	1,994	20,475	18,323
CS6055	6050 Central System with 163K words**	1,024,000	2,145	22,050	19,735
CS6056	6050 Central System with 196K words**	1,097,100	2,310	23,625	21,142
CS6057	6050 Central System with 229K words**	1,170,300	2,451	25,200	22,540
CS6058	6050 Central System with 262K words**	1,243,400	2,607	26,775	23,961
AM6051	Memory Extension; upgrades CS6058 to 393K words and to Extended Addressing	407,000	300	9,350	8,050
AM6052	Extends AM6051 to 524K words	359,000	250	8,250	7,125
CS6063	6060 Central System with 98K words**	950,900	1,994	20,475	18,323
CS6064	6060 Central System with 131K words**	1,024,000	2,145	22,050	19,735
CS6065	6060 Central System with 163K words**	1,097,100	2,301	23,625	21,142
CS6066	6060 Central System with 196K words**	1,170,300	2,451	25,200	22,540
CS6067	6060 Central System with 229K words**	1,243,400	2,607	26,775	23,961
CS6068	6060 Central System with 262K words**	1,316,600	2,757	28,350	25,373
AM6061	Memory Extension; upgrades CS6068 to 393K words and to Extended Addressing	407,000	300	9,350	8,050
AM6062	Extends AM6061 to 524K words	359,000	250	8,250	7,125
PM6050	Additional 6050 Central Processor	268,200	575	5,775	5,166
PM6060	Additional 6060 Central Processor	341,400	731	7,350	6,578
IM6000	Additional I/O Multiplexer with 8 channels	219,500	468	4,725	4,226
IC6001	Additional I/O Multiplexer Channel	14,630	31	315	278
PM6051	Upgrades PM6050 to Extended Addressing	12,000	0	275	235
PM6061	Upgrades PM6060 to Extended Addressing	12,000	0	275	235
IM6001	Upgrades IM6000 to Extended Addressing	19,000	0	440	380
<b>6070/6080 PROCESSORS &amp; CORE STORAGE</b>					
CS6074	6070 Central System with 131K words**	1,277,600	2,731	27,510	24,617
CS6076	6070 Central System with 196K words**	1,667,600	3,569	35,910	32,135
CS6078	6070 Central System with 262K words**	1,960,200	4,193	42,210	37,774
AM6071	Memory Extension; upgrades CS6078 to 393K words and to Extended Addressing	474,000	400	11,000	9,500
AM6072	Extends AM6071 to 524K words	383,000	300	8,800	7,600
AM6073	Additional 262K words (maximum of 2 per AM6072)	766,000	600	17,600	15,200
CS6084	6080 Central System with 131K words**	1,365,300	2,919	29,400	26,313
CS6086	6080 Central System with 196K words**	1,755,400	3,763	37,800	33,831
CS6088	6080 Central System with 262K words**	2,047,900	4,381	44,100	39,470
AM6081	Memory Extension; upgrades CS6088 to 393K words and to Extended Addressing	474,000	400	11,000	9,500
AM6082	Extends AM6081 to 524K words	383,000	300	8,800	7,600
AM6083	Additional 262K words (maximum of 2 per AM6082)	766,000	600	17,600	15,200
PM6070	Additional 6070 Central Processor	302,400	645	6,510	5,822
PM6080	Additional 6080 Central Processor	390,100	833	8,400	7,518
IM6000	Additional I/O Multiplexer with 8 channels	219,500	468	4,725	4,226
IC6001	Additional I/O Multiplexer Channel	14,630	31	315	278
PM6071	Upgrades PM6070 to Extended Addressing	14,000	0	330	285
PM6081	Upgrades PM6080 to Extended Addressing	14,000	0	330	285
IM6001	Upgrades IM6000 to Extended Addressing	19,000	0	440	380

\* Rental prices include equipment maintenance.

\*\* Central System includes Central Processor, 1 or 2 System Controllers (as required by memory size), and 1 I/O Multiplexer with 8 channels.

## Honeywell Series 6000 EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*	Rental (5-year lease)*
<b>MASS STORAGE</b>					
Bulk Store Subsystem:					
BSC001	Basic Bulk Store Control	41,800	95	1,320	1,140
BSF002	BSS System Control Port (1 required for each System Controller in the system)	3,600	5	110	95
BMC001	Memory Unit Control (maximum of 8 per BSC001)	10,800	15	330	285
BMC002	Additional Channel (connects a BMC001 to a second BSC001)	10,800	15	330	285
BMU001	Bulk Memory Unit; 1,048,576 bytes (maximum of 4 units per BMC001)	178,000	300	5,500	4,750
DSS181	Disk Storage Subsystem; 83 million chars.	101,200	350	2,392	2,142
DSU181	Disk Pack Drive; 27.6 million chars.	20,680	72	489	437
ADC181	Additional Data Channel (Switched)	8,800	30	208	187
DCH181	Dual Simultaneous Channel	44,000	152	1,040	931
DFE181	Additional Disk File Electronics	20,240	70	478	426
DSS190	Disk Storage Subsystem; 182.8 million chars.	162,800	563	3,848	3,442
DSU190	Disk Pack Drive; 91.4 million chars.	28,600	99	676	603
ADC190	Additional Data Channel (Switched)	8,800	30	208	187
DCH190	Dual Simultaneous Channel	44,000	153	1,040	931
AFE190	Additional Disk File Electronics	26,400	91	624	562
<b>INPUT/OUTPUT UNITS</b>					
7-Track Magnetic Tape Units:					
MTH200	7.5/21KC, 200/556 bpi	13,300	49	338	302
MTH300	7.5/21/30KC, 200/556/800 bpi	18,400	67	463	416
MTH201	15/42KC, 200/556 bpi	22,300	82	556	499
MTH301	15/42/60KC, 200/556/800 bpi	27,100	100	676	603
MTH372	30/83KC, 200/556 bpi	35,700	128	853	764
MTH373	30/83/120KC, 200/556/800 bpi	40,700	147	978	874
MTH501	15/42/60KC, 200/556/800 bpi	20,460	87	484	432
MTH504	25/70/100KC, 200/556/800 bpi	25,740	110	608	546
9-Track Magnetic Tape Units:					
MTH402	10/28KC, 200/556 bpi	13,300	49	338	302
MTH403	10/28/40KC, 200/556/800 bpi	18,400	67	463	416
MTH404	20/56KC, 200/556 bpi	22,300	82	556	499
MTH405	20/56/80KC, 200/556/800 bpi	27,100	100	676	603
MTH492	40/111KC, 200/556 bpi	35,700	128	853	764
MTH493	40/111/160KC, 200/556/800 bpi	40,700	147	978	874
MTH502	80/160KC, 800/1600 bpi	20,460	87	484	432
MTH505	133/266KC, 800/1600 bpi	25,740	110	608	546
Magnetic Tape Control Units:					
MTC330	7-Track, 1x8, all speeds	42,800	78	1,030	920
MTC334	7-Track, 2x16, all speeds	65,700	120	1,570	1,404
MTC400	7/9-Track, 1x8, all speeds	46,200	85	1,113	998
MTC404	7/9-Track, 2x16, all speeds	70,600	129	1,695	1,518
MTC501	9-Track, 1x8, for MTH502 & MTH505	28,600	74	676	603
MTC502	9-Track, 2x16, for MTH502 & MTH505	74,800	196	1,768	1,581
Features for MTC501 & MTC502 Tape Controls:					
ADC500	Additional Data Channel (non-simultaneous)	8,800	30	208	187
MTF503	7-Track Tape Unit Adapter (permits up to 2 MTH501 or MTH504 units on an MTC501, or up to 4 on an MTC502)	15,400	38	360	324
MTF504	Series 6000 Six-Bit to ASCII Code Translator	1,000	0	26	23
MTF505	Series 6000 Six-Bit to EBCDIC Code Translator	1,100	0	26	23
MTF506	EBCDIC to ASCII Code Translator	1,100	0	26	23
PTS200	Paper Tape Subsystem (includes 500-cps reader, 150-cps punch, and control)	39,200	215	1,082	967
CRZ201	Card Reader & Control; 900 cpm	26,800			
CPZ201	Card Punch & Control; 300 cpm	34,000			
PRT201	Printer & Control	57,700	316	1,596	1,430
PRT300	Train Printer & Control	75,090	305	1,924	1,721
	Additional Print Train Cartridge	3,090	Time & Mat'ls.	109	99
Unit Record Controls & associated I/O units:					
URC001	Integrated URC with 3 URA001 Adapters	46,000	100	1,320	1,140
URC002	Free-Standing URC with 3 URA001 Adapters	53,000	120	1,540	1,330
URF001	Additional Data Channel (maximum of 3 per URC001 or URC002)	8,800	10	220	190

\* Rental prices include equipment maintenance.

**Honeywell Series 6000  
EQUIPMENT PRICES**

		<u>Purchase Price</u>	<u>Monthly Maint.</u>	<u>Rental (1-year lease)*</u>	<u>Rental (5-year lease)*</u>
<b>INPUT/OUTPUT UNITS (continued)</b>					
URF002	Data Channel Expansion (required with second URF001)	13,200	15	330	285
URF003	Multiplexer Adapter (required if more than 4 devices are connected to a URC001 or URC002 or if PRT203 and PRT303 Printers are intermixed)	4,100	10	110	95
URA001	Additional Device Adapter (required for every device above 3 on a URC001 or URC002)	13,200	15	330	285
CRZ301	Card Reader; 1050 cpm	18,500	70	485	420
CRF301	51-Column Card Adapter (for CRZ301)	1,900	5	50	43
CRF302	ASCII Feature (for CRZ301)	7,100	22	125	105
CPZ300	Card Punch; 100-400 cpm	16,800	90	440	380
CPF302	ASCII Feature (for CPZ300)	6,000	20	110	95
PRT203	Line Printer; 1100 lpm (drum)	35,400	220	990	855
PRT303	Line Printer; 1200 lpm (train)	60,200	235	1,650	1,425
PTC308	Standard BCD Print Train (for PRT303)	3,550	5	120	109
PTC303	ASCII Print Train (for PRT303)	3,500	5	120	109
Data Entry Subsystem:					
DEC6000	Data Entry Controller	116,000	250	2,496	2,236
DHC600	Document Handler Channel for MRS200 or DRD200	4,800	5	104	94
DHC601	Document Handler Channel for DRD236	4,800	5	NA	94
ICP600	Interconnecting Port (for DEC6000; provides additional access to memory)	4,560	15	99	88
MRS200	MICR Reader-Sorter; 12 pockets, 1200 dpm	82,400	452	2,278	2,038
OPT311	Transposition Check Digit (for MRS200)	4,500	16	109	98
OPT312	Endorser Stamp Option (for MRS200)	4,640	27	120	107
BFR200	COC-5 Bar Font Recognition (for MRS200)	20,600	113	572	510
DRD200	Optical Document Reader; 1200 dpm	47,900	263	1,310	1,175
MSM200	Mark-Sense Capability (for DRD200)	4,000	23	109	98
CRM200	300-cpm Card Reader (for DRD200)	9,980	56	276	246
DRD236	MICR Reader-Sorter; 16 pockets, 1625 dpm	96,600	564	NA	1,997
236-2	Multilevel E-13B Recognition (for DRD236)	19,320	72	NA	400
236-3	Endorser (for DRD236)	10,120	65	NA	209
236-4	Expansion Unit (permits up to 16 additional pockets on DRD236)	5,060	13	NA	104
236-5	Expansion Module (4 pockets, for DRD236)	15,180	47	NA	314
CO8030	Master Console	19,800	32	463	411
CO8031	Auxiliary Console	18,600	32	426	380
ST8030	Console Storage Cabinet	1,490	2	34	31
SC6000	System Control Center	65,500	221	1,650	1,425
RD6000	Remote Display for SC6000	2,000	10	110	95
PSC200	Manual Peripheral Switch Console (includes one OPT510 switch)	7,850	15	192	172
OPT510	Manual Common Peripheral Switch Unit	1,910	3	47	42
THS200	Manual Tape Unit Switch for 37.5/75 ips Units	3,540	10	87	78
THS202	Manual Tape Unit Switch for 150 ips Units	3,540	10	87	78
<b>DATANET 355 COMMUNICATIONS PROCESSOR</b>					
SPA355	Processor, I/O Control, & 16K Memory	88,320	192	1,914	1,711
SPB355	Processor, I/O Control, & 32K Memory	146,400	318	3,172	2,839
ICA355	Intercomputer Adapter, including 1 port	11,040	35	239	213
ICP355	Additional Intercomputer Adapter Port	4,560	15	99	88
CPH355	High-Speed Common Peripheral Adapter	13,200	43	286	255
CPM355	Medium-Speed Common Peripheral Adapter	3,600	12	78	68
HDA355	High-Speed Device Adapter	10,320	33	224	198
HLA355	High-Speed Line Adapter	30,000	129	650	577
HSC351	High-Speed General-Purpose Channel with Automatic Call Unit	3,360	16	73	62
HSC355	High-Speed General-Purpose Channel	3,120	15	68	57
HSC356	Broad-Band Channel; 19,200 to 50,000 bps	4,320	14	94	83
HSA355	Two Asynchronous Channels; EIA RS-232	3,120	10	68	57
HSA357	Two Asynchronous Channels; Current Interface	2,650	9	60	50
HSC358	Asynchronous Channel; MIL Std. 188C	3,190	10	70	60
BSC355	Binary Synchronous Channel with CRC	3,920	19	85	75
HSS355	Two Synchronous Channels	3,600	12	78	68
HSS351	Two Synchronous Channels with ACU	3,800	12	83	73
LLA352	Low-Speed Line Adapter; 50, 75, 100, 200 bps	24,800	105	530	473
LLA353	Low-Speed Line Adapter; 50, 75, 110, 200 bps	24,800	105	530	473
LLA354	Low-Speed Line Adapter; 75, 110, 150, 300 bps	24,800	105	530	473

\* Rental prices include equipment maintenance.

Honeywell Series 6000  
EQUIPMENT PRICES

		<u>Purchase Price</u>	<u>Monthly Maint.</u>	<u>Rental (1-year lease)*</u>	<u>Rental (5-year lease)*</u>
<b>DATANET 355 COMMUNICATIONS PROCESSOR (continued)</b>					
LLA355	Low-Speed Line Adapter; 110, 134.5, 150, 300 bps	24,800	105	530	473
LSC351	Low-Speed Channel Package; ACU Interface	3,920	19	85	75
LSC355	Low-Speed Channel Package; EIA Interface	3,600	18	80	70
LSC357	Low-Speed Channel Package; Current Interface	2,450	12	55	45
LSC358	Low-Speed Channel Package; MIL Std. 188C	3,920	19	85	75
CMA355	Computer Monitor Adapter (required on each DATANET 355 in dual configuration)	11,000	30	260	235
PSA355	Peripheral Subsystem Adapter	13,200	43	285	255
LTD354	Line Transfer Device (for up to 6 lines)	58,140	185	1,580	1,415
LEF355	Line Expansion Function (maximum of 14 per LTD354)	7,612	18	180	165
DCA355	Direct Connect Capability — Asynchronous	440	—	10	10
DCS355	Direct Connect Capability — Synchronous	968	5	23	20
NPC355	Network Processor Control Console and Adapter	6,160	45	150	130
DHC600	Document Handler Channel for MRS200 or DRD200	4,800	5	104	94
DHC601	Document Handler Channel for DRD236	4,800	5	NA	94
<b>DATANET 305 COMMUNICATIONS PROCESSOR</b>					
DCP301	For 12 low-speed lines (up to 300 bps)	52,800	160	1,248	1,113
DCP302	For 2 synchronous lines (up to 4800 bps) for remote batch terminals	44,000	123	1,040	931
DCP303	For 12 low-speed lines (up to 300 bps), plus 2 synchronous lines (up to 4800 bps) for remote batch terminals	70,000	249	1,872	1,674
DCP304	For 20 low-speed lines (up to 300 bps)	61,000	182	1,540	1,330
DCP305	For 4 synchronous lines (up to 4800 bps) for remote batch terminals	55,000	163	1,380	1,190
DCP306	For 4 synchronous lines (up to 2400 bps) for VIP 775/785 terminals	56,100	166	1,410	1,220
DCP307	For 8 synchronous lines (up to 2400 bps) for remote batch terminals	68,100	231	1,960	1,690
DCP308	For 12 low-speed lines (up to 150 bps), plus 3 synchronous lines (up to 2400 bps) for VIP 775/785 terminals	71,000	246	2,080	1,800
DCP309	For 8 low-speed lines (up to 150 bps), 3 synchronous lines (up to 2400 bps) for remote batch terminals, and 2 synchronous lines (up to 2400 bps) for VIP 775/785 terminals	75,000	263	2,230	1,930
DCP310	For 12 low-speed lines (up to 150 bps), plus 6 synchronous lines (up to 2400 bps) for remote batch terminals	77,000	270	2,290	1,980
<b>MOTOR/GENERATORS</b>					
MG8030	31.3 KVA, 60 cycles, 208/440 volts	12,600	34	291	260
MG8031	62.6 KVA, 60 cycles, 440/480 volts	15,100	41	354	317
MG8033	62.6 KVA, 50 cycles, 380 volts	16,100	44	374	333
MG8034	62.6 KVA, 60 cycles, 208 volts	15,100	41	354	317
OPT825	Power Sequencer, 60 cycles	800	1	19	17
OPT826	Power Sequencer, 50 cycles	990	1	24	21

\* Rental prices include equipment maintenance.



## Honeywell Series 6000 EQUIPMENT PRICES

		<u>Purchase Price</u>	<u>Monthly Maint.</u>	<u>Rental (1-year lease)*</u>	<u>Rental (5-year lease)*</u>
<b>6030/6040 PROCESSORS &amp; CORE STORAGE</b>					
CS6032	6030 Central System with 65K words**	521,800	1,091	11,235	10,054
CS6033	6030 Central System with 98K words**	619,300	1,295	13,335	11,935
CS6034	6030 Central System with 131K words**	716,800	1,500	15,435	13,813
CS6042	6040 Central System with 65K words**	585,200	1,226	12,600	11,288
CS6043	6040 Central System with 98K words**	682,700	1,430	14,700	13,157
CS6044	6040 Central System with 131K words**	780,200	1,634	16,800	15,036
IC6001	Additional I/O Multiplexer Channel	14,630	31	315	278
CO8030	Master Console	19,800	32	463	411
CO8031	Auxiliary Console	18,600	32	426	380
ST8030	Console Storage Cabinet	1,490	2	34	31
<b>6050/6060 PROCESSORS &amp; CORE STORAGE</b>					
CS6053	6050 Central System with 98K words**	877,700	1,838	18,900	16,916
CS6054	6050 Central System with 131K words**	950,900	1,994	20,475	18,323
CS6055	6050 Central System with 163K words**	1,024,000	2,145	22,050	19,735
CS6056	6050 Central System with 196K words**	1,097,100	2,301	23,625	21,142
CS6057	6050 Central System with 229K words**	1,170,300	2,451	25,200	22,540
CS6058	6050 Central System with 262K words**	1,243,400	2,607	26,775	23,961
CS6063	6060 Central System with 98K words**	950,900	1,994	20,475	18,323
CS6064	6060 Central System with 131K words**	1,024,000	2,145	22,050	19,735
CS6065	6060 Central System with 163K words**	1,097,100	2,301	23,625	21,142
CS6066	6060 Central System with 196K words**	1,170,300	2,451	25,200	22,540
CS6067	6060 Central System with 229K words**	1,243,400	2,607	26,775	23,961
CS6068	6060 Central System with 262K words**	1,316,600	2,757	28,350	25,373
PM6050	Additional 6050 Central Processor	268,200	575	5,775	5,166
PM6060	Additional 6060 Central Processor	341,400	731	7,350	6,578
IM6000	Additional I/O Multiplexer with 8 channels	219,500	468	4,725	4,226
IC6001	Additional I/O Multiplexer Channel	14,630	31	315	278
CO8030	Master Console	19,800	32	463	411
CO8031	Auxiliary Console	18,600	32	426	380
ST8030	Console Storage Cabinet	1,490	2	34	31
<b>6070/6080 PROCESSORS &amp; CORE STORAGE</b>					
CS6074	6070 Central System with 131K words**	1,277,600	2,731	27,510	24,617
CS6076	6070 Central System with 196K words**	1,667,600	3,569	35,910	32,135
CS6078	6070 Central System with 262K words**	1,960,200	4,193	42,210	37,774
CS6084	6080 Central System with 131K words**	1,365,300	2,919	29,400	26,313
CS6086	6080 Central System with 196K words**	1,755,400	3,763	37,800	33,831
CS6088	6080 Central System with 262K words**	2,047,900	4,381	44,100	39,470
PM6070	Additional 6070 Central Processor	302,400	645	6,510	5,822
PM6080	Additional 6080 Central Processor	390,100	833	8,400	7,518
IM6000	Additional I/O Multiplexer with 8 channels	219,500	468	4,725	4,226
IC6001	Additional I/O Multiplexer Channel	14,630	31	315	278
CO8030	Master Console	19,800	32	463	411
CP8031	Auxiliary Console	18,600	32	426	380
ST8030	Console Storage Cabinet	1,490	2	34	31
<b>MASS STORAGE</b>					
DSS167	Removable Disk Subsystem; 90 million chars.	140,200	424	3,484	3,120
ADU167	Additional Disk Unit; 30 million chars.	29,700	90	738	660
ADC167	Additional Data Channel (Switched)	8,480	16	203	182
DFF167	Data File Protect (required on DSS167)	2,390	4	57	52
STC167	Stack Command (required on DSS167)	750	1	17	15
DSS170	Removable Disk Subsystem; 220 million chars.	264,100	797	6,198	5,548
CH0011	High-Speed File Channel (required for DSS170)	41,300	80	822	733
DSS180	Disk Storage Subsystem; 83 million chars.	101,200	350	2,392	2,142
DSU180	Disk Pack Drive; 27.6 million chars.	20,680	72	489	437
ADC180	Additional Data Channel (Switched)	8,800	30	208	187
DCH180	Dual Simultaneous Channel	44,000	152	1,040	931
DFE180	Additional Disk File Electronics	20,240	70	478	426
DSS190	Disk Storage Subsystem; 266 million chars.	162,800	563	3,848	3,442
DSU190	Disk Pack Drive; 133 million chars.	28,600	99	676	603
ADC190	Additional Data Channel (Switched)	8,800	30	208	187
DCH190	Dual Simultaneous Channel	44,000	153	1,040	931
AFE190	Additional Disk File Electronics	26,400	91	624	562
DSU270	Disk File Unit; 15.3 million chars.	26,000	138	931	832
DFE270	Disk File Electronics Unit	25,000	59	712	640
DSC270	Disk Storage Control	45,000	101	1,310	1,175
ADC270	Additional Data Channel, Simultaneous	15,000	34	437	390

\* Rental prices include equipment maintenance.

\*\* Central System includes Central Processor, 1 or 2 System Controllers (as required by memory size), and 1 I/O Multiplexer with 8 channels.

Honeywell Series 6000  
EQUIPMENT PRICES

		<u>Purchase Price</u>	<u>Monthly Maint.</u>	<u>Rental (1-year lease)*</u>	<u>Rental (5-year lease)*</u>
<b>INPUT/OUTPUT UNITS</b>					
7-Track Magnetic Tape Units:					
MTH200	7.5/21KC, 200/556 bpi	13,300	49	338	302
MTH300	7.5/21/30KC, 200/556/800 bpi	18,400	67	463	416
MTH201	15/42KC, 200/556 bpi	22,300	82	556	499
MTH301	15/42/60KC, 200/556/800 bpi	27,100	100	676	603
MTH372	30/83KC, 200/556 bpi	35,700	128	853	764
MTH373	30/83/120KC, 200/556/800 bpi	40,700	147	978	874
9-Track Magnetic Tape Units:					
MTH402	10/28KC, 200/556 bpi	13,300	49	338	302
MTH403	10/28/40KC, 200/556/800 bpi	18,400	67	463	416
MTH404	20/56KC, 200/556 bpi	22,300	82	556	499
MTH405	20/56/80KC, 200/556/800 bpi	27,100	100	676	603
MTH492	40/111KC, 200/556 bpi	35,700	128	853	764
MTH493	40/111/160KC, 200/556/800 bpi	40,700	147	978	874
MTH502	80/160KC, 800/1600 bpi	20,460	87	484	432
MTH505	133/266KC, 800/1600 bpi	25,740	110	608	546
Magnetic Tape Control Units:					
MTC330	7-Track, 1x8, all speeds	42,800	78	1,030	920
MTC334	7-Track, 2x16, all speeds	65,700	120	1,570	1,404
MTC400	7/9-Track, 1x8, all speeds	46,200	85	1,113	998
MTC404	7/9-Track, 2x16, all speeds	70,600	129	1,695	1,518
MTC501	9-Track, 1x8, for MTH502 & MTH505	28,600	74	676	603
MTC502	9-Track, 2x16, for MTH502 & MTH505	74,800	196	1,768	1,581
CRZ201	Card Reader & Control; 900 cpm	26,800			
CPZ201	Card Punch & Control; 300 cpm	34,000			
PRT201	Printer & Control	57,700	316	1,596	1,430
PRT300	Train Printer & Control	75,090	305	1,924	1,721
	Additional Print Train Cartridge	3,090	Time & Mat'ls.	109	99
PSC200	Manual Peripheral Switch Console (includes one OPT510 switch)	7,850	15	192	172
OPT510	Manual Common Peripheral Switch Unit	1,910	3	47	42
THS200	Manual Tape Unit Switch for 37.5/75 ips Units	3,540	10	87	78
THS202	Manual Tape Unit Switch for 150 ips Units	3,540	10	87	78
<b>DATANET 355 COMMUNICATIONS PROCESSOR</b>					
SPA355	Processor, I/O Control, & 16K Memory	88,320	192	1,914	1,711
SPB355	Processor, I/O Control, & 32K Memory	146,400	318	3,172	2,839
ICA355	Intercomputer Adapter, including 1 port	11,040	35	239	213
ICP355	Additional Intercomputer Adapter Port	4,560	15	99	88
CPH355	High-Speed Common Peripheral Adapter	13,200	43	286	255
CPM355	Medium-Speed Common Peripheral Adapter	3,600	12	78	68
HDA355	High-Speed Device Adapter	10,320	33	224	198
HLA355	High-Speed Line Adapter	30,000	129	650	577
HSC351	High-Speed General-Purpose Channel with Automatic Call Unit	3,360	16	73	62
HSC355	High-Speed General-Purpose Channel	3,120	15	68	57
HSC356	Broad-Band Channel	4,320	14	94	83
HSA355	Two Asynchronous Channels; 110 to 1800 bps	3,120	10	68	57
HSS355	Two Synchronous Channels; 2000 to 9600 bps	3,600	12	78	68
HSS351	Two Synchronous Channels; with Automatic Call Unit on one; 2000 to 9600 bps	3,800	12	83	73
LLA355	Low-Speed Line Adapter	24,480	105	530	473
LSC355	Four Low-Speed Channels; 110 to 300 bps	3,600	18	78	68
<b>DATANET 305 COMMUNICATIONS PROCESSOR</b>					
DCP301	12 Low-Speed Communication Lines	52,800	160	1,248	1,113
DCP302	2 Medium-Speed Communication Lines	44,000	123	1,040	931
DCP303	12 Low-Speed and 2 Medium-Speed Communication Lines	79,200	249	1,872	1,674
<b>MOTOR/GENERATORS</b>					
MG8030	31.3 KVA, 60 cycles, 208/440 volts	12,600	34	291	260
MG8031	62.6 KVA, 60 cycles, 440/480 volts	15,100	41	354	317
MG8033	62.6 KVA, 50 cycles, 380 volts	16,100	44	374	333
MG8034	62.6 KVA, 60 cycles, 208 volts	15,100	41	354	317
OPT825	Power Sequencer, 60 cycles	800	1	19	17
OPT826	Power Sequencer, 50 cycles	990	1	24	21

\* Rental prices include equipment maintenance.

NOTE: This price list reflects the increases of 4% or 5% in monthly rental prices, 7.5% in maintenance charges, and 6% in mainframe purchase prices which became effective on December 15, 1971.