Honeywell DPS 7 Series

MANAGEMENT SUMMARY

UPDATE: *As part of several price/performance adjustments to its DPS 7 line of medium-scale processors, Honeywell introduced a new DPS 7/40E entry-level model while dropping two existing bottom-end models, the DPS 7/35E and the DPS 7/45E. Honeywell also cut prices on the remaining DPS 7/55E and 7/65E models and introduced new disk, printer, and communications processor products. Additionally, the vendor introduced enhancements to the new GCOS 7 operating system while continuing to phase out the previous GCOS 64 operating system.*

The new DPS 7/40E features from two to six megabytes of main memory and two to four I/O channels and sells for $89,000. The new model is said to have 1.25 times the performance of the DPS 7/35E and two times the starting memory size. The DPS 7/35E was offered with one megabyte of memory, while the 7/40E comes with two megabytes. The 7/40E, which replaces the 7/35E and 7/45E models in the line, was announced in March 1986 and first delivered in April 1986.

While the DPS 7/55E and 7/65E remained essentially unchanged, Honeywell did reduce its purchase prices. The 7/55E was reduced from $158,800 to $120,000, and the 7/65E was reduced from $215,700 to $160,000. Honeywell rolled back prices in response to price cuts implemented by Groupe Bull, the French computer firm which manufactures the systems and distributes them in the U.S. through Honeywell, a vendor with which Bull has enjoyed a long-time collaboration. A Honeywell spokesperson said the price reductions were announced partly in response to a flat market, but more probably because Bull has been able to lower production costs.

The 7/55E features two to eight megabytes of main memory and four to six I/O channels. The 7/65E features two to ▷

The Honeywell DPS 7 Series medium-size systems have been designed primarily to serve as either host processors or remote satellite processors in a distributed processing environment. These systems offer a growth path for Level 62 and Level 64 users, and a hardware/software platform for Honeywell's Manufacturing System (HMS 7).

MODELS: DPS 7/40E, 7/55E, and 7/65E.
CONFIGURATION: From 2 to 8MB of memory and from 2 to 8 I/O channels.
COMPETITION: Burroughs B 3900 and Burroughs V Series; IBM System/38 and 4300 Series; NCR V-8500 Series; and Sperry System 80.
PRICE: Purchase prices range from $89,000 to $160,000.

CHARACTERISTICS

MANUFACTURER: Honeywell Information Systems, Inc., 200 Smith Street, Waltham, Massachusetts 02154. Telephone (617) 895-6000.

MODELS: DPS 7/40E, 7/55E, and 7/65E.

DATA FORMATS

BASIC UNIT: 8-bit byte plus one parity bit. The data paths are four bytes (32 bits) wide. Data can be interpreted as binary, decimal, hexadecimal, or alphanumeric.

FIXED-POINT OPERANDS: Data bits are interpreted in groups of four (packed or unpacked decimal data) or eight (alphanumeric EBCDIC), or in strings of between 16 and 64 (binary digits). The strings can be interpreted as signed for fixed-point binary numbers.

The new DPS 7/40E entry-level model features two to six megabytes of main memory, two to four I/O channels, a CRT console and keyboard, a Service and Unit Record Processor, and a maintenance diskette. It also supports a variety of peripheral devices.

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eight megabytes of memory and four to eight I/O channels. Last year, Honeywell started shipping memory expansion modules using 256K-bit chip MOS memory technology. Generally, users planning to expand main memories beyond the four- megabyte level will be supplied with the denser 256K-bit chips. All new shipments of DPS 7E processors are also outfitted with the 256K-bit chips. Older models shipped before last year still use the 64K-bit chips. Each model can be field upgraded to the power level and capacity of any of the larger models.

The new fixed disk subsystem includes the MSP4370 mass storage processor and the MSU1007 fixed disk unit. The MSU1007, supplied through Magnetic Peripherals Inc., contains two 515-megabyte capacity fixed-disk packs which can each be accessed individually by direct attachment to a mass storage processor. Total unformatted capacity per unit exceeds one gigabyte.

Average MSU1007 access time is 28.3 milliseconds and the data transfer rate is 1.8 megabytes per second. Other Honeywell disk products offered for the DPS 7 line have comparatively slower transfer rates and seek times. (Refer to Table 2.) The MSP4370 mass storage processor has addressing for eight MSU1007s expandable to 16.

Two belt printers introduced during fall 1985 include the PRU0909 and the PRU1209. The PRU0909 prints a 136-column line at 900 lines per minute (lpm) and the PRU1209 prints a 136-column line at 1200 lpm. Both speeds are based on a 63-character-set print belt.

New front-end communications processors also announced during fall 1985 include the DATANET 8/10, 8/20, and 8/30. The 8/10 features one megabyte of main memory expandable to two megabytes and supports up to 31 data communications lines; the 8/20 features a cache memory, has one megabyte of main memory expandable to two megabytes, and supports 31 to 127 lines; the 8/30 features a cache memory, includes two megabytes of memory expandable to four megabytes, and supports 159 to 255 lines. These lines can support synchronous, asynchronous, and HDLC (High-Level Data Link Control) communications.

The major enhancement to the processor line occurred a year ago when Honeywell began shipping DPS 7 models with the new GCOS 7 operating system. Unlike GCOS 64, the operating system it replaces, GCOS 7 is a menu-driven operating system with built-in user-friendly features such as prompts and Help facilities. It's designed for users throughout an organization whose level of computer training and experience can vary. According to Honeywell, the menu features will make inexperienced computer users productive in a short time while more experienced users can bypass some of the user-friendly features to achieve even greater productivity. GCOS 7 is a multitasking, virtual storage operating system that supports interactive and batch processing in centralized and distributed environments. Honeywell hopes to move most if not all of the entire DPS 7 user base to the new GCOS 7 version before the end of 1986.

FLOATING-POINT OPERANDS: Data can be represented as floating-point operands with single- (16-bit) or double- (32-bit) precision formats.

INSTRUCTIONS: The DPS 7 instruction repertoire consists of 221 instructions, including operations for address computations, and arithmetic instructions for performing fixed- and floating-point decimal and binary operations on packed or unpacked data. Operands can be binary, fixed- or floating-point, or decimal in packed or unpacked format; bytes; byte strings; or bit strings. In addition, the microcode can include the Series 200/2000 "Program Mode" option, and execute the Series 200/2000 instruction set.

INTERNAL CODE: EBCDIC.

MAIN STORAGE

Memory is organized into consecutively numbered byte locations. Four-byte blocks are always accessed regardless of operand size. Half-word (16-bit) operands must begin on even-numbered byte locations, and full-word (32-bit) and double-word (64-bit) operands must begin on byte locations divisible by four.

STORAGE TYPE: 64K-bit or 256K-bit MOS chips. Current Mode Logic (CML), a fast, low-power, low-heat technology, is used. CML has a propagation time of one nanosecond per logic port. In addition, the DPS 7 uses a multilayer micropackaging technique that allows 10,000 to 15,000 functions per board.

CAPACITY: See Table 1.

CYCLE TIME: See Table 1.

CHECKING: Each item of data stored in memory units and in control store is accompanied by a Hamming code (seven bits for every four data bytes) which permits the correction of single-bit errors and the detection of double-bit errors. Data paths, and particularly, the bus perform parity checks to ensure data integrity. All registers and calculation circuits include a key check.

RESERVED STORAGE: The DPS 7 protects every segment individually with an automatic system of rings and protection levels. This protection system, implemented by hardware and firmware, protects segments on the basis of the information they contain rather than their physical location.

The main processor, while executing a process, may be at one of four levels of privilege, called "rings." Rings are numbered from zero to three, with zero being the most privileged. A ring number is allocated to each segment when it is created and, when the process is entered, the main processor adopts this ring number. Each segment is allocated three protection levels, one for each possible use: read, write, or execute. Each level can be anywhere within the range of zero to three. At every reference to an address in a segment, the protection level for the relevant type of use is checked against the current ring number of the main processor. Access is only allowed under the following conditions: for read and write access, the ring number is less than or equal to the protection level; for execute access, the ring number is within the range between the write and execute protection levels. At linking time, the programmer specifies protection levels; this feature controls access to process segments from other active programs.

CENTRAL PROCESSORS

The three DPS 7 processor complexes are microprogrammed units built around a multiprocessor configuration involving the CPU, peripheral processors, and network

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TABLE 1. SYSTEM COMPARISON

MODEL	DPS 7/40E	DPS 7/55E	DPS 7/65E
SYSTEM CHARACTERISTICS			
Date announced	March 1986	November 1983	November 1983
Date first delivered	April 1986	January 1984	January 1984
Field upgradable to	7/55E, 65E	7/65E	—
Relative performance	1.00	1.58	2.34
Number of processors	1	1	1
Cycle time, nanoseconds	360	240	140
Word size, bits	32	32	32
Operating systems	GCOS 7, GCOS 64	GCOS 7, GCOS 64	GCOS 7, GCOS 64
MAIN MEMORY			
Type	64K-bit or 256K-bit MOS	64K-bit or 256K-bit MOS	64K-bit or 256K-bit MOS
Minimum capacity, bytes	2MB	2MB	2MB
Maximum capacity, bytes	6MB	8MB	8MB
Increment size, increment	1 or 2MB	1 or 2MB	1 or 2MB
Cycle time, nanoseconds	355 read, 290 write	355 read, 290 write	355 read, 290 write
BUFFER STORAGE			
Minimum capacity	Not applicable	Not applicable	Not applicable
Maximum capacity	Not applicable	Not applicable	Not applicable
Increment size	—	—	—
INPUT/OUTPUT CONTROL			
Number of channels:			
Byte multiplexer	—	—	—
Block multiplexer	—	—	—
Word	—	—	—
Other	2-4	4-6	4-8

▷ On the applications software side, Honeywell introduced packages that cater to users within the manufacturing sector. Manufacturing customers now make up 35 percent of the DPS 7 user base. In April, Honeywell's Manufacturing Systems Division announced packages specifically for the DPS 7 line that were incorporated in Honeywell Manufacturing System 7 (HMS 7), the firm's flagship MRP II product for manufacturing planning and control.

The DPS 7 Series is based on a similar product developed in France by Groupe Bull (formerly Cii Honeywell Bull). In 1984, Honeywell announced and began delivering revised versions of the DPS 7 and affixed an "E" at the end of each model designation. The "E" models are nearly identical in functionality and appearance to the earlier DPS 7 models. In 1984, it became possible to directly attach selected Level 62 mass storage units to assist Level 62 users in their migration to the DPS 7.

DPS 7 systems are networks of specialized processors that operate simultaneously, and are composed of seven processing elements, a control store, and a processor bus. This processing "system" is connected with the central bus, which also services main memory and the input/output processors. Major system functions such as task management, addressing, and data protection are implemented in firmware, providing a further performance boost. Peripheral devices are connected to the I/O processors, which have their own control stores, logic units, and main memories. Each peripheral subsystem (processor and devices) is then connected to the CPU via a high-speed I/O channel. This distributed architecture enables various subsystems to operate simultaneously without tying up the main processor.

A variety of I/O configurations is possible with the DPS 7. Each processor has an integrated Service and Unit Record ▷

▶ processor. The work load is distributed among these three elements to provide simultaneous processing and data transfer. Current mode logic (CML) technology is used extensively in CPU and input/output controller logic circuits and is said to provide faster gate speeds and less power consumption than comparable emitter-coupled logic (ECL) or transistor-transistor logic (TTL) circuits.

DPS 7 central processors are in turn composed of seven subunits, a control store, and a high-speed processor bus. This processing "system" is connected to the central bus, which also services main memory and the input/output processors. Peripheral devices are connected to the I/O processors, which have their own control stores and main memories, which in turn are connected to the CPU via high-speed channels. This distributed architecture enables various subsystems to operate simultaneously without tying up the main processor.

The seven components in the CPU include:

- **Pilot Machine (PIM):** The PIM retrieves microinstruction sequences from the control store and routes them to the appropriate subunits. Microprograms are composed of two or more 32-bit words, each protected by four parity bits.

- **Address Calculation Machine (ACM):** The ACM handles all address translations, includes the base registers and an associative memory that stores up to eight segment addresses, and also handles data protection by checking rings under GCOS.

- **Data and Instruction Management Machine (DIM):** The DIM provides the interface between the main memory and the other processor units and includes a 32-byte look-ahead feature that allows it to begin interpreting another instruction while a previous instruction is still being executed.

- **Arithmetic and Logic Machine (ALM):** The ALM includes the data registers and executes fixed-point, decimal, and logic operations. ▶

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Processor (SURP) that can handle five unit record devices (with an option for five more on an additional URP) and two optional communications modules that provide six communications lines each. Up to 21 billion bytes of on-line storage can be configured using separate mass storage processors and four different disk subsystems, including the new ultracompact, one-gigabyte, fixed media, dual-spindle unit, the MSU1007. As many as 16 tape drives can be connected to the DPS 7 via magnetic tape processors. From one to four additional tape units can be attached using a new tape adapter. The DATANET 8 family of front-end processors can be used with the DPS 7 to develop distributed networks that conform to Honeywell's Distributed Systems Architecture (DSA). Up to 255 communications lines can be connected this way.

The DPS 7 systems have been designed to play a key role in Honeywell's Distributed Systems Environment (DSE), where computer power is either centralized or distributed to remote locations as needed by the individual organization. The layered data communications framework which manages the operation of these networks is called the Distributed Systems Architecture (DSA). The various DPS 7 systems are targeted either as host processors or remote satellite processors in a larger network. The DA-TANET 8 communications processors, which control all activities in a DSA network, can be added to any DPS 7 system. Additional remote processors, such as Honeywell's DPS 6 minicomputer, round out the implementation of the DSE.

COMPETITIVE POSITION

Honeywell markets its medium-size DPS 7 line in a volatile segment of the computer world populated by minis, superminis, and small mainframes of all stripes with no single player clearly dominating. The tough guy on the block, however, continues to be IBM and its trusty System/38. Other systems competing with the DPS 7 include the IBM 4361 at the high end, the Burroughs B 3900, the new Burroughs V Series at the low end, and the bottom end of the NCR V-8500 Series. Additional competitors may include the odd assortment of mini vendors competing against the System/38, such as Data General, Digital Equipment Corporation, and Hewlett-Packard. Just the same, Honeywell believes its main competition continues to come from IBM.

While Honeywell introduced a new higher performing, entry-level processor for this market, IBM has been pelting the computer world with new System/36 and/38 products that offer price/performance advantages at the mini level. At the supermini level, IBM has been busy revamping 4300-level processors while also cutting prices. The announcement of six new aggressively priced System/38 models last June confirmed that the seven-year-old IBM mid-range line was still very much alive and has a future. Honeywell announced its new entry-level model and price cuts for existing processors shortly before the System/38 announcements.

- **Scientific Calculation Machine (SCM):** The SCM executes floating-point operations.

- **Timer:** Using the main clock as a reference, the timer transmits a master frequency along the processor bus and also provides various types of information, such as real-time, elapsed time, and process time.

- **Maintenance Interface Machine (MIM):** The MIM provides the interface between the main processor and the service processor for system initialization and testing.

SPECIAL FEATURES: *Control Store* contains firmware held in 32-bit words. Each word contains up to five instructions to be executed by the seven subunits during a single cycle. The sequencing of firmware instructions is controlled by the pilot machine. Up to five microinstructions can be executed simultaneously by the subunits.

The control store of the main processor is implemented in firmware and normally contains 12K words (but can have up to 24K words) enabling the execution of the Series 200/2000 instruction set.

Firmware is also used in the DPS 7 to perform functions traditionally performed by software. These include task management, procedure calls, and data protection.

The main processor is capable of recognizing and controlling a task, a unit of a program more significant than a single instruction. A task is a sequence of interdependent instructions. A program can comprise a number of tasks, each able to execute in parallel with the others (multitasking). This parallel execution of tasks requires a dispatching mechanism. On traditional machines, this mechanism required software intervention. On the DPS 7, it is a built-in firmware function of the main processor.

The DPS 7 uses firmware-controlled semaphores to interpret external events such as physical input/output termination, peripheral interrupts, operator interrupts, and messages from terminals. Using semaphores, it also synchronizes the execution of competing processes, passes messages between processes, and controls competing demands for system services.

A semaphore is a group of words containing a counter and a pointer to an associated queue. When the semaphore counter is negative, all the resources associated with it are busy and processes are awaiting completion. When the counter is positive, all processes are satisfied and resources are free. When the counter is zero, all resources are busy but no processes are waiting. This mechanism can be used in any situation involving processes waiting for the completion of any operation. In light of the semaphore approach, there are no interrupts as such. Any hardware or software event is handled through semaphores, combined with a masking feature used when high-priority events occur.

The DPS 7 systems use eight 32-bit Base Registers for internal address computation, sixteen 32-bit General Registers for data handling and indexing, four 64-bit Scientific Registers for floating-point data handling, one 32-bit Stack Register pointing to the stack associated with the running process, and one 28-bit Boundary Address Register holding the lowest absolute main memory address accessible by software.

Running under GCOS, the relative addressing mechanism is based on segmentation and its aim is to make optimum use of memory space. Each program running under GCOS on the DPS 7 is executed as a collection of fully relocatable segments. A segment may reside in different places. As a program is being executed, its constituent segments may be moved around memory to make room for other programs,

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▷ The DPS 7 line features two to eight megabytes of main memory and ranges in price from $89,000 for the entry-level model to $160,000 for the top-end model. The new System/38 Series features two to 32 megabytes of main memory and ranges in price from $37,500 for the entry-level version to $385,490 for a fully configured, top-of-the-line model. The new Burroughs V 310-1 has five megabytes of main memory and sells for $160,000, while the V 310-2 has 10 megabytes of main memory and sells for $210,000. Main memory for both processors can be expanded to up to 20 megabytes in five-megabyte increments. The Burroughs B 3900, featuring between two and five megabytes of main memory, sells for $120,000.

To compete effectively against IBM, vendors such as Honeywell, Burroughs, and NCR continue to cultivate their long-established niche markets. In April, Honeywell's Manufacturing Division announced four packaged systems for the DPS 7 operating under GCOS 7 to enhance productivity in manufacturing environments, a substantial portion of the DPS 7 user base. Honeywell has also made inroads within hospital and medical environments, an area Burroughs has also successfully cultivated. A third DPS 7 marketing area continues to be government and public sector accounts. With the announcement of new V processors, Burroughs also brought out products for its banking and financial customers. These included an off-load reader/sorter data link processor that lets V Series, B 3900, and B 4900 mainframes communicate with up to nine remote document processing centers.

ADVANTAGES AND RESTRICTIONS

Within the last few years Honeywell has been refashioning its medium-size processor line and increasing its appeal. In 1985, the vendor began delivering the new GCOS 7 operating system. This latest version of the operating system is in many ways a response to the more flexible role computer systems are playing in many organizations. The greater use of transaction processing lets more users with varying levels of experience access the central computer system. Menus, prompts, and Help facilities let non-data processing professionals become familiar with the components and capabilities of the operating system more quickly. In March 1986, Honeywell released Integrated Query System (IQS), a menu-oriented, fourth-generation inquiry and development tool. Of course, the use of such user-friendly features also increases the amount of memory space the operating system must occupy. In this regard, GCOS 7 is no exception. How much additional memory will be required to accommodate the new operating system depends on existing memory size, job mix, and applications. Highly interactive environments making use of the additional user-friendly features will probably have to add some additional memory.

The switch to GCOS 7 from GCOS 64 Release 0501 should be easy to accomplish, at least according to Honeywell. GCOS 7 is fully compatible with GCOS 64, making it possible for users of the current release of GCOS 64 to migrate to GCOS 7 without any conversion. ▷

▶ and, at a given point in time, some of its segments may even be temporarily removed from memory and placed on disk.

To avoid having to split a frequently used routine between two segments, segments can vary in size. Machine instructions used in the GCOS environment refer to segment-relative addresses, without reference to the physical location of the referenced operand. The absolute address is calculated as the instruction is executed using a segment descriptor and a displacement within the segment. High-speed registers assist in address development.

PHYSICAL SPECIFICATIONS: The DPS 7 processors require operating conditions of 68 to 78 degrees Fahrenheit with a noncondensing relative humidity of 45 to 55 percent. The power source must be two-phase, 208 volts ±10 percent at 60 Hz ±0.05 Hz. The CPU cabinet set measures 54.3 inches wide, 33.5 inches deep, and 33.5 inches high, and weighs 838 pounds. Heat output is 17,000 Btu/hour.

CONFIGURATION RULES

A basic DPS 7 system includes two megabytes of MOS memory, expandable in one- or two-megabyte modules to up to four megabytes. Those systems operating at the four-megabyte level add memory in two-megabyte increments (CMM4721). Also included are two or four channels, CRT console and keyboard, maintenance diskette, Service and Unit Record Processor (SURP), and Remote Maintenance Adapter. Each model can connect up to two DCC4270 Data Communications Controllers, which support up to 12 synchronous or asynchronous lines. All models can connect one or two DATANET 8 Front-end Network Processors for up to 255 communications lines. An additional Unit Record Processor can be attached to the DPS 7/55E and 7/65E that can connect up to five additional unit record devices. The 7/40E can support one MTP4275 Magnetic Tape Processor (MTP) and up to eight tape drives. The 7/55E and 7/65E can have two MTPs and up to 16 tapes. Disk storage is supported through one to four MSP4370, MSP4575, or MSP4270 Mass Storage Processors, or one to four MSS4979 Mass Storage Subsystems. The maximum number of spindles on DPS 7 systems ranges from 18 (DPS 7/40E) to 36 (DPS 7/65E) with a maximum on-line storage capacity of 20.8 billion bytes on the DPS 7/65E.

INPUT/OUTPUT CONTROL

High-speed channels are provided with each DPS 7 processor. Channel throughput is rated at 1.25 megabytes per second, although bursts of up to 1.81 megabytes per second are possible. The DPS 7/40E has two channels expandable to four; the DPS 7/55E has four channels expandable to six; and the DPS 7/65E has four channels expandable to eight. A basic DPS 7 consists of a single central processor, a mass storage processor, and an integrated Service and Unit Record Processor.

DPS 7 systems support four types of peripheral processors: unit record, mass storage, tape, and network. The integrated unit record processor supports the system console, card units, printers, diskette drives, and optionally, a DCC4270 or DCC4271 communications controller. Each peripheral processor contains its own arithmetic and logic unit, read/write memory, and read-only memory and is attached to the central system through a high-speed channel. Each processor has its own read/write memory as well as an arithmetic and logic unit. In full independence, it executes commands sent to it by the central processor. The first three processor types are microprogrammed and contain a special connection which allows the maintenance processor to check operations and diagnose errors. The network processor is programmed and has its own means of detecting faults. ▶

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TABLE 2. MASS STORAGE

MODEL	MSU0390	MSU0402	MSU0452	MSU0555	MSS4979	MSU1007
Cabinets per subsystem	1	1	1	1	3	1-4
Disk packs/HDAs per cabinet	1	1	1	2	3	2
Capacity	300MB	100MB	200MB	1200MB per drive	900MB	1000MB per unit
Tracks/segments per drive unit	Not specified	Not specified	Not specified	Not specified	Not specified	Not specified
Average seek time, msec.	25	25	25	25	25	20
Average access time, msec.	33.3	33.3	33.3	33.3	33.3	28.3
Average rotational delay, msec.	8.3	8.3	8.3	8.3	8.3	8.3
Data transfer rate	1,200,000 bytes/sec.	806,000 bytes/sec.	806,000 bytes/sec.	1,065,000 bytes/sec.	1,200,000 bytes/sec.	1,810,000 bytes/sec.
Controller model	MSP4270	MSP4575	MSP4575	MSP4575	Includes mass storage processor	MSP4370
Comments	Removable	Removable	Removable	Fixed	Removable	Fixed

▷ Honeywell has positioned the DPS 7 to provide an upward-compatible growth path for Level 62, Level 64, and Series 200/2000 users. The use of current mode logic (CML) technology and an improved packaging technique reportedly doubles the DPS 7's performance over the earlier Level 64/DPS-330 while reducing the space it requires to one-third. The DPS 7 fills the gap between the firm's DPS 6 family of 16- and 32-bit systems and its large-scale DPS 8 processors, a niche traditionally occupied by the Level 64. Honeywell has made the transition from Levels 62 and 64 and Series 200/2000 to the DPS 7 as easy as possible. Level 64 applications can move directly to the DPS 7 without modification. Level 62 and Series 200/2000 users have several transition aids available to make the change easier.

USER REACTION

Datapro's 1986 survey of general-purpose computers drew responses from 30 DPS 7 users. Of these users, 70 percent purchased their systems, 23.33 percent leased from a third party, and 6.67 percent leased their systems from Honeywell. At the time the survey was taken earlier this year, DPS 7 systems were in place an average of 36.38 months.

Of the users responding to the survey, five installed a DPS 7/45, four a DPS 7/55E, four a DPS 7/55, two a DPS 7/35E, and two a DPS 7/35. The balance of the respondents, 13, did not specify which DPS 7 systems were installed.

Similar to the year before, a significant number of users said they were involved in retailing and wholesaling and manufacturing type enterprises. Six respondents said retailing and wholesaling best described their businesses, while seven said manufacturing described their businesses. Other business sectors represented included transportation (three), insurance (three), government (two), and finally, a service bureau, a construction firm, and a banking establishment (one each). Six remaining respondents whose businesses were not specifically described on the survey questionnaire selected "other."

When asked to list principal applications, a significant number of respondents again cited retailing and manufacturing. As usual, traditional data processing applications led the pack. Principal applications cited in order of rank ▷

▶ The peripheral processing subsystems operate simultaneously with the central processor. Each subsystem operates under control of a microprogrammed peripheral processor. All devices and terminals attached to a unit record processor can operate concurrently. Mechanical operations on a disk or tape subsystem, such as seek and rewind, can proceed simultaneously with a data transfer on the same subsystem.

MASS STORAGE

Please refer to Table 2 for descriptions of mass storage units available for the DPS 7 Series.

Each DPS 7 system has at least one MSP4370, MSP4575, or MSP4270 Mass Storage Processor or one MSS4979 Mass Storage Subsystem. Depending on the DPS 7 model, up to 4 MSPs can be connected, controlling a total of up to 36 disk drives.

INPUT/OUTPUT UNITS

Please refer to Table 3 for information about Honeywell tape and printer products for the DPS 7 Series.

Up to two MTP4275 or MTP4475 Magnetic Tape Processors, connecting up to 16 tape drive units, can be supported on the DPS 7. The MTP4275 controls up to eight 7-track (200/556/800 bpi) or 9-track (800/1600 bpi) tape units; the MTP4475 controls up to eight 9-track (1600/6250 bpi) tape units.

The MTA4370 Magnetic Tape Adapter allows the attachment of from one to four nine-track tapes with a density of 1600 bpi.

In addition to tape processors, every DPS 7 system has one unit record processor called the Service and Unit Record Processor (SURP). The SURP performs unit record device and communications control, system console control, system initialization and reconfiguration, and maintenance control. The SURP also supports a Magnetic Tape Adapter (MTA4370) with up to four tapes. The largest DPS 7 systems can handle up to 10 unit record devices using a URP4375 Unit Record Processor in addition to the SURP.

The DDF4051 and DDU4055/4056 Diskette Drives are connected to the CPU via the SURP or an additional unit record processor. One diskette drive unit can be connected to each unit record processor. The DDF4051 is always connected to the SURP and must be specified with the initial system order. The diskette is organized into 77 tracks with 26 sectors per track and 128 bytes per sector. Only 74 of the tracks are used for data. Total data capacity per DDF4051 diskette is 492,544 bytes. Rotational speed is 360 revolutions per minute, and the transfer rate is 32.2 kilobytes per second. The 4055 is a single-drive unit, providing 492,544 ▶

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TABLE 3. INPUT/OUTPUT UNITS

Magnetic Tape Units	Number of Tracks	Recording Density, Bits/Inch	Encoding	Tape Speed, Inches/Sec.	Transfer Rate, Bytes/Sec.
MTU0320/0420	9	1600	PE	45 or 75	72,000/120,000
MTU0500	7 or 9	556/800/ 1600	NRZI/ PE	125	70,000/100,000/ 200,000
MTU0537	9	1600/ 6250	GCR/ PE	125	200,000/781,000

Printers	Printing Speed	Print Positions	Horizontal Spacing, Chars./Inch	Vertical Spacing, Lines/Inch	Form Size, Inches
PRU0615	600 lpm	136	10	6 or 8	3 to 15 wide
PRU0909	900 lpm	136	10	6 or 8	4 to 19 wide
PRU1209	1200 lpm	136	10	6 or 8	4 to 19 wide
PRU1600	1600 lpm	136 std.; 160 opt.	10	6 or 8	4 to 22 wide

▷ were accounting and billing (90 percent), order processing and inventory (70 percent), payroll and personnel (66.67 percent), sales and distribution (56.67 percent), purchasing (36.67 percent), manufacturing (26.67 percent), insurance (13.33 percent), and process control (10 percent). Applications cited by only 3.33 percent of the respondents included construction and architecture, health and medical care, math and statistics, and petroleum analysis. None of the respondents selected banking, education, or engineering/scientific applications.

Although Honeywell markets the DPS 7 line as a medium-size system, virtually all those responding to the survey said they use their DPS 7s as organizational rather than departmental machines. Interestingly, main memory and disk storage among these systems appeared relatively modest. Some 63.33 percent said their main storage was between one megabyte and four megabytes, while 36.67 percent said main storage was between four megabytes and eight megabytes. The largest concentration of DPS 7 users (60 percent) had disk capacity of between 1.2 gigabytes and 4.8 gigabytes. Some 93.33 percent had disk capacity ranging from 600 megabytes to less than 10 gigabytes. No one had capacity equaling 10 gigabytes or greater. All the users said the configurations proposed by Honeywell have been adequate.

On the software side, all the respondents said they obtained applications programs from in-house personnel. Additionally, 36.67 percent said they obtained applications software from independent suppliers, 30 percent from contract programming, 20 percent obtained packaged programs from the manufacturer, and 6.67 percent used the manufacturer's personnel. Twenty-two users said the software support they received from the vendor was excellent or good while eight said it was fair or poor. Twenty said available productivity aids were excellent or good, while eight said they were fair or poor. Users gave Honeywell applications software in general a 2.46 weighted average, virtually the same as last year's rating. While the rating is lukewarm at best, when it comes to applications software from vendors in general this score is about par for the course. Significantly, 40 percent said they planned to add more manufacturer's software this year. All of the respondents said their primary programming language was Cobol. ▷

▶ bytes of storage, and the 4056 is a dual-drive unit with a capacity of 985,088 bytes. The DDU4055 and DDU4056 are mutually exclusive with the MTA4370.

TERMINALS

Please refer to Table 4 and the terminal section of the price list.

COMMUNICATIONS

The DPS 7 is an integral part of Honeywell's Distributed Systems Environment (DSE), which places computer power where it is most needed. Typically the DPS 7 functions either as a host or a satellite processor within a network. The layered approach in developing a communications network that utilizes the inherent processing power in the DPS 7 is called the Distributed Systems Architecture (DSA). DSA provides the following: 1) access to public and value-added data networks, 2) application program independence from areas such as network configuration and terminal characteristics, 3) standardized user interfaces to the network, and 4) centralized or distributed control functions, independent of the processing functions. DSA networking products include not only DPS 7, but DPS 6 and DPS 6 Plus small systems, and DPS 8, DPS 88, and DPS 90 large systems. A number of specialized software packages are part of DSA, as well as a series of front-end network processors (FNP), the DATANET 8.

The DATANET 8 family of FNPs consists of the DATANET 8/10, 8/20, and 8/30. The 8/10 features one megabyte of main memory expandable to two megabytes and supports up to 31 data communications lines; the 8/20 features a cache memory, one megabyte of main memory expandable to two megabytes, and supports 31 to 127 lines; the 8/30 features a cache memory, two megabytes of memory expandable to four megabytes, and supports 159 to 255 lines. These lines can support synchronous, ansynchronous, and HDLC (High-Level Data Link Control) communications.

The DATANET 8 Series can interconnect systems using private networks that use HDLC data communications links. They can also be connected to Public Data Networks (PDNs), Value-Added Networks (VANs), as well as to most types of standard digital or analog, leased or switched, and data communications lines.

Each member of the DATANET family includes:

• Megabus architecture connection among all elements

• Processor and cabinet with multislot chassis ▶

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▷ In other DP areas, 46.67 percent of the users said they had a disaster recovery plan, while 16.67 percent said they planned to implement one this year. Some 13.33 percent also said they had an information center, while 10 percent said they planned to implement one this year. Eighty percent said they also planned to add more hardware this year.

According to this year's users' ratings listed in the table below, the DPS 7 line earned higher ratings over last year's results in all but two of the 14 rating categories. The two categories registering lower marks were troubleshooting and overall satisfaction. Troubleshooting earned a 3.05 weighted average last year compared with a 2.93 average this year. Overall satisfaction went down just slightly from a 3.33 last year to a 3.30 for this year.

The users' ratings are summerized in the following table.

	Excellent	Good	Fair	Poor	WA*
Ease of operation	16	14	0	0	3.53
Reliability of mainframe	19	10	1	0	3.60
Reliability of peripherals	15	10	5	0	3.33
Maintenance service:					
Responsiveness	17	11	2	0	3.50
Effectiveness	14	10	6	0	3.27
Technical support:					
Troubleshooting	8	13	8	1	2.93
Education	6	15	6	3	2.80
Documentation	4	15	10	1	2.73
Manufacturers software:					
Operating system	15	14	1	0	3.47
Compiler & assemblers	15	15	0	0	3.50
Application programs	3	8	10	3	2.46
Ease of programming	10	18	2	0	3.27
Ease of conversion	10	16	2	1	3.21
Overall satisfaction	10	19	1	0	3.30

*Weighted Average on a scale of 4.0 for Excellent.

All 30 of the survey respondents said the DPS 7 systems did what they were expected to do. Ninety percent also said they would recommend their systems to other users, while 10 percent were undecided. □

▶ • Minimum main memory size of one megabyte

• Integrated 5¼-inch diskette drive

• Multiline communications controller (MLC-16) for network and remote device connections

• Three supplied RS-232-C/V.24 ports

• System control facility (SCF)

Besides DATANET products, the DPS 7 can support two integrated data communications controllers (DCC4270) that connect up to 12 synchronous or asynchronous line attachments (DCA4270) to the DPS 7 at speeds up to 19.2K bps. The DCC4271 can be configured in lieu of one of the DCC4270s to provide for HDLC point-to-point support. Six different types of terminal protocols are supported: TTY (DCF4301), Honeywell VIP (DCF4302), BSC (DCF4303), BSC with transparency (DCF4304), IBM 3270 (DCF4308), and Honeywell MDLC (DCF4307). A polling extension (DCF4340) is available for synchronous lines with more than four terminals connected.

SOFTWARE

OPERATING SYSTEMS: DPS 7 can now operate under one of two available operating systems, GCOS 7 or GCOS 64. GCOS 7 is the newest version of the standard Honeywell operating system. It's a virtual storage, multipurpose operating system containing features for both experienced and inexperienced operators.

GCOS 64 was the primary DPS 7 operating system before the introduction of GCOS 7. It's the same monitor used on the Level 64/DPS-330, which supports batch, transaction, and distributed processing environments in addition to interactive timesharing. This older version of GCOS will eventually be phased out.

Components of GCOS are virtually identical on both the DPS 7 and Level 64/DPS systems.

GCOS 7 is a menu-driven system that incorporates user-friendly features to guide inexperienced or untrained users through its many components. To enhance productivity, more experienced users can bypass some user-friendly features. GCOS 7 supports centralized, distributive, interactive, and batch processing, and offers a data base management system. Similar to the previous operating system version, GCOS 7 can execute up to 64 concurrent activities. This latest version of the GCOS operating system is compatible with the previous operating system. Users operating under Release 0501, the latest release of the previous GCOS, can migrate to GCOS 7 with minimal transition requirements, according to Honeywell. GCOS 7 also includes transition products to help users migrate from certain IBM source-code programs. These include Cobol programs written for IBM 360/370 systems, IBM System 3 Cobol, and IBM System/3 RPG II.

Honeywell divides operating system functions into three parts: production system, information system, and development system. The production system component includes data base management and transaction processing features. Information functions involve utilities for retrieving and processing data and text with emphasis on management and end-user access to information. Development system functions include such tools as a data dictionary and menus to speed up program development time. Basic components of GCOS 7 include multitasking, virtual memory, diagnostics, resource allocation, CPU dispatching, and load balancing. Other major components include language compilers and networking products. Communications support is provided through Distributed Systems Architecture (DSA) networking software.

GCOS 7 is built around a large set of menus, prompts, Help text, and an interactive command language. Menus display functions for selection, the prompts provide brief descriptions of parameter entries, and the Help text supplies detailed explanations on request. Another related feature is the GCOS Command Language (GCL). This interactive command language lets users define and create command sequences. GCL includes the functions of Job Control Language and Operator Control Language.

The Command Management Function of GCL allows the system administrator to set up "environments" which are sets of commands and menus tailored to the needs of categories of users.

GCOS 7 uses virtual storage memory management techniques. To put main memory to most efficient use, system code, user code, and data segments can be relocated automatically. A combination of hardware, firmware, and software all work in concert to achieve this efficiency. To establish CPU execution priorities, GCOS 7 uses four dispatching algorithms: ▶

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TABLE 4. TERMINALS

MODEL	VIP 7814	VIP 7815-7817 and 7824-7827	VIP 7823/7831	VIP 7201	VIP 7301/ 7303/7307	VIP 7305
DISPLAY PARAMETERS						
Max. chars./screen	2000	2000	2000	1920	2000	2000
Screen size (lines x chars.)	24 x 80	24 x 80	24 x 80	24 x 80	25 x 80	25 x 80
Symbol formation	7 x 9 dot matrix	7 x 8 upper/ 7 x 9 lower	7 x 8 dot matrix/ 7 x 9 lower	7 x 11 dot matrix	7 x 9 dot matrix	7 x 8 upper/ 7 x 9 lower
Character phosphor	P31 green std.	P31 green	P31 green	P31 green std.	P31 green std.	P31 green std.
Total colors/no. simult. displayed	—	—	—	—	—	—
KEYBOARD PARAMETERS						
Style	Typewriter	Typewriter	Typewriter	Typewriter	Typewriter	Typewriter
Character/code set	128 ASCII	128 ASCII	128 ASCII	128 ASCII	128 ASCII	128 ASCII
Detachable	Std.	Std.	Std.	Std.	Std.	Std.
Program function keys	12 std.	12 std.	12 dual std.	7 std.	12 std.	12 dual std.
OTHER FEATURES						
Buffer capacity	3 pages	3 pages	3 pages	1 page	1 page	1 page
Tilt/swivel	Tilt opt.	Tilt opt.	Tilt opt.	Tilt opt.	No	Tilt opt.
Graphics capability	—	Std.	Std.	—	—	Std.
TERMINAL INTERFACE	RS-232-C	RS-232-C or RS-442-A	RS-232-C or RS-422-A	RS-232-C or RS-442-A	RS-232-C, RS-422-A, 20 ma, or MIL-188-C	RS-232-C or RS-422-A

▶ • Event-driven CPU-time by class;

• Slicing CPU-time within a class;

• Limiting CPU-time within a class; and

• Optimizing CPU and I/O-bound jobs in adjacent classes.

Resource allocation under GCOS 7 is flexible. Operators can mount tape and disk volumes on any available device. The operating system automatically recognizes the device and makes the mounted volume available to the executing job.

A job management system under GCOS 7 sets up priorities and determines when each job will be executed. A job scheduler uses a system of job classes and priorities to determine when each job will be executed. The system provides up to 16 user classes, eight levels of scheduling priorities, and 10 levels of execution priorities.

As jobs flow through the system, job accounting information is collected at all stages. The system tracks job names, times, dates, memory and segment activity, and I/O activity. Such information can be edited for printing or used for billing or system analysis programs.

A GCOS 7 facility called the Catalog contains information about files, projects, and users. The Catalog enhances system security by controlling access to various files. The facility is part of a built-in data integrity and protection system. The Catalog contains information about data accessible to users and the programs they can run. To help ensure that work submitted to GCOS 7 will not be lost, system journals contain copies of records before and after processing.

Data integrity and recovery are maintained through a number of facilities provided for these purposes. These include the File Salvage Facility, which ensures that file status and file control information is correct following an incident. The Before-Journal Facility restores file contents in case of hardware, software, program, or TDS transaction failure. The Checkpoint/Restart Facility establishes a program restart point. Used in conjunction with the Before-Journal Facility, the utility repositions files and starts jobs at the last restart point. The After-Journal Facility records file updates as they occur, making it possible to recover files in case of volume destruction. Deferred Updating delays updating files until a unit of processing is completed successfully.

To assist in error detection and correction, GCOS 7 maintains a permanent log. When an error is detected and corrected, if possible, the permanent log is updated. Operators and service personnel can use the log for routine maintenance procedures and to monitor the status and error history of all system components. To pinpoint and correct errors, the log can be accessed by service personnel locally and remotely.

PROGRAMMING LANGUAGES: GCOS 7 supports Cobol, Basic, RPG II, Fortran, PL/1, Pascal, GPL, and APL.

DATA BASE MANAGEMENT: Under GCOS 7, Honeywell offers several products for master file updating, job scheduling, and the enhancing of batch/transaction processing throughput. These include the I-D-S/II data base management system, Integrated Query System (IQS), and Data Management 7 (DM7). DM7 combines TDS, Data Base Manager (DBM), Query, an inquiry processor, and Data Base Reorganization (DBREORG) in a single product. (For information about TDS, please refer to the Data Communications section.) The Data Base Reorganization provides the data base administrator with the capability in interactive mode to physically reorganize the I-D-S/II data base according to schema DDL or DMCL modifications. The utility allows data base evolution without requiring specific user-written programs to unload and reload the data base. The utility also offers an "impact" phase with a command to compare the current schema with the desired schema in object form and to produce reports on all differences encountered and create a "transform schema."

I-D-S/II, the GCOS 7 data base manager, performs many functions in both batch and interactive environments. The facility includes an integrated manager, a utility for creating, administering, monitoring, maintaining, and validating the data base, and a dialogue capability. The data base can be accessed directly using Cobol verbs interactively.

Query is a procedure-oriented processor that provides for selection, retrieval, and formatting of information from all GCOS 7 data organizations (UFAS, I-D-S/II, BFAS, and MLDS). Originally made available under GCOS 64, Query is designed for use as a programming language for users with varying degrees of computer knowledge. Queries built under this product can help satisfy end-user needs for information in an immediately usable form. It includes special report formatting capabilities and a HELP facility. A Query processor option is available to update UFAS, I-D-S/II, and MLDS user-accessible data. The update option can be used in an interactive or batch processing environ- ▶

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▶ ment, and can use all the security features of GCOS 7 to protect data integrity.

Integrated Query System (IQS) is a fourth-generation information retrieval and development system that generates reports and provides access to the data base. Users can generate *ad hoc* information requests and perform "what if" analysis of business statistics. The package is designed for both experienced data processing professionals and for users with little programming experience who want direct access to information.

The package features menus and HELP facilities and allows access using English-like commands. The facility provides multiple views of information and lets users tailor views to the needs of individuals or specific groups. Other features include a facility for creating, modifying, verifying, and scanning data and for access to the GCOS 7 Forms Management for generation of display formats. Simple or complex report generation for printing or display is also available.

DATA MANAGEMENT: File access methods available under GCOS 7 are Unified File Access System (UFAS), Basic File Access System (BFAS), and Multiple Logic Data Store (MLDS). UFAS, the main file access facility under GCOS 7, offers a single alternative to random, sequential, and indexed sequential files. With UFAS, users need not be concerned with the physical characteristics of file media. UFAS permits all record insertions to be handled totally within the main body of the file structure. This results in predictable performance over the life of the file, reducing the need for periodic performance-related file reorganization. UFAS also supports secondary indexing capabilities for indexed sequential files.

BFAS, an IBM 360/370-compatible file system, allows interaction between IBM and Honeywell GCOS 7 environments.

MLDS supports the methods and structures used on Honeywell Level 62 and IBM System/3 environments.

Data Dictionary simplifies the standardizing of terminology and helps eliminate redundancy. To help improve program development, the facility provides programmers with a complete picture of applications as they pass through different stages of development.

DATA COMMUNICATIONS: Communications and networking configurations are available through the Data Communications Controller and the DATANET 8 front-end network processor. At the software level, GCOS 7 provides for a number of operating system facilities. These include the Transaction Driven System (TDS), Basic Terminal Network Support (BTNS), Front-end Network Processor Support (FNPS), Virtual Communications Access Method (VCAM), Message Access Method (MAM), File Transfer Facility/6 (FTF/6), Remote Batch Facility/6 (RBF/6), Distributed Job Processing (DJP), Unified File Transfer (UFT), and Micro-Mainframe Link.

Transaction Driven System (TDS) is a transactional monitor that allows users to communicate with the operating system through terminals and access data immediately. TDS controls user access to the I-D-S/II data base management system and to UFAS or MLDS files, and maintains file integrity and recovery through the journals facility. Transactions can be written in Cobol or RPG II. Additionally, a special interface allows the linking of batch programs to TDS as though they were terminals.

TDS handles messages entered by a user through a terminal, the initiation of a processing routine specific to that type of message, the processing of the message, and the response

sent to the terminal. A library of mostly user-written transaction processing routines (TPRs) corresponds to the various types of messages accepted by the system. TDS can handle many transaction types in a single session. Time and memory space are optimized by using a single copy of TPR even though the requests for that TPR may come from different terminals. With TDS, TPRs can be debugged interactively through use of IPCF.

The Basic Terminal Network Support (BTNS) module works in conjunction with the Data Communications Controller. BTNS manages the physical operation of networks, allocates communications resources, transmits messages among terminal and program queues, and monitors network activity of the communications controller.

Front-end Network Processor Support (FNPS) works with the DATANET 8 front-end processor and its resident Distributed Network Supervisor software to perform several operations. A major FNPS function is the managing of DATANET 8 interaction with GCOS 7. FNPS handles DATANET 8 requests, performs I/O channel control, executes buffer management and checks DATANET 8 operations. It also controls administrative functions, statistics collection and journalization, and software loading and generation.

Virtual Communications Access Method (VCAM) establishes logical connections between GCOS 7 communications-based applications and the communications network.

For user-written programs employing queued communications, Message Access Method queues and dequeues the messages passing between the communications network and Cobol communications programs.

Micro-Mainframe Link is a GCOS 7 function that allows file exchanges among GCOS 7 and IBM PC-compatible microcomputers. It also supports PC connection to host target applications. The PC will execute the VIP Emulation Version 3 products and emulate a VIP7800 terminal.

File Transfer Facility/6-DSA is used to exchange files between a DPS 7 and DPS 6/microSystem 6/Level 6 systems running DSA6. File transfer may be initiated from a DPS 6 terminal via either DPS 6 or DPS 7 interactive operator commands or through either DPS 7 batch JCL or interactive commands entered from a terminal in the DPS 7 network. File types supported for exchange include sequential, relative, and indexed files (UFAS/ANSI/ASCII). The file types at both ends must match. The number of simultaneous file transfers is limited only by performance. A deferred restart technique protects against loss of data.

Remote Batch Facility/6-DSA (RBF/6-DSA) is used to accept job requests from a DPS 6/microSystem 6/Level 6 system running DSA6 for execution on DPS 7. Job input can be submitted from a DPS 6 file or from a DPS 7 file or device. The submitted jobs are then scheduled for execution on the DPS 7. Remotely entered jobs can be controlled by an IOF user at a DPS 7 terminal. Output can be directed to a file on the submitting DPS 6 or routed to another station including the DPS 7. Print output transmitted to a DPS 6 running DSA6 is placed on a DPS 6 disk print file for later printing by the standard MOD 400 unspool utility.

Distributed Job Processing (DJP) establishes communications between DPS 7 systems through DSA networks. DJP permits remote batch job entry, message routing between systems, and the chaining or initiating of remotely submitted jobs automatically. The facility also monitors submitted jobs and receives generated output. The DJP Pass Through facility lets interactive users start new interactive sessions at other DPS 7s connected through the DSA network without terminating their original sessions. ▶

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▶ Unified File Transfer (UFT) is used to transfer information between two DPS 7 systems through a DSA primary network. Data transfers can be initiated through a job command or operator command.

Transactional Context Restart Facility (TCRF) is used to restart transactional applications on a backup system. The facility restarts TDS jobs in a short time without interrupting backup system operation.

PROGRAM DEVELOPMENT: Products designed to improve programmer productivity include Interactive Development Facility (IDF), Interactive Program Checkout Facility (IPCF), and Full Screen Editor (FSE). IDF creates environments for fashioning forms personally tailored to the needs and experience of users, including the creation of personal user commands. With IPCF, users have interactive commands to enable debugging programs through use of the same source-program elements (such as tags and data names) in which the programs are written. IPCF capabilities include stopping on an address, displaying or modifying the contents of one or more variables, and modifying a program's processing sequence. FSE, a screen-terminal oriented source text editor, is a menu-driven facility that contains an extensive HELP system. The product permits the formatted entry of Cobol and RPG II programs. The product complements the line/context editor by providing easy, full-screen creation and maintenance of library members.

UTILITIES: Utilities available system-wide include spooling-sorting-merging functions, code-forms-data management functions, system management facilities, networking and transition tools.

Spooling functions are handled by the GCOS 7 Output Writer. This function automatically handles printed and punched output production, unit record resource sharing among competing activities, and the restarting or repositioning after an incident, all without the need for user intervention. Sorting and merging functions sequence tape and disk files through various methods.

Code management is handled through Library Maintenance and Text Editing facilities. Using this feature, libraries containing source, executable, binary, and shareable code for system and user functions can be created, managed, and deleted. These facilities can be used in batch or interactive environments, and are supported by menus, prompts, and HELP text.

Forms management is handled through the Forms Management Utility. This feature simplifies forms creation, storage, and maintenance in transactional and interactive environments. Programmers can generate the forms by entering commands into the forms-generation utility. Among the terminals supported by the Forms Management Utility are VIP7800 (synchronous and asynchronous), VIP7700, and IBM 3270. Full Screen Editor and Forms Management Utility services are available through other GCOS 7 processors, such as the Integrated Query System (IQS).

Volume and file management are supported by a variety of utilities that can operate in batch or interactive modes. They are also supported by menus, prompts, and Help text. At the volume level, utilities are available for preparing volumes, checking volume integrity, duplicating volumes, printing blocks of a volume, listing volume content, and saving or restoring volumes. Similar functions are also available at the file level. Additional file level functions include the ability to create a file, compare two files, reorganize an indexed file, sort and load secondary indexes, process file groups, and allocate or deallocate file space.

GCOS 7 includes an extensive set of conversion aids to assist in migrating programs and files from Level 62, IBM System/3, and IBM 370 systems. In addition to program and file translations, GCOS 7 provides the following capabilities for Series 200/2000 transition: processing of 200/2000 files from GCOS 7 programs, and emulation of a Series 200/2000 system on a DPS 7/E system.

OTHER SOFTWARE: Products under this category manage and control disk-space distribution and provide monitors for hardware and software resources. These include the Multiple Backing Store, a facility that distributes disk-stored virtual memory over up to seven disk volumes. This helps to better distribute storage load and optimize performance under heavy disk-load conditions.

General Access Control, another management tool, provides for protected access to the same files simultaneously from concurrently executing jobs operating in batch, remote batch, transactional, and interactive environments.

System Behavior Reporter, a third management tool, monitors and reports on the behavior of allocated hardware and software resources. Coupled Systems Support allows disk space to be shared dynamically by two GCOS 7 systems. File and data base access between the two systems can be partially or fully shared. The two systems sharing disk files can be different configurations operating at different levels of power.

Remote Maintenance System consists of a remote console interface adapter and software diagnostic interface modules combined to provide an extension to the system console for field engineers. The engineers are remotely located and connected via phone lines. RMS provides the ability to troubleshoot hardware and firmware problems as well as software bugs concurrently with user production. With this facility, key diagnostic programs that operate under GCOS 7 and 64 can be remotely executed and patching of many software difficulties can be accomplished without an on-site visit. RMS operates only when the console operator places the system in maintenance mode and provides documentation of all communications via the system console.

PRICING AND SUPPORT

POLICY: DPS 7 equipment is available for purchase or for lease under a one-year, three-year, or five-year term.

SUPPORT: The basic monthly lease charges entitle the user to unlimited central processor usage per month with on-call remedial maintenance between the hours of 8 a.m. and 6 p.m. on Mondays through Fridays excluding Honeywell's published holidays. For scheduled maintenance beyond this period, the user pays an additional charge which is a fixed percentage of the basic monthly maintenance charge. As an alternative to scheduled extended maintenance, the user can obtain on-call maintenance service at standard hourly rates of $159 per working hour.

Honeywell's Distributed Maintenance Services is a term covering a variety of field engineering services, coordinated to assure maximum availability of the system. DMS includes a Response Center headquartered in Atlanta, Georgia for toll-free, 24-hour a day contact with Honeywell; the Technical Assistance Center in Newton, Massachusetts, which coordinates all activities and provides remote testing and correction facilities; a Logistics Inventory Data System for rapid location of parts; Service Account and Field Engineering representatives; an Alert system to notify FE management of special problems; Remote Support Facility for remote troubleshooting and remote software and hardware correction; and tools for easy software updating by customers.

The GCOS 7 basic operating system (SCS3000) is provided to DPS 7E users at no additional cost. All other facilities, ▶

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such as job management, file systems, conversion aids, language processors, utilities, applications packages, communications software, system maintenance, and system performance analysis are separately priced.

Honeywell offers six categories of support products for the DPS 7 systems. These products include data services, system engineering, software, education, publications, and supplies.

Data services consist of machine time for predelivery production and checkout, and for overload/peakload situations.

System engineering falls into one of five billable support categories as described in the following table. Field engineering managers are responsible for the degree of skill required to perform the job.

	Monthly Rates ($)	Hourly Rates* ($)
Principal or senior technical consultant	19,174	138
Project supervisor or technical consultant	15,653	112
Technical specialist	14,088	100
Systems analyst/senior programmer	11,739	85
Programmer	8,218	59

*Four-hour minimum.

EDUCATION: Education services include standard courses, advanced professional training, multimedia self-instruction courses which allow customers to self-train as often as needed, site surveys to determine educational requirements, on-site classes, and clustered on-site classes to accommodate a group of users from an area.

TYPICAL CONFIGURATION: Sample configurations for the DPS 7 are shown below. They do not include software. Please refer to the equipment and software price sections for a complete listing of purchase prices, maintenance, and lease charges.

SMALL CONFIGURATION:

DPS 7/40E Central System includes two megabytes of main memory; CRT console and keyboard; remote maintenance adapter; two I/O channels; service and unit record processor; integrated diskette drive	$89,000
CSF4104 console printer	4,100
MSP4270 Mass Storage Processor	21,560
Three MSU0390 Mass Storage Units (300MB per unit)	75,000
MTP4275 Magnetic Tape Processor	24,850

SMALL CONFIGURATION: (Continued)

MTU0420 Magnetic Tape Unit (1600 bpi, 75 ips)	16,895
URP4375 Unit Record Processor	18,270
PRU0909 Belt Printer (900 lpm)	30,950
DCC4270 Data Communications Controller with six synchronous line attachments	7,100
15 VIP7814 Display Terminals	40,500
TOTAL PURCHASE PRICE:	**$328,225**

MEDIUM CONFIGURATION

DPS 7/55E Central System includes two megabytes of main memory; four I/O channels; CRT console and keyboard; remote maintenance adapter; service and unit record processor; maintenance diskette	$120,000
CSF4104 console printer	4,100
CMM4947 2MB Memory Module for expansion from 2MB to 4MB	15,000
MSP4575 Mass Storage Processor	24,363
Three MSU0555 Mass Storage Units (1200MB per drive)	138,852
MTP4475 Magnetic Tape Processor	36,200
Eight MTU0537 Magnetic Tape Units (1600/6250 bpi, 125 ips)	199,200
URP4375 Unit Record Processor	18,270
PRU1209 Belt Printer (1200 lpm)	35,950
DATANET 8/20 Front-end Network Processor	38,000
30 VIP7814 Display Terminals	81,000
TOTAL PURCHASE PRICE:	**$710,935**

LARGE CONFIGURATION

DPS 7/65E Central Complex includes two megabytes of main memory; four I/O channels; CRT console and keyboard; remote maintenance adapter; service and unit record processor; maintenance diskette	$160,000
CMM4947 2MB Memory Module for expansion from 2MB to 4MB	15,000
CMM4721 Memory Module for expansion from 4MB to 6MB	15,000
CSF4104 console printer	4,100
MSP4370 Mass Storage Processor	27,000
Three MSU1007 Mass Storage Units (1GB per unit)	102,825
MTP4475 Magnetic Tape Processor	36,200
Eight MTU0537 Magnetic Tape Units (1600/6250 bpi, 125 ips)	199,200
URP4375 Unit Record Processor	18,270
PRU1600 Belt Printer (1600 lpm)	64,940
DATANET 8/30 Front-end Network Processor	80,000
30 VIP7814 Display Terminals	81,000
TOTAL PURCHASE PRICE:	**$803,535** ▶

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EQUIPMENT PRICES

	Purch. Price ($)	Monthly Maint. ($)	Monthly Charges		
			1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)
PROCESSORS					
CPS4940 DPS 7/40E Central Processor; includes two megabyte of main memory, CRT console, keyboard, remote maintenance adapter, two I/O channels, service and unit record processor, maintenance diskette and pedestal, cabinet with space for one MSP4575, one MSP4270, and two DCC4270s	89,000	210	4,660	3,770	3,177
CPS4957 DPS 7/55E Central Processor; includes two megabytes of main memory, CRT console, keyboard, four I/O channels, service and unit record processor, maintenance diskette and pedestal, remote maintenance adapter, cabinet with space for one MSP4575, one MSP4270, and two DCC4270s	120,000	364	7,398	6,877	6,098
CPS4967 DPS 7/65E Central Processor; includes two megabytes of main memory, CRT console, keyboard, four I/O channels, service and unit record processor, maintenance diskette and pedestal, remote maintenance adapter, cabinet with space for one MSP4575, one MSP4270, and two DCC4270s	160,000	562	9,408	8,748	7,759
PROCESSOR OPTIONS					
CMM4701 One-megabyte Memory Module	10,000	26	559	518	458
CMM4721 Two-megabyte Memory Module for DPS 7/E processors with four megabytes or six megabytes	15,000	52	843	783	692
CMM4947 Two-megabyte Memory Module for expansion from two megabytes to four megabytes	15,000	52	802	652	552
CPF4712 Peripheral Expansion Cabinet	13,808	47	516	482	429
CPF4713 H200/2000 Program Mode for CPS4940/CPS4957/CPS4967; includes cabinet	16,606	28	348	323	287
CPF4707 I/O Channel Expansion; for more than four channels	5,200	5	181	167	148
CPF4710 Two I/O Channels	9,200	4	290	270	236
CSF4104 Hard copy printer (120 cps); required peripheral	4,100	70	364	343	310
CSF4102 Pedestal for CSF4104; low for sitting	200	NA	NA	NA	NA
CSF4103 Pedestal for CSF4104; high for standing	200	NA	NA	NA	NA
PROCESSOR UPGRADES					
CPK4982 7/45E to 7/55E; minimum two megabytes C.P. memory is required	23,850	128	2,059	1,910	1,687
CPK4983 7/55E to 7/65E	40,000	198	2,010	1,871	1,661
CPK4987 7/35E to 7/55E; minimum two megabytes C.P. memory and two I/O channels are required	48,810	126	2,956	2,738	2,416
CPK4988 7/35E to 7/65E; minimum two megabytes C.P. memory and two I/O channels are required	81,335	324	4,966	4,609	4,077
CPK4989 7/45E to 7/65E; minimum two megabytes C.P. memory is required	64,395	326	4,069	3,781	3,348
CPK4991 7/40E to 7/55E; requires two I/O channels	31,000	150	1,240	1,022	877
CPK4992 7/40E to 7/65E; requires two I/O channels	61,800	348	3,438	2,820	2,408
MASS STORAGE					
MSP4575 Single-Channel Mass Storage Processor; includes one group of three device addresses	24,363	90	1,098	1,021	906
MSA4575 Group of three additional device addresses	3,075	22	118	111	100
MSF4575 Two-Channel Switch for MSP4575	9,518	26	323	300	266
MSF4506 Series 200/2000 Read/Write Mode	2,352	6	80	74	66
MSU0402 Mass Storage Unit; 100 megabytes	20,805	131	950	890	815
MSU0452 Mass Storage Unit; 200 megabytes	12,000	130	1,012	931	880
MSU0555 Mass Storage Unit; 1.2 gigabytes	46,284	197	1,827	1,703	1,517
MSF0006 Dual Access Feature; for MSU0402/0452	2,070	13	89	83	76
MSF0014 Dual Access Feature; for MSU0555	4,140	23	176	164	147
MSP4270 Single-Channel Mass Storage Processor; includes eight device addresses for MSU0390	21,560	90	1,098	1,021	906
MSF4270 Two-Channel Switch for MSP4270	9,518	26	323	300	266
MSS4979 Mass Storage Subsystem; 900-megabyte system includes addressing for eight devices	60,000	597	4,812	4,144	3,855
MSP4370 Mass Storage Processor; includes cabinet and eight device addresses	27,000	90	1,440	1,170	990
MSA4370 Eight additional device addresses	2,050	22	125	104	90
MSF4370 Two-Channel Switch for MSP4370	300	9	24	21	19
MSU1007 Fixed-Media Storage Unit; two devices, 500 megabytes each	34,275	167	1,881	1,538	1,310
MSF1007 Cabinet for two additional MSU1007	7,500	24	399	324	274
MSF0017 Dual Access for MSU1007	2,425	23	144	120	104
MSU0390 Mass Storage Unit; 300 megabytes	25,000	204	1,238	1,041	983
MSK4026 Upgrades MSU0402 from 100 to 200 megabytes	1,000	NA	62	61	62

NA—Not available.
NC—No charge.

Honeywell DPS 7 Series

		Purch. Price ($)	Monthly Maint. ($)	Monthly Charges		
				1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)

DISKETTE STORAGE

DDF4051	Second Drive for Integrated Diskette Unit; factory option	3,695	24	140	131	118
DDU4055	Single Diskette Drive; 492K bytes; requires pedestal	2,336	21	95	89	81
DDU4056	Dual Diskette Drive; 985K bytes; requires pedestal	3,833	32	152	144	130
DDF4052	Pedestal for DDU4055 or DDU4056; low for sitting	184	2	10	9	6
DDF4053	Pedestal for DDU4055 or DDU4056; high for standing	184	2	10	9	6

MAGNETIC TAPE EQUIPMENT

MTP4275	Magnetic Tape Processor, single-access; addressing for eight devices	24,850	120	896	837	748
MTP4475	PE/GCR Magnetic Tape Processor; addressing for eight MTU0537 units	36,200	265	1,295	1,209	1,080
MTF4275	Two-Channel Switch for MTP4275	7,004	22	242	225	200
MTF4207	Translator Option	2,783	9	111	103	91
MTF4407	ASCII to EBCDIC Translator	4,900	14	167	156	138
MTF4208	Pack/Depack Option	2,783	8	111	103	91
MTF4209	NRZI Option	3,728	24	162	151	136
MTA4370	Magnetic Tape Adapter on SURP (for MTU0320/0420)	5,500	43	215	202	182
MTU0320	Magnetic Tape Unit; 1600 bpi, 45 ips, primary	15,100	120	592	556	502
MTU0420	Magnetic Tape Unit; 1600 bpi, 75 ips, primary	16,895	140	668	627	567
MTU0421	Magnetic Tape Unit; 75 ips, 1600 bpi, secondary	16,895	140	668	627	567
MTU0500	Magnetic Tape Unit; 125 ips	12,128	159	725	680	613
MTF0011	Nine track, 1600 bpi for MTU0500	2,735	31	141	129	121
MTF0012	Nine track, 800/1600 bpi for MTU0500	4,137	68	198	187	171
MTF0013	Seven track, 200/556/800 bpi for MTU0500	4,788	110	305	287	260
MTF0015	Seven track, 200/556 bpi for MTU0500	2,735	38	150	136	130
MTF0016	Seven track, 556/800 bpi for MTU0500	3,213	40	139	126	120
MTF0018	Cartridge Load for MTU0500	735	2	28	27	24
MTF0020	High-Altitude Adapter	231	NA	8	7	5
MTU0537	Magnetic Tape Unit; 125 ips, 1600/6250 bpi	24,900	367	1,144	1,085	996
MTU0630	Magnetic Tape Unit; add-on only. Not available on new orders.	14,815	130	593	557	505
MTF0636	Nine-Track, 1600/800 bpi, 125 ips for MTU0630; add-on only. Not available on new orders	9,805	155	460	435	398

UNIT RECORD EQUIPMENT

URP4375	Unit Record Processor and Cabinet	18,270	52	623	579	514
URA4351	Addressing for Printer PRU0615	400	2	15	14	13
URA4352	Addressing for Printers PRU0909/1209/1600	5,000	3	191	176	155
URA4354	Addressing for Card Readers CRU0301/0501/1050	3,645	12	126	118	104
URA4355	Addressing for Card Punch PCU0120	6,878	23	238	221	197
URA4356	Addressing for Card Reader/Punch CCU0400	7,088	28	285	266	235
URA4362	Addressing for Diskette Units DDU4055/4056 on URP4375	2,620	12	100	94	83
URA4363	Addressing for Diskette Units DDU4055/4056 on SURP	2,620	12	100	94	83

PRINTERS

PRU0909	Belt Printer; 900 lines per minute (lpm)	30,950	381	1,715	1,616	1,467
PRU1209	Belt Printer; 1200 lpm	35,950	428	1,952	1,839	1,668
PRK0905	Upgrade Kit for PRU0906; 900 lpm to 1200 lpm. (The PRU0906 is no longer available.)	5,000	47	237	223	201
PRK0914	Upgrade Kit for PRU0909; 900 lpm to 1200 lpm	5,000	47	237	223	201
PRU1600	Belt Printer, 1600 lpm, 136 positions	64,940	538	2,910	2,735	2,472
PRF0022	24 Additional Print Positions for PRU1600	2,610	16	112	105	93
PRU0615	Band Printer, 600 lpm, 136 positions	14,585	180	752	708	646
PRM4006	Adapter for PRU0615	500	2	18	17	15

Belts for PRU1600:

PRB0703	63-characters, OCR-B font, Series 200/2000	2,460	90	—	—	—
PRB0501	63-character, EBCDIC, OCR-B font belt	2,460	90	—	—	—
PRB0500	63-character, OCR-B font belt, Series 100	2,460	90	—	—	—
PRB0513	63-character, ASCII, OCR-B font belt	2,460	90	—	—	—
PRB0524	63-character, OCR-A numeric belt	2,460	90	—	—	—
PRB0549	63-character, OCR-A alphanumeric belt	2,460	90	—	—	—
PRB0600	94-character, uppercase/lowercase belt, OCR-B font	2,567	90	—	—	—

Belts for the PRU0909/1209:

PRB3703	63-characters, OCR-B font, Series 200/2000	NC	—	—	—	—
PRB3501	63-character, EBCDIC, OCR-B font belt	NC	—	—	—	—

NA—Not available.
NC—No charge.

SEPTEMBER 1986

Honeywell DPS 7 Series

			Monthly Charges		
	Purch. Price ($)	Monthly Maint. ($)	1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)

Bands for PRU0615:

PRB2501	63 characters, EBCDIC, OCR-B font	NC	—	—	—	—
PRB2502	63-character, OCR-B font band, Series 200/2000	NC	—	—	—	—

PUNCHED CARD EQUIPMENT

CCU0400	Card Read/Punch; 600 cpm read, 100/400 cpm punch	28,185	219	914	894	868
CRU0301	Card Reader, 300 cpm	9,513	78	380	345	328
CRU0501	Card Reader, 500 cpm	19,500	119	684	638	568
CRF0006	IBM Mark Sense Option for CRU0301/0501	4,520	45	181	168	153
CRF0007	HIS Mark Sense Option for CRU0301/0501	4,520	45	181	168	153
CRF0030	Pedestal for CRU0301/0501; high for standing	184	—	—	—	—
CRF0031	Pedestal for CRU0301/0501; low for sitting	184	—	—	—	—
CRU1050	Card Reader, 1050 cpm	26,555	224	1,136	1,066	961
CRF0003	51-Column Option for CRU1050	2,079	6	75	69	62
CRF005	Mark Sense (IBM/HIS) for CRU1050	7,787	57	256	234	221
PCU0120	Card Punch, 120 cpm	20,032	153	816	741	687

TERMINALS

VIP7201	Asynchronous, Multipurpose Keyboard Display Terminal	795	20	—	—	—
VIP7301	Standard Keyboard Display Terminal with RS-422-A interface and 25-foot cable; includes optional RS-232-C interface	1,900	20	—	—	—
VIP7303	Word Processing Keyboard Display Terminal with RS-422-A interface and 25-foot cable; includes optional RS-232-C interface	1,900	20	—	—	—
VIP7307	Data Entry Keyboard Display Terminal with RS-422-A interface and 25-foot cable; includes optional RS-232-C interface	1,900	20	—	—	—
VIP7305	Multifunction Keyboard Display Terminal with RS-232-C/RS-422-A interface and 25-foot cable	1,900	20	—	—	—
VIP7814	Synchronous/Asynchronous Keyboard Display Terminal with 12-inch diagonal CRT, 1920-character display positions	2,700	25	—	123	—
VIP7815	Synchronous/Asynchronous Keyboard Display Terminal with 15-inch CRT green phosphor, RS-232-C and RS-422-A interfaces	3,095	30	—	138	—
VIP7823	Asynchronous Keyboard Display Terminal with Multifunction Keyboard; includes a 72-line scroll feature, buffered print adapter, and 25-foot RS-422-A cable	2,350	25	—	—	—

COMMUNICATIONS

DCC4270	Data Communications Controller for up to six lines	7,100	11	233	216	191
DCC4271	Data Communications Controller for up to four HDLC lines	4,700	11	158	147	130
DCF4270	Performance Expansion; 100K bps	4,284	8	142	131	116
DCF4301	Firmware for TTY Procedure	53	NA	1	1	1
DCF4302	Firmware for VIP Procedure	53	NA	1	1	1
DCF4303	Firmware for BSC Procedure without transparency	53	NA	1	1	1
DCF4304	Firmware for BSC Procedure with transparency	945	4	40	36	31
DCF4307	Firmware for HDLC Procedure	53	NA	1	1	1
DCF4308	Firmware for IBM 3270 Procedure	1,665	9	71	67	59
DCA4270	Synchronous/Asynchronous Line Attachment	1,000	5	37	34	31
DCF4340	Polling Extension for DCA4372/DCA4270	546	1	21	19	17

Network Processor Equipment

DCU8110	DATANET 8/10 Network Processor system with 1MB of memory expandable to 2MB; supports a maximum of 31 data communications ports and includes 3 RS-232-C/V.24 asynchronous/character synchronous ports	23,900	130	1,195	950	795
DCU8120	DATANET 8/20 Network Processor system with cache memory, 1MB of memory expandable to 2MB. System is upgradable to dual-processor system with dual-cache memory; supports 31 data communications ports extendable to 127 ports, and includes 3 RS-232-C/V.24 asynchronous/char. synchronous ports	38,000	215	1,900	1,525	1,275
DCU8130	DATANET 8/30 Network Processor system with cache memory and 2MB of memory expandable to 4MB. System is upgradable to dual-processor system with dual-cache memory; supports 159 data comm. ports expandable to 255 ports, and includes 3 RS-232-C/V.24 asynchronous/char. synchronous ports	80,000	350	4,000	3,200	2,675

NA—Not available.
NC—No charge.

Honeywell DPS 7 Series

EQUIPMENT PRICES

			Purch. Price ($)	Monthly Maint. ($)	Monthly Charges		
					1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)

DATANET OPTIONS

OPTIONS FOR THE DATANET 8/10 ONLY:

		Purch. Price ($)	Monthly Maint. ($)	1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)
DCM8110	One-megabyte Memory Expansion Module	7,000	50	350	280	230
DCE8105	Multiple Network Processor Channel Connection Adapter for DATANET 8/10 and medium systems only; required for DATANET 8/10 to support multiple Network Processor Channel Connections (NPCC) to DPS 7 or DPS 7/E Systems (max. 2). A second NPCC connection, DCE8103 or DCE8104 must be ordered with this adapter.	25	NA	2	1	1

OPTIONS FOR DATANET 8/20 ONLY:

		Purch. Price ($)	Monthly Maint. ($)	1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)
DCP8120	Extended Performance Option; includes second processor and associated cache memory	14,000	115	700	560	475
DCM8120	One-megabyte Memory Expansion Module	7,000	50	350	280	235
DCE8121	First Line Expansion Module; provides support for up to 32 additional data communications ports (max. 63 ports per DATANET 8/20)	2,500	5	125	100	85
DCE8122	Second Line Expansion Module; provides support for up to 64 additional data communication ports (max. 127 ports per DATANET 8/20); requires DCM8120 and DCE8121	5,000	10	250	200	170

OPTIONS FOR DATANET 8/30 ONLY:

		Purch. Price ($)	Monthly Maint. ($)	1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)
DCP8130	Extended Performance Option; includes second processor and associated cache memory	27,000	220	1,350	1,080	900
DCM8130	Two-megabyte Memory Expansion Module	14,000	100	700	560	470
DCE8131	Line Expansion Module; provides support for up to 96 additional data communications ports (max. 255 ports per DATANET 8/30); requires DCM8130	7,500	15	375	300	250

OPTIONS FOR DATANET 8/10, 8/20, AND 8/30:

		Purch. Price ($)	Monthly Maint. ($)	1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)
DCF8002	Visual Display Terminal Console, 24-by-80 character screen; one required for each DATANET 8/10, 8/20, or 8/30	795	20	40	35	30
DCF8003	Hard Copy Console Receive Only Printer (100 cps); one required for each system that uses DATANET 8, 8/10, 8/20, or 8/30 Network Processors	1,195	22	60	50	40
DCF8004	Console Table for Console Components	750	NA	40	30	25
DCF8005	Second 5¼-inch Diskette Drive	800	16	40	30	25
DCE8103	Network Processor Channel Connection to DPS 7/E Systems	8,000	65	339	319	288
DCE8104	Network Processor Channel Connection to DPS 7/E System	8,000	65	339	319	288
DCE8107	Network Processor Channel Connection to Level 66 DPS System	8,000	65	339	319	288
DCE8106	Network Processor Channel Connection to DPS 8 with Input/Output Multiplexer	8,000	65	339	319	288
DCE8109	Network Processor Channel Connection to DPS 88 System with Channel Adapter Unit	8,000	65	339	319	288
DCE8111	Network Processor Channel Connection to DPS 90 System with Input/Output Processor	8,000	65	339	319	288
DCE8052	Multiline Communications Controller-16 (MLC-16) accommodates up to four Communications Interface Adapters; maximum of 16 data communications ports per MLC-16	2,700	15	135	110	90

LOW- AND MEDIUM-SPEED OPTIONS:

		Purch. Price ($)	Monthly Maint. ($)	1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)
DCF8073	RS-232-C Asynchronous/Character Synchronous Integrated Communications Interface Adapter with four RS-232-C data communications ports; includes four 50-ft. cables. Maximum port speed is 19.2K bps	2,000	16	100	80	70
DCF8049	RS-232-C Bit Synchronous HDLC Integrated Communications Interface Adapter with two RS-232-C data communications ports; includes two 50-ft. cables. Maximum port speed is 19.2K bps.	3,200	26	160	130	110
DCF8053	Low- and Medium-Speed Asynchronous/Character Synchronous Communications Interface Adapter; accommodates up to four Line Interface Module Connections; any combination of DCF8055 and DCF8059 is allowed	1,000	7	50	40	35
DCF8055	RS-232-C/V.24 Asynchronous/Character Synchronous Line Interface Module with one RS-232-C/V.24 data communications port; includes one 50-ft. cable. Maximum port speed is 19.2K bps	275	3	15	12	10
DCF8059	Mil-188-C Asynchronous/Character Synchronous Line Interface Module with one Mil-188-C data communications port; includes one 50-ft. cable. Maximum port speed is 19.2K bps	275	3	15	12	10

NA—Not available.
NC—No charge.

Honeywell DPS 7 Series

		Monthly Charges			
DATANET OPTIONS (Continued)		Purch. Price ($)	Monthly Maint. ($)	1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)

		Purch. Price ($)	Monthly Maint. ($)	1-Year Lease ($)	3-Year Lease ($)	5-Year Lease ($)
	MEDIUM- AND HIGH-SPEED OPTIONS:					
DCF8061	Medium- and High-Speed Character Synchronous or Bit Synchronous Communications Interface Adapter accommodates one Line Interface Module Connection (DCF8062, DCF8064, DCF8067, DCF8069, or DCF8071)	2,200	16	110	90	75
	MEDIUM-SPEED OPTIONS FOR DCF8061					
DCF8062	RS-232-C/V.24 Bit Synchronous (HDLC) Line Interface Module with one RS-232-C/V.24 data communications port; includes one 50-ft. cable. Maximum port speed is 19.2K bps.	275	3	15	12	10
	HIGH-SPEED OPTIONS FOR DCF8061					
DCF8064	X.21 Bit Synchronous (HDLC) Line Interface Module with one X.21 data communications port; includes one 50-ft. cable. Maximum port speed is 64K bps	450	3	25	20	15
DCF8067	Mil-188-C Bit Synchronous (HDLC)/Character Synchronous Line Interface Module with one Mil-188-C data communications port; includes one 50-ft. cable; Maximum port speed is 64K bps.	450	3	25	20	15
DCF8069	V.35 Bit Synchronous (HDLC) Character Synchronous Line Interface Module with one V.35 data communications port; includes one 50-ft. cable; Maximum port speed is 64K bps.	450	3	25	20	15
DCF8071	Bell 301/303 Bit Synchronous (HDLC)/Character Synchronous Line Interface Module with one Bell 301/303 data communications port; includes one 50-ft. cable; Maximum port speed is 64K bps.	450	3	25	20	15
	OTHER OPTIONS FOR DATANET 8, 8/10, 8/20, AND 8/30:					
DCF8024	Direct Connect Capability for one Asynchronous or Character Synchronous Line with RS-232-C Physical Interface	350	2	14	13	12
DCF8026	Universal Modem Bypass; character synchronous to 19.2K bps. RS-232-C physical interface	415	2	16	15	13
VCW7401	V.35 Crossover Cable Adapter; requires W74-xxxx	198	2	NA	NA	NA
W74-xxxx	Custom V.35 Crossover Cable for VCW7401; 400-ft. maximum (xxxx is length in feet, right justified)	2 per foot	NA	NA	NA	NA

NA—Not available.
NC—No charge.

SOFTWARE PRICES

		Monthly* License Fee ($)	Monthly Software Support ($)
GCOS 7 OPERATING SYSTEM			
System Software and Options			
SCS3000	GCOS 7 System Support	NSC	(1)
SCS3221	System Supervisory Functions	1,121	220
SCS3210	Coupled Systems Support	85	27
SCS3212	General Access Control	104	28
SCC3206	File Transfer Facility/6 (FTF/6)	51	5
SCC3209	Remote Batch Facility/6 (RBF/6)	32	6
SCC3207	United File Transfer (UFT)	17	5
SCC3210	Distributed Job Processing	67	14
Production System			
SCC3200	Transaction Driven System (TDS)	315	138
SCC3202	Basic Terminal Network Support/HDLC	27	6
SCC3203	DSA Primary Network on DCC/ (DPN/D)	19	5
SCC3213	Generalized Terminal Writer (GTW)	50	12
SCD3200	Data Base Manager (DBM)	471	31
SCD3208	Data Management 7 (DM 7)	883	195
SCD3210	Data Management 7/IQS (DM 7/IQS)	855	189
SCD3205	Data Base Reorganizer	37	5
SCD3201	Multiple Logic Data Store (MLDS)	51	19
SCU3204	Transactional Context Restart Facility (TCRF)	55	15

Honeywell DPS 7 Series

		Monthly* License Fee ($)	Monthly Software Support ($)
Information System			
SCL3206	Basic	201	23
SCL3209	Query	285	85
SCL3210	Query Update	98	27
SCL3221	Integrated Query System (IQS) Basic Functions	145	40
SCL3222	IQS Line Driven Mode	40	15
SCL3223	IQS Menu Driven Mode	65	19
SCL3224	IQS Update	98	27
SCL3225	IQS Data Entry	40	17
SCL3226	IQS Information System	310	95
SCF3200	Wordpro	173	57
SCL3207	APL	RPQ	RPQ
SCF3201	APL Graphic Interface	RPQ	RPQ
Development System			
SCU3203	Interactive Development Facility (IDF)	84	13
SCP3200	Full Screen Editor (FSE)	70	13
SCP3202	Interactive Program Checkout Facility (IPCF)	65	19
SCD3202	Data Dictionary	298	54
SCL3200	Cobol	230	35
SCL3201	Fortran 77	244	26
SCL3202	RPG II	65	9
SCL3204	PL/1	RPQ	RPQ
SCL3205	Pascal	RPQ	RPQ
SCL3203	GPL	RPQ	RPQ
Transition Products			
SCV3001	370 Cobol Translator	NSC	11
SCV3002	System/3 Cobol Translator	NSC	11
SCV3005	RPGTRANS	NSC	11
SCV3006	PACK/FILTRANS	NSC	11
SCV3010	System/3 Sort Adapter	NSC	11
DATANET 8 Distributed Network Supervisor			
SNC8120	Distributed Network Supervisor (DNS); basic functions, NAD, async and sync terminal support, cross-net load/dump	560	99
SNC8121	Network Operator Interface (NOI)	11	5
SNC8124	DPS 7 Host/Multiple Host Connect	60	11
SNC8131	High Level Data Link Control (HDLC), point-to-point, and NRM	95	18
SNC8122	Value Added Network SNC8120 (Packet Switch X.25) PBX, LAN, and PAD	185	33
SNC8126	Primary Network Support X.21 Interface	185	33
SNC8127	Interactive Binary Synchronous Terminal Support (3270)	90	17
SNC8125	Binary Synchronous (2780) support for DPS 7	60	11
SCC3201	GCOS 7 Front-end Network Processor Support	17	5
SCU3230	Administrative Utilities Programmatic Interface (AUPI 7) for GCOS 7	35	6
SNC8196	Distributed Network Supervisor/Entry (DNS/E/7); GCOS 7	450	80
SNC8197	Remote Switch Concentrator	375	66

Basic software support is included with the software license.
NSC—No separate charge. Licensed for use without separate charge to users who have acquired their central processors/systems from Honeywell.
(1) Fee based on power of CPU.
RPQ—Call to request price quote. ■