

Honeywell DPS 90 Series

PRODUCT DESCRIPTION

With the announcement of the (Distributed Processing System) DPS 90 Series, Honeywell Information Systems becomes the latest vendor to introduce a new top-end mainframe series designed to relieve the computer capacity crunch of its big *Fortune 500* and big government customers, who have inordinately big computer capacity needs. The announcement of the new model line comes one month after IBM's much ballyhooed announcement of the 3090 Series, composed of two high-end processors that are also aimed at big system users. Honeywell believes its five new processors are powerful enough to keep it competitive in the IBM-dominated, big-mainframe marketplace for some years to come. The DPS 90 Series is said to be comparable in performance and capacity to the IBM 3090 Series. An earlier delivery date than the IBM 3090 may give Honeywell an extra competitive edge. Honeywell plans to ship the first models by the second half of this year. Volume shipments will begin by the first quarter of 1986, more than a year before IBM said it could deliver its top-end processor, the 3090 Model 400, which features up to 256 megabytes of shared expanded storage. Of course, whether IBM keeps to that delivery schedule or delivers the Model 400 sooner remains to be seen.

The DPS 90 Series offers more memory capacity and delivers up to three times the processor performance of Honeywell's previously most powerful computer series, the DPS 88. DPS 90 models are designed to serve at the center of communications networks that could typically involve other Honeywell systems ranging from the DPS 6 to the DPS 88 Series. The new series is designed to handle high-volume workloads in commercial, interactive, and engineering/scientific environments. Honeywell built vector processing capabilities into the DPS 90 to satisfy the needs of large organizations that need the performance potential of a good number cruncher.

PRODUCT ANNOUNCED: The new (Distributed Processing System) DPS 90 represents the most powerful processor series Honeywell Information Systems has offered to date. The new top-end model line was developed through a joint agreement between Honeywell and NEC Corporation of Japan, and is largely based on NEC S-1000 processor technology. The new series consists of five models offered in one-, two-, three-, and four-processor configurations, and also features a dual-processor, fully-redundant version. Depending on models and configuration, main memory can range from 32 to 256 megabytes. The new series uses current mode logic and 256K-bit memory chips. To support the DPS 90 line, Honeywell also announced a new mass storage subsystem, new magnetic tape processors, and enhanced belt printers.

COMPETITION: IBM 3090 Series, NAS AS/XL Series, Control Data Cyber 180, Burroughs A-15.

DATE ANNOUNCED: March 26, 1985.

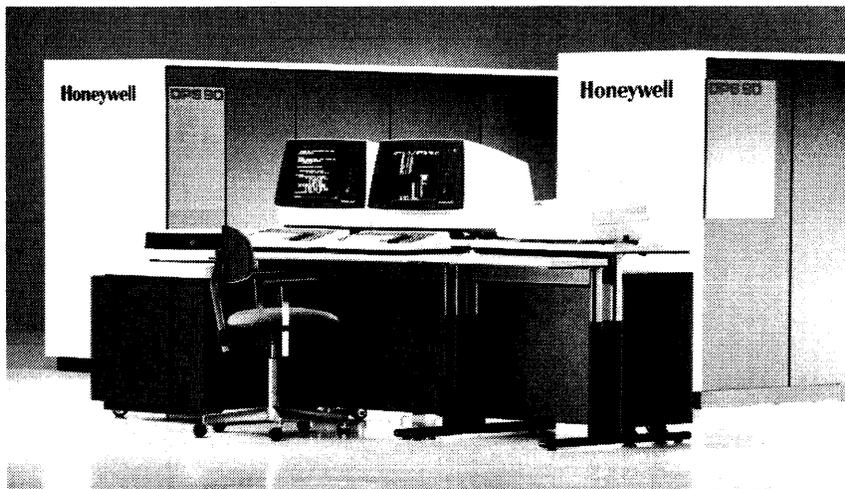
SCHEDULED DELIVERY: Second half of 1985.

BASIC SPECIFICATIONS

MANUFACTURER: Honeywell Information Systems, 200 Smith Street, Waltham, MA 02154. Telephone (617) 895-6000. In Canada: 155 Gordon Baker Road, Willowdale, Ontario M2H 3N7. Telephone (416) 499-6111.

MODELS: Honeywell DPS 90 single-processor 90/91, dual-processor 90/92, fully-redundant 90/92T, three-processor 90/93, and four-processor 90/94.

CONFIGURATION: The five models operate under an enhanced version of GCOS 8, and are based on NEC Corporation large systems technology.



Honeywell's new top-of-the-line DPS 90 mainframe family includes one-, two-, three-, and four-processor models, plus a fully-redundant dual system. The top-end DPS 90/94 can be configured with up to 256 megabytes of main memory and delivers three times the processing power of the DPS 88, Honeywell's previous top-end series.

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▷ The DPS 90 Series represents something of a new direction for Honeywell. These are the first processors Honeywell has offered that are based on agreements and collaborative efforts with other vendors. Honeywell and NEC Corporation of Japan entered into a cross-licensing agreement last year to develop a processor series based largely on NEC S-1000 technology. The new MSU3380 disk units offered with the processors were obtained from IBM under the terms of a third-party OEM agreement worked out last year.

The DPS 90 Series consists of the single-processor DPS 90/91, the dual-processor DPS 90/92, the fully-redundant DPS 90/92T, the three-processor DPS 90/93, and the four-processor DPS 90/94. The peripheral equipment introduced along with the new series includes a new mass storage subsystem, magnetic tape processors, and enhanced high-speed belt printers. As already alluded to, the mass storage subsystem incorporates the IBM-based MSU3380 head-of-string mass storage unit. The MSU3380 consists of two string controllers, two Head Disk Assemblies, and four actuators. The disk unit provides up to 1.8 gigabytes of formatted capacity, which exceeds the 1.1 gigabyte-capability of the MSU0501, Honeywell's previous maximum-capacity disk unit.

The new processor line operates under an enhanced version of GCOS 8, and is software compatible with the DPS 8 and DPS 88 Series. This makes it possible for DPS 8 or DPS 88 users to upgrade to the more powerful processors without major difficulties. DPS 8 users, in fact, can upgrade directly to the DPS 90 Series should their capacity requirements exceed the capabilities of the DPS 88. All the DPS 90 processors, except for the top-end DPS 90/94, are also field upgradable to progressively more powerful processors within the series.

DPS 90 memory capacity ranges from 32 to 256 megabytes. The 256-megabyte maximum capacity now exceeds the 128 memory capacity available with the DPS 88 line. Honeywell also becomes the latest vendor to make use of state-of-the-art 256K-bit MOS chip technology. The DPS 88 line uses 64K-bit memory chips. In a number of respects, the new series is similar to the DPS 88 line. Both use current mode logic (CML), microchip packaging, and pipelining techniques. CML is said to provide faster switching speeds at more modest power requirements than Transistor-to-Transistor logic. The DPS 90 Series differs from the DPS 88 in one major respect. The DPS 90 Series uses forced air-cooling techniques rather than the water-cooling approach of the DPS 88.

RELATIONSHIP TO CURRENT PRODUCT LINE:

The DPS 90 Series is positioned to provide a growth path for Honeywell large-system users who have outgrown the capabilities of Honeywell's DPS 8 and DPS 88 product line. To date, Honeywell has installed 3,125 large-scale processors at *Fortune 500* and large government installations worldwide. By Honeywell estimations, work loads among its customer base are growing at a rate of 20 to 50 percent annually. The DPS 90/91 single-processor mainframe is

▶ The DPS 90/91 single processor consists of one Central Processing Unit (CPU), two Input/Output Processors (I/OX), with four high-speed channel processors each, one Main Memory Unit with 32 megabytes of main memory, one System Control Unit (SCU), one Power Supply Unit (PSU), one System Control Center with serial printer, and one Interface Adapter Unit (IAU). Options include an additional I/OX and up to 96 megabytes of additional memory in 32-megabyte increments.

The DPS 90/92 dual-processor system consists of two CPUs, two I/OXs with four high-speed channel processors each, one MMU with 32 megabytes of main memory, one SCU, one PSU, one SCC with serial printer, and one IAU. Options include an additional I/OX and up to 96 megabytes of additional memory in 32-megabyte increments.

The DPS 90/92T tandem processor systems consists of two of each central system component. The fully-redundant version may be operated either as a single system or as two separate systems. Options include one or two additional I/OXs and up to 256 megabytes of additional memory in 32-megabyte increments.

The DPS 90/93 three-processor system consists of three CPUs, four I/OXs with four high-speed channel processors each, two MMUs with 32 megabytes of memory each, two SCUs, two PSUs, two SCCs with serial printer, and two IAUs. Options include an additional I/OX and up to 256 megabytes of additional memory in 32-megabyte increments.

The DPS 90/94 four-processor system consists of four CPUs, four I/OXs with four high-speed channel processors each, two MMUs with 32 megabytes of memory each, two SCUs, two PSUs, two SCCs, and two IAUs. Options include up to 256 megabytes of additional memory in 32-megabyte increments.

CENTRAL PROCESSORS AND MEMORY: The DPS 90 processors are designed to serve as the central system in large data processing networks populated with other Honeywell systems ranging from the DPS 6, DPS 7, and DPS 8 to the DPS 88. The DPS 90 Series can handle high-volume work loads in commercial, interactive, engineering and scientific environments. The processors make use of a new Fortran compiler to automatically invoke a set of 63 vector instructions for use in scientific and engineering applications.

The DPS 90 is said to have up to three times the processing performance of Honeywell's previously most powerful computer series, the DPS 88. The DPS 90/91 single-processor system delivers 30 percent to 70 percent greater performance than the DPS 88/81, depending on work load and application, while the top-end DPS 90/94 four-processor system provides up to 3.4 times the power of the DPS 90/91.

Processing throughput is enhanced through the use of a high-level pipeline control, cache memory, and a large capacity, high-speed address translation mechanism. In addition, the central processing system comes with built-in vector processing capabilities for engineering/scientific applications.

The high-level pipeline control feeds instructions and data continuously into the pipeline through the use of three 32-byte instruction streams, various other buffers, and refined prefetch control methods. The 128K-byte cache memory lets the CPU rapidly access recently used instructions and data. The high-speed address translation mechanism is a large-capacity buffer which helps to reduce the overhead of virtual-to-real address translations.

The DPS 90 Series makes extensive use of Current Mode Logic (CML) and micropackaging. CML circuitry is used in the CPU, SCU, MMU, I/OX, and high-speed channel processors. CML achieves faster switching speeds at a lower power consumption. It uses a higher density of logic gates per chip than transistor-to-transistor logic.

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▷ said to deliver 30 to 70 percent greater performance than the single-processor DPS 88/81, depending on work load and application, while the top-end DPS 90/94 four-processor model provides up to 3.4 times the power of the DPS 90/91.

Besides addressing the growth needs of its customers, Honeywell also wanted to protect their considerable investments. To accomplish this, Honeywell modified the NEC S-1000 based processor to make it compatible with the GCOS 8 operating system, with other Honeywell peripherals, and with its communications system. Honeywell systems operating under GCOS 8 can readily migrate to the DPS 90.

COMPETITIVE POSITION: The DPS 90 specifically focuses on two markets: interactive processing, an established Honeywell market niche, and engineering/scientific processing, a new Honeywell market. Honeywell has strongly addressed the interactive processing market throughout its large system line with strong emphasis on fault-tolerant capabilities, high availability, and high throughput. The DPS 90 is no exception in these respects. Most of the processors come with some degree of built-in redundancy to minimize downtime, while the DPS 90/92T comes as a fully-redundant system featuring two of each major system component. Honeywell believes its interactive processing and fault-tolerant capabilities give its large system products a clear edge over comparable IBM systems. By Honeywell estimations, the DPS 90 is superior to the new IBM 3090 Series in interactive processing and at least competitive to IBM in commercial batch processing capabilities.

The built-in vector processing capabilities for engineering and scientific work places the DPS 90 in direct competition with CDC Cyber 180 and Digital's VAX systems. Other vendors now finding this market exploitable include IBM and NAS, which have both built number crunching capabilities into their respective systems, the IBM 3090 and the NAS Alliance Series.

The DPS 90 contains most of the current state-of-the-art features to keep Honeywell in the same advanced technology league with IBM and the other vendors responding to the IBM announcements. Other vendors launching new high-end product lines include NAS with its AS/XL Alliance Series and Burroughs with its A 15 Series. All the new processor products are featuring high-capacity main memories and the new 256K-bit memory chips, except for IBM, which is using higher density 288K-bit chips. All the new high-end processor lines offer main memories of up to 256 megabytes, except for the Burroughs A 15 system which goes up to 192 megabytes.

Of all the remaining high-end mainframe vendors tailoring big systems to equally big Fortune 500 customers, IBM continues to be the vendor Honeywell needs to outgun. Whether the DPS 90 is indeed superior to the IBM 3090 in interactive processing environments, as Honeywell claims, is difficult to accurately gauge, since the vendor does not

▷ Multichip carriers, called micropackages, incorporate a large number of densely packed large-scale integrated chips in one air-cooled assembly. The micropackage ceramic substrate has high-dissipation heat sinks to allow forced-air cooling.

The DPS 90 central system includes the following modular components:

- Central Processing Unit (CPU)
- System Control Unit (SCU)
- Main Memory Unit (MMU)
- Input/Output Processor (I/OX)
- Power Supply Unit (PSU)
- System Control Center (SCC)
- Interface Adapter Unit (IAU)

The Central Processing Unit (CPU) decodes instructions from the main memory unit, executes arithmetic, logic and vector operations, and processes interrupts. It contains a memory buffer unit containing a 64K-byte operand cache and a 64K-byte instruction cache. Each cache is organized in 16-word blocks with set associative mapping. To maintain a high cache hit ratio, the buffer uses a leased recently used algorithm.

The System Control Unit (SCU) is packaged with the Main Memory Unit (MMU). The SCU handles data, commands and interrupts traffic among the various central components, and provides system availability, maintenance, and diagnostic functions. The MMU uses Metal Oxide Semiconductor (MOS) 256K-bit chips. An MMU can be configured to contain 32 to 128 megabytes of main memory. Larger systems configured with two MMUs can contain up to 256 megabytes of main memory.

The Input/Output Processor (I/OX), connected to the system control unit, performs system start-up, initiates system reconfiguration, handles errors, and controls system test and diagnosis. The I/OX comes with four high-speed channel processors which control input/output operations and data transfer between high-speed peripheral equipment and the MMU.

The System Control Center (SCC) controls the entire DPS 90 system, simplifies system interaction, monitors activities under the control of the operating system, initializes the system and provides an interface to maintenance and diagnostic functions for Honeywell maintenance contract customers. The SCC consists of a control unit, an operator panel, an operator display with keyboard, a status display with keyboard, two diskette drives, a fixed disk, an activity monitor, a timer feature, a serial printer, and a service processor.

The Interface Adapter Unit (IAU) contains two back panels which each support four general-purpose adapters. The adapters permit attachment of peripheral equipment complying with Federal Information Processing Standards. With additional back panels, the IAU may be configured with up to 16 general-purpose adapters.

The Power Supply Unit (PSU), packaged in a separate cabinet, provides the source power for one or two central processing units, and the necessary control interface to an automatic sequencing unit.

I/O PROCESSING: The I/OX comes with four High-Speed Channel Processors that control data transfer between high-speed peripheral equipment and the MMU. Each HCP provides four high-speed I/O channel ports that achieve transfer rates of up to 3 megabytes per second. A maximum of 16 channels per I/OX can be configured. In systems using a maximum of four I/OXs up to 64 channels can be configured. Channel types supported include Peripheral Subsystem Interface 2- or 4-trip channels, Direct Interface channels, and data streaming channels.

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► disclose standard performance measurements such as MIPS and processor cycle time. Honeywell and other mainframe vendors have been backing away from such handy benchmarks in recent years, claiming variations in system architectures and applications make MIPS and cycle time comparisons between competing processors misleading.

It is possible to make some comparisons between Honeywell and IBM based on price and main memory size. A basic IBM 3090 Model 200 with a minimum of 64 megabytes of memory sells for approximately \$5 million, roughly equal to the cost of the Honeywell two-processor DPS 90/92 which comes minimally configured with 32 megabytes of memory. Adding an additional 32 megabytes of memory to the DPS 90/92 to make it equal the basic 64 megabytes of the Model 200 brings the price to \$5,400,000. The top-end IBM Model 400, a four-way processor minimally configured with 128 megabytes of main memory, costs roughly \$9,100,185, while the top-end Honeywell DPS 90/94, also a four-processor system that comes minimally configured with 64 megabytes, sells for \$8,350,000. When configured with 128 megabytes to equal the Model 400 main memory, the price comes to \$9,150,000. □

► **COMMUNICATIONS:** The DPS 90 Series uses Datanet 8 and Datanet 666X network processors to carry large-volume communications loads, allowing central processors to concentrate on information processing. Datanet 8 operates under Distributive Network Supervisor software. Datanet 666X can operate under either General Remote Terminal Supervisor-II (GRTS-II) or the Network Processing Supervisor (NPS).

PERIPHERALS: New peripheral systems introduced for the DPS 90 Series include the MSP3880 Series Mass Storage Subsystem, the MSP80XX Mass Storage Processor Series, the MTP80XX Magnetic Tape Processor Series, and an enhanced series of belt printers.

The MSP3880 Series includes two mass storage processors which comply with the Federal Information Processor Standards, the MSP3881 and the MSP3885. The 3881 includes two storage directors and two IAU attachment channels. The MSP3885 includes two storage directors and four IAU attachment channels. The storage directors attach to the controller in the head-of-string mass storage units. The MSPs, in turn, attach to channels in the input/output data transfer path of the central system.

Disk units designed for use with the two mass storage processors are the MSU3380 Head-of-String Mass Storage Unit, and the MSU3382 Slave Mass Storage Unit. The MSU3380 comes with two string controllers, two Head Disk Assemblies (HDAs), and four actuators. The MSU3382 slave unit provides two additional HDAs and four actuators. Each MSU has a total formatted storage capacity of 1.8 gigabytes.

The MSP8021/22/23 mass storage processors are designed to work with Honeywell's existing line of mass storage units, the MSU0451, 0500, and 0501. To make more efficient use of floor space, the processor series lets users configure selectable combinations of the MSP8021 storage processor line and the MTP8021 magnetic tape line in single compact cabinets. The MSP8021

freestanding single-channel processor supports up to 16 MSU spindles. The MSP8022 secondary single-channel processor supports up to 16 MSU spindles. MSP8021 and MSF8021 are prerequisites. The MSP8023 primary single-channel processor also supports up to 16 MSU spindles. A prerequisite is the MTP8021 magnetic tape processor. The unit cannot be used with the MSP8021. All the MSUs can be field upgraded with optional dual-channel capabilities to provide redundancy and greater simultaneous access to mass storage units. MSPs can be configured with up to 16 removable-disk MSUs, eight fixed-disk MSUs, or else a mixed combination of removable and fixed-disk units.

The MTP8021/22/23 are designed to work with Honeywell's existing line of magnetic tape drives, the MTU0500, 0610, and 0630. As noted above, the magnetic tape processors can be housed in selectable combinations with the new MSPs to make more efficient use of floor space. The tape processors provide control for a string of tape units and connect to the bidirectional input/output data transfer paths of central systems.

The MTP8021 is a freestanding primary single channel tape processor that includes 1600/6250 bpi capability and the first MTU addressing feature. It can support up to eight tape units.

The MTP8022 secondary single-channel processor includes 1600/6250 bpi capability and the first MTU addressing feature. The MTP8021 and MTF8021 are prerequisites. The processor can support up to eight tape units.

The MTP8023 primary single-channel processor includes 1600/6250 bpi capability and the first MTU addressing feature. The MSP8021 mass storage processor is a prerequisite. The MTP8023 cannot be used with the MTP8021. It can support up to eight tape units. Tape processors can be field upgraded with optional dual channel capabilities to provide system redundancy and greater access to tape units. A single-channel tape processor can support up to eight tape units in a single-channel subsystem. The dual channel option provides two separate channels in a tape processor, allowing the two channels to be interconnected. Both could support up to 16 tape units in dual simultaneous channel configuration.

The URP0600 or URP8901 Unit Record Processors can control up to eight unit record devices simultaneously. Unit record devices include card readers, a card punch that handles 100 to 400 cards per minute, a card reader/punch unit that reads at 400 cards per minute and punches at 100 cards per minute, and on-line, high-speed printers.

Enhanced output devices include four high-speed belt printers, the PRU0903, 0908, 1203, and 1208. The PRU0908 (900 lpm) and the PRU1208 (1200 lpm) work with the DPS 90 Series. The PRU0903 (900 lpm) and the PRU1203 (1200 lpm) work with Honeywell's other large systems. The PRU0903/0908 printers can be field upgraded to the performance of the PRU1203/1208 printers. The PRU0901/0903 and PRU1201/1203 printers can be made to work with the DPS 90 system with the PRK0907 exchange feature.

SOFTWARE: The DPS 90 Series operates under an enhanced version of GCOS 8, Honeywell's principal operating system. Honeywell DPS 8 and DPS 88 users operating under GCOS can migrate to the DPS 90 Series. The new processor line supports Cobol, Fortran, PL/I, GMAP, APL, Pascal, Basic, Lisp, RPG II, and C. Data Management facilities include the Data Management-IV (DM-IV) data manager and the DM-IV Transaction Processor for information control between terminal users and the computer. Other facilities include the File Management Supervisor, and the Unified File Access System that permits logical data management facilities to interface with the data storage hardware. ►

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EQUIPMENT PRICES

		Purchase Price (\$)	Monthly Maint. (\$)	1-Year Lease (\$)	4-Year Lease (\$)
PROCESSORS					
CPS8990	DPS 90/91 Central System includes a single CPU and 32 megabytes of main memory	3,950,000	6,250	246,875	183,721
CPS8992	DPS 90/92 Central System includes two CPUs and 32 megabytes of main memory	5,000,000	7,500	312,500	232,558
CPS8996	DPS 90/92T fully-redundant version contains two of each central system component and 64 megabytes of main memory	6,250,000	9,250	390,625	290,698
CPS8993	DPS 90/93 Central System includes three CPUs and 64 megabytes of main memory	7,300,000	10,500	456,250	339,535
CPS8994	DPS 90/94 Central System includes four CPUs and 64 megabytes of main memory	8,350,000	11,750	521,875	388,372
ADDITIONAL MEMORY					
	Additional 32-megabyte memory module	400,000	—	—	—
MASS STORAGE SUBSYSTEM					
MSP3881	Mass Storage Processor includes two storage directors and two attachment channels	74,270	—	4,460	3,795
MSP3885	Mass Storage Processor includes two storage directors and four attachment channels	90,270	—	5,350	4,550
MSP8021	Freestanding Primary Single-Channel Mass Storage Processor, which includes first MSU addressing feature; requires one channel connection feature	39,000	—	2,311	1,965
MSP8022	Secondary Single-Channel Mass Storage Processor, which includes first MSU addressing feature; requires one channel connection feature. MSP8021 and MSF8021 are prerequisites.	29,000	—	1,720	1,460
MSP8023	Primary Single-Channel Mass Storage Processor, which includes first MSU addressing feature. The MTP8021 Magnetic Tape Processor is a prerequisite; requires one channel connection feature.	32,000	—	1,900	1,615
MSU3380	Head-of-String Mass Storage Disk Drive includes a built-in controller and two HDAs	88,800	—	4,780	4,070
MSU3382	Slave Mass Storage Disk Drive includes two HDAs and attaches to the MSU3380	64,450	—	3,470	2,960
MAGNETIC TAPE PROCESSORS					
MTP8021	Freestanding Primary Single-Channel Magnetic Tape Processor, which includes 1600/6250 bpi capability and first MTU addressing feature; requires a minimum of one channel connection feature.	29,000	—	1,620	1,355
MTP8022	Secondary Single-Channel Magnetic Tape Processor, which includes 1600/6250 bpi capability and first MTU addressing feature. MTP8021 and MTF8021 are prerequisites; requires a minimum of one channel connection feature.	29,000	—	1,620	1,355
MTP8023	Primary Single-Channel Magnetic Tape Processor, which includes 1600/6250 bpi capability and first MTU addressing feature. MSP8021 is a prerequisite; requires a minimum of one channel connection feature.	22,000	—	1,230	1,300
PRINTERS					
PRU903/908	High-Speed Belt Printers (900 lpm)	34,975	—	2,065	1,720
PRU 1203/1208	High-Speed Belt Printers (1200 lpm)	38,275	—	2,340	1,920