

# Honeywell Bull DPS 8000 Series

## PRODUCT DESCRIPTION

Honeywell Bull Inc. has addressed the growing power needs of its DPS 8 users with the announcement of the new DPS 8000 Series of large-scale mainframes, a new follow-on series that provides a migration path for the heart of Honeywell Bull's user base, the DPS 8 user. The first two installments of the DPS 8000 Series, announced in June, include the single-processor DPS 8000 Model 81 and the dual-redundant Model 82. Three- and four-processor versions will be announced at an undisclosed later date. In the software area, Honeywell Bull is satisfying demands for a relational data base management system with the announcement of Interel relational software for GCOS 8. Other significant software announcements included Infoedge and the Development Center Nucleus, software offerings containing tools for program development.

The new model line makes use of very-large-scale integration (VLSI), current mode logic (CML) gate arrays and one-megabit dynamic random access (DRAM) memory chips. Similar to past pronouncements for other Honeywell Bull model lines, the vendor claims the new machines have a substantial performance edge over comparable IBM systems in interactive processing. In mixed work load environments involving on-line and traditional batch processing, the DPS 8000 has a two-to-one edge in interactive processing over IBM systems with comparable batch performance. The Model 81 can process up to 62 transactions per second or about 225,000 transactions per hour at an average of four physical I/Os per transaction. The Model 82 dual-processor version is 1.8 times more powerful than the Model 81 and processes more than 110 transactions per second. The DPS 8000 is positioned to compete against the high end of the IBM 4381 Series and the low end of the IBM 3090 Series. Within the Honeywell Bull world, both DPS 8000 processors are positioned above the DPS 8/70, the top-end model within the DPS 8 model line. The Model 81 is said to have 1.6 times the performance of the DPS 8/70 ▶

**PRODUCT ANNOUNCED:** The two-processor Honeywell Bull DPS 8000 Series, offered as an upgrade path for the DPS 8 Series of medium- to large-scale mainframe users, are large-scale mainframes positioned to handle interactive on-line and distributed processing.

**COMPETITION:** Amdahl 580 Series, IBM 4381 and 3090 Model 120E.

**DATE ANNOUNCED:** June 1987.

**SCHEDULED DELIVERY:** December 1987.

## BASIC SPECIFICATIONS

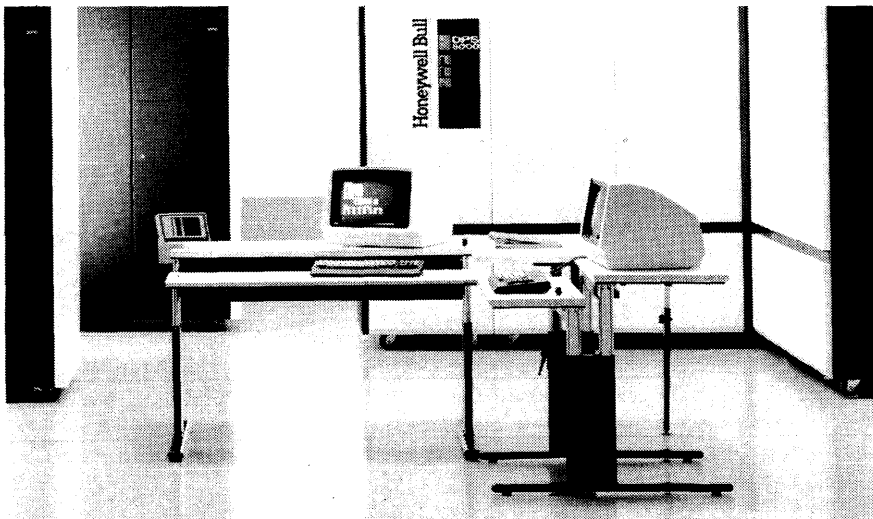
**MANUFACTURER:** Honeywell Bull Inc., Deer Valley Computer Park, 13430 North Black Canyon Highway, Phoenix, AZ 85029. Telephone (602) 862-8000.

**MODELS:** DPS 8000 Model 81 and Model 82.

**CONFIGURATION:** The DPS 8000 Model 81 is a single-processor complex consisting of one CPU with 16 megabytes of main memory, one System Console, one System Control Unit (SCU), one Maintenance Subsystem (MS), one Input/Output Processor (IOP) supporting up to 16 physical channel connections, and one modem for remote maintenance. Memory can be expanded to 128 megabytes in 16-, 32-, and 64-megabyte increments. Users can also configure three additional consoles per IOP for a maximum of four, an optional 23-inch large screen monitor, an additional system console, and an optional system console printer.

The DPS 8000 Model 82 is a fully redundant processor complex consisting of two CPUs, 32 megabytes of main memory, two SCUs, two MSs, two IOPs, each supporting up to 16 physical channels, and two modems for remote maintenance. Main memory is expandable to 256 megabytes in 16-, 32-, 64-, and 128-megabyte increments. Users can also configure the system with up to six additional system consoles or a maximum of four consoles per IOP and up to eight per system. Additionally, users can configure an optional 23-inch large screen monitor and a optional system console printer.

**CENTRAL PROCESSOR AND MEMORY:** DPS 8000 complexes use Very-Large-Scale Integration (VLSI) gate arrays and make use of one-megabit chip, dynamic random access memory ▶



*Honeywell Bull's new DPS 8000 delivers two-and-one-half to five times the performance of the DPS 8.*

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▷ in commercial/scientific batch environments and 1.8 times within Data Management IV-Transaction Processor environments. Jobs that use long floating-point operands and BCD jobs may have substantially less performance, according to Honeywell Bull. Compared to the DPS 8/49, the Model 81 is said to have a relative performance range of 2.6 to 3.0.

The DPS 8000 Model 81 single-processor system features 16 megabytes of main memory, expandable to 128 megabytes, and one Input/Output Processor (IOP) which supports up to 16 physical channels. It's field upgradable to a DPS 8000 Model 82. The Model 82 features 32 megabytes of memory, expandable to 256 megabytes, and two IOPs which each support up to 16 physical channels. The Model 82 contains two of each major central system component to ensure maximum availability in the event of component failure.

In the software area, Honeywell Bull announced Interel, integrated relational data management software. Interel includes a Structured Query Language (SQL) interface and the Integrated Relational Dictionary System (IRDS). Interel's implementation of SQL is compatible with IBM's SQL/DS and DB2, Oracle from Oracle Corporation, Ingres from Relational Technology Inc., and the Teradata DBC/1012 data base computer. Interel will be available with GCOS 8 Release 3000 in December. License origination fees range from \$8,000 to \$14,000 depending on the system size. Monthly license fees range from \$950 to \$2,100.

Other announced software products include Infoedge, a set of productivity tools for both technical and non-technical users, and Development Center Nucleus, a product for DP professionals that addresses all stages of applications development. Infoedge products include an electronic spread sheet, a forms generator, and a menu system that integrates Infoedge optional packages into a single system.

**RELATIONSHIP TO CURRENT PRODUCT LINE:** Of all the Honeywell Bull offerings announced within the last year, the introduction of the DPS 8000 Series may prove to be the most critical. By Honeywell Bull's own estimation, DPS 8 installations make up about 80 percent of the company's 10,000 worldwide user base. The two-processor DPS 8000, the apparent follow-on series for the eight-year-old DPS 8 product line, is aimed squarely at this substantial user base. The announcement of a new processor series employing the latest logic gate and memory technology is long overdue, of course. According to market estimates compiled by International Data Corporation, the Framingham, Massachusetts computer industry market research firm, 1,082 Honeywell Bull users worldwide are using DPS 8/70 machines, the top-end product within the existing DPS 8 line. This represents more than a third of the entire worldwide DPS 8 user base. Before the introduction of the DPS 8000 Series, DPS 8/70 users looking for more room to grow could jump to a DPS 88 model with a starting price of \$1.7 million, or they could move to a Honeywell Bull DPS 90 which carries a starting price of \$3.95 million. The DPS 8000 Series, however, represents a potentially less costly

▷ (DRAM). A central complex includes the central processing unit (CPU), System Control Unit (SCU), main memory component, and the Input/Output Processor (IOP). The CPU makes use of instruction pipeline processing to speed up instruction execution. It also uses virtual memory addressing and contains an associative memory that holds the most recently referenced page table words. Descriptor-controlled access enhances system security. Extended segment capability supports segment sizes up to four billion bytes. Execution control store holds up to 64K bytes of command information.

The SCU component is the interface between the CPU and main memory and the input/output processor and connected peripherals. The SCU regulates data transfer traffic, and controls system interrupts and demands for central memory.

Main memory uses one-megabit DRAM circuits obtained from another chip vendor. Main memory ranges from 16 megabytes to 256 megabytes. Memory supports internal memory interlacing to speed up data access and uses automatic error detection and correction. Memory can be expanded through the addition of memory boards.

**INPUT/OUTPUT SUBSYSTEM:** The DPS 8000 IOP handles data transfers between connected peripheral subsystems and network processors and the SCU. An IOP supports up to 16 physical channels and 64 logical channels. Under this arrangement, a single physical channel accepts data from multiple logical channels. Concurrent input and output operations are possible through channel pipelining. Maximum transfer speed is three megabytes per channel. Each IOP has an aggregate throughput rate of up to 17.8 megabytes per second.

**COMMUNICATIONS:** Datanet 8 Series front-end network processors handle communications chores for the DPS 8000 mainframes. The Datanet 8 Series includes the 8/10, 8/20, and 8/30, which operate within Honeywell Bull's Distributed Systems Architecture (DNA), an open communications architecture. Up to eight Datanet processors can be configured per system.

The DPS 8000 Series is designed to accommodate distributed processing and conforms to the Open Systems Interconnection (OSI) standard for connecting Honeywell Bull equipment and hardware from other vendors. With the introduction of the DPS 8000, Honeywell Bull announced Integrated Information Architecture, which divides Honeywell Bull systems into three different operating levels that range from the enterprise level at the top of a computing organization, departmental level at the middle, and workstation level at the bottom. Users can access information pertinent to an entire organization at the enterprise level. Data that serves the specialized needs of separate groups within an organization can reside at the departmental level. Workstation-level processing meets the informational needs of individuals. Each level can be interconnected in two or three tiers to meet specific user requirements, according to Honeywell Bull.

**SOFTWARE:** Shortly before announcing the DPS 8000, Honeywell Bull announced GCOS 8 Software Release 3000, the latest version of the company's primary operating system for large-scale mainframes. Included in the new release is support for relational data management software, improved transaction processing, and new, larger capacity disk drives.

Release 3000 includes the Rapid Access Data System (RADS), a feature for improving system throughput. Through RADS, users can access a larger percentage of data held in a special section of main memory rather than disk memory to improve response times, particularly within interactive environments.

To enhance connectivity, Honeywell Bull introduced Personal Computer Interconnect (PCI) for MS-DOS-based personal computers. With PCI, users can access data from the mainframe and download the data to a personal computer. PCI features a window manager, graphics, VIP terminal emulation, file transfer, and script processing. PCI can work with Lotus 1-2-3, dBase III, Multimate Advantage, and WordStar Professional.

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► move. The cost of a basic system ranges from \$675,000 for an entry-level Model 81 to \$1.3 million for a two-processor Model 82.

The DPS 8000 Series extends the power range of the DPS 8 Series using architectural features and circuit technology that are similar to Honeywell Bull's newer products such as the DPS 90 and DPS 88. The company's medium-to-large scale offerings now employ VSLI Current Mode Logic circuitry and one-megabit memory chips compared to the larger models of the DPS 8 Series which use LSI MSI Schottky TTL logic and 16K-bit and 64K-bit memory chips. The DPS 8000 Series can be configured with 16 megabytes to 256 megabytes of main memory compared to the DPS 8 Series which can be configured with 8 megabytes to 64 megabytes of main memory.

In the auxiliary storage area, Honeywell Bull now offers the MSU3381 and MSU3383 double-capacity disk units, which feature unformatted capacities of 5.04 gigabytes. Last year, Honeywell Bull made the MSU3380/3382 disks available to its DPS 8 users. These units each have a capacity of 1.8 gigabytes. Both the MSU3380/3382 and the MSU3381/3383 are purchased from IBM on an OEM basis.

In the peripheral area, DPS 8 users planning to migrate to a DPS 8000 will be able to move most of their existing disk, tape, printer, and card unit peripherals over to the DPS 8000 Series. To make it possible to attach peripheral devices to DPS 8000 machines, users must purchase channel connection exchange features to connect peripherals to the DPS 8000 IOP. In addition, some of the older peripherals such as the MTU610 tape unit and the PRU1600 line printer will require further Honeywell Bull consideration.

In the software area, the DPS 8000 Series will operate under Software Release 3000, the latest version of the standard Honeywell Bull GCOS 8 operating system used for all of the company's large-scale mainframe products. Initially, DPS 8000 systems will be supported by GCOS 8 SR2500 until SR3000 becomes available. Along with the announcement of a new GCOS release, Honeywell Bull unveiled Interel, a new relational data management system which uses the ANSI-standard SQL. Interel's SQL can access relational as well as non-relational files, including UFAS and DM IV in retrieval mode only. Honeywell Bull's other data management offering continues to be Data Management IV (DM IV), a CODASYL-type offering that features on-line transaction processing and query/reporting in addition to data management.

**COMPETITIVE POSITION:** With the introduction of the DPS 8000 and the earlier introduction of the DPS 7000 supermini, Honeywell Bull, the newly formed corporate entity composed of Honeywell Inc., Groupe Bull of France, and NEC of Japan, has begun to refocus on established Honeywell markets, with renewed emphasis on some basic product advantages. Areas receiving particular attention are corporate-wide connectivity, on-line interactive processing, and friendlier end-user accessibility through In-

► **PROGRAMMING LANGUAGES:** Announced with Release 3000 were Cobol-85 and Ada, which both conform to ANSI standards. Cobol-85 was also validated by the Federal Compiler Validation Service. The offering will be supported by a new Debug Support System. The Honeywell Bull Ada Compilation System has been validated by the Department of Defense as Level 1.8.

**DATA MANAGEMENT:** Interel, announced with the DPS 8000, is an integrated relational data management product. Interel includes Structured Query Language (SQL) and the Integrated Relational Dictionary System (IRDS). Interel's implementation of SQL is compatible with IBM's SQL/DS and DB2, Oracle from Oracle Corporation, Ingres, from Relational Technology Inc. and the Teradata DBC/1012 data base computer. Interel's SQL language accesses both non-relational and relational data bases. Interel will be available with GCOS 8 Release 3000 in December.

Interel uses English-like commands to create, update, or delete tables or authorize access to system users. Interel automatically creates table definition and data base table space, establishes the necessary controlling information, and deposits this information in the IRDS central dictionary.

Interel accesses storage data through the Data Manager. Using this component, full relational files can be added to existing non-relational models, and information can be merged through SQL. This functionality provides users with a seamless interface from third-generation data base technologies to newer fourth-generation technologies and allows users to migrate to relational data base functions without the need to duplicate information through copy management.

**PROGRAM DEVELOPMENT:** Infoedge contains a set of productivity tools for both experienced data processing professionals, technical end users, and non-data processing professionals. The product includes a spread sheet, a forms generator, and a menu system. Infoedge features include Infoedge-Menu Services, which provide a consistent menu selection regardless of terminal or workstation types, systems, function sets, or user sophistication. Menu selections include the Resource Dictionary Services, which allow access to the Information Resource Dictionary System within Interel.

Options available with Infoedge include decision-support services, query facilities, and workstation facilities. Query Facilities include Example Query, an end-user request facility and Reporter, a facility for formatting data obtained from Example Query and SQL into report form. Workstation facilities include Infoedge-Mail, a distributed electronic message facility, and Infoedge-Meetings, a facility that permits authorized users to attend "meetings" through a terminal device. ►

terel, Honeywell Bull's new relational data management system.

Honeywell Bull has positioned the DPS 8000 Series against IBM's 4381 Series and the low end of the 3090 Series. The vendor claims to have a two-to-one advantage over IBM in interactive processing within mixed work load environments involving both batch and interactive processing, with batch being about equal. In May, IBM announced four new 4381 models that are more powerful than existing 4300 models, and also announced a new low-end 3090, the Model 120E. In the connectivity area, Honeywell Bull announced its Integrated Information Architecture (IIA). IIA lets users working within mainframe, mini, or micro environments access data at different computing levels ►

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▷ within an organization. In conjunction with this concept, the new Interrel relational data management system is designed to make it easier for end users to access data bases and find the information they need. Interrel, using an SQL interface, can access both relational and non-relational data structures. The Personal Computer Interconnect product lets PC users access mainframe data and download the data to the PC for incorporation into popular PC-based application packages, such as Lotus 1-2-3, dBase III, Multimate Advantage, and WordStar Professional. Honeywell Bull is also reemphasizing distributed processing and compatibility with the Open System Interconnect (OSI) standard. Additionally, the GCOS 8 operating system runs on all Honeywell Bull large-scale mainframes beginning at the DPS 8 and now the DPS 8000 level, making it possible for applications written for one large machine to work with minimal or no modification on other Honeywell Bull large-scale hardware. Meanwhile, Honeywell Bull is currently phasing out other operating systems such as Multics, which also ran on DPS 8 vintage mainframes, despite protests from a devoted following.

Many of these recent Honeywell Bull announcements stressing hardware integration and easier data access are in step with industry trends in general and IBM pronouncements in particular. For the last year especially, IBM has been offering hardware- and software-based connectivity products to let PC, mini, and mainframe users operating under incompatible hardware and operating systems share information. Unlike Honeywell Bull which offers GCOS 8 as the primary operating environment for its large-scale mainframes, IBM continues to cope with problems of having to support incompatible operating systems. To encourage 4381 VSE users to migrate to MVX XA, IBM announced in May the Migration System (MVS-MS) product, which is intended to reduce the time and cost required to convert from VSE/SP Versions 1, 2, and 3 to an MVA operating environment. MVS-MS was announced with the May 11 introduction of the four new 4381 mainframes. For more information about the IBM announcement, please refer to the IBM 4300 Series Product Enhancement (Report 70C-504MK-321 in Volume 1) at the end of the IBM 4300 report. □

### EQUIPMENT PRICES

|                     |   | Purch.<br>Price<br>(\$) | Monthly<br>Maint.<br>(\$) | 1-Year<br>Lease<br>(\$) | 4-Year<br>Lease<br>(\$) |
|---------------------|---|-------------------------|---------------------------|-------------------------|-------------------------|
| <b>PROCESSORS</b>   |   |                         |                           |                         |                         |
| CPS8681             | DPS 8000/81 Central System Complex features one CPU, 16 megabytes of main memory, one Input/Output Processor (IOP) with 16 physical channels, one System Console with large screen monitor interface, 14-inch CRT, Keyboard, one Service Processor w/related storage devices, one Monitor, and one Modem                        | 675,000                 | 850                       | 45,000                  | 33,750                  |
| CPS8682             | DPS 8000/82 fully redundant System Complex features two CPUs; two System Control Units each with 16 megabytes of main memory; two IOPs each with 16 physical channels; two System Consoles with large-screen interfaces, 14-inch CRTs, keyboard, and IOP connections; two Service Processes, two Modems<br><br>System Upgrades: | 1,300,000               | 1,600                     | 87,850                  | 65,000                  |
| CPK8681             | DPS 8000/81 to DPS 8000/82  | 675,000                 | 750                       | 45,000                  | 33,750                  |
| CMM8601             | Additional 16 megabytes of memory   | 120,000                 | 210                       | 8,000                   | 6,000                   |
|                     | System Consoles and Console Options:  |                         |                           |                         |                         |
| CSU8600             | Additional System Console   | 10,000                  | 50                        | 480                     | 400                     |
| CSF8600             | Optional printer for system console; 100 characters per second  | 1,225                   | 50                        | 121                     | 103                     |
| CSF8603             | Optional Printer Pedestal for CSF8600   | 395                     | NA                        | NA                      | NA                      |
| CSF8601             | Optional 23-inch Large Screen Monitor for System Console  | 2,358                   | 16                        | 157                     | 135                     |
| CSF8602             | Optional Ceiling Mount for CSF8601  | 195                     | NA                        | NA                      | NA                      |
| <b>MASS STORAGE</b> |   |                         |                           |                         |                         |
| MSP3882             | 3880 Mass Storage Subsystem includes mass storage processor; two-channel, FIPS-compliant system supports up to two MSU3380/81s and six MSU3382/83s  | 74,270                  | 200                       | 4,400                   | 3,745                   |
| MSP3886             | 3880 Mass Storage Subsystem includes mass storage processor; four-channel, FIPS-compliant system supports up to two MSU3380/81s and six MSU3382/83s   | 88,270                  | 224                       | 5,320                   | 4,550                   |
| MSU3381             | Mass Storage Unit; head-of-string double-capacity system provides 3.697 gigabytes of formatted capacity   | 122,500                 | 295                       | 7,100                   | 6,500                   |
| MSU3383             | Mass Storage Unit, secondary double-capacity system; up to three may be added to each MSU3380/3381  | 98,150                  | 215                       | 5,750                   | 5,200                   |
| MSF8030             | Primary Disk Channel Connection Feature for MSP8021/22/23; each connection feature provides one IOP channel, cables, and associated interface logic in the mass storage processor   | 6,000                   | 10                        | 360                     | 305                     |
| MSF8031             | Switched Disk Channel Connection Feature for MSP8021/22/23; each connection feature provides one IOP channel, cables, and associated interface logic in the mass storage processor  | 4,850                   | 8                         | 290                     | 245                     |
| MSF3882             | Upgrade from MSP3882 to MSP3886; upgrade kit includes two switched general disk channel connections to the IOP<br><br>Mass Storage Exchange Features:   | 15,000                  | 24                        | 920                     | 805                     |

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| MASS STORAGE (Continued)                     |  | Purch.<br>Price<br>(\$) | Monthly<br>Maint.<br>(\$) | 1-Year<br>Lease<br>(\$) | 4-Year<br>Lease<br>(\$) |
|--|--|-------------------------|---------------------------|-------------------------|-------------------------|
| MXF8622                                      | Channel Exchange Feature for MSP0607/0609  | 5,000                   | NA                        | NA                      | NA                      |
| MXF8624                                      | Channel Exchange Feature for MSP0611/0612  | 5,000                   | NA                        | NA                      | NA                      |
| MSF8626                                      | Channel Exchange Feature for MSF8012/8013/8016/8017 channel connections  | 5,000                   | NA                        | NA                      | NA                      |
| MXF8636                                      | Channel Exchange Feature for MSP3880   | 18,350                  | NA                        | NA                      | NA                      |
| MXF8638                                      | Channel Exchange Feature for MSP3884   | 36,700                  | NA                        | NA                      | NA                      |
| <b>MAGNETIC TAPE SUBSYSTEMS</b>              |  |                         |                           |                         |                         |
| MTS8225                                      | Magnetic Tape Subsystem; FIPS-compliant, 125 inches per second (ips), 800/1600 bits per inch (bpi) supports up to eight tape devices and requires either MTF8200 or MTF8201                                  | 48,000                  | 410                       | 2,913                   | 2,516                   |
| MTS8226                                      | Magnetic Tape Subsystem; FIPS-compliant, 125 ips, 1600/6250 bpi supports up to eight tape devices and requires either MTF8200 or MTF8201   | 45,000                  | 410                       | 2,774                   | 2,395                   |
| MTS8228                                      | Magnetic Tape Subsystem; FIPS-compliant, 200 ips, 1600/6250 bpi supports up to eight tape devices and requires either MTF8200 or MTF8201   | 47,000                  | 515                       | 2,876                   | 2,484                   |
| MTF8030                                      | Primary Tape Channel Connection Feature for MTP8021/8022/8023; each connection feature provides one IOP channel, cables, and associated interface logic in the magnetic tape processor                       | 5,000                   | 9                         | 300                     | 255                     |
| MTF8031                                      | Switched Tape Channel Connection Feature for MTP8021/8022/8023   | 4,850                   | 8                         | 290                     | 245                     |
| MTF8209                                      | Switched General Tape Channel Connection for MTS8225/26/28   | 8,000                   | 12                        | 421                     | 364                     |
| Magnetic Tape Channel Exchange Features:     |  |                         |                           |                         |                         |
| MXF8616                                      | Channel Exchange Feature for MTP0610; each exchange feature provides one IOP channel connection to connect tape processor that was previously attached to a Level 66 or DPS 8 system to a DPS 8000 system    | 5,000                   | NA                        | NA                      | NA                      |
| MXF8618                                      | Channel Exchange Feature for MTP0611 Magnetic Tape Processor; provides one IOP channel connection to connect existing processor previously attached to a Level 66 or DPS 8 to a DPS 8000 system              | 5,000                   | NA                        | NA                      | NA                      |
| MSF8620                                      | Channel Exchange Feature for MTF8012/8013/8016/8017 channel connections; provides one IOP channel connection to attach existing systems previously connected to a Level 66 or DPS 8 to a DPS 8000 system     | 5,000                   | NA                        | NA                      | NA                      |
| MXF8634                                      | Channel Exchange Feature for MTS8205/8206/8208 and MTF8202; provides one IOP channel connection to attach existing system previously attached to a DPS 8 to a DPS 8000 system                                | 9,175                   | NA                        | NA                      | NA                      |
| <b>UNIT RECORD PROCESSORS</b>                |  |                         |                           |                         |                         |
| URP8600                                      | Embedded Unit Record Processor; supports up to two CRU050/1050, PCU0120/0121, or CCU0401 card units  | 4,500                   | 8                         | 300                     | 225                     |
| URP8601                                      | Embedded Unit Record Processor; supports up to two PRU0901/0903/1201/1203 printers   | 4,500                   | 8                         | 300                     | 225                     |
| URP8602                                      | Embedded Unit Record Processor; supports up to two PRU1200/1600 printers   | 4,500                   | 8                         | 300                     | 225                     |
| <b>NETWORK PROCESSOR CHANNEL CONNECTIONS</b> |  |                         |                           |                         |                         |
| DCE8020                                      | Datanet 8 Network Processor Channel Connection Feature; each connection feature provides one IOP channel, cables, and associated interface in the Datanet 8  | 8,000                   | 72                        | 346                     | 295                     |
| DCE8119                                      | Datanet 8/10, 8/20, 8/30 Network Processor Channel Connection Feature; provides one IOP channel, cables, and associated interface in the Datanet systems   | 8,000                   | 72                        | 346                     | 295                     |
| Network Processor Channel Exchange Features: |  |                         |                           |                         |                         |
| MXF8628                                      | Channel Exchange Feature for Datanet 8 and PPS   | 3,500                   | NA                        | NA                      | NA                      |
| MXF8641                                      | Channel Exchange Feature for Datanet 8/10, 8/20, and 8/30  | 3,500                   | NA                        | NA                      | NA                      |
| MXF8630                                      | Channel Exchange Feature for Datanet 6641/6651/6661/6678; provides one IOP host connection feature to connect Datanet 66 processor previously connected to a Level 66 or DPS 8 system to the DPS 8000 system | 3,500                   | NA                        | NA                      | NA                      |
| Hyperchannel Connections:                    |  |                         |                           |                         |                         |
| MXF8640                                      | DPS 8000 Series Hyperchannel Connection Feature A161   | 14,000                  | 111                       | 1,111                   | 745                     |
| MXF8632                                      | DPS 8000 System Channel Exchange Feature for connecting existing A161 Hyperchannel Subsystem previously attached to a Level 66 or DPS 8 to an IOP  | 5,300                   | NA                        | NA                      | NA                      |
| MXF8639                                      | Power Sequence for FIPS channel/subsystem  | 3,200                   | 5                         | 200                     | 149                     |

NA—Not available.

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### SOFTWARE PRICES

|   | License<br>Orig.<br>Fee<br>(\$) | Monthly<br>License<br>Fee<br>(\$) | Initial<br>License<br>Fee<br>(\$) | Annual<br>License<br>Fee<br>(\$) |
|---|---------------------------------|-----------------------------------|-----------------------------------|----------------------------------|
| <b>GCOS 8 Software</b>  |                                 |                                   |                                   |                                  |
| GCOS 8 Operating System Executive minimum charges; license origination fee and monthly license fee depend on size of central system | 2,000                           | 500                               |                                   |                                  |
| GCOS 8 Operating System Executive maximum charges; license origination fee and monthly license fee depend on size of central system | 12,000                          | 4,700                             |                                   |                                  |
| Personal Computer Interconnect; volume copy license is available for quantities of 50 to 1,000 copies                               |                                 |                                   | 495                               |                                  |
| <b>Programming Languages:</b>   |                                 |                                   |                                   |                                  |
| Cobol-85 compiler; minimum charges  | 840                             | 420                               |                                   |                                  |
| Cobol-85; maximum charges   | 1,000                           | 500                               |                                   |                                  |
| Ada Language System; minimum charge   |                                 |                                   | 40,000                            | 12,000                           |
| Ada Language System; maximum charge   |                                 |                                   | 50,000                            | 15,100                           |
| <b>Data Management:</b>   |                                 |                                   |                                   |                                  |
| Interrel integrated relational data management software; minimum charges  | 8,000                           | 950                               |                                   |                                  |
| Interrel integrated relational data management software; maximum charges  | 14,000                          | 2,100                             |                                   |                                  |
| Development Center Nucleus; 90-day trial period is available for a license fee of \$10,000 ■  | 9,450                           | 3,150                             |                                   |                                  |