

# Unisys 2200 Series

## MANAGEMENT SUMMARY

The 2200 Series was announced in October 1986 by Sperry Corporation, which had recently been acquired by Burroughs Corporation. The new company formed by the merger was subsequently named "Unisys."

Unisys is touting the 2200/200 as a new category of computer: the "midframe." The new systems are said to offer the performance of a mainframe with the small size and ease of use of a minicomputer. The 2200/200 systems can be used as central computers, as departmental machines, or as special-purpose systems. No special flooring or air-conditioning is required for the basic models.

The 2200/200 models are built around a new 256K-bit CMOS chip technology. They use the 1100 Series instruction set, including the Extended Instruction Set, and run the 1100 Operating System. Four models are available: the uniprocessor 2200/201, the dual-processor 2200/202, the three-processor 2200/203, and the four-processor 2200/204. The 2200/201 and 2200/202 are housed in the basic system cabinet. Adding the third and fourth processor requires an expansion cabinet. Main memory ranges from 8 megabytes to 48 megabytes, with the basic cabinet holding up to 24 megabytes.

The system cabinets also house the I/O Processor, integrated disk and tape drives, and various adapters and channel interfaces. A wide variety of peripherals and communications devices can be connected to the system.

Unlike most mainframe systems, the 2200/200 systems use a bus architecture. The System Bus (S-Bus) transfers in- ➤

The 2200/200 systems are modular mid-range systems that use the instruction set and operating system of the 1100 Series mainframes developed by Sperry Corporation. The systems can have up to four central processors housed in one or two desk-sized cabinets.

**MODELS:** 2200/201, 2200/202, 2200/203, and 2200/204.

**CONFIGURATION:** From 1 to 4 CPUs, 8MB to 48MB of main memory, 32KB of cache per CPU, 2 to 16 integrated disk drives, 1 to 4 integrated cartridge tape drives, and 2 to 224 workstations/terminals.

**COMPETITION:** Digital Equipment 8200 and 8300; IBM 9370, System/38, and 4300 Series; and NCR 9800.

**PRICE:** Basic purchase prices range from \$153,340 to \$415,690.

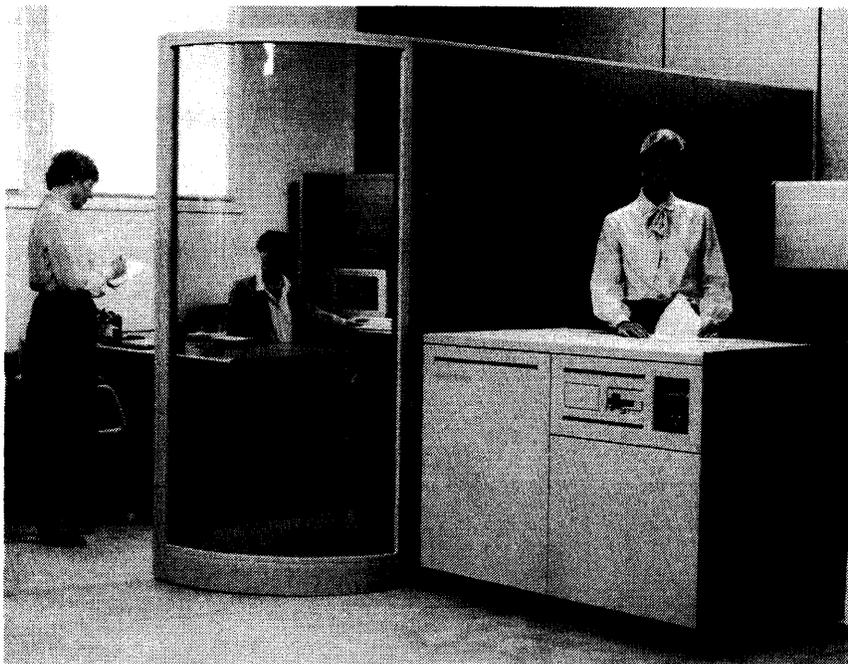
## CHARACTERISTICS

**MANUFACTURER:** Unisys Corporation, P.O. Box 500, Blue Bell, Pennsylvania 19424. Telephone (215) 542-4011. In Canada: Unisys, Inc., 55 City Centre Drive, Mississauga, Ontario.

**MODELS:** 2200/201, 2200/202, 2200/203, and 2200/204.

## DATA FORMATS

**BASIC UNIT:** A 36-bit word. In main storage, each word location includes four additional parity bits. ➤



*The 2200/201 is the entry-level model in Sperry's new 2200 Series of mid-range systems. The 2200/201 is equipped with 8 megabytes of main memory, expandable to 24 megabytes. Up to eight integrated disk drives can be added to the basic 2200/201 cabinet, which occupies only 10.5 square feet of floor space.*

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➤ instructions and data among the Instruction Processors (the central processors), the I/O Processors, and main memory. The I/O Processor uses a transfer bus (T-Bus) with interfaces to peripherals and communications devices. There is another bus, the L-Bus, that runs off the T-Bus and supports communications lines and a laser printer.

The 2200/200 effectively replaces the System 11/Mapper 10 system, Sperry's earlier 1100 Series-compatible small system. The 2200 now provides the entry to the 1100 family. It uses the same software and much of the same hardware as the 1100/60, 1100/70, and 1100/90 systems. The vendor has stated that the 2200/200 models are the first of a new integrated family. Future additions to the family are expected to provide a growth path for 1100/70 and 1100/90 users.

Performance of the new systems ranges from 1.2 MIPS (million instructions per second) for a 2200/201 to 4.2 MIPS for a 2200/204 in a mixed business/scientific environment. In a strictly scientific environment, the 2200/204 operates at 5.4 MIPS. In comparison, the 1100/60 and 1100/70 have MIPS ratings of 0.5 to 5.7, and the 1100/90 has a rating of 5 to 25 MIPS.

### COMPETITIVE POSITION

One of the major competitors for the 2200/200 is IBM's new 9370 superminicomputer. Like the 2200/200, the 9370 is a mid-range system that uses mainframe architecture; in this case, System/370 architecture.

The 9370 family includes four models, all of them uni-processor models. According to Unisys, the 2200/200 will compete with the two high-end 9370 models. Main memory on the larger 9370 models ranges from 8 to 16 megabytes, compared to the 2200/200's 8 to 48 megabytes. IBM does not release MIPS ratings, so performance comparisons are difficult.

The 9370 is a rack-mounted, bus-oriented system that supports a wide variety of peripherals. Unlike the 2200/200, however, the 9370 includes no integrated peripherals or control units in the basic system. A 2200/201 system with 8 megabytes of main memory, 32K bytes of cache memory, two integrated hard disk drives, two display terminals, one I/O Processor, and the integrated controllers/adapters sells for \$153,340. The IBM 9375 Model 60 with 8 megabytes of main memory and a processor console costs \$93,000, while a top-of-the-line 9377 Model 90 with 8 megabytes of main memory and a processor console costs \$190,000. Other system components cost extra.

Unisys also has the advantage over IBM on delivery schedules. The 2200/200 systems were available as early as December 1986, whereas the 9375 Model 60 and the 9377 Model 90 won't be available until the third and fourth quarter of 1987, respectively.

The 2200/200 systems will also compete with the Digital Equipment 8200 and 8300 systems and the NCR 9800, which was introduced earlier this year. The new NCR ➤

➤ **FIXED-POINT OPERANDS:** One 36-bit single-precision word. Addition and subtraction can also be performed upon 2-word (72-bit) double-precision operands and upon 18-bit half-words and 12-bit third-words; the left-most bit holds the sign in each case. Moreover, partial words of 6, 9, 12, or 18 bits can be transferred into and out of the arithmetic and control registers.

**FLOATING-POINT OPERANDS:** One word, consisting of 27-bit-plus-sign fraction and 8-bit exponent for single precision; or two words, consisting of 60-bit-plus-sign fraction and 11-bit exponent for double precision. The sign is the most significant bit in single precision (bit 35) and double precision (bit 71). Negative floating-point numbers are represented by the one's complement of the entire corresponding positive floating-point number. Single-precision negative exponents are biased by 128, while double-precision negative exponents are biased by 1,024.

**INSTRUCTIONS:** One word, consisting of 6-bit Function Code, 4-bit Partial-Word or Immediate-Operand Designator, 4-bit Control Register Designator, 4-bit Index Register Designator, 1-bit Index Modification Designator, 1-bit Indirect Address Designator, and 16-bit Address Field.

**INTERNAL CODE:** Unisys (Sperry) communications terminals and other I/O units can employ a 6-bit Fielddata code or standard ASCII code. The 2200 processors are not code sensitive and can manipulate data in 6-bit, 9-bit, 12-bit, or 18-bit codes.

### MAIN MEMORY

All main memory is housed in the 2200 system cabinet.

**STORAGE TYPE:** Complementary metal oxide semiconductor (CMOS) using 256K-bit chips.

**CAPACITY:** See Table 1.

**CYCLE TIME:** Not specified by the vendor.

**CHECKING:** The Main Storage Unit (MSU) contains circuitry for single-bit error detection and correction and detection of double-bit errors. Multiples of double-bit errors and some odd multiples of double-bit errors are also detected. Memory errors are detected using a 7-bit hamming code generated for all read and write operations.

A parity bit with each half-word is checked whenever storage is referenced for I/O transfers via the two I/O unit interfaces. The MSU also detects single-bit address errors and out-of-bounds addresses.

**RESERVED STORAGE:** Not specified by the vendor.

### CENTRAL PROCESSORS

All 2200 Series systems are based on the same Instruction Processor (IP) that performs all logical, arithmetic, and instruction sequencing operations. Each IP contains a 32K-byte cache memory.

The 2200 Series processors use a new 256K-bit chip set, which incorporates 1100 Series architecture. Six chips make up the basic 2200 Instruction Processor: the Arithmetic Logic Unit chip, which supports all arithmetic and logic functions; the Address Generator Unit chip, which performs basic and extended addressing; the Decode/Control chip, which performs the first level of decoding on instructions and sends the starting microcode address to the other chips; the Cache Interface chip, which supports the system's cache memory; the Extended Instruction Set chip, which provides extensions to the basic 1100 Series instruction set; and the ➤

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TABLE 1. SYSTEM COMPARISON

MODEL	2200/201	2200/202	2200/203	2200/204
<b>SYSTEM CHARACTERISTICS</b>				
Date announced	October 1986	October 1986	October 1986	October 1986
Date first delivered	December 1986	December 1986	December 1986	December 1986
Field upgradable to	2200/202	2200/203	2200/204	—
Relative performance	1.2 MIPS	Not specified	Not specified	4.2 to 5.4 MIPS
Number of processors	1	2	3	4
Cycle time, nanoseconds	Not specified	Not specified	Not specified	Not specified
Word size, bits	36	36	36	36
Operating systems	1100 OS	1100 OS	1100 OS	1100 OS
<b>MAIN MEMORY</b>				
Type	256K-bit CMOS	256K-bit CMOS	256K-bit CMOS	256K-bit CMOS
Minimum capacity, bytes	8M	16M	16M	16M
Maximum capacity, bytes	12M	24M	48M	48M
Increment size, bytes	2M	2M	2M	2M
Cycle time, nanoseconds	Not specified	Not specified	Not specified	Not specified
<b>BUFFER STORAGE</b>				
Minimum capacity	32KB	32KB per CPU	32KB per CPU	32KB per CPU
Maximum capacity	32KB	32KB per CPU	32KB per CPU	32KB per CPU
Increment size	None	None	None	None
<b>INPUT/OUTPUT CONTROL</b>				
Number of channels:				
Byte multiplexer	0	0	0	0
Block multiplexer	Up to 4	Up to 4	Up to 8	Up to 8
Word	0	0	0	0
Other	Up to 5 DCC IIs	Up to 5 DCC IIs	Up to 10 DCC IIs	Up to 10 DCC IIs

➤ systems are bus-oriented, multiprocessor systems designed for on-line transaction processing. According to NCR, the 9800 processors perform at 0.6 to 8.0 MIPS, depending upon the number of processors in the configuration. The 9800 systems include from one to eight application processors, which correspond to the central processor on other systems, and from one to four data storage processors that serve as file processors for main memory. Main memory ranges from 2 to 48 megabytes. Prices for the 9800 systems range from \$41,220 for an entry-level system with one application processor to \$340,508 for a system with eight application processors and 32 megabytes of memory.

#### ADVANTAGES AND RESTRICTIONS

Because the 2200/200 systems use the 1100 Operating System, they are completely compatible with most of the 1100 Series software. The new systems thus provide a growth path for users who want to start with a smaller system than the 1100/70 system.

The 2200/200 systems also use many 1100 Series peripherals, including the Uniservo 22, 24, 26, and 28 Magnetic Tape Subsystems and the 0776 Line Printers. Thus, if users want to trade up to an 1100 Series system in the future, they will not have to replace all of their peripheral equipment.

Because of its modular design, the 2200/200 offers a great deal of configuration flexibility. The various buses, channels, and interfaces enable users to add peripheral devices as needed and to choose the most practical or economical method of connecting them to the system.

Communications options provide further flexibility. Each integrated Workstation Control Unit permits the direct connection of up to 16 terminals. The new Programmable Line Module is an integrated communications processor ➤

➤ optional Multiply/Divide chip, which provides hardware acceleration for multiply and divide instructions.

At the heart of the 2200 Series systems is the System Bus (S-Bus), which transfers instructions and data among system components at 29.6 megabytes per second. In addition to connecting the Instruction Processor, I/O Processor, and Main Storage Unit, the S-Bus has six expansion slots for attaching I/O channels.

**SPECIAL FEATURES:** The 2200 Series Instruction Processor provides a duplicate, mirror processor that checks each operation in parallel with the basic processor to ensure integrity and accuracy. If the Instruction Processor fails, the redundant processor can take over its functions.

**PHYSICAL SPECIFICATIONS:** The basic 2200 system cabinet measures 50 inches in width, 38 inches in height, and 30 inches in depth. The cabinet weighs 420 pounds. The 2200 operates at 50 or 60 hertz and has a heat dissipation rate of 7,200 Btus. The basic system cabinet does not require special flooring, electrical connections, or cooling.

#### CONFIGURATION RULES

The basic 2200/201 system includes one Instruction Processor (IP) with 32K bytes of cache memory. The basic system cabinet also contains one Main Storage Unit (MSU), the System Bus (S-Bus), the Input/Output Processor (IOP), two integrated 140MB hard disk drives, and a Workstation Control Unit (WCU). Two SVT-1121 display terminals are also included in the basic configuration.

The MSU includes 2M words (8M bytes) of main memory, expandable to 3M words (12M bytes). Two MSUs with a total of 24M bytes of memory may be housed in the basic cabinet.

Up to eight integrated disk drives can be housed in the basic system cabinet. One tape subsystem is required. An integrated F4071 Cartridge Tape Subsystem, a Uniservo 18 Streaming Tape Subsystem, or Uniservo 22 or 24 Tape Subsystem can be used to meet that requirement. Two cartridge tape units fit into the basic cabinet. In addition, up to 7 WCUs, each supporting 16 terminals/workstations, can be housed in the basic cabinet. ➤

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► capable of supporting a number of communications protocols. For larger installations, the Distributed Communications Processors (DCPs) can be connected to the 2200/200 to off-load communications processing from the central processors. In a distributed network, the 2200/200 system can serve as either the host or as a departmental machine communicating with another 2200/200, with an 1100 Series host, or with an IBM host.

It is too early to judge the 2200 Series' performance, or to be sure just what effect the Sperry-Burroughs merger will have. The 2200/200 currently serves as the entry-level 1100 Series system. If Unisys continues with plans for larger 2200 Series models, the new product line will also provide a better growth path for 1100 Series users. Should these plans be discontinued, however, the future of the 2200 Series would be uncertain at best. □

► The 2200 Series system can be expanded by adding additional components to the basic cabinet, by adding an expansion cabinet, and by adding external peripherals. The 2200/201 can be upgraded to a 2200/202 dual-processor system by installing a second Instruction Processor in the basic cabinet. Further expansion to a three-processor 2200/203 or four-processor 2200/204 requires an expansion cabinet. In addition to the third or fourth IP, the expansion cabinet can house an IOP, two MSUs, eight integrated disk drives, and two cartridge tape drives. Thus, a maximum 2200/204 system includes 4 IPs, 48 megabytes of memory, 2 IOPs, 16 integrated disk drives, and 4 cartridge tape units.

External disk drives, tape drives, printers, and communications processors can be added through the various adapters and channels available for the 2200 Series systems. These are described below.

### INPUT/OUTPUT CONTROL

The integrated I/O Processor occupies one slot on the System Bus. The IOP uses a transfer bus (T-Bus) with five slots for the interfaces that connect peripherals and communications devices to the 2200 Series system. In the basic system cabinet, one slot must contain a SCSI (Small Computer System Interface) Host Adapter (SHA) and one slot must contain an L-Bus Adapter (LBA).

The integrated disk and tape units connect to the system through the SHA, which supports six peripheral devices. Up to three SHAs can be housed in each 2200 Series cabinet.

The L-Bus supports the Workstation Control Units, the Nonimpact Printer Control Unit (NIPCU), and communications lines. The NIPCU provides the interface for the Model 47 Laser Printer. One L-Bus can be housed in each 2200 Series cabinet.

The Byte Peripheral Adapter (BPA) provides the interface for the Uniservo 18 Streaming Tape Subsystem, Uniservo 22 and 24 Tape Subsystems with integrated controllers, the 0789 Line Printer, and the DCP/10A and DCP/15 communications processors. The BPA has four drops and occupies one slot on the T-Bus.

Two types of I/O channels are also available. The Disk Controller Channel II (DCC II) supports up to eight external Model 8451 Disk Subsystems. The 8451 drives each provide 400 megabytes of formatted storage. The DCC II occupies one slot on the S-Bus. Five DCC IIs can be housed in each 2200 system cabinet. The Block Multiplexer Chan-

nel (BMC) supports up to eight peripheral devices, including the Uniservo 26 and 28 Tape Subsystems, the 0716 Card Reader, the 0776 Line Printer, the Hyperchannel, the DCP/20 and DCP/40 communications processors, and the Interprocessor Channel Coupler. The BMC occupies one slot on the S-Bus; four BMCs can be housed in one system cabinet. The DCC II and BMC are mutually exclusive.

### MASS STORAGE

For disk drives supported on the 2200 Series, please refer to Table 2.

### INPUT/OUTPUT UNITS

Magnetic tape subsystems and printers for the 2200 Series are listed in Table 3.

### TERMINALS

Workstations for the 2200 Series are described in Table 4.

### COMMUNICATIONS

The integrated *Workstation Control Unit (WCU)* provides for the attachment of up to 16 SVT-1121, PC/microIT, or older UTS 20L workstations to a single 250K bit-per-second coaxial cable directly connected to the system. The WCU connects to an L-Bus Adapter (LBA), which has eight ports and occupies one slot on the T-Bus of the I/O Processor. Up to seven WCUs can be housed in the basic 2200 Series cabinet. The WCU can be used to off-load the Distributed Communications Processor (DCP) in a communications network.

The *Programmable Line Module (PLM)* is a single-board communications processor that can be integrated into the basic cabinet of a 2200 Series system and connected to the LBA. The PLM provides one megabyte of storage, a host interface, and two RS-232-C interfaces. Line speeds of 19.2K bits per second are supported. Each 2200/200 system cabinet can house three PLMs or one PLM with an expansion line module that supports a specific communications protocol. Available protocols include Sperry Uniscope, Unix, packet switched public data network, X.21, X.25, NTR, and IBM RJE, 3270, and SNA. The PLM supports up to six communication lines per 2200 system cabinet.

The *Central Support Interface Line Module (CSI LM)* provides connection through a modem to a Unisys computer located in the Unisys Support Center. The CSI LM provides remote diagnostics and transfer of diagnostic information and data files.

Also available are the *Hyperchannel* and *Interprocessor Channel Coupler (IPCC)*, two freestanding units that link multiple 2200 Series systems to each other and to Unisys 1100 Series systems via a high-speed channel.

*DCP/Telcon* is an intelligent communications system that provides basic hardware, software, and peripherals for users with large communications networks. The system can operate as a front-end processor for 2200 Series and 1100 Series host processors, as a network nodal processor, or as a remote concentrator. As such, it provides networks that support realtime, time-sharing, remote job entry, and message switching applications. The major components of Telcon are the Distributed Communications Processor (DCP) and the Telcon network software. Multiple DCPs can be combined to form a node of high throughput and processing capability.

Four DCP models are available: the DCP/10A, DCP/15, DCP/20, and DCP/40. The entry-level DCP/10A includes a processor, 512K bytes of memory, and communications line

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► modules. The DCP/10A supports 8 half- or full-duplex communications lines. It connects to the 2200 Series through the Byte Peripheral Adapter.

The DCP/15, announced in October 1986, will supersede the DCP/10A. The DCP/15 includes a processor, from 2 to 4 megabytes of memory, integrated diskette, integrated hard disk, and communications line modules. It supports up to 52 full-duplex communications lines and connects to the 2200 Series via the Byte Peripheral Adapter.

The DCP/20 system consists of a processor with 512K to 2048K bytes of memory, one to three I/O Processors, and communications line modules. The main processor performs both generalized communications processing and input/output processing; the I/O Processors perform input/output processing only. The DCP/20 connects to a 2200 Series system via a Block Multiplexer Channel.

Each DCP/20 I/O Processor provides programmed control for up to 16 data paths, which can be a combination of serial lines to remote equipment, channels to peripheral devices, or channels to on-site host 2200 Series, 1100 Series, or 90 Series processors. Each operational port on the I/O processors requires one line module, which provides an interface to a line and performs various communications functions such as control character recognition and line timing. The DCP/20 accommodates asynchronous, synchronous, and wideband transmission at up to 64K bits per second. It supports Universal Data Link Control (UDLC) as well as character-oriented communications protocols.

The DCP/40 system also connects to a 2200 Series system via a Block Multiplexer Channel. The DCP/40 includes a processor with 512K to 4096K bytes of memory, expandable in 512K-byte increments. A maximum DCP/40 may include up to 16 I/O processors, each of which provides program control for up to 16 communications channels. Each can handle a mixture of remote lines, parallel interfaces, and host channel connections. Each I/O Processor is programmed separately using a set of more than 60 macro instructions and each handles, in addition to data transmission and receipt, remote terminal polling, error checking and recovery, dynamic buffer allocation, reporting of line status, and recording of error and traffic statistics. The DCP/40 supports up to 1,016 full-duplex communications lines.

The DCPs are modular hardware systems that can be tailored to meet the needs of a broad range of users. The network software, Telcon, like the hardware, is also modularly structured and readily tailored by the user. A repertoire of more than 285 instructions is available to the user for the generation, assembly, and loading of message-handling routines.

Software and firmware terminal handlers in the DCPs are available for most standard Unisys (Sperry) terminal devices, as well as for terminals from other vendors, including Teletype and IBM 3270 and 2780/3780 batch. Other software modules handle particular line protocols, such as the UDLC trunk lines, or access links to/from X.25 packet-switching services.

Peripherals available for the DCPs include hard disk subsystems, diskette subsystems, magnetic tape subsystems, and printers. The DCPs require an operator console, which can be a UTS 20 terminal, an SVT-1121 terminal, or a UTS 400 terminal attached to a communications line.

### SOFTWARE

**OPERATING SYSTEM:** The 2200 Series systems use the *1100 Operating System*, which supports batch, transaction, realtime, and interactive processing in multiprogramming, multiprocessing, and distributed processing environments.

Batch processing jobs can be submitted either locally or remotely. A scheduling routine selects the runs to be initiated in accordance with user-assigned priorities and deadlines.

The demand processing facilities of the 1100 Operating System permit interactive use of the system by multiple users at remote terminals. By means of the Executive Control Language, demand-mode users can compile and execute programs, use library facilities, and communicate with the computer center and with other terminals.

Realtime and communications programs, which are subject to specific time constraints, receive top-priority handling by the 1100 Operating System. Realtime programs receive privileged access to system resources, such as central processors, memory, and input/output channels, and have a priority higher than any other processing except for Executive interrupt processing. Interrupt processing routines can be defined for each realtime communications line; they execute at a higher priority than all other processing.

Multiprocessing is handled as a logical extension of the 1100 Executive's multiprogramming capabilities. The system maintains a list of processor activities currently waiting to be performed. Each processor inspects this list, selects a task, and executes it. One processor can interlock the others while referencing critical areas of common data, and various other techniques are employed to guard against interprocessor interference.

Standard system software for the 2200 Series comes in a pregenerated form called the *General Purpose Typical Executive (GPTE)*. GPTE is ready to use and requires minimal site tailoring. For sites requiring more tailoring, Mixed Mode Executive, a symbolic form of the standard software, is available. The Mixed Mode Executive permits traditional system generation and maintenance.

GPTE includes the 1100 OS Executive and a number of other programs, including the following: Customer On-Site Maintenance and Installation System (COMUS), the Symbolic Stream Generator (SSG), the Site Administration Package (SIMAN), the Post-Mortem Dump Processor (PMD), the Element Processor (ELT), the Procedure Definition Processor (PDP), the File and Program Utility Processor (FURPUR), the Meta-Assembler (MASM), the Communications Management System 1100 (CMS 1100), the File Administration System (FAS), the Integrated Recovery Utility (IRU), the Transaction Interface Package (TIP), and the Display Processing System (DPS).

COMUS facilitates the installation and maintenance of the Executive software and program products. COMUS provides a high-level interface that directs an automatic system generation process. COMUS also supports an interface for installing all software into the system libraries. Augmenting COMUS is the Symbolic Stream Generator (SSG). Directions and models for building the desired stream images are conveyed to SSG through a skeleton program. The resulting symbolic output streams can be placed in a user-specified file, printed, and dynamically added for execution after SSG terminates. SSG also helps to maintain symbolic input files that may be printed, corrected, and updated for later use.

SIMAN provides a single interface for the site administrator to define users' quota limits, Terminal Security System (TSS) data, and system security data. TSS permits each installation to establish a file of valid remote system users through user identification codes, passwords, and other pertinent information. SIMAN allows installation passwords to be changed dynamically and enables users to be selected as masters or submasters to allow delegation of authority in creating and updating identifications and passwords in the TSS file. Each installation can define the action ►

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TABLE 2. MASS STORAGE

MODEL	4113	8451
Cabinets per subsystem	—	4
Disk packs/HDAs per cabinet	8	2 to 4
Capacity	140MB	400MB
Tracks/segments per drive unit	—	17,064
Average seek time, msec.	25	—
Average access time, msec.	—	20
Average rotational delay, msec.	—	8.3
Data transfer rate	1.2M bytes/sec.	1.87 bytes/sec.
Controller model	Integrated	Integrated
Comments	A 5¼-inch Winchester disk drive housed in the 2200 system cabinet	A freestanding fixed-disk subsystem

► to be taken in the event of an attempted security violation. SIMAN is also a security control processor that is used to create and maintain a user security profile data base, which is then used to control user access to files and certain privileged functions.

PMD is a user debugging aid that produces edited dumps of the contents of main storage if the program terminates abnormally. Optionally, a dump can be produced when a program terminates normally.

ELT is used to insert symbolic, relocatable, absolute, or omnibus elements into a program file from images in the runstream.

PDP processes symbolic elements that may contain Assembler, Fortran, or Cobol procedures and produces entries in the table of contents of a program file.

FURPUR consists of a set of file maintenance routines that provide for the management and manipulation of cataloged or temporary files containing data or programs.

MASM is described under the Programming Languages section of this report. FAS and IRU are described under Data Management; CMS 1100, under Data Communications. A description of DPS and TIP can be found in the Other Software section.

**PROGRAMMING LANGUAGES:** The 2200 Series supports Cobol, Fortran, and RPG II. Also available are the Macro general-purpose processor, which extends host languages through its ability to process character strings, and the Meta-Assembler (MASM), which is tailored to be particularly efficient for the 1100 Series instruction set.

**DATA BASE MANAGEMENT:** The *Universal Data System (UDS) 1100* is designed to provide 1100 Series users with a single unified data subsystem that furnishes the data management services for all components of the 1100 Operating System. UDS 1100 components include the UDS 1100 Control, Data Management System (DMS) 1100, Processor Common Input/Output System (PCIOS), Relational Data Management System (RDMS) 1100, Data Dictionary System (DDS) 1100, Define File Processor (DFP), Integrated Recovery Utility (IRU), File Administration System (FAS), and Shared File System (SFS).

The UDS 1100 Control is the on-line data manager of UDS, which provides a complete range of data structures, utility programs, and support programs. UDS 1100 Control integrates these different programs and manages the movement of data between data models. It also centralizes functions such as audit trails and administration.

DMS 1100 is a comprehensive data base management system developed under the guiding principles of the CODASYL Data Base Task Group. It is designed to satisfy the need for standardized data management techniques that

provide the following capabilities: separation of the data definition and data manipulation functions, an acceptable degree of data independence, data base protection and integrity, and alternate data access methods. DMS has four principal components: a Data Description Language, a Data Manipulation Language, a Data Management Routine, and a Data Recognition Utility.

The Data Description Language is a standalone language whose record descriptions are compatible with those of Cobol. The Data Manipulation Language consists of commands embedded in Cobol and Fortran to allow these host languages to manipulate the data base via DMS 1100. The Data Management Routine, the key operational component of DMS 1100, maintains the data base and preserves its integrity. The Data Reorganization Utility provides for optimization of the physical placement of records within an existing data base without the need for tailored unload and reload programs.

QLP 1100 is an English-language inquiry system that allows inquiries to be made to data bases generated under DMS 1100. QLP 1100 has the ability to access standard data files and incorporates extended reporting capabilities. It uses a command language designed around a simplified English syntax and requires a minimum knowledge of the DMS 1100 data base structure. QLP can operate either in demand or batch mode, although the primary mode is interactive. Its two major component modules, the Scan Parser, which analyzes incoming commands, and the Task Translator, which accesses the data base, are both reentrant. Through the use of the QLP command languages, users can inquire into the data base, update records, add new records, or delete records. QLP 1100 uses a Subschema Data Definition Language (QLPSDDL) similar to the DMS 1100 DDL. Access to the data base via QLP is regulated by the Data Base Administrator through use of SDDL. QLP also provides a report writer and procedural facilities.

DMS 1100 is described in more detail in Report SW25-944YT-101 in Volume 3 of *Datapro 70*.

PCIOS is designed to ensure compatible data file formats. It supports sequential, indexed sequential, and multikeyed sequential access methods for ASCII Cobol, ASCII Fortran, RPG, Sort, and QLP.

RDMS 1100 provides definition and access for both host language programming and end-user interface software. Relational data bases are defined by the data manipulation language used for retrieval and updating of data. The Relational Transformation Language provides relational views of other data bases, such as DMS 1100. Also available is the Relational Syntax Analyzer (RSA), which permits ASCII Cobol and ASCII Fortran users to access RDMS under UDS.

DDS 1100 provides a means for the centralized description, location, and control of the various elements within a user

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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.
4071 Cartridge Tape	—	8000	QIC 24	90	90,000
Uniservo 18 Streaming Tape	9	1600	PE	25	40,000
	9	1600	PE	100	160,000
Uniservo 22	9	800	NRZI	75	60,000
	9	1600	PE	75	120,000
Uniservo 24	9	800	NRZI	125	100,000
	9	1600	PE	125	200,000
Uniservo 26	9	1600	PE	75	120,000
	9	6250	GCR	75	470,000
Uniservo 28	9	1600	PE	125	200,000
	9	6250	GCR	125	780,000
Printers	Printing Speed	Print Positions	Horizontal Spacing, Chars./Inch	Vertical Spacing, Lines/Inch	Form Size, Inches
Model 47	19 ppm	105, 127, or 159	10, 12, or 15	—	8.5 to 14 wide
0789-20	300 or 640 lpm	132	10	6 or 8	Up to 15 wide
0776-00	760 lpm	136	10	6 or 8	4.0 to 18.75 wide, 24 long
0776-02	900 lpm	136	10	6 or 8	Same
0776-04	1200 lpm	136	10	6 or 8	Same

► data base environment. DDS 1100 consists of a data base of information, called the meta-data base, about the entities in the user data base environment, as well as a set of processors that access the meta-data base for the purpose of creating, updating, and reporting information.

DFP provides a data file description external to the program processing the file. Using DFP, programs written in Fortran, Cobol, and RPG are file format independent and can share common files.

IRU provides the user with English-language commands to initiate a variety of integrity features and capabilities. IRU can be used to compare complete or partial records between files.

FAS provides administrative control over policies for file operations, file maintenance, and file recovery. FAS includes capabilities for mass storage file backup, archiving, and reporting. It also provides for the administration of hierarchical files and directories.

UDS SFS is a collection of file access routines that support file handling for Unisys-developed language processors. Files written by an application developed in one programming language can be read and updated by applications developed in another programming language. Files can be concurrently accessed by more than one user. SFS contains a logical data manager, a storage record manager, and data banks. A Data Dictionary System command is used to designate a file as shared.

**DATA MANAGEMENT:** The *Information Management System (IMS) 1100* is an interactive transaction processing

system compatible with the IMS 90 used on the Sperry 90 Series computers. It provides defined record management and access to both data and conventional files. IMS 1100 interfaces with DMS 1100 data bases.

**DATA COMMUNICATIONS:** The 2200 Series systems support the following data communications packages: the Communications Management System (CMS) 1100, the Programmable Line Module (PLM) 1100, the Processor Common Communication System (PCCS) 1100, the Remote Batch File Transfer/Extended (RBFTE), On-Line Disk/1100, and On-Line Transfer/1100, as well as the Distributed Communications Architecture (DCA).

The *Communications Management System 1100* is the communications network interface for all 2200 Series processors to a DCA-based DCP/Telcon network. It has been separated from the 2200 system generation process, thus allowing the entire terminal network configuration to be generated, checked, and corrected without generating a full system. CMS has cognizance of all terminals in the network and handles polling, parity checking, data blocking, data packing and unpacking, message envelope formatting, message acknowledgement, message queuing, and other message control procedures. The message queue can be maintained in main and/or auxiliary storage. A Protocol function determines what the current activity on each circuit should be in terms of overall system loading, availability of facilities, user-specified priorities, type of circuit or device, and activity response level from the terminal.

CMS handles the standard Unisys (Sperry) terminals, as well as "alien" terminal devices. For alien devices the user must supply a skeletal communications control routine that

## Unisys 2200 Series

► interfaces into the device-control master service routine of CMS.

The *Programmable Line Module 1100* software supports the PLM communications processor integrated into the 2200 Series systems. PLM 1100 operates within the PLM hardware to provide for the attachment of terminals and other host systems. It supports front-end processors in a DCA environment.

PLM 1100 includes the following modules: PLM-UTS, which supports Sperry UTS terminals; PLM-BSC 3270, which emulates IBM 3270 terminals; PLM-DDP, which provides interconnection to DCP/Telcon networks, host-to-host 2200 connection, and DDP 1100 interconnections; PLM-RJE, which provides for data interchange between a 2200/200 and an IBM host; PLM-SX1100, which supports Unix environments; PLM-X25 and PLM-X21, which connect a UTS 4000 terminal to the X.25 or X.21 Public Data Network; PLM-SNA, which provides IBM SNA support; PLM-OIS, which supports office terminals; and PLM-NTR, which supports batch terminals that emulate NTR protocol.

Using COMUS, a PLM 1100 configuration is tailored to match the site hardware. Then the executable software and the configuration tables are loaded into the 2200/200 host, and the communications lines are initialized. PLM 1100 interfaces with CMS 1100.

The *Processor Common Communication System 1100* provides a means by which application programs developed in high-level languages such as Cobol can utilize the 2200 Series communications system. Programs using PCCS 1100 can communicate with other communication programs, terminal users, remote batch systems, and certain host computers.

The *Remote Batch File Transfer/Extended* enables the transfer of files between 2200/200 systems and IBM host systems connected by a bisynchronous communications 2780/3780 line. RBFTE permits file transfers to be initiated from either the Unisys or IBM host. The 2200/200 system must include PLM/RJE software or a DCP/20 or DCP/40 communications processor.

*On-Line Disk/1100* permits a 2200 or 1100 Series host-cataloged file to be used as a Unisys (Sperry) personal computer hard disk to provide a virtual disk capability for the PC user. Thus, the mainframe can access data on the PC, and the PC can access data on the mainframe. A companion product, *On-Line Disk/PC*, must be installed in the personal computer.

*On-Line Transfer/1100* allows for the transfer of ASCII files between a 2200 or 1100 Series mainframe and a Unisys (Sperry) personal computer. The package supports both synchronous and asynchronous environments.

The *Distributed Communications Architecture* describes the currently available communications hardware and software components through which networking of Unisys (Sperry) processors and terminal devices is achieved.

Whether network control is host dependent or host independent, there are still certain hardware components and subsystems required to implement a DCA network. Inherently, a DCA node or host must contain several software components that provide it with the network interface.

The capability of completely separating communications management from applications processing is a key characteristic of DCA. The off-loading of communications processing permits the host or hosts to concentrate their energies on applications processing, their primary function. Another

characteristic of DCA is its ready acceptance of other vendors' terminals, processors, and networks.

An extensive library of modular network management applications is available. User programming for tailored communications functions (such as message switching) is also fully supported.

A minimal DCA network requires a DCA host with a communications subsystem. A DCA terminal is generally one for which a standard terminal-handling module is available. In DCA, each terminal might be operating with different character codes (ASCII, EBCDIC), transmission modes (start/stop asynchronous, character synchronous), or terminal protocols (U100, IBM 2780). It is the responsibility of the Distributed Communications Processor closest to the terminal to translate its data format into a common trunk language—typically UDLC.

UDLC is a bit-oriented, synchronous protocol designed for full-duplex operation. Devices connected by UDLC trunks can utilize either switched or nonswitched, voice grade or digital lines. UDLC, like its SDLC, HDLC, and ADCCP predecessors, uses bit sequences rather than whole characters for control codes. (Hence the nomenclature "bit oriented.") This characteristic permits much more control information to be contained in the same or smaller amount of message space.

**PROGRAM DEVELOPMENT:** *Mapper 1100* is a realtime report processing system for multiple terminal systems. Data is collected and updated via the CRT display units in free-form or prescribed report formats. Functions such as record and page display, update, search, sort, and report generation can be developed into saved programs for on-line application development. A forms generation capability allows implementation of data bases and related report processing and generating services without applications programming.

*CTS 1100* is a modular software system that provides users at remote terminals with a human-machine interface. The system consists of the CTS Control module; interactive syntax analyzers for Basic, Fortran, and Cobol; and access to the compilers for Cobol and Fortran. CTS provides the user with a simplified command language editor. Although still available, CTS has effectively been superseded by the newer Interactive Processing Facility, which is described below.

The *Interactive Processing Facility* supports both batch and time-sharing operations. It provides a user interface to the system through a procedural command language and an English-language response language. IPF 1100 is designed for ease of use by users with little or no data processing background, as well as by computer professionals. Functional capabilities can be expanded by adding user-developed program modules or by modifying or adding commands. IPF 1100 includes data management capabilities, security features, and session control capabilities.

IPF consists of a number of separately priced modules. IPF Control provides the framework for the installation and use of the other modules. The IPF Command Language is the primary interface for using IPF. It is based on CODASYL specifications. The development of command language sub-routines and macros is accomplished through the IPF Procedures module. The Distributed Data Processing module supports file transfers and job submissions from 2200 Series to 2200 Series systems. The Edit 1100 module is an input and update editor that provides access to a variety of file formats, works in an easy-to-use full-screen mode, and can be used from a terminal or called from a program. The User Assistance module manages responses to the terminal user, as well as HELP and explanation processing. Finally, the

## Unisys 2200 Series

TABLE 4. TERMINALS

MODEL	PC/microIT	SVT-1121
<b>DISPLAY PARAMETERS</b>		
Max. chars./screen	1,920	1,920 or 3,168
Screen size (lines x chars.)	24 x 80	24 x 80 or 24 x 132
Symbol formation	7 x 7 or 7 x 9 dot matrix	7 x 9 or 5 x 7 dot matrix
Character phosphor	Green monochrome or color	P31 green
Total colors/no. simult. displayed	Palette of 64; 16 displayable	—
<b>KEYBOARD PARAMETERS</b>		
Style	Varies	Typewriter
Character/code set	84-key standard	94-key
Detachable	Yes	Yes
Program function keys	10 standard	—
<b>OTHER FEATURES</b>		
Buffer capacity	4KB or 16KB	—
Tilt/swivel	—	Standard
Graphics capability	Graphics monitors available	—
<b>TERMINAL INTERFACE</b>	RS-232	Sperry coaxial cable, using UDLC protocol; RS-232 printer port

► Distributed Information Services module provides document exchange among hosts with different architectures.

*SX 1100* is a Unix System V-based 1100 OS application program designed to provide a set of software development tools for applications developers as well as for the execution of standard applications. It features debugging tools, on-line documentation, a file management system, access to 1100 OS demand processing, and the ability to access and write 1100 OS formatted files.

The *Programmer's Advanced Debugging System (PADS) 1100* is a language-independent debugging tool. PADS was designed primarily for debugging programs written in high-level languages such as Cobol and Fortran, but it may also be used for programs written in Assembler.

**UTILITIES:** The 2200 Series systems support a number of utility packages, including CULL, Sort/Merge, Log Analyzer, Performance Analysis Routines, and the On-line System Activity Monitor.

*CULL* produces an alphabetically sorted, cross-referenced listing of all symbols in a specified set of symbolic elements. Each symbol processed by CULL can contain up to 12 alphanumeric characters plus the dollar sign. An interactive version, IACULL, is also available.

The *Sort/Merge* package provides three sort options and a standard merge option. The sort options are record sort, selection sort, and tag sort. Up to 26 files can be merged, and up to 40 keys can be specified.

The *Log Analyzer (LA)* is designed to assist the user in monitoring the resource utilization of an 1100 Series system. The *Performance Analysis Routines (PAR)* package is a reporting system for data collected by the Software Instrumentation Package embedded in the operating system. The *On-line System Activity Monitor (OSAM)* provides an on-line, realtime display of system activity. OSAM can be used in conjunction with LA and PAR.

**OTHER SOFTWARE:** The *Transaction Interface Package (TIP)* serves as the "middleman" between the 1100 Operating System and the user's application programs in a transaction-oriented on-line data processing system. TIP's functions are stimulated by the incoming transaction messages stored in the common data pool maintained by CMS. The TIP transaction scanner, Transcan, analyzes each message, determines which application program is required to process it, and arranges for the Executive to load and execute that program. One application program can also call another

application program via TIP, through program action based on data parameters. The application programs can be written in Cobol, Fortran, Assembly Language, or PL/1 and can be reentrant. TIP's features include on-line debugging aids, a batch-mode checkout capability, interprogram protection facilities, and comprehensive system recovery provisions. User-written routines can be accommodated by TIP to perform installation-specified functions such as prioritizing messages and other special message manipulation. The integrated recovery feature supports synchronized recovery of the communications messages and data base updates in a transaction processing environment. Once an input message is received, the requested transaction will be executed regardless of any component failure.

The *Display Processing System (DPS) 1100* provides for screen handling and the management of display-oriented transactions in an on-line environment. DPS 1100 includes an interactive screen generator and a screen handler. Additional functions are provided for data editing and validation, applying passwords to screens or separate fields of screens, and controlling access to multipage screens.

*Checkpoint/Restart* snapshots a run or program and creates a checkpoint that may be used for restarting at a later time, if desired.

Application packages available for the 2200 Series include Sufics 1100 (Sperry Univac Financial Integrated Control System 1100) and the Calc II spreadsheet program.

#### PRICING AND SUPPORT

**POLICY:** The 2200/200 systems are available for purchase or on a one-year or five-year lease. All software is unbundled.

**SUPPORT:** On-site operating system support can be obtained for a flat monthly fee. Support is available for some software at a separate monthly charge.

The standard use and service agreements allow unlimited use of the equipment (exclusive of the time required for remedial and preventive maintenance). There are no extra-charge fees. The basic maintenance charge covers maintenance of the equipment for nine consecutive hours a day between the hours of 7 a.m. and 6 p.m., Monday through Friday. Extended periods of maintenance are available at premium rates.

The Total Remote Assistance Center (TRACE) is a remote hardware maintenance facility located in Roseville, Minne- ►

## Unisys 2200 Series

► sota. TRACE is available to 2200 Series customers via a dedicated WATS number 24 hours per day and seven days per week. Via TRACE, a user's system may be monitored and controlled using on-site and remote library testing programs. TRACE also provides support for a wide range of terminals connected to dial-up lines. Various data files in Roseville contain information on approved hardware changes, references to solutions for problems encountered with diagnostic test software in field use, and operating system enhancements and problems. Other files contain a history of how the system should operate properly, and can be utilized for comparison purposes during diagnostic testing.

**EDUCATION:** A variety of courses, both self-study courses and lecture courses, are offered. Instruction is available for both hardware and software systems.

**TYPICAL CONFIGURATIONS:** The following systems illustrate some of the configurations that are possible within the 2200 Series. All necessary hardware and operating system software are included in the indicated prices.

### 2200/201:

Processor Complex with one CPU, MSU with 8MB of main memory, 32KB of cache, IOP, two 140MB integrated disk drives, and two SVT-1121 terminals	\$138,100
Two 4113 Disk Formatters and Drives (280MB)	15,400
Two 4115 Disk Drive Expansions (280MB, for a system total of 840MB)	13,200
One 4071 Cartridge Tape Subsystem	4,400
One 0789-20 Printer (640 lpm)	15,650
One Print Band	225
One F4325-01 Programmable Line Module	6,600
One F4077-00 Byte Peripheral Adapter	3,080
One F4079-01 SCSI Host Adapter, 2nd	4,290
One 8987-99 General Purpose Typical Executive	21,332

**TOTAL PURCHASE PRICE:** \$222,277

### 2200/202:

Processor Complex with two CPUs, two MSUs with a total of 16MB of memory, 32KB of cache per CPU, IOP, two 140MB integrated disk drives, and two SVT-1121 terminals	\$218,290
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Three 4113 Disk Formatters and Drives (420MB)	23,100
Three 4115 Disk Drive Expansions (420MB, for a system total of 1.1GB)	19,800
Two 4071 Cartridge Tape Subsystems	8,800
One 0876-71 Uniservo 22 Tape Subsystem	26,690
Two 0789-20 Printers (640 lpm)	31,300
Two Print Bands	450
One F4325-01 Programmable Line Module	6,600
One F4077-00 Byte Peripheral Adapter	3,080
One F4079-01 SCSI Host Adapter, 2nd	4,290
One 8987-99 General Purpose Typical Executive	21,332

**TOTAL PURCHASE PRICE:** \$363,732

### 2200/204:

Processor Complex with 2 system cabinets, 4 CPUs, 2 MSUs with a total of 16MB of memory, 32KB of cache per CPU, 2 IOPs, two 140MB integrated disk drives, and 2 SVT-1121 terminals	\$400,450
Two F4073-00 Main Storage Units (4MB)	35,420
Fourteen F4076-00 MSU Expansions (28MB, for a system total of 48MB)	141,680
Seven 4113 Disk Formatters and Drives (980MB)	53,900
Seven 4115 Disk Drive Expansions (980MB, for a system total of 2.2GB)	46,200
One 0876-69 Uniservo 24 Tape Subsystem with controller and one 125-ips drive	28,010
Two 0876-73 Uniservo 24 Tape Drives	41,020
One 0447-95 Laser Printer (19 ppm)	25,262
One Character Font Cartridge	175
One 0789-20 Printer (640 lpm)	15,650
One Print Band	225
Two F4325-01 Programmable Line Modules	13,200
Two SVT-1121 Display Terminals	1,790
One F4077-00 Byte Peripheral Adapter	3,080
One F4079-01 SCSI Host Adapter, 2nd	4,290
One F4079-02 SCSI Host Adapter, 3rd	4,070
One F4079-03 SCSI Host Adapter, 4th	4,510
One F4223-01 Nonimpact Printer Control Unit	3,312
One 8987-98 General Purpose Typical Executive	42,667

**TOTAL PURCHASE PRICE:** \$864,911

### Monthly Charges\*

Purchase (\$)	Monthly Maint. (\$)	1-Year Lease (\$)	5-Year Lease (\$)
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### PROCESSORS & FEATURES

3088-80	2200/201 System; consists of one basic cabinet containing one Instruction Processor, one Main Storage Unit (MSU) with 2M words (8M bytes) of main memory, 32KB of cache memory, one Input/Output Processor (IOP), one L-Bus Adapter, one SCSI Host Adapter (SHA-1) with one disk formatter and two F4113 disk drives, and one Workstation Control Unit (WCU) with two SVT-1121 terminals; requires one tape unit	138,100	665	5,754	3,836
3088-96	2200/202 System; same as 2200/201, but includes two Instruction Processors and two MSUs with a total of 4M words (16M bytes) of main memory	218,290	940	9,095	6,064

\*Lease prices do not include maintenance.

\*\*On-call annual maintenance.

NA—Not available.

## Unisys 2200 Series

TABLE 4. TERMINALS

MODEL	PC/microIT	SVT-1121
<b>DISPLAY PARAMETERS</b>		
Max. chars./screen	1,920	1,920 or 3,168
Screen size (lines x chars.)	24 x 80	24 x 80 or 24 x 132
Symbol formation	7 x 7 or 7 x 9 dot matrix	7 x 9 or 5 x 7 dot matrix
Character phosphor	Green monochrome or color	P31 green
Total colors/no. simult. displayed	Palette of 64; 16 displayable	—
<b>KEYBOARD PARAMETERS</b>		
Style	Varies	Typewriter
Character/code set	84-key standard	94-key
Detachable	Yes	Yes
Program function keys	10 standard	—
<b>OTHER FEATURES</b>		
Buffer capacity	4KB or 16KB	—
Tilt/swivel	—	Standard
Graphics capability	Graphics monitors available	—
<b>TERMINAL INTERFACE</b>	RS-232	Sperry coaxial cable, using UDLC protocol; RS-232 printer port

► Distributed Information Services module provides document exchange among hosts with different architectures.

*SX 1100* is a Unix System V-based 1100 OS application program designed to provide a set of software development tools for applications developers as well as for the execution of standard applications. It features debugging tools, on-line documentation, a file management system, access to 1100 OS demand processing, and the ability to access and write 1100 OS formatted files.

*The Programmer's Advanced Debugging System (PADS) 1100* is a language-independent debugging tool. PADS was designed primarily for debugging programs written in high-level languages such as Cobol and Fortran, but it may also be used for programs written in Assembler.

**UTILITIES:** The 2200 Series systems support a number of utility packages, including CULL, Sort/Merge, Log Analyzer, Performance Analysis Routines, and the On-line System Activity Monitor.

*CULL* produces an alphabetically sorted, cross-referenced listing of all symbols in a specified set of symbolic elements. Each symbol processed by CULL can contain up to 12 alphanumeric characters plus the dollar sign. An interactive version, IACULL, is also available.

The *Sort/Merge* package provides three sort options and a standard merge option. The sort options are record sort, selection sort, and tag sort. Up to 26 files can be merged, and up to 40 keys can be specified.

The *Log Analyzer (LA)* is designed to assist the user in monitoring the resource utilization of an 1100 Series system. The *Performance Analysis Routines (PAR)* package is a reporting system for data collected by the Software Instrumentation Package embedded in the operating system. The *On-line System Activity Monitor (OSAM)* provides an on-line, realtime display of system activity. OSAM can be used in conjunction with LA and PAR.

**OTHER SOFTWARE:** The *Transaction Interface Package (TIP)* serves as the "middleman" between the 1100 Operating System and the user's application programs in a transaction-oriented on-line data processing system. TIP's functions are stimulated by the incoming transaction messages stored in the common data pool maintained by CMS. The TIP transaction scanner, Transcan, analyzes each message, determines which application program is required to process it, and arranges for the Executive to load and execute that program. One application program can also call another

application program via TIP, through program action based on data parameters. The application programs can be written in Cobol, Fortran, Assembly Language, or PL/1 and can be reentrant. TIP's features include on-line debugging aids, a batch-mode checkout capability, interprogram protection facilities, and comprehensive system recovery provisions. User-written routines can be accommodated by TIP to perform installation-specified functions such as prioritizing messages and other special message manipulation. The integrated recovery feature supports synchronized recovery of the communications messages and data base updates in a transaction processing environment. Once an input message is received, the requested transaction will be executed regardless of any component failure.

The *Display Processing System (DPS) 1100* provides for screen handling and the management of display-oriented transactions in an on-line environment. DPS 1100 includes an interactive screen generator and a screen handler. Additional functions are provided for data editing and validation, applying passwords to screens or separate fields of screens, and controlling access to multipage screens.

*Checkpoint/Restart* snapshots a run or program and creates a checkpoint that may be used for restarting at a later time, if desired.

Application packages available for the 2200 Series include Sufics 1100 (Sperry Univac Financial Integrated Control System 1100) and the Calc II spreadsheet program.

#### PRICING AND SUPPORT

**POLICY:** The 2200/200 systems are available for purchase or on a one-year or five-year lease. All software is unbundled.

**SUPPORT:** On-site operating system support can be obtained for a flat monthly fee. Support is available for some software at a separate monthly charge.

The standard use and service agreements allow unlimited use of the equipment (exclusive of the time required for remedial and preventive maintenance). There are no extra-use charges. The basic maintenance charge covers maintenance of the equipment for nine consecutive hours a day between the hours of 7 a.m. and 6 p.m., Monday through Friday. Extended periods of maintenance are available at premium rates.

The Total Remote Assistance Center (TRACE) is a remote hardware maintenance facility located in Roseville, Minne- ►

## Unisys 2200 Series

► **sota. TRACE** is available to 2200 Series customers via a dedicated WATS number 24 hours per day and seven days per week. Via TRACE, a user's system may be monitored and controlled using on-site and remote library testing programs. TRACE also provides support for a wide range of terminals connected to dial-up lines. Various data files in Roseville contain information on approved hardware changes, references to solutions for problems encountered with diagnostic test software in field use, and operating system enhancements and problems. Other files contain a history of how the system should operate properly, and can be utilized for comparison purposes during diagnostic testing.

**EDUCATION:** A variety of courses, both self-study courses and lecture courses, are offered. Instruction is available for both hardware and software systems.

**TYPICAL CONFIGURATIONS:** The following systems illustrate some of the configurations that are possible within the 2200 Series. All necessary hardware and operating system software are included in the indicated prices.

### 2200/201:

Processor Complex with one CPU, MSU with 8MB of main memory, 32KB of cache, IOP, two 140MB integrated disk drives, and two SVT-1121 terminals	\$153,340
Two 4113 Disk Formatters and Drives (280MB)	15,400
Two 4115 Disk Drive Expansions (280MB, for a system total of 840MB)	13,200
One 4071 Cartridge Tape Subsystem	4,400
One 0789-20 Printer (640 lpm)	15,650
One Print Band	225
One F4325-01 Programmable Line Module	6,600
One F4077-00 Byte Peripheral Adapter	3,080
One F4079-01 SCSI Host Adapter, 2nd	4,290
One 8987-99 General Purpose Typical Executive	21,332

**TOTAL PURCHASE PRICE:** \$237,517

### 2200/202:

Processor Complex with two CPUs, two MSUs with a total of 16MB of memory, 32KB of cache per CPU, IOP, two 140MB integrated disk drives, and two SVT-1121 terminals	\$233,530
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Three 4113 Disk Formatters and Drives (420MB)	23,100
Three 4115 Disk Drive Expansions (420MB, for a system total of 1.1GB)	19,800
Two 4071 Cartridge Tape Subsystems	8,800
One 0876-71 Uniservo 22 Tape Subsystem	26,690
Two 0789-20 Printers (640 lpm)	31,300
Two Print Bands	450
One F4325-01 Programmable Line Module	6,600
One F4077-00 Byte Peripheral Adapter	3,080
One F4079-01 SCSI Host Adapter, 2nd	4,290
One 8987-99 General Purpose Typical Executive	21,332

**TOTAL PURCHASE PRICE:** \$378,972

### 2200/204:

Processor Complex with 2 system cabinets, 4 CPUs, 2 MSUs with a total of 16MB of memory, 32KB of cache per CPU, 2 IOPs, two 140MB integrated disk drives, and 2 SVT-1121 terminals	\$415,690
Two F4073-00 Main Storage Units (4MB)	35,420
Fourteen F4076-00 MSU Expansions (28MB, for a system total of 48MB)	141,680
Seven 4113 Disk Formatters and Drives (980MB)	53,900
Seven 4115 Disk Drive Expansions (980MB, for a system total of 2.2GB)	46,200
One 0876-69 Uniservo 24 Tape Subsystem with controller and one 125-ips drive	28,010
Two 0876-73 Uniservo 24 Tape Drives	41,020
One 0447-95 Laser Printer (19 ppm)	25,262
One Character Font Cartridge	175
One 0789-20 Printer (640 lpm)	15,650
One Print Band	225
Two F4325-01 Programmable Line Modules	13,200
Two SVT-1121 Display Terminals	1,790
One F4077-00 Byte Peripheral Adapter	3,080
One F4079-01 SCSI Host Adapter, 2nd	4,290
One F4079-02 SCSI Host Adapter, 3rd	4,070
One F4079-03 SCSI Host Adapter, 4th	4,510
One F4223-01 Nonimpact Printer Control Unit	3,312
One 8987-98 General Purpose Typical Executive	42,667

**TOTAL PURCHASE PRICE:** \$880,151

## EQUIPMENT PRICES

		Monthly Charges*			
		Purchase (\$)	Monthly Maint. (\$)	1-Year Lease (\$)	5-Year Lease (\$)
3088-80	2200/201 System; consists of one basic cabinet containing one Instruction Processor, one Main Storage Unit (MSU) with 2M words (8M bytes) of main memory, 32KB of cache memory, one Input/Output Processor (IOP), one L-Bus Adapter, one SCSI Host Adapter (SHA-1) with one disk formatter and two F4113 disk drives, and one Workstation Control Unit (WCU) with two SVT-1121 terminals; requires one tape unit	153,340	665	6,390	4,259
3088-96	2200/202 System; same as 2200/201, but includes two Instruction Processors and two MSUs with a total of 4M words (16M bytes) of main memory	233,530	940	9,730	6,487

\*Lease prices do not include maintenance.

\*\*On-call annual maintenance.

NA—Not available.

## Unisys 2200 Series

		Monthly Charges*			
		Purchase (\$)	Monthly Maint. (\$)	1-Year Lease (\$)	5-Year Lease (\$)
<b>PROCESSORS &amp; FEATURES (Continued)</b>					
3088-95	2200/203 System; adds an expansion cabinet and a third Instruction Processor to a 2200/202 configuration	327,850	1,335	13,660	9,108
3088-94	2200/204 System; adds a fourth Instruction Processor	400,450	1,590	16,685	11,125
3089-00	Expansion Cabinet; can contain two Instruction Processors, two MSUs, one IOP, eight 4113 Disk Subsystems, and two 4071 Cartridge Tape Units	36,960	140	1,540	1,027
F4111-99	Instruction Processor Expansion; maximum of two IPs per cabinet and four per system	72,600	255	3,025	2,017
F4151-99	High-Speed Multiply/Divide	11,000	25	459	305
F4080-99	IOP Expansion; for installation in the 3089-00 Expansion Cabinet	13,200	60	550	367
F4073-00	Main Storage Unit; includes control and 0.5M words (2MB) of memory	17,710	60	738	492
F4076-00	MSU Expansion; 0.5M words (2MB) of memory; maximum of 5 per MSU	10,120	40	422	281
1974-01	Peripheral Cabinet	1,606	8	67	45
F4257-00	Disk Controller Channel (DCC II); supports the attachment of up to eight 8451 Disk Subsystems with up to four disk drives each; maximum of 5 DCC IIs per cabinet and 10 per system	10,863	50	453	302
K3652-01	Block Multiplexer Channel (BMC); mutually exclusive with DCC II; maximum of four per 2200 system cabinet	9,350	65	390	260
F4369-00	BMC Conversion	1,650	7	69	49
F4223-01	Nonimpact Printer Control Unit (NIPCU); required to support the Model 47 Laser Printer	3,312	17	138	92
F4077-00	Byte Peripheral Adapter (BPA); provides for the connection of 0789 Printers, Uniservo 18, 22, and 24 Magnetic Tape Subsystems, and DCP/10A and DCP/15 communications processors	3,080	10	128	86
F4078-00	L-Bus Adapter (LBA); provides for the connection of workstations and Programmable Line Modules	4,400	25	183	122
F4612-00	L-Bus Expansion Module; permits the installation of one WCU or NIPCU on the L-Bus in place of a PLM Expansion Line Module	550	—	23	15
F4079-01	SCSI Host Adapter (SHA-2); provides second SHA for the connection of additional integrated disks and cartridge tape units	4,290	25	179	119
F4079-02	SHA-3; provides third SCSI Host Adapter	4,070	25	170	113
F4079-03	SHA-4; provides fourth SCSI Host Adapter; requires expansion cabinet	4,510	25	188	125
F4079-04	SHA-5; provides fifth SCSI Host Adapter; requires expansion cabinet	4,290	25	179	119
F4079-05	SHA-6; provides sixth SCSI Host Adapter; requires expansion cabinet	4,070	25	170	113
F3955-01	Workstation Control Unit (WCU); provides connections for up to 16 workstations/consoles; one is included in the basic system cabinet; requires IOP Expansion with LBA for installation in the expansion cabinet	2,750	13	115	76
F4270-00	Power Supply Expansion, First	2,640	15	110	73
F4270-01	Power Supply Expansion, Maximum	6,050	30	252	168
F4378-00	Power Supply, +12V DC	1,210	10	50	34
F4549-00	Dayclock Auxiliary Battery	660	4	28	18
K3728-01	Subsystem Power Control (SPC); provides remote power control	16,000	34	667	444
F3729-00	SPC Interface Expansion; provides additional control unit interfaces	1,600	3	64	48
<b>MASS STORAGE</b>					
F4113-01	Disk Formatter II and 140MB Disk Drive; fits into system cabinet; supports one additional disk drive	7,700	35	321	214
F4115-01	Disk Drive Expansion, 140MB; maximum of 8 disks per system cabinet	6,600	30	275	183
8451-00	8451 Disk Subsystem; includes integrated controller and 400MB disk drive; maximum of 4 drives per Disk Subsystem cabinet and 4 subsystems per 2200 Series system	38,266	171	1,594	1,063
F4329-00	8451 Disk Drive Expansion	12,900	65	538	358
F4332-00	Dual Access Feature	4,850	28	202	135
<b>MAGNETIC TAPE UNITS</b>					
F4071-00	Tape Formatter III and Cartridge Tape Drive; fits into 2200 system cabinet; maximum of two per cabinet	4,400	25	183	122
2014-99	Uniservo 18 Streaming Tape Unit; first drive	8,900	89	271	223
K3782-01	Uniservo 18 Streaming Tape Unit; additional drive; maximum of four drives per BPA	8,600	87	260	215
0876-71	Uniservo 22 Tape Subsystem; includes one U22 tape drive and control for up to three additional U22 or U24 tape drives; maximum of four subsystems per BPA	26,690	160	1,112	741
0876-69	Uniservo 24 Tape Subsystem; includes one U24 tape drive and control for up to three additional U24 or U22 tape drives; maximum of four subsystems per BPA	28,010	183	1,167	778

\*Lease prices do not include maintenance.

\*\*On-call annual maintenance.

NA—Not available.

## Unisys 2200 Series

		Monthly Charges*			
MAGNETIC TAPE UNITS (Continued)		Purchase (\$)	Monthly Maint. (\$)	1-Year Lease (\$)	5-Year Lease (\$)
5055-99	Uniservo 2X Control; provides control for up to eight U22, U24, U26, or U28 tape drives, in any combination	22,700	140	635	470
F2451-00	9-Track NRZI Feature for 5055 Control	3,170	16	82	63
F3737-00	Dual Access Feature for 5055 Control	900	5	27	20
F3738-00	Dual Channel Feature for 5055 Control	1,000	4	34	25
F3739-00	Translation Feature; ASCII to/from EBCDIC	3,600	18	94	72
0876-75	Uniservo 22 Tape Drive; 800/1600 bpi	19,190	110	690	460
0876-73	Uniservo 24 Tape Drive; 800/1600 bpi	20,510	133	737	491
0884-00	Uniservo 26 Tape Drive; 1600/6250 bpi	22,000	180	595	440
0884-02	Uniservo 28 Tape Drive; 1600/6250 bpi	24,750	190	675	500
<b>PRINTERS &amp; CARD READERS</b>					
0447-93	Model 47 Laser Printer (with fiber optic link); 19 ppm; requires NIPCU on the L-Bus	27,262	239	1,136	757
0447-95	Model 47 Laser Printer (with RS-232 interface); 19 ppm; requires NIPCU on the L-Bus	25,262	227	1,053	702
F4164-XX	Character Font Cartridge	175	—	8	5
F4712-00	Fiber Optic Cable, 100 feet	420	—	—	—
F4712-01	Fiber Optic Cable, 250 feet	690	—	—	—
F4712-02	Fiber Optic Cable, 500 feet	1,140	—	—	—
F4712-03	Fiber Optic Cable, 750 feet	1,590	—	—	—
F4712-04	Fiber Optic Cable, 1,000 feet	2,040	—	—	—
F4712-05	Fiber Optic Cable, 2,000 feet	3,840	—	—	—
F8290-03	RS-232 Duplex Cable; PVC-coated, 20 feet	64	—	—	—
F8290-06	RS-232 Duplex Cable; PVC-coated, 50 feet	78	—	—	—
F8291-03	RS-232 Duplex Cable; Teflon-coated, 20 feet	86	—	—	—
F8291-06	RS-232 Duplex Cable; Teflon-coated, 50 feet	132	—	—	—
0776-00	Line Printer and Control; 760 lpm with 48-character set	36,570	284	1,006	803
0776-02	Line Printer and Control; 900 lpm	41,340	340	1,134	907
0776-04	Line Printer and Control; 1200 lpm	48,000	388	1,431	1,145
F2217-00	Speed Upgrade; 0776-00 to 0776-02	4,770	56	128	104
F2245-00	Expanded Character Set Control; required for character sets with more than 64 characters	1,910	5	50	40
F2215-XX	Printer Cartridge	1,270	—	34	26
F2216-XX	Printer Cartridge	1,440	—	34	26
0789-20	Line Printer; 640 lpm	15,650	156	417	313
F3321-XX	Initial Print Band	225	—	—	—
F3608-XX	Replacement Print Band	184	—	—	—
0716-89	Card Reader and Control; 80 columns	16,545	179	445	322
F1487-00	Short Card Feature; 51 columns	1,968	17	45	32
F1487-01	Short Card Feature; 66 columns	1,968	17	45	32
<b>TERMINALS</b>					
3612-95	SVT-1121 Console; includes 14-inch screen, keyboard, setup menu in 6 languages, full-duplex auxiliary port, security keylock, and power cord	895	10	—	—
0425-93	Data Processing Quality Printer for SVT-1121; 160 cps	1,275	38	55	45
0425-92	High Definition Quality Printer for SVT-1121; 160/40 cps	1,395	44	60	50
0472-99	Bidirectional Printer for SVT-1121; 160 cps in data processing mode, 32 cps in near letter quality mode	695	—	—	—
3137-99	PC/microIT; basic unit with 512KB of memory; does not include keyboard, display, disks, or diskettes	2,345	**281	NA	NA
3137-98	PC/microIT; expanded unit with 512KB of memory and 20MB fixed-disk drive with controller	3,540	**419	NA	NA
3137-93	PC/microIT; configured system with 512KB of memory, 20MB fixed-disk drive with controller, and 1.2MB diskette drive	3,815	**419	NA	NA
3137-92	PC/microIT; basic system with 512KB of memory and 1.2MB diskette drive	2,620	**281	NA	NA
F4208-60	Standard Keyboard	155	**24	NA	NA
3617-00	Monochrome Display Unit	275	**44	NA	NA
F5051-01	Monochrome Display Unit Controller	225	NA	NA	NA
3584-02	Color Graphics Display Unit	680	**125	NA	NA
F4764-00	Color Graphics Display Unit Controller	244	NA	NA	NA

\*Lease prices do not include maintenance.

\*\*On-call annual maintenance.

NA—Not available.

## Unisys 2200 Series

		Monthly Charges*			
		Purchase (\$)	Monthly Maint. (\$)	1-Year Lease (\$)	5-Year Lease (\$)
<b>PROCESSORS &amp; FEATURES (Continued)</b>					
3088-95	2200/203 System; adds an expansion cabinet and a third Instruction Processor to a 2200/202 configuration	343,090	1,335	14,295	9,530
3088-94	2200/204 System; adds a fourth Instruction Processor	415,690	1,590	17,320	11,547
3089-00	Expansion Cabinet; can contain two Instruction Processors, two MSUs, one IOP, eight 4113 Disk Subsystems, and two 4071 Cartridge Tape Units	36,960	140	1,540	1,027
F4111-99	Instruction Processor Expansion; maximum of two IPs per cabinet and four per system	72,600	255	3,025	2,017
F4151-99	High-Speed Multiply/Divide	11,000	25	459	305
F4080-99	IOP Expansion; for installation in the 3089-00 Expansion Cabinet	13,200	60	550	367
F4073-00	Main Storage Unit; includes control and 0.5M words (2MB) of memory	17,710	60	738	492
F4076-00	MSU Expansion; 0.5M words (2MB) of memory; maximum of 5 per MSU	10,120	40	422	281
1974-01	Peripheral Cabinet	1,606	8	67	45
F4257-00	Disk Controller Channel (DCC II); supports the attachment of up to eight 8451 Disk Subsystems with up to four disk drives each; maximum of 5 DCC IIs per cabinet and 10 per system	10,863	50	453	302
K3652-01	Block Multiplexer Channel (BMC); mutually exclusive with DCC II; maximum of four per 2200 system cabinet	9,350	65	390	260
F4369-00	BMC Conversion	1,650	7	69	49
F4223-01	Nonimpact Printer Control Unit (NIPCU); required to support the Model 47 Laser Printer	3,312	17	138	92
F4077-00	Byte Peripheral Adapter (BPA); provides for the connection of 0789 Printers, Uniservo 18, 22, and 24 Magnetic Tape Subsystems, and DCP/10A and DCP/15 communications processors	3,080	10	128	86
F4078-00	L-Bus Adapter (LBA); provides for the connection of workstations and Programmable Line Modules	4,400	25	183	122
F4612-00	L-Bus Expansion Module; permits the installation of one WCU or NIPCU on the L-Bus in place of a PLM Expansion Line Module	550	—	23	15
F4079-01	SCSI Host Adapter (SHA-2); provides second SHA for the connection of additional integrated disks and cartridge tape units	4,290	25	179	119
F4079-02	SHA-3; provides third SCSI Host Adapter	4,070	25	170	113
F4079-03	SHA-4; provides fourth SCSI Host Adapter; requires expansion cabinet	4,510	25	188	125
F4079-04	SHA-5; provides fifth SCSI Host Adapter; requires expansion cabinet	4,290	25	179	119
F4079-05	SHA-6; provides sixth SCSI Host Adapter; requires expansion cabinet	4,070	25	170	113
F3955-01	Workstation Control Unit (WCU); provides connections for up to 16 workstations/consoles; one is included in the basic system cabinet; requires IOP Expansion with LBA for installation in the expansion cabinet	2,750	13	115	76
F4270-00	Power Supply Expansion, First	2,640	15	110	73
F4270-01	Power Supply Expansion, Maximum	6,050	30	252	168
F4378-00	Power Supply, +12V DC	1,210	10	50	34
F4549-00	Dayclock Auxiliary Battery	660	4	28	18
K3728-01	Subsystem Power Control (SPC); provides remote power control	16,000	34	667	444
F3729-00	SPC Interface Expansion; provides additional control unit interfaces	1,600	3	64	48
<b>MASS STORAGE</b>					
F4113-01	Disk Formatter II and 140MB Disk Drive; fits into system cabinet; supports one additional disk drive	7,700	35	321	214
F4115-01	Disk Drive Expansion, 140MB; maximum of 8 disks per system cabinet	6,600	30	275	183
8451-00	8451 Disk Subsystem; includes integrated controller and 400MB disk drive; maximum of 4 drives per Disk Subsystem cabinet and 4 subsystems per 2200 Series system	38,266	171	1,594	1,063
F4329-00	8451 Disk Drive Expansion	12,900	65	538	358
F4332-00	Dual Access Feature	4,850	28	202	135
<b>MAGNETIC TAPE UNITS</b>					
F4071-00	Tape Formatter III and Cartridge Tape Drive; fits into 2200 system cabinet; maximum of two per cabinet	4,400	25	183	122
2014-99	Uniservo 18 Streaming Tape Unit; first drive	8,900	89	271	223
K3782-01	Uniservo 18 Streaming Tape Unit; additional drive; maximum of four drives per BPA	8,600	87	260	215
0876-71	Uniservo 22 Tape Subsystem; includes one U22 tape drive and control for up to three additional U22 or U24 tape drives; maximum of four subsystems per BPA	26,690	160	1,112	741
0876-69	Uniservo 24 Tape Subsystem; includes one U24 tape drive and control for up to three additional U24 or U22 tape drives; maximum of four subsystems per BPA	28,010	183	1,167	778

\*Lease prices do not include maintenance.

\*\*On-call annual maintenance.

NA—Not available.

Unisys 2200 Series

Monthly Charges\*

MAGNETIC TAPE UNITS (Continued)

		Purchase (\$)	Monthly Maint. (\$)	1-Year Lease (\$)	5-Year Lease (\$)
5055-99	Uniservo 2X Control; provides control for up to eight U22, U24, U26, or U28 tape drives, in any combination	22,700	140	635	470
F2451-00	9-Track NRZI Feature for 5055 Control	3,170	16	82	63
F3737-00	Dual Access Feature for 5055 Control	900	5	27	20
F3738-00	Dual Channel Feature for 5055 Control	1,000	4	34	25
F3739-00	Translation Feature; ASCII to/from EBCDIC	3,600	18	94	72
0876-75	Uniservo 22 Tape Drive; 800/1600 bpi	19,190	110	690	460
0876-73	Uniservo 24 Tape Drive; 800/1600 bpi	20,510	133	737	491
0884-00	Uniservo 26 Tape Drive; 1600/6250 bpi	22,000	180	595	440
0884-02	Uniservo 28 Tape Drive; 1600/6250 bpi	24,750	190	675	500

PRINTERS & CARD READERS

0447-93	Model 47 Laser Printer (with fiber optic link); 19 ppm; requires NIPCU on the L-Bus	27,262	239	1,136	757
0447-95	Model 47 Laser Printer (with RS-232 interface); 19 ppm; requires NIPCU on the L-Bus	25,262	227	1,053	702
F4164-XX	Character Font Cartridge	175	—	8	5
F4712-00	Fiber Optic Cable, 100 feet	420	—	—	—
F4712-01	Fiber Optic Cable, 250 feet	690	—	—	—
F4712-02	Fiber Optic Cable, 500 feet	1,140	—	—	—
F4712-03	Fiber Optic Cable, 750 feet	1,590	—	—	—
F4712-04	Fiber Optic Cable, 1,000 feet	2,040	—	—	—
F4712-05	Fiber Optic Cable, 2,000 feet	3,840	—	—	—
F8290-03	RS-232 Duplex Cable; PVC-coated, 20 feet	64	—	—	—
F8290-06	RS-232 Duplex Cable; PVC-coated, 50 feet	78	—	—	—
F8291-03	RS-232 Duplex Cable; Teflon-coated, 20 feet	86	—	—	—
F8291-06	RS-232 Duplex Cable; Teflon-coated, 50 feet	132	—	—	—
0776-00	Line Printer and Control; 760 lpm with 48-character set	36,570	284	1,006	803
0776-02	Line Printer and Control; 900 lpm	41,340	340	1,134	907
0776-04	Line Printer and Control; 1200 lpm	48,000	388	1,431	1,145
F2217-00	Speed Upgrade; 0776-00 to 0776-02	4,770	56	128	104
F2245-00	Expanded Character Set Control; required for character sets with more than 64 characters	1,910	5	50	40
F2215-XX	Printer Cartridge	1,270	—	34	26
F2216-XX	Printer Cartridge	1,440	—	34	26
0789-20	Line Printer; 640 lpm	15,650	156	417	313
F3321-XX	Initial Print Band	225	—	—	—
F3608-XX	Replacement Print Band	184	—	—	—
0716-89	Card Reader and Control; 80 columns	16,545	179	445	322
F1487-00	Short Card Feature; 51 columns	1,968	17	45	32
F1487-01	Short Card Feature; 66 columns	1,968	17	45	32

TERMINALS

3612-95	SVT-1121 Console; includes 14-inch screen, keyboard, setup menu in 6 languages, full-duplex auxiliary port, security keylock, and power cord	895	10	—	—
0425-93	Data Processing Quality Printer for SVT-1121; 160 cps	1,275	38	55	45
0425-92	High Definition Quality Printer for SVT-1121; 160/40 cps	1,395	44	60	50
0472-99	Bidirectional Printer for SVT-1121; 160 cps in data processing mode, 32 cps in near letter quality mode	695	—	—	—
3137-99	PC/microIT; basic unit with 512KB of memory; does not include keyboard, display, disks, or diskettes	2,345	**281	NA	NA
3137-98	PC/microIT; expanded unit with 512KB of memory and 20MB fixed-disk drive with controller	3,540	**419	NA	NA
3137-93	PC/microIT; configured system with 512KB of memory, 20MB fixed-disk drive with controller, and 1.2MB diskette drive	3,815	**419	NA	NA
3137-92	PC/microIT; basic system with 512KB of memory and 1.2MB diskette drive	2,620	**281	NA	NA
F4208-60	Standard Keyboard	155	**24	NA	NA
3617-00	Monochrome Display Unit	275	**44	NA	NA
F5051-01	Monochrome Display Unit Controller	225	NA	NA	NA
3584-02	Color Graphics Display Unit	680	**125	NA	NA
F4764-00	Color Graphics Display Unit Controller	244	NA	NA	NA

\*Lease prices do not include maintenance.

\*\*On-call annual maintenance.

NA—Not available.

## Unisys 2200 Series

		Monthly Charges*			
		Purchase	Monthly	1-Year	5-Year
		(\$)	(\$)	(\$)	(\$)
<b>COMMUNICATIONS</b>					
0986-00	Interprocessor Channel Coupler (IPCC); connects two systems via block multiplexer or selector channels	20,000	55	440	375
F3950-00	IPCC Module, Additional	20,000	55	440	375
F4325-01	Programmable Line Module (PLM); provides integrated communications processor, host interface, and RS-232-C or X.21 interface; maximum of three PLMs per 2200 cabinet	6,600	30	275	183
F3165-02	Multiline Asynchronous Line Module; provides full-duplex interface to up to four data sets; conforms to RS-232-C and CCITT V.24 and V.28; up to 2400 bps; requires a PLM	2,880	14	120	80
F3837-01	Multiline Synchronous Line Module; provides full-duplex interface to up to four data sets; conforms to RS-232-C and CCITT V.24 and V.28; requires a PLM	2,880	14	120	80
F3163-05	Medium-Speed Line Module; provides full-duplex interface to a synchronous or asynchronous modem; conforms to RS-232-C and CCITT V.24 and V.28; also operates with Bell DDS up to 9600 bps	1,275	8	53	36
F3163-06	Medium-Speed Line Module; provides full-duplex interface to switched public data networks; conforms to CCITT X.21; requires a PLM	2,500	14	104	69
F3842-99	Central Support Interface; provides communications line connection to a Unisys Support Center; includes modem	3,850	15	160	107
F3842-98	Central Support Interface; for international use; does not include modem	3,080	12	128	86
1986-75	Distributed Communications Processor/10A (DCP/10A); includes cabinet with space for additional DCP/10A, processor with 512K bytes of storage, power supply, power distribution, cooling, operator panel, active line indicators, microprograms, multiple device line module, and integrated diskette drive with controller; requires F1946-02 or F1947-03 host interface	14,950	159	623	415
1986-73	DCP/10A; same as 1986-75, except that processor includes 1MB of storage	20,450	229	852	568
1986-71	DCP/10A; same as 1986-75, except it also includes a 10MB rigid disk drive	17,750	210	740	493
1986-69	DCP/10A; same as 1986-75, except it includes a processor with 1MB of storage and a 10MB rigid disk drive	23,250	280	939	646
2005-75	DCP/10A; same as 1986-75, except cabinet is not included	13,716	152	587	386
2005-73	DCP/10A; same as 2005-75, except processor has 1MB of storage	19,216	222	816	539
2005-71	DCP/10A; same as 2005-75, except it also includes integrated 10MB rigid disk drive	16,516	203	704	464
2005-69	DCP/10A; same as 2005-75, except it includes a processor with 1MB of storage and an integrated 10MB rigid disk drive	22,016	273	903	617
F3891-03	Storage Expansion; expands processor storage from 512KB to 1MB	10,400	70	433	289
F4427-00	Storage Expansion; expands processor storage from 1MB to 1.5MB or from 1.5MB to 2MB	10,400	70	433	289
F3895-00	Power Supply Expansion; provides additional power for remote configurations	882	5	26	21
F1947-03	8-Bit Host Interface	4,000	23	105	85
1986-67	Data Communications Processor/15 (DCP/15); includes cabinet with processor, 2MB of memory expandable to 4MB, power supply, power distribution, cooling, operation panel, active line indicators, microprograms, multiple device line module, and integrated diskette drive with controller; requires F1946-02 or F1947-03 host interface and SVT-1121 console; provides space for one 2053-XX DCP/15	15,125	50	630	420
1986-63	DCP/15; same as 1986-67, but also includes 20MB of integrated disk storage	17,125	70	714	476
1986-65	Expanded DCP/15; includes 4MB of memory	23,320	55	972	648
1986-61	Expanded DCP/15; includes 4MB of memory and 20MB of integrated disk storage	25,320	75	1,055	703
2053-99	DCP/15; same as 1986-67, except cabinet is not included	13,915	50	580	387
2053-97	DCP/15; same as 1986-65, except cabinet is not included	22,110	50	921	614
2053-95	DCP/15; same as 1986-63, except cabinet is not included	15,915	70	663	442
2053-93	DCP/15; same as 1986-61, except cabinet is not included	24,110	75	1,005	670
F3895-01	Power Supply Expansion; provides additional power for remote configurations	970	5	40	27
8597-78	Data Communications Processor/20 (DCP/20); includes cabinet, processor with 512KB of storage, power supplies, power distribution, cooling, maintenance panel, operator panel, active line indicators, microprograms, and integrated diskette drive	35,000	229	1,458	972
8597-76	DCP/20; same as 8597-78, except processor includes 1MB of storage	42,110	355	1,755	1,170
2024-96	Storage Expansion; expands processor storage from 512KB to 1MB	12,250	126	510	340
8597-01	Expansion Cabinet; contains processor capable of performing I/O functions only; provides mounting for 8 line modules; maximum of 2 per DCP/20 system	24,000	119	656	525
F2894-00	Line Module Expansion; provides 8 additional line modules for 8597-01	12,000	60	460	250
8596-79	Distributed Communications Processor/40 (DCP/40); preconfigured system including 512KB of main storage, 4.6MB rigid disk subsystem, integrated diskette drive, 1100 Series interface, 8-bit peripheral interface, and active line indicators; accommodates up to 11 communications line modules; requires a UTS 20 or UTS 400 console	102,675	584	2,809	2,225

\*Lease prices do not include maintenance.

\*\*On-call annual maintenance.

NA—Not available.

## Unisys 2200 Series

### Monthly Charges\*

#### COMMUNICATIONS (Continued)

		Purchase (\$)	Monthly Maint. (\$)	1-Year Lease (\$)	5-Year Lease (\$)
8596-77	DCP/40; same as 8596-79, except it accommodates up to 27 communications line modules and has 14MB disk; includes second I/O processor	119,651	674	3,324	2,629
8596-96	DCP/40; includes processor with 512KB of main storage, I/O controller module, first I/O processor, and microprograms; requires an integrated diskette plus an 8441-81 disk subsystem, communications line modules, and an SVT-1121 console	84,245	452	2,305	1,843
K1930-01	Storage Expansion; provides additional 512KB of storage; maximum of 3	15,600	126	410	325
1945-99	Expansion Cabinet; provides power supply and power controller; accommodates up to 4 I/O processors and up to 4MB of main storage; maximum of 3 per DCP/40 system, only one of which can contain storage	27,060	146	740	593
F2942-01	Storage Controller; provides a storage controller and 512KB of storage; mounts in expansion cabinet; can be expanded to 2MB by the addition of up to 3 K1930-01 storage expansion features and expanded up to 4MB with the addition of a 2036-99 and 3 K3930-01 features; maximum of one per system	26,880	145	735	588
2036-99	Storage Controller Expansion; includes 512KB of storage; can be expanded to 2MB with the addition of up to 3 K1930-01 storage expansion features to create the second 2MB of storage in the 1945-99 expansion cabinet	13,950	77	365	290
F1933-00	I/O Processor Controller Module; provides expansion cabinet with first IOP an space for mounting 3 additional IOPs and a storage port expander	14,680	78	399	320
F2941-99	Second IOP Expansion; provides second IOP for 8596-96 or 1945-99; includes power for 2 more IOPs	14,920	81	410	326
F1932-99	Third IOP; mounts in 8596-96 or 1945-99; includes storage port expander	14,185	76	389	310
F1932-98	Fourth IOP	10,635	57	294	231
F1928-00	Operator Station; a freestanding work surface that can be used for the local console	1,200	—	30	25
F1825-05	Active Line Indicator; provides a visual display of line activity on up to 16 communications line modules in a single IOP	960	4	26	21
Features for the DCPs:					
F1936-00	DCP/20-DCP/40 Storage Port Expander; provides a multiplexed interface to a single local storage access port for up to 4 requestors	3,550	19	95	75
F1946-02	1100 Series ISI Interface; provides a full-duplex ISI interface to a word channel; maximum of 1 per DCP/10A or DCP/15 cabinet, 2 per DCP/20 cabinet, or 4 per DCP/40 cabinet	4,000	23	110	89
F1947-02	Host Byte Interface; provides interface to Series 90 byte multiplexer channel or 1100 Series block multiplexer channel; maximum of 1 per DCP/20 cabinet or 2 per DCP/40 cabinet (not available for DCP/10A or DCP/15)	4,000	23	105	85
F1947-03	Host Byte Interface; provides interface to 1100 Series block multiplexer channel; for DCP/10A or DCP/15	4,000	23	105	85
F3878-00	Byte Interface Line Module; provides 8-bit interface to the 8409 disk subsystem	1,900	11	56	45
F1948-01	16-bit Peripheral Interface; provides interface to a peripheral subsystem; allows operation in 8- or 16-bit mode (for DCP/20 and DCP/40)	3,000	16	84	68
F1941-00	Full-Duplex Interface to Asynchronous Data Sets; conforms to EIA RS-232-C and CCITT V.24 and V.28; data set rates up to 2400 bps	960	3	25	20
F1942-00	Full-Duplex Interface to Synchronous Data Sets; conforms to EIA RS-232-C and CCITT V.24 and V.28; data set rates up to 9600 bps	960	3	26	21
F3163-00	Full-Duplex Interface to Synchronous or Asynchronous Modems; conforms to EIA RS-232-C and CCITT V.24 and V.28; operates with Bell DDS up to 9600 bps or at data set rates up to 19,200 bps	1,275	8	35	30
F3163-01	Full-Duplex Interface to Public Data Networks; conforms to CCITT X.21 and X.25; operates at rates up to 19,200 bps	2,500	14	63	50
F3163-04	Full-Duplex Interface to Synchronous Modems; conforms to RS-449; up to 9600 bps	1,920	11	50	40
F3164-00	Full-Duplex Interface to Bell 303 Modem; up to 64K bps	7,200	38	188	150
F3164-01	Full-Duplex Interface to Carrier Facilities; conforms to CCITT V.35; operates with UDLC protocol data formats (64K bps), V.35 facilities (48K bps), and Bell DDS and DSDS facilities (56K bps)	3,745	21	100	80
F3165-01	Multiline Asynchronous Line Module; provides full-duplex interfaces to up to 4 data sets; conforms to RS-232-C and CCITT V.24 and V.28; up to 2400 bps	2,880	14	79	63
F3837-99	Multiline Asynchronous Line Module; provides full-duplex interfaces to up to 4 data sets or direct-connect terminals; conforms to RS-232-C and CCITT V.24 and V.28; up to 9600 bps	2,250	18	94	63
F3837-00	Multiline Synchronous Line Module; provides up to 4 full-duplex interfaces to data sets or direct-connect terminals; conforms to RS-232-C and CCITT V.24 and V.28; up to 19.2K bps	2,250	18	94	63
F3835-00	Remote Partitioning Capability; maximum of 1 on DCP/20 or 4 on DCP/40 (not available for DCP/10A or DCP/15)	960	5	25	20
F1945-00	Auto Dialing Line Module; interfaces to Bell 801 Automatic Calling Units or those conforming to CCITT V.24 and V.25	1,005	4	25	20

\*Lease prices do not include maintenance

\*\*On-call annual maintenance.

NA—Not available.

## Unisys 2200 Series

## Monthly Charges\*

## COMMUNICATIONS (Continued)

		Purchase (\$)	Monthly Maint. (\$)	1-Year Lease (\$)	5-Year Lease (\$)
8590-00	Remote Control Module (RCM); provides the capability to control power on/off and other functions of up to 4 DCP processors; requires RCM Adapter, F3163-00 or F3163-04, and/or 1 or 2 F3556-00 and F3557-00	13,526	61	355	280
F3898-00	Remote Control Adapter for DCP/10A and DCP/15; provides interface between the RCM and the DCP	1,915	11	50	40
F2893-00	Remote Control Adapter for DCP/20	1,824	11	48	38
F1937-00	Remote Control Adapter for DCP/40	1,824	11	48	38
2523-00	Line Switch Module (LSM); provides the capability to switch communications lines and/or peripherals from a local or remote source; requires 1 switch feature; up to 6 switch features supported	28,750	112	748	597
1962-00	LSM Auxiliary Cabinet for DCP/20 and DCP/40; provides mounting for up to 10 switch features	6,872	39	197	143
F3557-00	RCM/LSM Microcode	350	1	9	7
F3556-00	RCM/LSM Local Control Interface; provides one loadable line module for the RCM and LSM and one for the DCP	3,600	16	95	75
F3105-00	Modem Expander; enables a second RCM or LSM to share a single RS-232-C modem	1,440	4	38	30
F3109-00	RS-232-C Switch; provides the capability to switch 8 RS-232-C communications lines from one communications controller to another	4,930	22	132	102
F3110-00	CCITT V.35 Switch; up to 8 lines	9,325	43	245	195
F3112-00	RS-449 Switch; up to 4 lines	6,000	27	156	125
F3113-00	16-bit Parallel Interface Switch; up to 4 interfaces (not for DCP/10A)	7,200	33	188	150
F3559-00	Bell 303 Switch; up to 4 lines (not for DCP/10A)	16,800	82	440	350
F1939-00	Integrated Diskette Subsystem for DCP/20 and DCP/40; includes 256KB diskette and controller	1,920	12	53	42
8408-02	Cartridge Disk Control; controls up to 2 F2380 drives (for DCP/20 and DCP/40)	5,564	32	146	109
F2380-04	Fixed/Removable Cartridge Disk Drive; five megabytes fixed, five megabytes removable	17,750	124	461	330
F2187-00	Second I/O Interface for dual F2380 configuration	1,568	9	39	29
8409-99	Disk Subsystem; includes cabinet, control, and one 4.6MB disk drive; requires Byte Interface Line Module, F3878-00 (not for DCP/15)	9,650	82	378	280
8409-97	Disk Subsystem; same as 8409-99, except it includes a 14MB drive	10,746	94	478	354
F3900-00	Disk Drive Expansion; provides a second disk drive with 4.6MB capacity; maximum of one	3,777	54	158	117
F3900-01	Disk Drive Expansion; provides a second disk drive with 14MB capacity; maximum of one	4,207	66	188	139
F4085-00	Disk Drive Expansion; expands the capacity of one 4.6MB drive to 14MB	1,096	12	100	74
F3881-00	Dual Disk Control; provides a second DCP interface	2,000	9	65	50
F4158-01	Integrated Disk Drive for DCP/15; 20MB	2,000	20	83	56
8441-78	8441 Disk Subsystem; 30MB; connects to DCP/15	4,200	28	175	116
F4228-98	Additional 8441-78 Disk Drive	2,710	26	112	75
8441-79	Disk Subsystem; includes cabinet, controller, and 30MB disk drive; connects to DCP/10A	4,200	28	175	116
F4228-98	Disk Expansion; provides additional 30MB disk drive for 8441-79	2,710	26	112	75
8441-81	Disk Subsystem; includes cabinet, controller, and 30MB disk drive; connects to DCP/20 and DCP/40	4,200	28	175	116
F4228-99	Disk Expansion; provides additional 30MB disk drive for 8441-81	2,710	26	112	75
0871-01	Uniservo 10 Magnetic Tape Unit; PE/NRZI, 1600/800 bps, 25 ips (for DCP/20 and DCP/40)	13,962	93	318	239
F2721-00	Uniservo 10 Controller; controls up to 2 drives	10,320	56	284	215
F2879-00	AC Power Switch; provides remote control of second Uniservo 10	1,200	5	32	25
0445-99	Data Processing Quality Printer; 160 cps; connects to DCP/20 or DCP/40	775	17	35	23
0445-97	High Definition Quality Printer; 160/40 cps; connects to DCP/20 or DCP/40	895	20	49	27
F4224-00	Paper Roll for 0445 Printers	45	1	3	2
F4109-00	Forms Tractor	50	1	3	2
F3977-00	Printer Stand for 0445 Printers	230	—	10	8

\*Lease prices do not include maintenance

\*\*On-call annual maintenance.

NA—Not available.

## Unisys 2200 Series

### SOFTWARE PRICES

	<b>Single Extended Term Charge* (\$)</b>
<b>Operating System</b>	
8987-99	21,332
General-Purpose Typical Executive (GPTE) for 2200/201 and 2200/202; includes CMS 1100, MCB, and DPS 1100 for limited use, which allows terminals and workstations attached to a WCU to be used either as consoles or as communications terminals	
8987-98	42,667
GPTE for 2200/203 and 2200/204	
8987-97	21,335
GPTE 203/204 Upgrade; required when a Model 201 or 202 is upgraded to a Model 203 or 204	
8986-99	45,332
Mixed Mode Executive for 2200/201 and 2200/202 (includes both object and source code)	
8986-98	66,667
Mixed Mode Executive for 2200/203 and 2200/204	
8986-97	21,335
Mixed Mode Executive 203/204 Upgrade	
<b>Language Processors</b>	
6153-95	6,399
ASCII Cobol	
6154-95	14,688
ASCII Fortran	
6243-94	4,992
RPG II Group	
6160-95	4,848
Macro	
6165-97	3,958
General Syntax Analyzer	
<b>Data Base Management &amp; Data Management</b>	
6292-96	8,278
Universal Data System (UDS) 1100 Control	
6700-95	43,471
UDS Data Management System (DMS) 1100	
6298-92	14,688
UDS Query Language Processor (QLP) 1100	
6298-91	17,136
UDS QLP with PCIOS Interface	
6293-97	31,050
UDS Relational Data Management System (RDMS) 1100	
6299-96	20,699
UDS Data Dictionary System	
6177-95	2,400
Define File Processor	
6175-92	24,729
IRU Version II	
7747-98	8,278
UDS Shared File System (SFS)	
6155-96	60,720
Data Management System (DMS) 1100	
6176-97	21,140
Data Dictionary System (DDS)	
6152-95	1,066
Processor Common Input/Output System (PCIOS)	
6244-95	7,488
Information Management System (IMS) 1100	
6866-98	8,278
Relational Syntax Analyzer	
6157-91	23,461
Query Language Processor (QLP) 1100	
6157-90	27,323
QLP with PCIOS Interface	
<b>Data Communications</b>	
8709-00	4,267
Programmable Line Module (PLM)/RJE	
8710-00	4,267
PLM/BSC 3270	
8711-00	4,267
PLM/DDP	
8712-00	2,132
PLM/UTS	
8713-00	2,132
PLM/SX 1100	
8714-00	4,267
PLM/X.25	
8715-00	4,267
PLM/X.21	
8716-00	4,267
PLM/SNA	
8717-00	4,267
PLM/NTR	
8718-00	2,132
PLM/OIS	
6169-78	7,440
Communications Management System (CMS) 1100 License Expansion; allows use of CMS 1100 beyond the limited use included in the GPTE or Mixed Mode Executive license; supports a Telcon DCA network	
6159-95	4,848
Processor Common Communication System (PCCS)	
6136-92	6,750
DCP/10, DCP/15 Operating System	
6136-95	9,000
DCP/20 Operating System	
6136-01	16,425
DCP/40 Operating System	
6249-97	3,888
Message Control Bank (MCB) License Expansion; allows use of MCB beyond the limits of the GPTE or Mixed Mode Executive license	
8859-99	4,500
Remote Batch File Transfer/Extended (RBFTE)	
7681-99	1,599
On-Line Transfer/1100	
7683-99	6,399
On-Line Disk/1100	
<b>Program Development</b>	
6146-93	37,536
Mapper 1100 (16 users)	
6146-92	56,304
Mapper 1100 (17+ users)	
6146-91	18,768
Mapper 1100 17+ Upgrade	
6734-98	1,448
Cobol Editor	
6239-95	8,064
Programmers Advanced Debugging System (PADS) 1100	

\*License for a 5-year period.

## Unisys 2200 Series

Program Development (Continued)		Single Extended Term Charge* (\$)
6170-97	Conversational Time-Sharing System (CTS) 1100	14,491
6262-97	Interactive Processing Facility (IPF) Command Language	11,457
6260-97	IPF Control	4,139
6263-97	IPF Procedures	14,490
6245-95	IPF Edit 1100	12,006
6264-97	User Assistance	3,105
6261-97	Distributed Data Processing (DDP) 1100	4,139
7623-90	SX 1100; 16 users	9,600
7623-89	SX 1100; 32 users	14,400
7623-86	SX 1100 Upgrade; from 16 to 32 users	4,800
<b>Utilities</b>		
6162-95	Checkpoint/Restart	4,848
6271-97	CULL Processor	1,036
F3859-97	Interactive CULL (IACULL)	1,036
6135-97	Sort/Merge	6,209
6246-97	Log Analyzer	4,966
6161-97	Performance Analysis Routines	12,006
6274-97	On-line System Activity Monitor (OSAM)	6,209
<b>Miscellaneous Products</b>		
6237-96	Display Processing System (DPS) 1100 License Expansion; allows use of DPS 1100 beyond the limited purpose included in the GPTE or Mixed Mode Executive license	13,536
6753-98	Percon Control; provides support for peripheral devices such as printers	2,070
F6115-97	Percon Control for 0776 and 0447 Printers	3,589
F6115-98	Percon Control for 0789 Printers	3,589

\*License for a 5-year period. ■