

Burroughs B 2900, B 3900, and B 4900

MANAGEMENT SUMMARY

The B 2900 and B 3900 Series represent the medium-scale members of Burroughs "900 Series" of computer systems. The original B 2900 models, the B 2910 and B 2930, were replaced in March 1983 by the B 2925, which offers twice the memory capacity of the B 2910. In September 1981, the B 3955 was introduced as a replacement for the original B 3950. Compared with the B 3950, the B 3955 provides a 47 percent reduction in floor space requirements and a 25 percent reduction in power and air conditioning requirements.

The B 4955, introduced in September 1982, is compatible with the medium-scale B 2900 and B 3900 systems. However, in terms of performance, the B 4955 fits between Burroughs' large-scale B 6900 and B 7900 systems and between IBM's high-end 4300 Series models and low-end 308X Series models.

According to Burroughs, the B 3955 provides a 50 percent performance improvement over the B 2925, while the B 4955 offers more than twice the performance of the B 3955.

The B 2900, B 3900, and B 4900 systems feature asynchronous pipelined architecture, which Burroughs calls "micro-modular concurrent" architecture. Each central processor is composed of a series of processing elements that can operate concurrently to perform such operations as instruction pre-fetch and data address calculation, data fetching and manipulation, instruction execution, and independent I/O initiation and transfer.

The Input/Output Processor (IOP) initiates data transfers between the memory and peripheral subsystems asynchronously and independently of the central processor. The IOP is interfaced to the peripheral

The B 2900, B 3900, and B 4900 Series are medium-to large-scale computer systems that feature asynchronous pipelined architecture, Data Link Processors that manage I/O operations independently of the central processor, and multiprocessing capabilities. The systems offer substantial performance improvements over the older B 2800, B 3800, and B 4800 Series.

MODELS: B 2925, B 3955, and B 4955.
CONFIGURATION: From 1 to 4 CPUs, 1 to 5 megabytes of main memory, 6 to 64 DLPs, and up to 288 communications lines.
COMPETITION: Honeywell DPS 7 and DPS 8, IBM 4300 Series, IPL Systems 4400 Series, Magnuson M80 Series, and Sperry Univac System 80 and 1100/60.
PRICING: Purchase prices for Central Systems range from \$145,000 to \$780,000.

CHARACTERISTICS

MANUFACTURER: Burroughs Corporation, Burroughs Place, Detroit, Michigan 48232. Telephone (313) 972-7000.

MODELS: B 2925, B 3955, and B 4955.

PREVIOUS MODELS: B 2910, B 2930, and B 3950.

DATE ANNOUNCED: See Table 1.

DATE OF FIRST DELIVERY: B 2925—first quarter 1983; B 3955—fourth quarter 1981; B 4955—third quarter 1983.

DATA FORMAT

Memory word size is 48 bits. No fixed word length is used.



The B 4955 computer system is available in either single or multiple processor configurations. Through a Shared System Processor (SSP), up to four processors can be connected to share common disk data files.

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▷ subsystems through Data Link Processors (DLPs). Each DLP is an independent microprocessor programmed to service a specific category of peripheral devices.

The basic B 2925 system includes one megabyte of main memory, an operator keyboard/display terminal, a DLP Base, a 1 x 8 disk controller, and two 243K-byte mini-disk (diskette) drives. One mini-disk drive is used for data loading or unloading. Six DLPs are standard. The B 2925 can be field upgraded to a B 3955.

The basic B 3955 system includes two megabytes of main memory, an integrated console, an operator keyboard/display terminal, two DLP Bases, seven DLPs, two mini-disk drives, and a 2x8 disk controller. The system is expandable to four megabytes of main memory and 32 DLPs.

The basic B 4955 system includes five megabytes of main memory. Burroughs plans to offer up to 10 megabytes of memory at a future date. The B 4955 Central System also includes an integrated console, an operator display terminal, two mini-disk drives, three DLP Bases, and six DLPs. The system can be expanded to include up to 64 DLPs.

In addition to the uniprocessor configurations specified, the B 2900, B 3900, and B 4900 systems can be expanded with up to three additional processors to form a loosely coupled multiprocessor system with shared mass storage, peripherals, and communications systems. With the addition of the Shared System Processor (SSP), the operating system, compilers, utilities, program libraries, and data files can also be shared by up to four central processors. The SSP forms part of the I/O subsystem and is physically a DLP with memory cards. Multiprocessor systems can include B 2800, B 3800, or B 4800 Series systems as long as at least one processor in the system is a B 2900, B 3900, or B 4900. The SSP requires a dedicated DLP Base in the host B 2900, B 3900, or B 4900.

PERIPHERALS AND COMMUNICATIONS

The peripheral equipment for the B 2900/B 3900/B 4900 includes mass storage media with capacities of 5.5 to 1608 megabytes, magnetic tape units with data transfer rates of 80K to 200K bytes per second PE and 470K to 1250K bytes per second GCR/PE, line printers with speeds from 650 to 2000 lines per minute, card readers rated at 300 to 800 cards per minute, and MICR and MICR/OCR readers rated at 1000, 1625, and 2600 documents per minute.

Communications facilities are provided by the B874 Systems and Communications Processor, the Uniline Data Link Processor, and the CP 3680 Data Communications System. Features available through all communications processors include standard synchronous/asynchronous communications, standard two-wire direct connect, automatic dial-out, binary synchronous, and BDLC protocols. The Uniline Data Link Processor accommodates Burroughs direct interface arrangements in addition to the facilities mentioned above.

▶ MAIN STORAGE

STORAGE TYPE: MOS, utilizing 64K-bit chips.

CYCLE TIME: See Table 1.

CAPACITY: See Table 1.

CHECKING: An error detection and correction scheme is employed that provides for all single-bit errors to be detected and corrected. All double-bit errors are detected.

STORAGE PROTECTION: Provided by a base register and a limit register. The high-order three digits of generated memory addresses are checked to ascertain that they fall within the range defined by these two registers.

CENTRAL PROCESSOR

The B 2900/B 3900/B 4900 Series processors employ an asynchronous pipelined architecture utilizing multiple independent processor modules. Under this scheme, some processing steps can be overlapped, including instruction pre-fetch, address calculations, and data address calculations; data fetch and manipulation; instruction execution; and I/O initiation.

The B 2900 and B 3900 systems' functional modules consist of the Memory Interface Control (MIC) module, the Parallel/Serial Interface (PSI) module, the Fetch module, the Math module, the Address Store and Manipulate (ASAM) module, the Master Control Store (MCS) module, the Clock/Timer module, and the I/O Processor (IOP).

The MIC module provides an interface to the memory storage cards. It performs BCD-to-binary conversion on memory addresses and contains the error correction and memory refresh control circuitry.

The PSI module provides a data path between main memory and the CPU, as well as requesting all memory cycles needed by the processor. The PSI module also performs data zone stripping or adding as specified by the various move instructions.

The Fetch module performs all of the functions necessary to resolve the instruction OP codes, variants, and addresses in preparation for execution. This resolution includes modifying the base address when the program base is not equal to zero, performing all address indexing, and resolving all indirect addressing. The Fetch module controls the other modules needed to fetch an instruction.

The Math module is the arithmetic unit of the central processor. It performs all data manipulation specified by an instruction during instruction execution. The Math module contains data buffers capable of storing 256 bytes of data for each operand address. The data storage capability is designed to enhance processor-to-memory interfacing during instruction execution.

The ASAM module stores the memory addresses of operands used by the processor during the execute phase of an instruction. It also performs Base and Limit boundary checking for the processor during both the fetch and execute phases of an instruction.

The MCS module receives an instruction from the Fetch module after all variables are resolved. It sequences all events needed to complete an instruction and controls all other modules involved in the execution of an instruction.

The Clock/Timer module produces the 7-megahertz main system clock used by the central processor and also generates

Burroughs B 2900, B 3900, and B 4900**TABLE 1. Characteristics of the B 2900/ B 3900/ B 4900 Systems**

	B 2925	B 3955	B 4955
CENTRAL PROCESSORS			
Date of introduction	March 1983	September 1982	September 1982
Number of processors per system	1 to 4	1 to 4	1 to 4
MAIN STORAGE			
Type	64K-bit MOS	64K-bit MOS	64K-bit MOS
Cycle time, nanoseconds	571	571	440
Minimum capacity, bytes	1,048,576	2,097,152	5,242,884
Maximum capacity, bytes	2,097,152	4,194,308	5,242,884
Increment size, bytes	1,048,576	1,048,576	None
Bytes fetched per cycle	4	4	5
Error correction	Standard	Standard	Standard
Interleaving	No	No	4-way
I/O AND COMMUNICATIONS			
Number of DLPs	6 to 16	7 to 32	6 to 64
Aggregate I/O data rate, bytes per second	7,000,000	7,000,000	16,000,000
Number of B 874 SCPs per CPU	Up to 10	Up to 10	Up to 10
Communication lines per B 874	Up to 32	Up to 32	Up to 32
Number of CP 3680s per CPU	1	1	1
Communications lines per CP 3680	Up to 288	Up to 288	Up to 288

➤ The CP 3680, introduced in September 1981, is a front-end communications system that provides on-line network generation and management capabilities for up to four B 2000/B 3000/B 4000 central processors. The CP 3680 supports two types of communications interfaces: an eight-line asynchronous adapter and a two-line asynchronous/synchronous adapter. Also available is the CP 3680-01 Redundant System, which automatically assumes control of the network in the event of a failure in the CP 3680.

To facilitate the development of B 874 communications control programs, Burroughs provides the Generalized Message Control System (GEMCOS), a parameter-based system that executes user-tailored message control programs, plus the Network Definition Language (NDL), a language and compiler that enables users to define and generate customized network control programs. The GEMCOS message control system forms the interface between the network control program and the user programs processing the communications messages.

For the CP 3680, Burroughs provides the CP 3600 Data Communications Software, a task-based operating system that includes an integrated message control system.

SOFTWARE

The B 2900/B 3900 Software Facilities Program includes the Master Control Program (MCP) operating system, NDL, GEMCOS, and a language compiler. The compiler can be Cobol, Basic, RPG II, or Fortran. The Software Facilities Program for the B 4900 includes the MCP IX and MCP VI operating systems, utilities, Burroughs Programming Language, Work Flow Language, one compiler of the user's choice, and a choice of B 874 NDL, ➤

➤ a 7-megahertz clock for use by the MIC. The MIC clock is 180 degrees out of phase with the system clock. The Clock/Timer module also provides a real-time clock function.

The I/O processor (IOP), independently of the central processor, initiates data transfers between main memory and peripheral subsystems. The IOP uses I/O descriptors to manage the entire I/O operation. The IOP is interfaced to the peripheral subsystems through Data Link Processors (DLPs). Each DLP is microprocessor-controlled and is independent of every other DLP.

The B 4900 central processor includes three functional modules: the Memory Interface Module (MIM), the Fetch Module (FM), and the Execute Module (EM).

The MIM controls all access to main memory. Requests for data or code information come to the MIM via the Address/Write bus from the other processor modules in decimal form. The MIM converts these decimal addresses to pseudo-binary for the actual memory access. The B 4900 memory subsystem is four-way interleaved and has a bandpass of nearly 50 megabytes per second.

The Fetch Module performs pre-fetch functions on code, and sometimes on data, and supplies the Execute Module with formatted instructions. The Fetch Module retrieves raw information from memory, resolves all field length and data addresses, resolves any code or data interlock problems, and performs dynamic branch prediction for conditional branch instructions.

The Execute Module is the instruction execution unit. The B 4900 instruction set is implemented in microcode, and each instruction actually has two sets of microcode: an optimal one for frequently encountered forms of the instruction and a generalized form for the remainder. The Execute Module includes 1.3 million bits of control store, which contains all of the microcode needed to process an instruction.

Multiprocessor configurations of up to four central processors are possible on all B 2900, B 3900, and B 4900 systems. The multiprocessor configurations can share the CP 3680 Data Communications System, mass storage, magnetic ➤

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➤ Medium Systems NDL, Basic GEMCOS, or CP 3600 DCS.

With the introduction of the B 3955, Burroughs announced a new release of the operating system, MCP IX. MCP IX is functionally compatible with the previous release, MCP VI, and supports the same features. MCP IX has been optimized to take advantage of the B 2925, B 3955, and B 4955 system technology and to increase total system throughput.

Other software products available for the B 2900/B 3900/B 4900 systems include Command and Edit Language (CANDE), On-Line Data Entry System (ODESY), Data Management System II (DMS II), DMS Inquiry, Reporter II, and the Workflow Management System.

Program compatibility with other computers is achieved via higher-level languages. The Cobol and Fortran compilers conform to the American National Standards for these languages. Programs written in RPG or RPG II for IBM computers can either be compiled by the RPG II compiler or translated into Cobol by the COFIRS II (Cobol from IBM RPG Specifications) routines.

USER REACTION

Datapro's 1983 computer user survey elicited responses from 21 B 2900 users and 6 B 3900 users. The B 2900 respondents had a total of 27 CPUs, while the B 3900 respondents had a total of 10 CPUs. The B 2900 and B 3900 systems had been installed for an average of 25.4 months.

The users surveyed represented a number of industries, including banking/finance institutions, government agencies, manufacturing companies, retail/wholesale businesses and service bureaus.

For their application software, 25 users had in-house personnel do the programming, 12 users bought packages from the hardware manufacturer, 7 had contract programming done, and 10 bought proprietary application programs.

Most of the users surveyed had between 1024K bytes and 2048K bytes of main memory and from 600 megabytes to 1200 megabytes of disk storage. All but one of the users reported using Cobol as the primary programming language. A significant number of users reported that the program/data and peripherals carried over from other systems were compatible with the new system. One-third of those surveyed said that the hardware was late, while only four reported that the software was late for installation.

Three users of The B 2900 and B 3900 were interviewed in January, 1983. One of the banking/finance institutions commented that they were "well-satisfied" with their B 2900. They said that the "conversion went well" and the B 2900 was "more reliable" (uptime was better) than the B 3700 they used to have.

➤ tape units, printers, punched card equipment, and MICR/OCR reader sorters.

Multiprocessor configurations are also supported by the B X376-95 Shared System Processor (SSP). The SSP enables the capabilities of the operating system, compilers, utilities, program libraries, and data files to be shared by up to four processors. The SSP provides the capability for both read and write access of the same file by different programs executing in one to four central systems. The SSP prevents the erroneous updating of data that may be concurrently accessed from multiple processors.

The B 2900 and B 3900 include a System Maintenance Vehicle (SMV) that enables maintenance personnel to run special diagnostics called maintenance test cases. These test cases consist of data files built from simulated proper functioning of all circuits in all modules of the central processor. When run, the test cases give a circuit-by-circuit comparison of actual operation to the test case file. The test case files are stored on mini-disks in the system console.

The SMV consists of a programmable microprocessor, a system maintenance controller, and I/O ports which provide test paths to all system modules. The SMV also loads both operational and diagnostic firmware into the processor modules' control store, controls clock pulses to the system, and emulates maintenance panel functions.

The B 4900 system includes a Maintenance Processor that monitors the status of the central processor, memory, DLPs, and IOPs. The System Maintenance Controller provides the interface between the Maintenance Processor and the rest of the system. Interruption of system operation results in the display of a status message that indicates the cause of the interruption and the procedures or diagnostics tests that should be run. Maintenance hardware is included in each B 4955 system module.

The B 2900/B 3900/B 4900 Series Systems also monitor their own environmental conditions, including input air cooling and power source. Warning lights, operator messages, and maintenance log entries are part of the monitoring system.

CONTROL STORAGE: Access time to microcode is 45 nanoseconds.

INPUT/OUTPUT CONTROL

Each central processor includes one or two input/output processors (IOPs) that control the movement of data between main memory and the system input/output devices. On all B 2900/B 3900/B 4900 processors, individual peripheral devices operate under control of Data Link Processors (DLPs), which are associated with each input/output channel. Each DLP is designed to control a particular type of peripheral device and contains one or more record-length buffers to minimize contention for accesses to main memory.

The Data Link Processors are housed in the DLP Base, which contains 34 card positions and a power supply sufficient to handle 8 DLPs. Although the maximum number of DLPs per base is always eight, the exact number that can be housed in one base is determined by the number of cards required by the individual DLPs, as signified by each DLP's numeric suffix. A total of 20 cards per base are available for the DLPs. The DLPs provide high-speed data transfer through record-length buffers of 80 bytes for punched card equipment, 132 bytes for printers, and five 256-byte buffers for disk pack drives.

➤ **The aggregate data rate through the input/output processor is 7 megabytes per second on the B 2900 and B 3900 and 16 megabytes per second on the B 4900.** ➤

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	Excellent	Good	Fair	Poor	WA*
Ease of operation	17	8	2	0	3.56
Reliability of mainframe	10	15	1	0	3.35
Reliability of peripherals	5	18	3	1	3.00
Maintenance service:					
Responsiveness	12	10	3	2	3.19
Effectiveness	9	13	1	3	3.08
Technical support:					
Trouble-shooting	3	9	11	4	2.41
Education	1	12	6	7	2.27
Documentation	0	10	11	6	2.15
Manufacturers software:					
Operating system	16	10	1	0	3.56
Compilers & assemblers	9	14	3	1	3.15
Applications programs	2	13	4	1	2.80
Ease of programming	7	18	2	0	3.19
Ease of conversion	9	13	3	1	3.15
Overall satisfaction	8	17	2	0	3.22

Weighted Average on a scale of 4.0 for Excellent.

One of the retail/wholesale respondents indicated that they had "quite an easy conversion" from their B 3771. However, the B 2900 "wasn't a great upgrade from the old machine and the performance was less than expected."

The B 3955 user was from the health care/medical industry. She said that they were "very pleased with the B 3900" and that everything went "very smoothly" in their conversion from a B 2700. The only negative comment was that they have "had some problems" with their line printers.

Overall, the ratings and interviews indicate that most of those surveyed are satisfied with the B 2900 or B 3900 they have installed. The user survey revealed that 21 out of 27 users would recommend their system to another user. □

▶ **SIMULTANEOUS OPERATIONS:** One input or output operation on each installed DLP I/O channel can occur simultaneously with computing. Other simultaneous operations are described under the Central Processor section of this report.

CONFIGURATION RULES

The basic B 2925 system includes one megabyte of main memory expandable to two megabytes. One DLP Base and four DLPs are standard. An additional DLP Base and 12 additional DLPs can be configured. DLPs packaged with the system include those for the operator display terminal/diagnostic console, line printer, magnetic tape subsystem, and disk pack drive. A 1 x 8 disk controller is also included. A B 2925 can be field upgraded to a B 3955.

The basic B 3955 includes two megabytes of main memory expandable to five megabytes in one-megabyte increments. Two DLP Bases and a console DLP, operator display DLP, two disk drive DLPs, magnetic tape DLP, line printer DLP, and card reader DLP are standard. A B 3955 can support a maximum of 4 DLP Bases and 32 DLPs. The third and fourth DLP Bases require the Extension Cabinet.

The B 4955 system includes five megabytes of main memory. Three DLP Bases and one operator console DLP, two disk drive DLPs, two magnetic tape DLPs, and one printer DLP are included. A B 4955 can support a maximum of 8 DLP Bases and 64 DLPs. Expansion beyond three DLP Bases requires an Expansion Cabinet.

I/O controls or DLPs from the B 2800/B 3800/B 4800 Series systems are not compatible with the B 2900/B 3900/B 4900 Series. Peripheral devices on the B 2900, B 3900, and B 4900 are only restricted by the number of available spaces for DLPs and the number of card spaces per DLP Base. When configuring a system, the number of cards per DLP Base cannot exceed 20 and the number of DLPs per DLP Base cannot exceed 8. The currently available DLPs and the number of cards each contains are given in the Equipment Prices section at the end of this report.

The Shared System Processor (SSP) permits code and data files residing on mass storage devices to be shared by up to four B X800 or B X900 systems, provided that at least one system is a B 2900, B 3900 or B 4900. In order to connect the SSP, a port interface adapter is required for each system configuration. If a B 9470 Disk File is shared, a minimum of three storage modules is required for a two-system configuration. The B 2377-6 Disk File Exchange is required for more than two systems and must be housed in B 2900 or B X800 auxiliary cabinet; it cannot be housed in a B 3955 system. The SSP requires a dedicated DLP Base on the host B 2900/B 3900/B 4900 system, thus reducing the maximum number of DLPs by eight. On a B 2925 or B 3955, the SSP can reside in the Exchange/Base Cabinet or Extension Cabinet as the fourth DLP Base.

MASS STORAGE

Please refer to Table 2 for disk subsystems supported on the B 2900/B 3900/B 4900 systems.

INPUT/OUTPUT UNITS

Magnetic tape drives, printers, card readers, and MICR/OCR reader-sorters supported on the B 2900/B 3900/B 4900 systems are listed in Table 3.

COMMUNICATIONS CONTROL

B 874 SYSTEMS AND COMMUNICATIONS PROCESSOR (SCP): The B 874 SCP is a microprogrammed front-end communications processor that performs the specialized functions associated with the transmission and reception of data, including error recovery, code translation, line discipline management, and most network control functions. The B 874 SCP is available in two models, the B 874-1 and the B 874-4. The basic B 874-1 system consists of a 1.7-megahertz processor with 12K bytes of control memory, integrated host interface, and 32-line adapter cluster. The faster B 874-4 contains a 4-megahertz processor with 16K bytes of control memory. A 4K-byte or 16K-byte user memory module, expandable to 96K bytes, is available for both models.

Line adapters available for the B 874 SCP include standard asynchronous/synchronous/binary synchronous, standard two-wire direct connect, automatic dial-out, and, on the B 874-4, Burroughs Data Link Control (BDLC). The B 874 Adapter Cluster will accommodate up to 16 line adapters. Most of the line interface adapters are dual adapters, handling two full-duplex lines, each with different characteristics. The adapter cluster allows data speeds up to 19,200 bits per second per line adapter in an environment of up to 32 half-duplex communications lines or 16 BDLC half-/full-duplex lines. A TTY-compatible line adapter provides data transmission at up to 38,500 bits per second.

The B 874 Network Definition Language (NDL) is available to prepare customized network control programs containing tables, system code, and microprograms for each B 874 SCP. The network control program is compiled on the host processor and loaded from the host system disk to the communications processor through an MCP command. Also available is the Generalized Message Control System (GEMCOS), a software package designed to generate a ▶

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TABLE 2. MASS STORAGE

Subsystems	B 9470-1 Disk	B 9484-12 Disk	B 9484-51 Disk	B 9494-5 Disk*	B 9494-41 Disk
Cabinets per subsystem Disk packs/HDAs per cabinet	1 or 2 1	— Removable	Up to 8 2 removable	— Fixed	Up to 4 2 fixed
Capacity, megabytes	5.5	252	130.4	542	402
Average access time, milliseconds	5	36.8	25	30	28
Average rotational delay	—	8.3	8.3	8.3	8.17
Data transfer rate, bytes/second	650,000	1,200,000	605,000	1,200,000	650,000
Controller model	Integrated	B 9387-51, B 9387-52	B 9387-4X	B 9387-51, B 9387-52	B 9387-4X
Comments	Head-per-track disk; each B 9470-1 supports one B 9470-11 add-on drive; requires B X373-90 DLP	Requires B X304-90 DLP	Requires B X304-90 DLP	Requires B X304-90 DLP	Requires B X304-90 DLP

*Supported on the B 4900 only.

► custom-tailored Message Control System. GEMCOS is described in more detail in the "Software" section of this report.

The B 874 SCP connects to a B 2900/B 3900/B 4900 system through the B X303-90 DLP. The DLP on the B 3955 supports the B 874-4 SCP only.

UNILINE DLP: The B X351-90 Uniline DLP provides connection for data sets (with or without automatic dial out), while the B X351-91 provides Burroughs direct interface and two-wire direct connect facilities. The B X351-90 Uniline DLP permits connection between a single processor and one communications line through a data set employing either the Burroughs standard asynchronous or synchronous line procedures. In the synchronous mode the maximum transmission speed is 9600 bits per second, and in the asynchronous mode the maximum transmission speed is 1800 bits per second.

CP 3680 DATA COMMUNICATIONS SYSTEM: Announced in September 1981, the CP 3680 is a front-end communications system that can simultaneously service up to four Burroughs B 2000/B 3000/B 4000 host computers. Two models are available: the basic CP 3680 Data Communications System and the CP 3680-01 Redundant Communications System. The CP 3680-01, operating in a "hot standby" mode, assumes control of the network and host interfaces in the event of a CP 3680 failure.

CP 3680 capabilities include on-line network generation and management; control of all line protocol functions such as polling and selecting stations; support for polled, bisynchronous, Teletype, point-to-point, and bit-oriented protocols; user-defined protocols; control character mapping for device-independent application programs; on-line network statistics and monitoring; and queuing of inbound and outbound messages. Optional features include the Remote Diagnostic Facility and the Power Fail Recovery Option, which provides battery backup in the event of an external power failure.

The CP 3680 supports a number of commonly used communications protocols, which Burroughs has grouped into five Protocol Classes. Class 1 protocols include polled protocols such as Burroughs Poll-Select, Lear-Siegler ADM-2, NCR 270 variants, NCR 796 variants, and IBM 2260. Class 2 protocols are binary synchronous protocols such as point-to-point (IBM 2780/3780), multipoint (IBM 3270), multipoint inverse (to communicate with IBM hosts), and NCR bisynch transparent (3270 variant). Class 3 protocols

include Teletype, TWX, and Bell Vu-Set protocols. Class 4 protocols include point-to-point protocols, such as Burroughs Remote Job Entry (B 761) and Burroughs point-to-point batch mode variant, contention mode variant, and conversational variant. Class 5 protocols include Burroughs Data Link Control (BDLC), ISO High-Level Data Link Control (HDLC), ANSI Advanced Data Communications Control Procedures (ADCCP), and IBM Synchronous Data Link Control (SDLC).

The basic CP 3680 system includes a processor with 256K bytes of memory; 14 I/O ports, of which 9 can be used for data communications interfaces; a 20-megabyte disk subsystem with interface; a real-time clock; a Dual Channel Port Controller (DCPC); a system console interface; and a firmware set. A CP 3641-01 system console is required for the first CP 3680 system at each site. Also required are a host interface for each host computer and the CP 3600 Data Communications Software (DCS). If the CP 3680-01 redundant system is added, the CP 3600 Standby Communications Software (SCS) is required.

Two types of microprocessor-based communications adapters are available: an eight-line asynchronous adapter and a two-line asynchronous/synchronous adapter. Each adapter requires one I/O port and supports an aggregate data rate of up to 8000 characters per second. With the eight-line asynchronous adapter, all communications lines must operate at the same data rate and the protocols used must be of the same protocol class. When the two-line synchronous adapter is used, all communications lines must use protocols of the same protocol class, but data rates can vary.

The CP 3680 system can be expanded to 25 I/O ports by the addition of the I/O Expansion Unit. Further expansion, to a maximum of 41 I/O ports, is accomplished by adding the I/O Port Extender. Of the total of 41 I/O ports, 36 can be used for communications interfaces. The number of line adapters cannot exceed 8 on an entry-level CP 3680, 22 on a CP 3680 with the I/O Expansion Unit, or 36 on a CP 3680 with the I/O Expansion Unit and the I/O Port Extender. A maximum CP 3680 configuration supports up to 288 asynchronous multi-drop lines or 72 synchronous multi-drop lines, up to 2000 terminal stations, and up to 2000 transaction types. However, when the number of terminals in the network exceeds 400, a 256K-byte memory module must be added. The CP 3680 transfers data to the host computer at a rate of 200,000 characters per second.

The table-driven CP 3600 DCS software enables users to modify, control, and monitor networks on-line. It also

Burroughs B 2900, B 3900, and B 4900**TABLE 3. INPUT/OUTPUT UNITS**

Magnetic Tape Units	Number of Tracks	Recording Density, Bits/Inch	Encoding	Tape Speed, Inches/Sec.	Transfer Rate, Bytes/Sec.
B 9495-8	9	1600	PE	50	80,000
B 9495-82	9	1600	PE	75	120,000
B 9495-83	9	1600	PE	125	200,000
B 9495-24	9	1600	PE	200	320,000
B 9495-32	9	6250	GCR	200	1,250,000
B 9495-33	9	1600	PE	75	120,000
B 9495-33	9	6250	GCR	75	470,000
B 9495-33	9	1600	PE	125	200,000
B 9495-33	9	6250	GCR	125	780,000
Printers	Printing Speed	Print Positions	Horizontal Spacing, Chars./Inch	Vertical Spacing, Lines/Inch	Form Size, Inches
B 9246-6	650 lpm	132	10	6 or 8	4 to 20 in. wide
B 9246-12	1250 lpm	132	10	6 or 8	
B 9246-21	2000 lpm	132	10	6 or 8	
B 9247-14	1100 lpm	132	10	6 or 8	4 to 20 in. wide
B 9247-15	1500 lpm	132	10	6 or 8	
Card Equipment	Columns	Speed, Cards/Min.	Input Hopper Capacity	Output Stacker Capacity	Options
B 9115 Card Reader	80	300	1000	1000	51-col. read
B 9116 Card Reader	80	600	1000	1000	51-col. read
B 9117 Card Reader	80	800	1000	1000	51-col. read
MICR/OCR Reader/Sorters	Type Font	Speed, Documents/Min.	Number of Stackers	Document Size, Inches	Options
B 9137-4	MICR E13B	1000	8 to 16	—	Endorser, field override, batch ticket detector
B 9190-2	MICR E13B; OCR 7B, OCR A/1428, or OCR B/1428/407	1625	4 to 32	—	Endorser, microfilm module, 51-col. read, offline sort
B 9195	—	2600	20 to 32	4 $\frac{7}{8}$ to 9 $\frac{1}{2}$ in. long, 2 $\frac{1}{2}$ to 4 $\frac{1}{2}$ in. tall	Endorser, microfilm module

► includes an integrated message control system that provides five-level message security, dynamic and fixed message routing, on-line forms generation, and simultaneous servicing of up to four host processors. Message control system files, forms files, and application data save areas are stored in CP 3680 memory or on the CP 3680 disk.

Existing Network Definition Language (NDL) applications will run on the CP 3680 with little or no modification, according to Burroughs. NDL applications can run concurrently with the CP 3680 resident message control system. Support for Burroughs program products that currently require a B 874 communications processor, such as GEMCOS and CANDE, is also available.

SOFTWARE

The Software Facility Program is required for all B 2900 and B 3900 systems. The package includes the MCP operating system, utilities, Basic GEMCOS, B 874 NDL, Medium Systems NDL, and a choice of one compiler. These programs are described in the paragraphs that follow.

The B 4900 Software Facility Program includes the MCP VI and MCP IX operating systems, utilities, the Burroughs Programming Language, the Work Flow Language, a choice of one compiler, and a choice of one data communications option, which can be B 4000 NDL, B 874 NDL, Basic GEMCOS, MCS Generator, or CP 3600 DCS.

MASTER CONTROL PROGRAM: The principal component of Burroughs software support for the B 2900/B 3900/B 4900 Series systems is the MCP, a modular operating system that schedules and controls all operations of the systems. The MCP requires from 14K to 50K bytes of main memory, up to 400K bytes of disk storage, at least one magnetic tape unit, a card reader, and a console typewriter or display console. A high-speed trace option adds another 7.5K bytes to the main memory requirements.

MCP IX, released in 1981, is the currently available version of the MCP for the B 2900/B 3900/B 4900 systems. MCP IX is functionally compatible with the earlier MCP VI and supports the same functions. However, MCP IX has been optimized to take advantage of the B 2925, B 3955, and B 4955 technology and to increase system throughput. ►

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► The MCP multiprogramming executive has the capability to supervise the execution of up to 99 concurrent jobs. Under MCP, user programs can be divided into a resident portion that must be resident in main memory for program execution and a series of overlayable segments that can be brought into main memory only when required for program execution. The compiler builds a segment dictionary reflecting the program organization and computes the memory requirements for containing the resident portions of the program plus the minimum main memory space required for accommodating the largest single overlayable segments of the program. During program execution, the MCP uses the segment dictionary to locate required program segments either in main memory or on disk. When adequate main memory space is available, the MCP's overlay segments are allowed to remain in main memory until the space is required by another program. MCP IX also provides a virtual memory management capability that allows the use of programs that exceed the size of the physical main memory.

The MCP performs the following principal functions: 1) schedules the loading and execution of user programs in a multiprogramming environment; 2) allocates main memory storage and relocates user programs as necessary to achieve efficient storage utilization; 3) schedules and initiates all I/O operations; 4) services all interrupts and attempts recovery from I/O errors; 5) provides I/O control functions such as blocking, buffering, file opening and closing, data communications control, etc.; 6) loads program segments or overlays upon request; 7) creates and maintains disk program libraries in symbolic and/or machine-language form; 8) establishes communication between the system and its operator via the console typewriter, display console, and control cards; 9) provides dump, trace, and checkpoint/restart facilities; and 10) maintains a system log.

The MCP handles batch-mode jobs entered both locally and from remote terminals, as well as data communications and time-sharing jobs. Programs are loaded and executed in a sequence determined by their assigned priorities and memory requirements. Jobs of equal priority are processed on a first-in/first-out basis, and a time-slicing technique is used to ensure access to the central processor for programs of equal priority. Top-priority jobs can cause lower-priority jobs to be rolled out to disk to make the required main memory available. When the end of a job is reached and other jobs are waiting, the remaining programs in main memory are compacted to maximize the contiguous memory area available for loading and initiating one or more new programs.

Other significant MCP features are: 1) a "STOQUE" capability that permits asynchronous transfers of data between programs; 2) a 3-level priority system that permits assignment of separate priorities for scheduling, processing, and memory utilization; 3) a 3-level logging system that provides an Operator Display Terminal Log of all system messages, a Maintenance Log showing the performance of each system component, and a Run Log that facilitates cost distribution and system audits; 4) ability to relocate the MCP modules in main memory; and 5) ability to overlap MCPI/O operations (such as opening files) with computing.

MCP has comprehensive facilities for accumulating data on the utilization of system resources by each executing user program. The program logs central processor utilization, peripheral use by type, and system overhead factors such as load-dumps, print-backup, and pseudo-reader, for each job executed. The log file can be analyzed by the TABS program to prepare billing reports for computer usage.

Optional modules within MCP include the Data Communications Processor Control (DCP) module, the Data Management System II (DMS II) module, and the Shared Systems Processor (SSP) module.

The DCP module controls all communications between the B 874 Systems and Communications Processor and the active Message Control System (MCS). The DMS II module is a data management facility provided to establish logical relationships between data. (DMS II is discussed elsewhere in this section.) The SSP module provides the capability for concurrent access, both read and write, of the same file by different programs executing in one to four central systems. Protection from erroneous updating of data by independently functioning processors is also provided by the SSP module.

COBOL: The most recently released Burroughs Cobol compiler is based on Cobol-74 and includes all the facilities of full American National Standard Cobol, including the Sort and Segmentation modules. Source-language program debugging facilities, data communications constructs, and a number of other useful extensions are also included. The EBCDIC, BCL, and ASCII character sets are supported. The compiler accepts a Cobol source program and generates a machine-code object program which is placed in disk storage, ready for execution. The compiler automatically divides all object programs into logical, relocatable segments.

Also available for the B2900/B3900/B4900 systems is a Cobol 68 compiler, which is compatible with the older American National Standard Cobol 68 language.

FORTRAN: The Fortran 66 compiler provides extended language facilities which are compatible with IBM Fortran IV Level H, includes the full ANS Fortran language plus numerous extensions, and is upward-compatible with the Fortran compilers for the larger B5900, B6900, and B7900 systems. The compiler requires 45K bytes of main memory and makes use of the fixed-length floating-point arithmetic instructions, extended addressing capabilities, and 4-digit adders of the processors to achieve significantly higher object program execution speeds. A Fortan 77 compiler is also available.

BASIC: B2900/B3900/B4900 Basic is an industry-standard implementation of the Basic language that generally corresponds to the original Dartmouth Basic.

RPG II: A full implementation of the RPG II language with extensions for data communications and DMS II data base management.

BURROUGHS PROGRAM LANGUAGE (BPL): BPL enables assembly language programmers to code in a higher-level language that permits complete control of all machine-level facilities, including instruction modification, indexing, incrementation, and character or bit manipulation. Data declarations are required, and facilities for macro instructions and program segmentation are provided. Burroughs emphasizes that BPL is not a Cobol or Fortran replacement language, but a replacement for the Assembler for programs that require extensive machine-dependent coding.

NETWORK DEFINITION LANGUAGE (NDL): A special-purpose programming tool that enables users to define and generate customized Network Control programs for data communications applications. The Network Controller handles line disciplines, buffer management, message queuing, and auditing, and supervises the flow of messages between user-coded programs and remote terminals. This enables the user's application programs to deal with remote terminals in the same manner as with conventional on-site peripheral devices. After the programmer defines the custom Network Controller in the NDL syntax, the source statements are processed by the NDL Compiler and converted into the necessary object code and tables for the B 874 Systems and Communications Processor. The NDL compiler requires a minimum of 90K bytes of main memory.

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► **GENERALIZED MESSAGE CONTROL SYSTEM (GEMCOS):** This software system generates an installation-defined message control system (MCS) that manages a transaction-oriented communications network, provides security, handles transaction routing, controls message formatting, and provides a transaction processing interface for applications programs. All transaction terminals in the network are controlled by the GEMCOS-created MCS and interfaced to the applications programs and the data base. Thus, GEMCOS enables users to develop transaction processing application programs independently of the network environment. The input to GEMCOS is coded in the Transaction Control Language, a descriptive, free-form language that uses key words to describe both the network environment and the requirements for message routing, message formats, access control, recovery, etc. Alternatively, a user-developed Message Control System can be written in Cobol or the Burroughs Program Language (BPL).

COMMAND AND EDIT LANGUAGE (CANDE): This time-sharing Message Control System enables multiple users at remote terminals to create programs or data files, compile and execute programs, edit and alter programs or files, search files, send messages to other terminals, and perform a variety of other functions. Files created through CANDE can be saved and used later by the same user or by other users to whom access is granted. CANDE provides the capability for interactive program development and testing concurrently with the execution of applications programs. It also provides effective control of the access, security, and charging functions in a computer time-sharing network.

ON-LINE DATA ENTRY SYSTEM (ODESY): A sophisticated data entry and validation system using multiple on-line visual display units. It provides a generalized and generative "front end" for the existing application packages. It enables future packages to be designed to use its extensive editing facilities and thus reduce development effort by virtually eliminating conventional input control programs. Because of these editing facilities, ODESY is able to produce batches of essentially error-free data for input to application programs.

REPORTER II: This is a report writer designed to simplify the retrieval, analysis, and reporting of information maintained in computer files. Reporter II accepts report specifications coded in a free-form report description language and generates a Cobol program tailored to produce the required report. The system can retrieve input data from multiple files and/or DMS II data bases, select data based on a wide range of criteria, perform arithmetic and statistical functions, sort data in ascending or descending order according to multiple keys, control access through a password system, produce automatically formatted reports, and create one or more files of extracted data for subsequent processing or reporting.

In addition to the basic (RP2) version, Reporter II is available in an Advanced version, an Audit version, and an On-Line version. Reporter II (Advanced) adds the capabilities for generation of multiple reports in one pass through the input data, creation of summary-only (matrix) reports, and controlled formatting for special reports or preprinted forms. Audit-Reporter extends the Reporter II system by providing auditors with effective software tools for testing and evaluating the records produced by an EDP system. The On-Line Reporter is an optional module that can be added to any of the three preceding systems to provide an on-line mode of operation that enables users at remote terminals to enter, generate, compile, and execute report programs.

DATA MANAGEMENT SYSTEM II (DMS II): This comprehensive data base management system is integrated with the MCP operating system and uses MCP facilities for accessing records in the data base to achieve greater run-time

efficiency. Through the MCP facilities, the DMS II data base can be accessed by applications programs operating in multiple processing environments, such as batch, remote job entry, time-sharing, and transaction processing. DMS II incorporates a Data And Structure Definition Language (DASDL) that provides for the logical description of data in sets or subsets and for mapping the logical data into physical structures. A variety of retrieval methods is supported, including indexed sequential, random, and ordered lists. The latter method creates indices that require small amounts of disk storage and permit very fast searches.

DMS II permits multiple indices to be established for accessing a file, and each file can be accessed by any of the available access methods to provide retrieval of information by different applications programs. Cobol and RPG II interfaces are provided. When multiple programs are accessing the data base, DMS II provides lockout protection at the record level to prevent simultaneous updating of a record. The DMS II audit trail captures a record of all data base maintenance functions to facilitate automatic recovery.

DMS INQUIRY: This optional extension of DMS II provides an easy-to-use language that enables non-EDP personnel to access the data base via remote terminals. Users can "browse" through information stored in the data base and retrieve it either serially or randomly, without the delays normally associated with programming and debugging an inquiry program.

BURROUGHS NETWORK ARCHITECTURE (BNA): A set of software designed to enhance the interaction of terminals with host CPUs in a network environment. BNA is also designed to facilitate a move into distributed data processing. Through the BNA architecture, Burroughs processors and terminals can be granted access to data bases throughout a network, job tasks and information files can be transferred from one point to another, and data processing resources available in a network can be shared among participants regardless of location. BNA is designed to work with existing Burroughs terminal networks and with the Global Memory multiprocessing facility available on Burroughs large-scale processors. BNA depends on logical links rather than physical links, relying on network tables maintained in the host processors for routing. All routing is through host mainframes. Services provided by BNA include those designated host and those designated network. Host services include coordination of communication between tasks being executed at various hosts; control of the creation, updating, and transfer of data from host to host; and handling of communication with logical points within the network. Network services perform message routing, linking hosts using the Burroughs Data Link Control (BDLC) bit-oriented protocol. Network services also permit connection of Burroughs processors to packet-switching services using X.25 procedures. Links can also be established to non-Burroughs machines using currently available software such as NDLC.

BURROUGHS DATA LINK CONTROL: Until the adoption of BDLC, a bit-oriented line control procedure for synchronous transmissions, Burroughs' protocol was Basic Mode, a character-oriented line control procedure. In the Basic Mode protocol system, the user data was "enveloped" or bracketed by line control characters before transmission.

In BDLC, the data is bracketed with a lesser number of characters because bits, rather than whole characters, are used to represent the control codes. This reduction in non-information control data transmitted with user data is significant despite the addition of transmission error detecting control bits.

BDLC is based on High-Level Data Link Control Procedures (HDLC), the protocol standard developed by the International Standards Organization (ISO) and the European

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► **Computer Manufacturers Association (ECMA), and Advanced Data Communications Control Procedures (ADCCP), the protocol standard developed by the American National Standard Institute (ANSI). It is Burroughs' intention to maintain BDLC compatible with the bit-oriented protocols of selected competitors (such as IBM's SDLC).**

In networks using BDLC, one device, a processor, operates as a Primary Station. All other devices, whether processors or terminals, function as Secondary Stations. (This arrangement is referred to as the Unbalanced Configuration.) Any line can be full- or half-duplex, switched or non-switched, analog or digital. In the point-to-point arrangement, the Primary Station is at one end of a communications line, and a Secondary Station is the other end. In the multipoint arrangement, the Primary Station is at one end of the line and two or more Secondary Stations are connected to the line. A device can function as a Secondary Station on one line and as a Primary Station on another line. Such an arrangement can occur when a given Secondary Station has one line to a Primary Station and another line to devices that are not connected to that Primary Station.

The Primary Station controls the establishment of links for data transfer, controls the actual data transfer, and controls error recovery operations. The Secondary Stations can operate in the Normal Response Mode (NRM) or in the Asynchronous Response Mode (ARM). In the Normal Response Mode, the Secondary Station cannot initiate transmissions. Specific permission to transmit and/or respond to a command must be given to the Secondary Station by the Primary Station. Once given permission, a Secondary Station can transmit up to seven frames (messages) without requiring additional permission. In an optional version of BDLC, up to 127 frames can be transmitted without requiring additional permission.

In the Asynchronous Response Mode, the Secondary Stations can initiate transmission without permission from the Primary Station. In this mode, Secondary Stations on a multipoint line must contend with each other to obtain a link for transmission. In the NRM, the Primary Station polls each station and thereby assures each station equal opportunity for link establishment.

WORK FLOW MANAGEMENT: Implemented with the Work Flow Language (WFL), a free form English-like language for managing the flow of job streams, priorities, and resource allocation in a Burroughs multiprogramming environment. WFL can implement work flow control functions including task initiation, task termination, task attributes, file attributes, file equation, control statements, declarations, and printout control. WFL provides job streaming capabilities by specifying the execution sequence of interrelated programs as serial or parallel.

FUNCTIONAL LOGICAL ANALYSIS OF MACHINE EFFICIENCY (FLAME): FLAME is a performance evaluation tool designed to measure both hardware and software performance. FLAME collects raw data at specified intervals and writes it out to magnetic tape or disk for subsequent processing by the FLAMER report program. Additional program modules provide supplementary reports, report summaries, special versions of the System Run Log, disk utilization analyses, and real-time monitoring of the B2900/B3900/B4900 systems.

UTILITY ROUTINES: A Sort Program Generator accepts parameters entered by the user and generates disk or tape sort programs tailored to meet specific requirements. It can also utilize the "intrinsic sort" capability of the MCP to perform immediate sorts without generating specialized programs. When disk units are used to hold the work files, either a tag sort or a full-record sort can be performed. For tape sorting, from 3 to 8 tape units can be used. A merge capability permits

from 2 to 8 properly sequenced input files to be combined into a single output file.

DMPALL is a general information transfer routine that can print the contents of any card, disk, magnetic tape, or paper tape file or transcribe a file between any two types of hardware devices. The file ID, record length, blocking factor, and/or parity can be altered during the transcription compilations and executions, and for program listings.

The Time Analysis and Billing System (TABS) utilizes the MCP-created system log to analyze computer usage and disburse the costs of the computer and related services according to a hierarchy of charge numbers. The system consists of a series of daily programs that analyze central processor, peripheral, and main memory utilization, multiprogramming performance, and the total number of program executions and use time accumulated by each charge number. A monthly billing report reflects the total dollar value of computer services by charge number and prorates the charges for utility services based on the percentage use of the system. A computer charge summary provides a summary of accumulated month-to-date charges per account number for production runs, compilers, program testing, and use of program utilities.

Standard Utility functions provided with MCP include library maintenance, system log maintenance, conversion of data files from one format or media to another, and set/change program priorities for processor, memory, and scheduling before or during program scheduling and execution.

APPLICATION PROGRAMS: Among the applications programs available from Burroughs are:

APT III (Numerical control)

BHAS II (Burroughs Hospital Administration System)

BHIPS (Burroughs Hospital Information Processing System)

BIPASS (Burroughs Inventory Planning, Analysis, and Simulation System)

BPS (Business Planning System)

DIS (Distribution Information System)

GBMS (General Business Management System)

Infostats (forecasting and statistical analysis)

PCS (Production Control System)

SCHOLASTIC System

TMS (Text Management and Electronic Mail System)

Total Banking System

PRICING

CONTRACT TERMS: The B2900, B3900 and B4900 systems are available for purchase or for lease under a 1-year, 3-year, or 5-year lease agreement. The standard lease agreement entitles the customer to unlimited use of the equipment and includes full-time equipment maintenance coverage (24 hours/day, 7 days/week). The standard maintenance agreement for purchased systems covers maintenance of the equipment for nine consecutive hours per day on Monday through Friday only; extended maintenance coverage is available at higher rates. The central system (CPU, memory, channels, etc.) is warranted for one year; the peripheral equipment, for 90 days. ►

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► All maintenance charges listed in this report are for "metro 1" (city) districts. Super city rates (e.g. New York or Chicago) are four percent higher. Rates outside a metro area (10 miles from city) are 20 percent higher.

All lease plans may include purchase options that allow 50 percent of the rental paid during the first 36 months to be applied toward the purchase price at any time during the lease period.

SOFTWARE: All software is unbundled. Program Products for the B 2900/B 3900/B 4900 systems are offered under either an Unlimited-Time License Plan, for a one-time charge or 12 monthly payments followed by an annual maintenance fee, or a Limited-Time License Plan, with monthly payments.

TECHNICAL SUPPORT: Users can purchase Burroughs technical support in several ways: under a Product Support Agreement, on a per-diem basis, or on an hourly charge basis.

EDUCATION: Users can obtain the necessary training by paying for individual courses. The currently available courses range from 1 to 10 days in length, cost \$121 to \$1,850 for each attendee, and fall into the following broad categories: Systems Support, Operations, Languages, Environmental (data base and data communications), and Applications.

EQUIPMENT: Listed below are typical B 2900, B 3900, and B 4900 configurations. All necessary control units and exchange units are included in the indicated prices. The quoted rental prices are for a one-year lease and include maintenance service.

B 2925 SYSTEM: Consists of a B 2925 Central System (CPU with one megabyte of main memory, system console, operator display terminal, two mini-disk drives, DLP Base, six DLPs, and B 9387-41 Disk Controller) plus one 402-megabyte B 9494-41 Dual Fixed-Disk Drive, one 80KBS B 9495-45 Magnetic Tape Subsystem, one 300-cpm B 9115 Card Reader, and one 650-lpm B 9246-6 Line Printer. The purchase price is \$211,368, monthly maintenance is \$908, and monthly rental is \$8,617.

B 3955 SYSTEM: Consists of a B 3955 Central System (CPU with two megabytes of main memory, integrated console, operator display terminal, two mini-disk drives, two DLP Bases, seven DLPs, and B 9387-42 Disk Controller) plus one 804-megabyte B 9494-42 Dual Fixed-Disk Data Bank, four 120KBS B 9495-82 Magnetic Tape Units with B 9499-51 Master Electronic Exchange, one 600-cpm B 9116 Card Reader and one 1500-lpm B 9247-15 Line Printer. The purchase price is \$483,832, monthly maintenance is \$2,131.30, and monthly rental is \$19,373.

B 4955 SYSTEM: Consists of a B 4955 Central System (CPU with five megabytes of main memory, integrated console, operator display terminal, two mini-disk drives, three DLP Bases, and six DLPs) plus one 1608-megabyte B 9494-44 Dual Fixed-Disk Data Bank, one B 9387-42 Disk Controller, six 1250/320KBS B 9495-24 Magnetic Tape Units with B 949921 Magnetic Tape Controller, one 600-cpm B 9116 Card Reader, and one 2000-lpm B 9246-21 Line Printer. The purchase price is \$1,246,654, monthly maintenance is \$4,026.30, and monthly rental is \$51,406.

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
PROCESSORS AND MAIN MEMORY					
B 2925	Central System; includes CPU with one megabyte of main memory, I/O processor, console and operator display with keyboard, 2 mini-disk drives for system maintenance, Data Link Processor (DLP) Base, console DLP, operator display DLP, disk drive DLP, magnetic tape DLP, line printer DLP, and 1 x 8 disk controller	\$145,000	\$430.00	\$ 6,287	\$ —
B 3955	Central System; includes CPU with 2 megabytes of main memory, I/O processor, integrated console, operator display with keyboard, 2 mini-disk drives for system maintenance, 2 DLP Bases, console DLP, operator display DLP, 2 disk drive DLPs, magnetic tape DLP, line printer DLP, card reader DLP, and 2 x 8 disk controller	304,500	621.00	11,551	9,450
B 4955	Central System; includes CPU with 5 megabytes of main memory, 2 I/O processors, integrated console, operator display with keyboard, 2 mini-disk drives for system maintenance, 3 DLP Bases, console DLP, 2 disk drive DLPs, 2 magnetic tape DLPs, and line printer DLP	780,000	1,300.00	33,725	24,742
	One-megabyte Memory Increment for B 2900 and B 3900 systems	12,000	—	—	—
B 2900 OPTIONS					
B 2909-91	Additional DLP Base; one allowed	10,500	25.40	410	342
B 2095-91	Exchange/Base Cabinet; can house a B 2377-6 Disk File Exchange, an additional DLP Base, or a Shared System Processor	26,251	50.00	1,019	840
B 9361-21	Operator Display	3,098	22.00	133	122
B 2376-95	Shared System Processor	12,601	27.80	519	442
B 2376-92	Port Interface Adapter for B 2800 DLPs	2,588	26.20	102	91
B 2376-93	Port Interface Adapter for B 3800/B 4800 DLPs	2,588	26.20	102	91
B 2376-94	Port Interface Adapter for B X900 DLPs	2,588	26.20	102	91
B 2373-90	B 9470 Disk File DLP-3 (3 cards)	4,620	27.60	185	160
B 2304-90	B 9484/B 9494 Disk Drive DLP-2 (2 cards)	4,620	18.60	185	160
B 2395-90	B 9495-8 Magnetic Tape DLP-2 (2 cards)	4,043	18.60	160	142
B 2395-91	B 9495-82/B 9495-83 Magnetic Tape DLP-2 (2 cards)	4,043	18.60	160	142
B 2395-92	B 9495-24/B 9495-32/B 9495-33 Magnetic Tape DLP-3 (3 cards)	4,620	27.60	185	160

*Maintenance rates are for nine hours, five days per week.

**Lease prices include 24-hour, 7-day maintenance.

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		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
▶ B 2900 OPTIONS (Continued)					
B 2395-93	B 9495-82/B 9495-83 NRZ Magnetic Tape DLP-2 (2 cards)	4,043	18.60	161	139
B 2246-91	B 9246-21 Line Printer DLP-2 (2 cards)	5,175	31.50	147	129
B 2246-92	B 9246-6 Line Printer DLP-2 (2 cards)	5,175	52.30	147	129
B 2247-93	B 9247-14 Line Printer DLP-2 (2 cards)	5,175	18.60	147	129
B 2247-94	B 9247-15 Line Printer DLP-2 (2 cards)	5,175	18.60	147	129
B 2110-90	B 9115/B 9116/B 9117 Card Reader DLP-2 (2 cards)	2,888	18.60	117	97
B 2137-90	B 9137/B9190 Reader-Sorter DLP-3 (3 cards)	8,409	27.60	332	288
B 2138-90	B 9195 Reader-Sorter DLP-3 (3 cards)	9,702	27.60	384	332
B 2341-90	Operator Display DLP	4,232	25.40	166	144
B 2303-90	B 874 DLP-2 (2 cards)	3,396	18.60	135	119
B 2368-90	CP 3680 DLP	4,043	17.20	152	135
B 2351-90	Uniline DLP-3 (Modem connect; 3 cards)	3,676	27.60	144	122
B 2351-91	Uniline DLP-3 (TDI connect; 3 cards)	3,676	27.60	144	122
B 3900 OPTIONS					
B 3909-91	Additional DLP Base; maximum of 3	10,500	23.80	431	360
B 3905-91	Extension Cabinet; includes one DLP Base; can house a second DLP Base or a Shared Systems Processor	26,251	54.00	1,070	882
B 9361-21	Operator Display	3,098	—	113	122
B 3376-95	Shared Systems Processor	12,601	36.00	519	442
B 3376-92	Port Interface Adapter for B 2800 DLPs	2,588	26.20	102	91
B 3376-93	Port Interface Adapter for B 3800/B 4800 DLPs	2,588	26.20	102	91
B 3376-94	Port Interface Adapter for B X900 DLPs	2,588	26.20	102	91
B 3373-90	B 9470 Disk File DLP-3 (3 cards)	4,620	27.60	185	160
B 3304-90	B 9484/B 9494 Disk Drive DLP-2 (2 cards)	4,620	18.60	185	160
B 3395-90	B 9495-8 Magnetic Tape DLP-2 (2 cards)	4,043	18.60	160	142
B 3395-91	B 9495-82/B 9495-83 Magnetic Tape DLP-2 (2 cards)	4,043	18.60	160	142
B 3395-92	B 9495-24/B 9495-32/B 9495-33 Magnetic Tape DLP-3 (3 cards)	4,620	27.60	185	160
B 3395-93	B 9495-82/B 9495-83 NRZ Magnetic Tape DLP-3 (3 cards)	4,043	21.30	161	139
B 3246-91	B 9246-21 Line Printer DLP-2 (2 cards)	5,175	31.50	147	129
B 3246-92	B 9246-6 Line Printer DLP-2 (2 cards)	5,175	31.50	147	129
B 3247-93	B 9247-14 Line Printer DLP-2 (2 cards)	5,175	18.60	147	129
B 3247-94	B 9247-15 Line Printer DLP-2 (2 cards)	5,175	18.60	147	129
B 3110-90	B 9115/B 9116/B 9117 Card Reader DLP-2 (two cards)	2,888	18.60	117	97
B 3137-90	B 9137/B 9190 Reader-Sorter DLP-3 (3 cards)	8,409	27.60	332	288
B 3138-90	B 9195 Reader-Sorter DLP-3 (3 cards)	9,702	27.60	384	332
B 3303-90	B 874 DLP-2 (2 cards)	3,396	18.60	135	119
B 3368-90	CP 3680 DLP	4,043	17.20	152	135
B 3351-90	Uniline DLP-3 (modem connect; 3 cards)	3,576	27.60	144	122
B 3351-91	Uniline DLP-3 (TDI connect; 3 cards)	3,576	27.60	144	122
B 3341-9	Operator Display DLP-3 (3 cards)	4,232	15.70	166	144
B 4900 OPTIONS					
B 4909-91	Additional DLP Base; maximum of 5	15,000	25.40	765	515
B 4095-91	Expansion Cabinet; includes one DLP Base	51,100	58.00	2,079	1,718
B 9361-985	Operator Display	3,098	22.00	133	122
B 4376-95	Shared Systems Processor	12,601	65.00	519	442
B 4376-92	Host Interface Adapter for B 2800 DLPs	2,588	20.00	102	91
B 4376-93	Host Interface Adapter for B 3800/B 4800 DLPs	2,588	20.00	102	91
B 4376-94	Host Interface Adapter for B X900 DLPs	2,588	20.00	102	91
B 4373-90	B 9470 Disk File DLP-3 (3 cards)	4,620	40.00	185	160
B 4304-90	B 9484/B 9494 Disk Drive DLP-2 (2 cards)	4,620	40.00	185	160
B 4395-90	B 9495-8 Magnetic Tape DLP-2 (2 cards)	4,043	46.00	160	142
B 4395-91	B 9495-82/B 9495-83 Magnetic Tape DLP-2 (2 cards)	4,043	46.00	160	142
B 4395-92	B 9495-24/B 9495-32/B 9495-33 Magnetic Tape DLP-3 (3 cards)	4,620	65.00	185	160
B 4395-93	B 9495-82/B 9495-83 NRZ Magnetic Tape DLP-2 (2 cards)	4,043	46.00	161	139
B 4246-91	B 9246-21 Line Printer DLP-2 (2 cards)	5,175	40.00	147	129
B 4246-92	B 9246-6 Line Printer DLP-2 (2 cards)	5,175	40.00	147	129
B 4246-93	B 9246-12 Line Printer DLP-2 (2 cards)	5,175	40.00	147	129
B 4247-93	B 9247-14 Line Printer DLP-2 (2 cards)	5,175	40.00	147	129
B 4247-94	B 9247-15 Line Printer DLP-2 (2 cards)	5,175	40.00	147	129
B 4110-90	B 9115/B 9116/B 9117 Card Reader DLP-2 (2 cards)	2,888	40.00	117	97
B 4137-90	B 9137/ B 9190 Reader-Sorter DLP-3 (3 cards)	8,409	48.00	332	288
B 4138-90	B 9195 Reader-Sorter DLP-3 (3 cards)	9,702	48.00	384	332
B 4303-90	B 874 DLP-2 (2 cards)	3,396	33.00	135	119
B 4368-91	CP 3680 DLP	4,620	46.00	185	160
B 4351-93	Uniline DLP	4,000	40.00	163	133
B 4341-9	Operator Display DLP	4,232	14.50	166	144

*Maintenance rates are for nine hours, five days per week.

**Lease prices include 24-hour, 7-day maintenance.

Burroughs B 2900, B 3900, and B 4900

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
MASS STORAGE					
B 9470-1	Head-Per-Track Disk File; primary drive; 5.5 megabytes; includes power supply and air system	42,840	121.00	1,460	1,182
B 9470-11	Add-on Drive; 5.5 megabytes; requires B 9470-1	36,540	118.00	1,240	1008
B 9471-6	Disk File Electronics Unit for B 9470 drives; one required for every four drives	12,601	73.00	409	332
B 9484-12	Disk Pack Drive; 252 megabytes	30,000	120.00	1,430	1,070
B 9484-51	Dual Disk Pack Drive; 130.4 megabytes	21,000	132.00	815	664
B 9494-41	Dual Fixed-Disk Drive; 402 megabytes	25,200	94.50	847	643
B 9494-42	Dual Fixed-Disk Data Bank; includes two dual-spindle B 9494-41 drives; 804 megabytes	42,000	187.00	1,694	1,286
B 9494-43	Dual Fixed-Disk Data Bank; includes three dual-spindle B 9494-41 drives; 1206 megabytes	59,850	259.00	2,541	1,929
B 9494-44	Dual Fixed-Disk Data Bank; includes four dual-spindle B 9494-41 drives; 1608 megabytes	78,750	334.00	3,388	2,572
B 9987-1	Dual Port Feature for B 9494-41 drive	5,880	23.20	188	155
B 9387-41	Controller for B 9494 or B 9484-51 drives; 1x8	42,000	72.90	1,360	1,151
B 9387-42	Controller for B 9494 or B 9484-51 drives; 2x8	57,488	171.00	1,883	1,605
B 9387-46	Controller for B 9494 or B 9484-51 drives; 2 x 16; includes disk exchange	68,408	228.00	2,319	1,943
B 9387-49	Controller for B 9494 or B 9484-51 drives; 4 x 16; includes disk exchange	138,916	424.00	4,929	3,885
B 9387-40	Controller for B 9494 or B 9484-51 drives; 6 x 16; includes disk exchange	220,973	687.00	7,711	6,336
B X387-5	Basic Disk Pack Drive Exchange for B 9387-41 and -42 controllers and B 9484-51 drive	26,734	122.00	1,059	810
B X387-6	Controller Port Expansion Adapter; expands B X387-5 to 4X or 8X	5,345	28.70	186	152
B X387-7	Exchange Expansion Adapter; allows B X387-5 to be used with up to 16 drives	16,932	85.90	615	470
B X387-8	Spindle Exchange Expansion; allows four additional spindles to be attached to B X387-5; maximum of 16 spindles per subsystem	6,684	28.70	245	186
B 9494-5	Fixed Disk Drive; 542 megabytes	33,000	105.00	1,615	1,210
B 9387-51	Controller for B 9484-12 and B 9494-5 drives; single path	20,000	60.00	905	680
B 9387-52	Controller for B 9484-12 and B 9494-5 drives; dual path	30,000	90.00	1,355	1,015
B 9387-12	Disk Exchange	51,247	178.00	1,827	1,347
MAGNETIC TAPE UNITS					
B 9495-8	Magnetic Tape Unit; 80 KBS, 9-channel, 1600 bpi, PE; requires B 9499-33, -34, or -35 Exchange	11,551	130.00	447	364
B 9495-45	Magnetic Tape Subsystem; consists of B 9495-8 tape unit and B 9499-33 Exchange	17,860	135.00	600	495
B 9499-33	1x4 Master Electronic Exchange	11,465	40.00	413	316
B 9499-34	1x8 Master Electronic Exchange	12,350	40.00	443	345
B 9499-35	2x8 Master Electronic Exchange	14,465	87.50	520	402
B 9495-82	Magnetic Tape Unit; 120 KBS, 9-channel, 1600 bpi, PE; requires B 9499-5X Exchange	18,100	135.00	705	547
B 9495-83	Magnetic Tape Unit; 120 KBS, 9-channel, 1600 bpi, PE; requires B 9499-5X Exchange	22,447	154.00	895	693
B 9499-50	1 x 4 Master Electronic Exchange	19,100	123.00	729	557
B 9499-51	1 x 8 Master Electronic Exchange	21,060	123.00	770	589
B 9499-52	2 x 8 Master Electronic Exchange	51,240	258.00	2,089	1,211
B 9499-53	2 x 16 Master Electronic Exchange	53,940	258.00	2,198	1,401
B 9499-54	3 x 16 Master Electronic Exchange	83,310	382.00	3,260	2,210
B 9499-55	4 x 16 Master Electronic Exchange	110,200	505.00	4,267	2,910
B 9999-4	NRZI Option for B 9495-82 and -83 drives	788	6.60	29	24
B 9999-5	NRZI Option for B 9499-50 to -55 exchanges	2,731	38.80	89	73
B 9495-24	Magnetic Tape Unit; 1250/320KBS, 9-channel, 6250/1600 bpi, GCR/PE	36,225	216.00	1,223	969
B 9495-32	Magnetic Tape Unit; 470/120 KBS, 9-channel, 6250/1600 bpi, GCR/PE	21,736	158.00	880	621
B 9495-32M	Same as B 9495-32, but includes formatter/controller	50,258	266.00	1,970	1,572
B 9495-33	Magnetic Tape Unit; 780/200 KBS, 9-channel, 6250/1600 bpi, GCR/PE	24,917	166.00	1,000	704
B 9495-33M	Same as B 9495-33, but includes formatter/controller	53,440	273.00	2,075	1,656
B 9499-21	GCR/PE Controller; 1 x 8	42,634	232.00	1,444	1,154
B 9499-22	GCR/PE Controller; 2 x 8	85,288	462.00	2,900	2,302
B 9499-23	GCR/PE Controller; 3 x 8	127,899	696.00	4,335	3,457
B 9499-24	GCR/PE Controller; 4 x 8	170,553	928.00	5,772	4,610
B 9499-42	Electronic Exchange for B 9499-21 through -24; 2 x 16	7,571	23.20	275	213
B 9499-43	Electronic Exchange for B 9499-21 through -24; 3 x 16	9,680	31.00	357	294
B 9499-44	Electronic Exchange for B 9499-21 through -24; 4 x 16	11,356	31.00	419	332
B 9999-3	Dual Host Switch	5,624	16.20	174	141
CARD READERS					
B 9115	Card Reader; 300 cpm, 80 column	8,608	66.50	332	255
B 9116	Card Reader; 600 cpm, 80 column	11,372	93.30	442	339
B 9117	Card Reader; 800 cpm, 80 column	12,952	114.00	499	383
B 9915	51-Column Read Feature for B 9115, B 9116, and B 9117	844	0.00	26	20
PRINTERS					
B 9246-6	Band Printer; 650 lpm, 132 positions	14,700	182.00	551	423

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Burroughs B 2900, B 3900, and B 4900

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
PRINTERS (Continued)					
B 9247-14	Train Printer; 1100 lpm, 132 positions	25,000	495.00	1,544	1,230
B 9247-15	Train Printer; 1500 lpm, 132 positions	33,000	567.00	2,096	1,686
B 9942-10	Additional Train Module	3,408	43.20	138	113
B 9246-12	Train Printer; 1250 lpm, 132 positions	42,500	420.00	1,635	1,360
B 9246-21	Train Printer; 2000 lpm, 132 positions	69,300	600.00	3,255	2,625
READER-SORTERS					
B 9137-4	MICR Reader-Sorter; 1000 dpm, 8 pockets; includes Multitrack E13B, basic off-line sort, resettable item counter, and control interface	53,336	691.00	1,835	1,554
B 9937-11	Four-Pocket Module; pockets 9 to 16	11,990	49.60	420	375
B 9937-50	Impact Endorser	8,781	121.00	271	220
B 9937-70	Basic Two-Field Off-Line Sort	1,298	11.60	38	34
B 9937-71	Eight-Pocket Basic Off-Line Sort; two fields only	1,558	11.60	47	40
B 9937-72	Expanded Off-Line Field Sort; provides one additional; maximum of eight fields	260	2.60	9	9
B 9937-73	Extended Sort Control	2,596	33.60	75	68
B 9937-74	Valid Character Check	260	2.40	9	9
B 9937-76	Zero Kill; three maximum	519	2.40	16	12
B 9937-77	No Field, No Digit; three maximum	519	2.40	16	14
B 9937-78	Digit Override; three maximum	519	2.40	16	14
B 9937-79	Digit Edit; three maximum	519	2.40	16	14
B 9937-80	Field Override; three maximum	519	2.40	16	14
B 9937-81	Field Edit; three maximum	519	2.40	16	14
B 9937-82	Stacker Overflow	519	2.40	16	14
B 9937-83	Batch Ticket Detector	519	2.40	16	14
B 9937-84	Resettable Item Counter	260	2.40	9	9
B 9937-85	Non-Resettable Item Counter	260	2.40	9	9
B 9937-86	Running Time Meter	260	2.40	9	9
B 9937-87	Mobile Carrier	163	0.00	0	0
B 9937-88	One-Tray Document Rack	66	0.00	0	0
B 9937-90	Control Interface; 3A Host Control	1,733	2.80	56	47
B 9937-91	Control Interface; 4A Host Control	1,733	2.80	56	47
B 9190-2	MICR/OCR Reader-Sorter; 1625 dpm, 4 pockets; requires one control interface and at least one character recognition module	42,525	681.00	2,299	1,951
B 9990-90	Control Interface; 4A Host Control	1,773	4.20	53	43
B 9990-91	Control Interface; 3A Host Control	1,773	4.20	53	43
B 9990-21	MICR E13B Character Recognition Module; single track	15,430	61.30	505	431
B 9990-22	MICR E13B Character Recognition Module; double read	40,478	122.00	1,345	1,145
B 9990-32	OCR 7B (Credit Card)	52,815	164.00	1,723	1,460
B 9990-33	OCR A/1428	52,815	164.00	1,723	1,460
B 9990-34	OCR B/1403/407	52,815	164.00	1,723	1,460
B 9990-10	Four-Pocket Module; pockets 17-20	23,521	98.70	746	636
B 9990-11	Four-Pocket Module; pockets 5-16	15,175	61.80	485	411
B 9990-12	Four-Pocket Module; pockets 21-32	15,175	61.80	485	411
B 9990-50	Impact Endorser; with digital advance	15,730	81.80	541	463
B 9990-53	Non-Impact Endorser, Ink Jet	34,545	221.00	1,108	940
B 9990-55	Impact Endorser; without digital advance	15,121	77.70	520	442
B 9990-60	Microfilm Camera	85,470	613.00	3,214	2,731
B 9990-70	Off-Line Sort Package	5,198	40.80	142	121
B 9195-20	Document Processor; 20 pockets	347,728	2,926.00	10,888	8,854
B 9195-24	Document Processor; 24 pockets	376,156	3,143.00	11,738	9,544
B 9195-28	Document Processor; 28 pockets	404,996	3,360.00	12,600	10,246
B 9195-32	Document Processor; 32 pockets	433,527	3,579.00	13,456	10,948
B 9995-72	Additional Memory; 4K bytes	9,919	22.40***	370	305
B 9995-53	Modular Non-Impact Endorser	46,144	396.00***	782	605
B 9995-60	Microfilm Module	131,840	856.00***	2,654	2,194
COMMUNICATIONS EQUIPMENT					
B 874-1	Systems and Communications Processor (SCP); includes 1.7-megahertz processor, 12K bytes of control storage, integrated host interface, and 32-line adapter cluster	10,500	151.00	442	322
B 874-4	Similar to B 874-1, but includes 4-megahertz processor and 16K bytes of control storage	27,300	213.00	893	770
B 1-4	4K bytes of user memory for B 874	783	8.00	25	18
B 32-2	16K bytes of user memory for B 874	2,521	32.80	100	89
B 74-1	Memory Expansion Module for B 874 systems over 32K bytes	5,550	76.80	192	158
B 74-5	Dual Host Switch for B 874-4 processor	2,794	25.70	88	71
B 74-7	BDLC Feature for B 874-4 processor	1,849	13.80	59	48
B 551-1	Direct Connect Dual Line Adapter, two-wire; maximum data rate 9600 bps	2,006	8.60	51	41
B 551-2	Direct Connect Dual Line Adapter, TTY-compatible; maximum data rate 38,500 bps	1,234	8.60	41	36
B 551-3	Direct Connect Dual Line Adapter, Balanced Differential Interface; maximum data rate 19,200 bps	1,644	8.60	53	48

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***For 24-hour, 7-day maintenance.

Burroughs B 2900, B 3900, and B 4900 EQUIPMENT PRICES

► COMMUNICATIONS EQUIPMENT (Continued)		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
B 551-6	Synchronous/Asynchronous Data Set Dual Line Adapter; maximum data rate 9600 bps	1,234	8.60	41	36
B 551-7	BDLC Single Line Adapter for B 874-4; maximum data rate 9600 bps	1,481	12.00	48	41
B 551-12	Synchronous/Asynchronous Single Line Adapter with addressing; maximum data rate 9600 bps	1,029	8.60	36	30
CP 3680	Data Communications System; includes processor with 256K bytes of memory; 14 I/O interfaces, 20MB disk subsystem with interface, real-time clock, Dual Channel Port Controller (DCPC), firmware set, system console interface, and system cabinet	64,050	535.00	2,625	2,205
CP 3680-01	Redundant Data Communications System; includes second CP 3680 system plus CP 3643-01 Dual Port Interface Unit with cable, CP 3644-01 Dual System I/O Interface Unit with cable, CP 3645-01 I/O Expansion Cabinet, and CP 3646-01 I/O Port Extender with DCPC	60,900	475.00	2,520	2,100
CP 3610	Memory Module, 256K bytes	17,851	107.00	657	541
CP 3620-01	Host Interface Unit; one required for each host CPU (available through the first quarter of 1982)	2,626	17.80	116	95
CP 3620-03	Host Interface Unit; one required for each host CPU (available the second quarter of 1982)	2,626	17.80	116	95
CP 3630-01	Eight-Line Asynchronous Communications Adapter	5,408	35.60	200	163
CP 3631-01	Two-Line Synchronous/Asynchronous Communications Adapter	2,416	21.40	95	84
CP 3632-01	Direct Connect Interface Unit	368	2.40	19	11
CP 3633-01	Automatic Calling Unit	1,260	8.30	48	37
CP 3634-01	Line Interface Extension Cable, 50 feet	64	5.00	5	3
CP 3640-01	Remote Diagnostic Unit with modem	1,996	17.80	69	58
CP 3641-01	System Console	3,151	29.70	116	95
CP 3642-01	Power Fail Recovery System	2,626	23.80	95	84
CP 3643-01	Dual Processor Interface with cables	2,941	29.70	111	90
CP 3644-01	Dual System I/O Interface Unit with cables	3,833	33.30	142	116
CP 3645-01	I/O Port Expansion Cabinet with CP 3646-01	21,001	189.00	814	630
CP 3646-01	I/O Port Extender with Dual Channel Port Controller	18,271	173.00	672	546

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SOFTWARE PRICES

		Unlimited-Time Plan		Limited-Time Plan	
		Initial Charge		Annual Maint.	Monthly License
		Single Payment	12 Monthly Payments		
SSF	Software Facilities Program for the B 2900 and B 3900 includes utilities, Basic GEMCOS, B 874 NDL, Medium MCP operating system, NDL, and one compiler	\$23,100	\$2,118	\$4,828	\$ 847
SSF	Software Facilities Program for B 4900; includes MCP IX and MCP VI operating systems, utilities, Burroughs Programming Language, Work Flow Language, one compiler, and a choice of B 874 NDL, Medium Systems NDL, Basic GEMCOS, or CP 3600 DCS	32,000	—	90 to 334*	1,067
CBV	Cobol '68 Compiler	NC	NC	NC	NC
COB	Cobol '74 Compiler	3,300	303	690	121
RPG	RPG II Compiler	3,300	303	690	121
BAS	Basic Compiler	3,300	303	690	121
FTV	Fortran Compiler (IBM Level H compatible)	3,300	303	690	121
BPL	Burroughs Programming Language	NC	NC	NC	NC
TAB	TABS Analysis System	NC	NC	NC	NC
CE1	CANDE	2,250	206	473	83
DE2	ODESY	5,564	534	1,164	219
MCA	GEMCOS Advanced	12,870	1,234	2,691	506
MCT	GEMCOS Total	16,547	1,586	3,459	651
RP2	Reporter II Basic	8,330	799	1,742	328
RPO	On-Line Reporter	1,226	118	257	49
AUD	Audit Reporter	17,946	1,720	3,751	706
ARP	Advanced Reporter II	13,126	1,258	2,744	516
DM2	Data Management System II (DMS II)	12,000	1,100	2,508	440
DM1	DMS II Inquiry	3,000	275	627	110
WFL	Work Flow Management System	1,650	152	346	61
MC7	Message Control System Generator	2,953	283	358	117
FLM	FLAME Monitor	2,400	232	423	220
CP 3680 Software					
CP 3600 DCS	Data Communications Software for CP 3680	10,000	—	2,090	330
CP 3600 SCS	Standby Communications Software for CP 3680-01	5,000	—	1,045	165

*Price depends on level of support selected.