Burroughs B 1900 Series

MANAGEMENT SUMMARY

The B 1900 Series is the top of the Burroughs small business computer line; other series in this category are the smaller Burroughs B 90 and B 900. Software is compatible from these smaller series as well as from earlier B 1700 and B 1800 systems. In addition, the B 1900, which was introduced in 1979, offers up to 30 percent increased performance over the older systems.

The B 1900 product line consists of three models in packages and special applications versions. Models are the entry-level B 1905, the larger B 1955, and the dual-processor B 1985; respective packages are the B 1905-SYS, and B 1985-SYS. Versions for special applications include the B 1913-SYS, the B 1955-CMS, and the BP-1-SYS. The B 1913-SYS is a B 1905 designed for financial applications; the B 1955-CMS supports Computer Management System (CMS) software applications written for B 80, B 90, B 800, or B 900 systems. The BP-1-SYS, Business Partner basic system, includes a B 1955, the TCS IV software package, and the LINC (Logic Information and Network Compiler). LINC is used for ease in developing on-line real-time applications software.

Two B 1900 processor-only versions are available for B 1700 and B 1800 users who wish to retain their existing peripheral equipment; these versions are the B 1955-1-SY and the B 1985-1-SY.

High-density Transistor-Transistor Logic (TTL) is used in the B 1900 processors and controls to provide increased performance and reduce the number of electronic components, thereby enhancing system reliability. Like the earlier ▷

The B 1900 Series consists of three packaged small-to-medium-scale systems that offer price and performance improvements over the earlier B 1700 and B 1800 systems along with full program compatibility.

MODELS: B 1905, B 1955, and B 1985.
CONFIGURATION: From 131K bytes to 2.0 megabytes of main memory, 1 to 32 communications lines, and 7 to 15 I/O controls.
COMPETITION: Honeywell DPS 6, IBM System/38, NCR I-9000, and Sperry Univac 80/5 Series.
PRICE: Purchase prices for typical configurations range from $62,475 to $180,000.

CHARACTERISTICS

MANUFACTURER: Burroughs Corporation, Burroughs Place, Detroit, Michigan 48232. Telephone (313) 972-7000. CANADA: Burroughs-Canada, 801 York Mills Road, Don Mills, Ontario, Canada M3B1X7. Telephone (416) 445-4030.

MODELS: Three packaged systems: the entry-level B 1905-SYS, the larger B 1955-SYS, and the dual-processor B 1985-SYS; two processor-only systems: the B 1955-1SY and B 1985-1SY; and three special application versions: the B 1913-SYS, the B 1955-CMS, and the BP-1-SYS.

DATE ANNOUNCED: B 1905, B 1955, and B 1985—October 1979. ▶
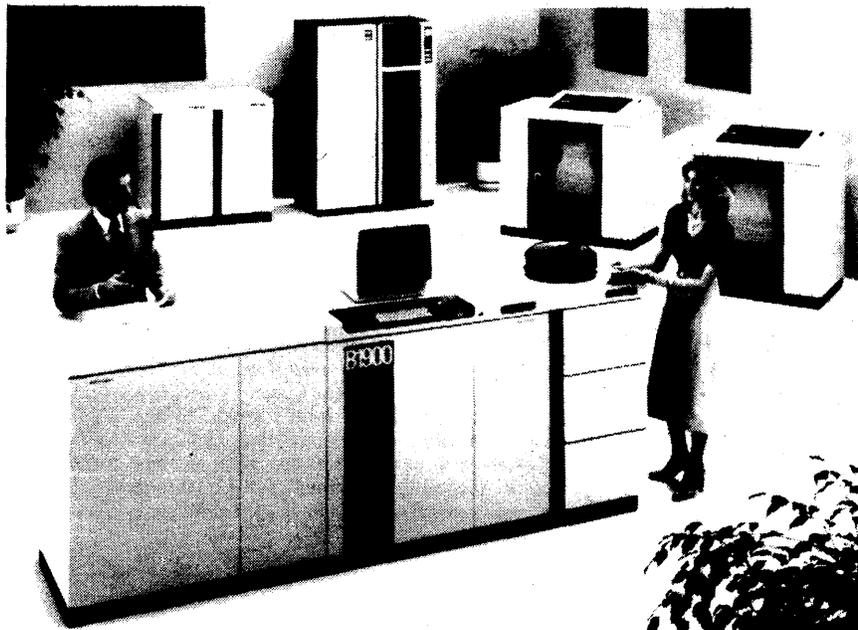
The B 1985, the largest member of the B 1900 family, is a dual-processor system with two central processors sharing from 0.5 to 2 million bytes of main memory. The B 1985-SYS package costs $156,400 and, according to Burroughs, is one of the few dual-processor systems in the $100,000 price range.

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B 1700 and B 1800 Series, the B 1900 systems feature dynamically variable microprogramming, automatic multiprogramming, and virtual memory. Probably the most noteworthy feature of these systems is their "variable micrologic," an advanced form of microprogramming that alters the central processor's logical operations to suit the characteristics of each programming language. The central processors are "soft" machines whose logical structure is largely undefined until the appropriate microprograms are loaded to control their operations. Main memories which are addressable down to the individual bit level provide great flexibility in data field lengths and, according to Burroughs, yield increases of 20 to 40 percent in the efficiency of memory utilization for most applications.

Two software packages—TCS III for the B 1905 and TCS IV for the B 1955 and B 1985—combine an improved version of Burroughs' time-tested Master Control Program with the software facilities required for on-line transaction processing.

The B 1900 Series systems, like the large-scale Burroughs systems, are programmed almost exclusively in higher-level languages. Compilers are available for the ANSI 74 Cobol, ANSI 77 Fortran, RPG II, and Basic languages. Associated with each compiler is an Interpreter, a specialized microprogram that is used at execution time to interpret and execute the code generated by the compiler. The B 1900 microprogramming itself is not user-accessible.

Burroughs is placing strong marketing emphasis on its library of Business Management Systems. These are groups of related application programs that should significantly reduce the cost and time required to get a B 1900 system into productive operation for many users in manufacturing, wholesaling, distribution, banking, utilities, hospitals, government agencies, schools, and motor freight companies. In addition, Burroughs will, for a fee, provide all the system support required to install and maintain a system.

The B 1955 can also operate with the Computer Management System (CMS) software used on the smaller Burroughs B 80, B 90, B 800, and B 900 systems. When the B 1955 is equipped with the CMS–TCS systems software and a B 1362 Data Communications Processor, it can execute application programs written for any of the smaller CMS computers and can be intermixed with the other smaller CMS computers in networks. According to Burroughs, the availability of CMS on the B 1955 provides from two to four times the performance previously available on CMS systems.

THE B 1900 MODELS

The packages B 1900 Series computer systems differ primarily in central processor speed, number of processors, main memory capacity, and peripheral equipment.

The entry-level B 1905–SYS consists of a 4-megahertz central processor, 131,072 bytes of MOS main memory (expandable to a maximum of 1 megabyte), 8,192 bytes of ▷

DATE OF FIRST DELIVERY: B 1905, B 1955, and B 1955-1—1st quarter 1980; B 1985—2nd quarter 1980.

DATA FORMATS

The B 1900 Series main memories are addressable to the bit level and utilize no preferred word or byte boundaries that are visible to the rest of the system. Variable instruction and operand lengths permit from 1 to 65,536 bits of data to be addressed with a single instruction, and up to 24 bits can be transferred in parallel between main memory and the processor. According to Burroughs, this feature yields a 20 to 40 percent reduction in memory requirements for typical programs.

FIXED-POINT OPERANDS: None.

FLOATING-POINT OPERANDS: None.

INTERNAL CODE: EBCDIC; other media codes, such as ASCII, can be translated. ASCII is used with the Computer Management System (CMS) software.

MAIN STORAGE

TYPE: N-channel MOS; 16K and 64K bits per chip.

CAPACITY: See Table 1.

CYCLE TIME: See Table 1.

CHECKING: All models employ error-correcting (EC) main memory. EC detects and corrects all single-bit main memory errors and detects most multiple-bit errors. EC generates a 3-bit check field for each 8-bit byte as it is written, and recomputes the field when the byte is read. If the check bits do not match, the erroneous bit is corrected before data is transmitted to the processor. EC helps to provide uninterrupted operation and is transparent to the user. A modified Hamming code is used by the hardware encoder on each memory board to construct the check field.

STORAGE PROTECTION: Main storage write operations are permitted only within limits defined by a base register and a limit register.

CENTRAL PROCESSORS

The B 1900 Series processors feature dynamically variable microprogrammed logic and bit-addressable memories. The processors' logic functions are performed by a set of elementary operators called microinstructions, which operate on strings of bits. There are 32 defined microinstructions in the B 1900 processors. All current microinstructions are 16 bits in length.

Burroughs defines S-language (Secondary-language) instructions as intermediate instructions which are equivalent to the machine-language instructions of conventional computers. Each S-language instruction is implemented by a string of microinstructions which interpretively execute the functions specified by the S-instruction. Because the S-instructions are software-defined by the microprograms, the functions they specify can be quite complex. In most cases, S-instructions specify an operation to be performed, one or more operand addresses, data field lengths, and units of data.

For each B 1900 programming language, Burroughs has defined an "ideal machine" and developed a specialized microprogram, called an Interpreter, that makes the B 1900 ▶

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The B 1985-SYS is a dual-processor, master/slave system consisting of two 6-megahertz central processors sharing 524,288 bytes of MOS main memory (expandable to a maximum of 2 megabytes), 8,192 bytes of cache memory per processor, a 130-megabyte dual disk pack drive and control, a 650-lpm line printer, an 8-line communications control, a display console, and an expansion cabinet. The system can include up to 15 I/O controls.

The B 1955-1SY and B 1985-1SY are the same as the B 1955-SYS and B 1985-SYS systems, respectively, except that the disk pack drive, line printer, and printer control are omitted and the prices are correspondingly reduced.

PERIPHERALS AND COMMUNICATIONS

The peripheral equipment for the B 1900 systems includes a wide variety of removable and non-removable disk storage units, line printers, MICR/OCR document reader/sorters, magnetic tape and cassette drives, diskette drives, 80- and 96-column card devices, and display terminals.

The increasingly important role of data communications is underlined by the fact that a communications control is included in each of the packaged B 1900 systems. A single-line control is part of the B 1905-SYS and a B 1352 Multi-Line Communications Control (MLC) is included in the B 1955-SYS and B 1985-SYS systems. The basic B 1352 handles up to 8 lines, and the B 1353 MLC Extension permits a total of 16 communications lines to be attached to each control. With the MLC, a B 1900 Series system can function either as a central computer in a multiple-line communications network or as a high-powered remote terminal communicating with a larger central computer.

The Burroughs Network Architecture (BNA) is designed to enhance the interaction of terminals with host CPUs in network environments. 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 anywhere in a network can be shared by participants regardless of the distance between them.

To facilitate the development of communications control programs, Burroughs provides the Generalized Message Control System (GEMCOS), a parameter-based system that operates user-tailored Message Control Programs, plus the Network Definition Language (NDL) and User Programming Language (UPL). NDL is a language and compiler that enables users to define and generate customized network control programs. UPL is an Algol-like language and compiler designed to aid experienced programmers in solving complex message handling problems. The GEMCOS Message Control System forms the interface between the network control program and the user programs processing the communications messages.

Remote job entry applications can be implemented on the B 1900 Series systems through the HASP Remote Terminal Program Product and the Power/RJE Remote Terminal ▷

tor-transistor logic. (TTL) and feature a high-speed, bipolar microinstruction cache memory with a capacity of 8,192 bytes. The processor has the capability to dynamically execute all types of microcode from this memory, which is managed by the hardware on a demand basis, thereby allowing a greater percentage of microinstructions to be resident in the cache for immediate retrieval. Overlap logic within the system provides for complete simultaneity of fetch/execute and effectively eliminates read access time when executing from the cache.

The B 1985 is a dual-processor system in which the two processors share a common memory and operate under a master/slave concept. The master processor contains the operating system and executes all system code as well as performing all resource management. While the master processor can also execute user code, the slave processor *only* executes user code, making demands on the master to execute system code. The B 1985 master/slave system is queue-driven. If the master is executing user code, the slave may queue its request to the master and interrupt it. Upon completion of the requested work, the master is free to return to the user job it suspended.

CONTROL STORAGE: See table for cache memory speeds and capacities.

REGISTERS: Information not available from Burroughs.

ADDRESSING: Information not available from Burroughs.

INSTRUCTION REPERTOIRE: Information not available from Burroughs.

INTERRUPTS: The B 1900 Series processors use a "soft" interrupt system, meaning that interrupt conditions do not cause any automatic hardware actions. Instead, the recognition of interrupt conditions and initiation of the appropriate actions is completely under software control.

PHYSICAL SPECIFICATIONS:

Central Processors	
B 1955	B 1985
Height: 44 in.-112 cm	44 in.-112 cm
Width: 45 in.-115 cm	90 in.-218.6 cm
Depth: 29 in. -74 cm	29 in.-74 cm
Weight: 650 lbs.-295 kg	1,300 lbs.-591 kg

INPUT/OUTPUT CONTROL

I/O CHANNELS: Each type of peripheral device or subsystem requires a different I/O control, and each I/O control, in turn, requires an appropriate number of card slots in the processor chassis or expansion cabinet. The maximum number of I/O controls allowed in each B 1900 system is listed in the table.

SIMULTANEOUS OPERATIONS: All I/O controls are buffered to permit overlapped read/write/compute operations.

CONFIGURATION RULES

Configuration parameters for the B 1900 Series are as follows:

• Up to 2 million bytes of main memory.
• Up to 3.2 billion bytes of on-line disk storage.
• Up to 32 communications lines. ▶

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TABLE 1. CHARACTERISTICS OF THE B 1900 SYSTEMS

PROCESSOR	B 1905	B 1955	B 1985
CENTRAL PROCESSORS			
Date announced	October 1979	October 1979	October 1979
Date of first delivery	1st quarter 1980	1st quarter 1980	2nd quarter 1980
No. of central processors	1	1	2
Processor cycle time, nanoseconds	250	167	167
Maximum processor I/O controls	7	8	8
Max. processor + expansion I/O controls	15	15	15
MAIN MEMORY			
Minimum capacity, bytes	131,072	524,288	524,288
Maximum capacity, bytes	1,048,576	2,097,152	2,097,152
Read cycle time, nanoseconds (per byte)	500	333	333
Chip size (bits)/type	16K n-channel MOS	16K/64K n-channel MOS	16K/64K n-channel MOS
Checking	Error correcting	Error correcting	Error correcting
MICROINSTRUCTION CACHE MEMORY			
Minimum capacity, bytes	8,192	8,192	16,384 (8K per CPU)
Maximum capacity, bytes	8,192	8,192	16,384 (8K per CPU)
Read cycle time, nanoseconds (per 16-bit access)	82	55	55
COMMUNICATIONS CAPABILITIES			
Maximum no. of lines	1 std; 8 max.	8 std; 32 max.	8 std; 32 max.
Synchronous	Opt.; to 50,000 bps	Opt.; to 50,000 bps	Opt.; to 50,000 bps
Asynchronous	Opt; to 19,200 bps	Opt; to 19,200 bps	Opt; to 19,200 bps
Protocols supported	Basic Mode, BDLC, Bisync	Basic Mode, BDLC, Bisync	Basic Mode, BDLC, Bisync
Single-line communications control	Yes	Yes	Yes
Multi-line communications control	No	Yes	Yes
MAXIMUM I/O SPEEDS			
80-column card reading	300-800 cpm	300-800 cpm	300-800 cpm
96-column card reading	300 cpm	300 cpm	300 cpm
96-column card punching	60 cpm	60 cpm	60 cpm
Printing (standard character sets)	85-2000 lpm; 320 std.	85-2000 lpm; 650 std.	85-2000 lpm; 650 std.
Magnetic tape I/O (PE)	40 KBS	40 KBS	40 KBS
Magnetic tape I/O (NRZI PE)	80 120 KBS	80 120 KBS	80 120 KBS
Cassette tape I/O	10 ips	10 ips	10 ips
MICR OCR reader-sorters	No	900 dpm	900 dpm
AVAILABILITY OF MASS STORAGE			
Disk cartridge drives	No	No	No
Dual disk pack drives	Yes	Yes	Yes
Fixed disk drives	Yes	Yes	Yes
Mini-disk drives	Yes	Yes	Yes

▷ cache memory, a 65.2-megabyte dual disk pack drive, a 320-lpm line printer, a display console, and a universal single-line control. A maximum of seven I/O controls can be housed in the processor cabinet. Entry-level B 1905 systems can operate in any normal office environment, according to Burroughs.

The B 1955–SYS system consists of a 6-megahertz central processor, 524,288 bytes of MOS main memory (expandable to a maximum of 2 megabytes), 8,192 bytes of cache memory, a 65.2-megabyte dual disk pack drive, a 650-lpm line printer, an 8-line communications control, and a display console. The B 1955–SYS system can be expanded to include up to 15 I/O controls and a wide variety of peripheral equipment. An expansion cabinet is required when the number of I/O controls exceeds eight. An expansion cabinet is also required when the 16K-bit memory exceeds one megabyte, although a cabinet is not needed for one megabyte expansions to the newer 64K-bit memory. Burroughs rates the B 1955's performance approximately 30 percent above that of the B 1905. ▷

appear to be logically equivalent to that machine. The interpreter executes the instructions which have been generated by the corresponding compiler. These compiler-generated instructions are expressed in an appropriate S-language. Because the S-language and its Interpreter are oriented toward the characteristics of each programming language. Burroughs states that on the average only about one-tenth as many S-instructions need to be executed to perform a given function as in typical machine-level computer programs.

No execution times for either individual microinstructions or S-instructions have been released by Burroughs to date.

Under MCP control, it is possible for programs written in two or more languages to run concurrently in a multiprogramming mix. In this case, all of the corresponding Interpreters reside in main or control memory, and the B 1900 changes rapidly from one state to another (e.g., from a "Cobol machine" to a "Fortran machine") whenever the MCP transfers control from program to program. The Interpreters, S code, and user data are all location-independent.

All of the B 1900 Series processor models are program-compatible and similar in architecture. They utilize transis- ▶

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▷ Program Product. Operating under MCP, the HASP program enables the B 1900 to multiprogram on-site processing with remote job entry to IBM System/360 or System/370 computers operating under the HASP binary synchronous multi-leaving protocol. Using the Power/RJE program, B 1900 systems are made to look like IBM 3780 remote workstations. Under control of the MCP, the B 1900 systems function as remote batch terminals on-line to an IBM 360/370 or 4300 system running DOS/POWER or OS/JES2. Other Burroughs programs enable the B 1900 systems to serve as remote job entry terminals for the larger Burroughs B 2000, B 3000, B 4000, B 6000, or B 7000 Series computers.

SOFTWARE

Software support for the B 1900 Series computers centers on one operating system available with two package options, TCS III for the B 1905-SYS and TCS IV for the B 1955-SYS and B 1985-SYS. TCS III consists of the Master Control Program (MCP) for overall system control, the Network Definition Language (NDL) for generating communications control programs, the ODESY system for on-line data entry and validation, either the Text Editor or CANDE for on-line programming and/or file updating, system utilities to handle sorting and other routine operations, and the user's choice of one compiler (e.g. Cobol, RPG II, Fortran, or Interactive Basic). TCS IV includes all the facilities of TCS III plus either the Generalized Message Control System (GEMCOS) or SMCS (Supervisory Generalized Message Control System), and either the DMS-II data base management system or the Reporter II System for generating customized report programs.

The Master Control Program is an integrated operating system that complements the hardware to create an unusually effective environment for multiprogrammed operation. Like the MCP operating systems for the larger Burroughs computers, the B 1900 MCP is user-oriented and much easier to understand and use than most of the competitive operating systems. The MCP receives its orders through straightforward messages entered via the console keyboard or control cards.

The B 1900 systems provide full object-code compatibility with the architecturally similar Burroughs B 1700 and B 1800 systems. Program compatibility with other computers is achieved via higher-level languages. The B 1900 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 B 1900 RPG compiler or translated into Cobol by the COFIRS II (Cobol from IBM RPG Specifications) routines.

COMPETITIVE POSITION

The B 1900 systems compete against the IBM 4331 and System/38 (as an alternative growth path for users of the System/3, System/32, or System/34) and against systems such as the Sperry Univac System 80, the Honeywell DPS6, NCR I-9040/-9050, and Hewlett-Packard 3000 Series. ▷

▶ The configuration rules for the different processor are explained in detail below. Workstations, line printers, and magnetic tapes are configured, depending on the processor model, with card slot and controller constraints.

The basic B 1905 processor cabinet accommodates a maximum of 7 I/O controls and 512K bytes of main memory. An optional expansion cabinet permits up to one million bytes of memory and 12 I/O controls to be used. The B 1052 1.0-Megabyte Memory Base feature is required to expand the memory to one million bytes. The B 1905 supports one- and two-card I/O controls. The Universal Single-Line Control (USCL) requires a one-card I/O position. The B 1905 supports USCLs to its I/O maximum. The built-in disk electronics controller accommodates up to four disk drives. A second 1x8 disk subsystem may be added.

The B 1955's basic cabinet holds up to 8 I/O controls in addition to the multi-line control; an expansion cabinet permits up to 15 I/O controls to be used. The B 1955 requires an expansion cabinet when 16K-bit main memory chips exceed one million bytes, however, systems with 64K-bit memory chips do not require an expansion cabinet for memory exceeding one million bytes.

A B 1985 system can include up to 15 I/O controls in addition to the multi-line control.

Seven different types of I/O controls are available for the B 1900 Series systems. The number and types of I/O controls that can be connected to each system are governed by the overall limitations shown in the table, by restrictions on the number of card slots available, and by various complex interrelationships. The B 1905 can use only Type A and B controls. The basic system can have a maximum of seven controls, of which no more than two can be Type B. The total number of card slots cannot exceed 55 on a B 1955 or 40 on a B 1985 system.

The types of I/O controls required by the various I/O units used with the B 1900 systems are as follows:

Control Type A (one I/O card)
All 80-column card readers (300, 600, or 800 cpm)
All 80-column card punches (150 or 300 cpm)
9246 Printers (320, 650, or 1250 lpm)
9247 Printers (1100 or 1500 lpm)
Universal Single-line communications control
CMS data communications processor base

Control Type B (two I/O cards)
9419 96-column Reader/Punch Multi-Purpose Card Unit (300/60/60 cpm)
MICR reader-sorters (1000 or 1625 lpm)
9490 Cassette Tape Subsystem
9484 or 9494 Disk Drives
9489 Mini-Disk Drives
9495 or 9491 PE Magnetic Tape Units
NRZI/PE magnetic tape unit switchable configuration (also requires control type G)
CMS data communications processor basic plus extension

Control Type F (four I/O cards)
Single-line communications control

Control Type G (eight I/O cards)
9495 NRZI Magnetic Tape Units
Four-line multi-line communications control

Control Type H (six I/O cards)
Dual-line communications control

Control Type J (twelve I/O cards)
Eight-line multi-line communications control
DCP data communications processor ▶

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TABLE 2. MASS STORAGE

Subsystems	B 9489 ICMD	B 9484-51	B 9494-41	B 9494-42	B 9494-43	B 9494-44
Cabinets per subsystem	up to 2	up to 8	1	2	3	4
Disk packs/HDAs per cabinet	up to 2	2 removable	2 non-removable	2 non-removable	2 non-removable	2 non-removable
Capacity, megabytes	243,000	130.4	402	804	1206	1608
Tracks/segments per drive unit	—	—	—	—	—	—
Average access time, milliseconds	343	25	28	28	28	28
Average rotational delay	—	8.3	8.17	8.17	8.17	8.17
Data transfer rate, bytes/second	31,000	605,000	650,000	650,000	650,000	650,000
Controller model	B 1489	B 9387-4X	B 9387-4X	B 9387-4X	B 9387-4X	B 9387-4X
Comments		Standard in B 1985				

▷ ## ADVANTAGES AND RESTRICTIONS

According to Burroughs, the B 1900 offers the advantages of state-of-the-art technology (such as dynamic resource allocation), easy expandability within the series (moving up from a B 1905 to a dual-processor B 1985), ease of use, and optimum price/performance (the B 1985 is one of the few dual-processor systems in the $100,000 price range).

USER REACTION

Fifty-six users of the B 1900 responded to the Datapro's 1983 computer users' survey. Respondents reported on 60 systems which had been installed for an average of 30 months. The major industries represented were manufacturing (15 users), retail/wholesale (12 users), and banking/finance/securities (10 users). Principal applications were accounting (41 users), order entry (29 users), purchasing (21 users), and sales (16 users).

Configurations ranged from 512KB to approximately 2048KB of memory, from 6 to 30 local workstations, from 1 to 5 remote workstations, and from 200MB to about 1200MB of disk storage.

Thirty-three users purchased their systems, 19 rented or leased from the manufacturer, and 4 leased from a third party. Data base management systems were used by 35 respondents, while a communication monitor was implemented by 26 users.

A table follows, showing users' ratings of their B 1900 systems.

	Excellent	Good	Fair	Poor	WA*
Ease of operation	40	14	2	0	3.7
Reliability of mainframe	33	17	6	0	3.5
Reliability of peripherals	8	33	15	0	2.9
Maintenance service:					
Responsiveness	20	23	11	2	3.1
Effectiveness	13	33	6	4	3.0
Technical support:					
Trouble-shooting	5	22	20	7	2.5
Education	6	27	14	7	2.6
Documentation	2	14	33	6	2.2

▷

▶ *Control Type K (ten I/O cards)*
Eight-line multi-line communications control extension
DCP-1 extension

MASS STORAGE

For information on mass storage devices for the B 1900, refer to Table 2.

INPUT/OUTPUT UNITS

For information on magnetic tape units, card readers, line printers, and reader-sorters used with the B 1900, refer to Table 3.

COMMUNICATIONS CONTROL

B 1351 SINGLE-LINE CONTROL: Provides the interface between a single leased or switched communications line and any B 1900 Series processor. Each control must be equipped with an appropriate line adapter. Line adapters, as listed below, permit communication with teletypewriter terminals and with the full range of Burroughs computers and terminal equipment.

The B 1351 Single-Line Control can utilize any adapter listed below except the B 1667-5, while the B 1351-2 Single-Line Control has a universal adapter that handles all connections except Burroughs direct interface at up to 19,200 bps, Burroughs standard synchronous at up to 4800 bps or 9600 bps, and bisynchronous at up to 50,000 bps.

B 1351-1 DUAL SINGLE-LINE CONTROL: Provides the interface between two leased or switched communications lines and a B 1900 Series processor. Otherwise similar to the B 1351 Single-Line Control.

B 1351-2 UNIVERSAL SINGLE-LINE CONTROL—Asynchronous/Synchronous: Provides microprocessor-based data communications control with a universal adapter that handles asynchronous and synchronous connections at speeds up to 50,000 bps; does not support the automatic dial-out adapter.

B 1351-3 UNIVERSAL SINGLE-LINE CONTROL—Bisynchronous: Provides microprocessor-based data communications control with a universal adapter that handles bisynchronous connections at speeds up to 9,600 bps; does not support the automatic dial-out adapter.

B 1352 EIGHT-LINE MULTI-LINE CONTROL: Provides the interface between B 1955 or B 1985 processors and up to eight leased or switched communications lines. ▶

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Manufacturer's software					
Operating system	41	12	3	0	3.7
Compilers & Assemblers	22	30	4	0	3.3
Applications programs	5	24	14	3	2.7
Ease of programming	23	30	3	0	3.4
Ease of conversion	17	32	4	0	3.3
Overall satisfaction	19	32	4	1	3.2

*Weighted Average based on a scale of 4.0 for Excellent.

Users were generally satisfied with their B 1900s. Specifically, 43 respondents said that the B 1900 was easy to expand/reconfigure, 32 indicated that programs/data carried over from other systems were compatible—as the vendor promised, 30 cited response time, and 26 thought that the data base language was efficient and effective.

On the opposite side, 14 users said the installation of the equipment was late, 11 commented that the vendor did not supply all the promised software or support, and 7 said the vendor enhancements/changes to hardware/software were hard to keep up with.

The following comment from one user, echoed the sentiments of four others, "Based on our evaluations, we believe these systems to be very effective in terms of cost/performance. The system software and data base software are the class of the industry. As a vendor, Burroughs' major fault is inadequate support at the local level. Users without good in-house personnel would probably experience some difficulties."

Finally, when asked if they would recommend their B 1900 systems to other users, 45 said yes, 3 said no, and 7 were undecided.□

► With the 1353 Controller Extension, a total of up to 16 lines can be serviced. The 1352 MLC must be equipped with an appropriate adapter for each line. Line adapters permit communications with Teletype terminals and with the full range of Burroughs computers and terminal equipment. Transmission speeds up to 9600 bits/second can be handled in either asynchronous, synchronous or binary synchronous mode. Wideband transmission is possible at up to 50,000 bps. The transmission code is 7-bit ASCII plus parity.

The 1352 MLC interfaces directly with main memory through the Port Interchange, thereby reducing the demands it imposes upon the central processor. Although the MLC performs numerous communications control functions and operates in a largely processor-independent manner, it is a hard-wired controller rather than a programmable communications processor. One character of buffering per adapter is provided in the MLC, in addition to the one character accumulated by the buffer.

A B 1955 or B 1985 system can include a maximum of two B 1352 MLCs, each equipped with a 1353 Controller Extension, for a maximum total of 32 lines.

B 1354 FOUR-LINE MULTI-LINE CONTROL: Similar to the B 1352, but restricted to four lines. No extension is available to increase the B 1354's capacity.

LINE ADAPTERS: Burroughs offers 16 different line adapters, divided between asynchronous, direct connect, synchronous, wideband, automatic calling and Burroughs Data Link Control models. They can be summarized as follows:

Asynchronous data set adapters: B 1650-1—up to 1200 bps, connection types II, III, or IV; B 1650-2—up to 1800 bps, connection type V; and B 1652-1—Teletype, connection type II.

Direct connect adapters: B 1650-5—two-wire, up to 2400 bps; B 1650-6—two-wire, up to 4800 bps; B 1650-7—two-wire, up to 9600 bps; B 1652-5—Teletype, all the above with connection type II; and B 1667-2—Burroughs direct interface up to 19,200 bps, connection type X.

Synchronous data set adapters: B 1651-1—Burroughs standard, up to 2400 bps, connection type VI or VII; B 1651-2—Burroughs standard, up to 4800 bps, connection type VIII; B 1651-3—Burroughs standard, up to 9600 bps, connection type XII; B 1653-1—bisync, up to 2400 bps, connection type VI or VII; B 1653-2—bisync, up to 4800 bps, connection type VIII; and B 1653-3—bisync, up to 9600 bps, connection type IX.

B 1352-2 Wideband Data Set Adapter—bisync, up to 50,000 bps with connection type XI.

B 1667-5 Automatic Calling Unit Adapter—connects with up to four Bell 801 Automatic Calling Units or three Bell 801 Automatic Calling Units and one in-built data set automatic calling unit.

Burroughs Data Link Control (BDLC) Models: B 1654-1—half-duplex adapter, B 1654-2—full duplex adapter, B 1654-9—adapter upgrade from half-duplex to full duplex.

Connection type I is a standard two-wire direct interface without a data set. Connection types II and III are a Western Electric 103A Data Set or equivalent with either an asynchronous switched line up to 150 bps (type II) or an asynchronous unconditioned lease line with capabilities up to 300 bps (type III). Western Electric 202C Data Sets with an asynchronous switched line up to 1200 bps form the type IV connection. TA 713 or TA 783 Data Sets or equivalent along with an asynchronous unconditioned leased line with capabilities up to 1800 bps form the type V connection. Type VI and VII connections consist of a TA 734-24 data set or equivalent and either a 2000-bps synchronous switched line (type VI) or an unconditioned 2400-bps synchronous leased line (type VII). A synchronous C1 conditioned 4800-bps leased line and TA 734-48 Data Set or equivalent form type VIII connection. A type IX connection is composed of a 9600-bps synchronous leased line and Rixon DS9601 Data Sets. No data set is required for a type X connection, which is a Burroughs direct interface (BDI). A type XI connection consists of a WE303 and leased wideband service.

B 1362 DATA COMMUNICATIONS PROCESSOR (DCP-4): The B 1362 is used with B 1900 systems running Computer Management System (CMS) software. (CMS software is compatible with the smaller Burroughs B 80, B 90, B 800, and B 900 computers.) The B 1362 is an intelligent 8-bit microprocessor-based data communications processor with 64K bytes of memory which directly executes a network controller program generated via the CMS NDL compiler and post compiler. Since the B 1362 performs network controller functions, the B 1900 CPU is thus freed to do other processing. Each DCP-4 has a bandpass of up to 60K bps; up to four lines may be configured per DCP-4 base via two dual adapters. Up to 12 lines may be configured per DCP-4 with a B 1367 extension, via 6 dual adapters. A ►

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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.
B 9490-25 cassette	—	800	NRZ	10	1000
B 9491	9	1600	PE	10	40,000
B 9495-8	9	1600	PE	50	80,000
B 9497-11 cassette	—	—	NRZ	10	—

Printers	Printing Speed	Print Positions	Horizontal Spacing, Chars./Inch	Vertical Spacing, Lines/Inch	Form Size, Inches
B 9246-3	320	132	10	6 or 8	4 to 20
B 9246-4	650	132	10	6 or 8	4 to 20
B 9246-13	1250	132	10	6 or 8	4 to 20
B 9247-14	1100	132	10	6 or 8	4 to 20
B 9247-15	1500	132	10	6 or 8	4 to 20
B 9246-20	2000	132	10	6 or 8	4 to 20
B 9249-375	375/500	—	—	—	—
B 9249-31	270/370	—	—	—	—

Punched Card Equipment	Columns	Speed Cards/Min.	Input Hopper Capacity	Output Stacker Capacity	Options
B 9115	80	300	1000	1000	51-col. read
B 9116	80	600	1000	1000	51-col. read
B 9117	80	800	1000	1000	51-col. read
B 9119-1	96	300	—	—	
B 9419-2	96	300	—	—	
B 9419-6	96	300	—	—	Used for off-line sorting, keypunching, verifying

MICR/OCR Reader/Sorters	Type Font	Speed, Documents/Min.	Number of Stackers	Document Size, Inches	Options
B 9137-4	E13B	1000	8	—	
B 9190-2	MICR E13B, OCR 7B, OCR A/ 1428, or OCR B/ 1428/407	1625	4	—	3 types of endorsers, microfilm module, off-line sort, 50-col. read

► maximum of 5 DCP-4 base and extension modules are supported per system. The following line adapters are supported by the DCP-4: the B 1661 dual terminal direct interface (TDI), B 1662 dual half-duplex modem connect, B 1663 single full-duplex, B 1664 single SDLC, and B 1667 dual TD1 half-duplex modem connect. The B 1667 dual line adapter provides for one TDI line and one half-duplex modem-connect line, as long as the combined bandpass is not greater than 38.4 bps.

SOFTWARE

OPERATING SYSTEMS: The B 1900 Series system software is available in two packaging options which support both conventional data processing and on-line transaction processing.

TCS III(Transaction Control System III) is the required operating system for all B 1905 computer systems. It consists of the Master Control Program (MCP) for overall system control; the Network Definition Language (NDL) for generating communications control programs; the ODESY on-line data entry system; either the Text Editor or CANDE for on-line programming and/or file updating; the user's choice of one compiler; and system utilities to handle sorting and other routine operations.

TCS IV is the required operating system for all B 1955 and B 1985 computer systems. It includes all the facilities of TCS III plus the Generalized Message Control System (GEMCOS) and either the DMS-II data base management system or the Reporter II System for generating customized report programs.

The components of TCS III and TCS IV are individually described below.

Computer Management System—Transaction Control System I (CMS-TCS1). This alternative set of systems software is designed for use in B 1900 installations that need to maintain program compatibility with the Computer Management System (CMS) software used on the smaller B 80, B 90, B 800, and B 900 Series computers. CMS-TCS1 consists of the following components: Master Control Program, CANDE, ODESY, NDL, CMS Cobol, or RPG compiler, and system utilities. The B 1362 Data Communications Processor (DCP-4) is required in all B 1900 systems using CMS-TCS1 software; it can be configured in place of the standard B 1352 Multi-Line Communications Control.

Master Control Program: The MCP is a modular operating system that manages and controls all operations of the system. It performs the following principal functions: 1) ►

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▶ schedules the loading and execution of user programs in a multiprogramming environment, in accordance with user-assigned priorities; 2) allocates memory areas, processor logic, and peripheral units; 3) schedules and initiates all I/O operations; 4) provides automatic error-handling procedures; 5) creates and maintains a disk program library; 6) handles communication between the system and its operator via the console typewriter and control cards; 7) provides a printout showing the status of all active jobs upon request; 8) guides the compilation of programs written in Cobol, Fortran, Basic, and RPG; 9) handles file opening and closing, physical data management, utility functions, program loading, and program library calls; and 10) controls data communications devices and MICR reader-sorters.

The MCP is written in Burroughs' Software Development Language (SDL), a high-level language oriented toward facilitating the writing of systems software. Therefore, whenever the MCP is in use, all or part of the SDL Interpreter must be resident in memory.

The MCP requires a minimum of 28K bytes of memory plus the memory space required to hold the users' programs. Required peripheral equipment includes a display console, dual disk pack drive unit, and line printer.

WORD PROCESSING: The Text Management System (TMS) adds the features of word processing and electronic mail to the data processing system. TMS includes an automatic spelling and automatic formatting features for document layout.

LANGUAGES: The B 1900 Series computer systems support Cobol, RPG, Fortran, Basic, Micro Implementation Language, Software Development Language, Network Definition Language, and User Programming Language.

The *B 1900 Cobol* language is an essentially complete implementation of full American National Standard 1974 Cobol except for the Report Writer module, which is omitted from the B 1900 Version. Cobol object programs are regarded as a collection of logical segments which can be loaded and executed individually or in groups, meaning that programs can be written without the usual limitations imposed by the computer's memory capacity.

The Cobol compiler runs on any B 1900 system. The compiler requires about 40K bytes of memory. Object programs generated by the Cobol compiler are expressed in an S-language that is oriented toward efficient handling of 4-bit digits and 8-bit characters. The Cobol Interpreter, required at execution time, occupies about 3K bytes of memory in addition to the object program's requirements.

B 1900 Cobol includes a queue handling technique and a sort capability that includes a tag search, a restart facility, vertical collating sequence, and tape sorting.

The *B 1900 Report Program Generator (RPG)* is a compiler-driven language. The compiler converts source programs written in the widely used RPG language into object programs that can be executed by B 1900 systems. The compiler permits programs written in IBM RPG or RPG II, or in most other versions of the RPG language, to be compiled and run with little or no change. RPG programs are automatically segmented during compilation, so programs can be written without the usual limitations imposed by the computer's memory capacity. The RPG Compiler runs on any B 1900 system. The compiler requires about 10K bytes of memory exclusive of MCP. The RPG Interpreter occupies about 3K bytes of memory at execution time in addition to the object program's requirements.

The *B 1900 Fortran* language is compatible with American National Standard 1977 Fortran and includes certain Burroughs extensions to provide features available in IBM Fortran IV Level II. The compiler requires about 48K bytes of memory. Object programs produced by the Fortran compiler are expressed in an S-language that is oriented toward efficient handling of 36-bit "words" and 72-bit "doublewords." The Fortran Interpreter, required at execution time, occupies about 3.5K bytes of memory in addition to the object program's requirements.

B 1900 Basic is a language that generally corresponds to the original Dartmouth Basic (Beginners' All-Purpose Symbolic Instruction Code). Burroughs offers both a batch-mode Basic compiler and an Interactive Basic System for the B 1900 Series computers.

The batch-mode Basic compiler requires a minimum of 12K bytes of memory exclusive of MCP requirements. Object programs produced by the Basic compiler are expressed in an S-language that is oriented toward efficient handling of 40-bit (5-character) "words." The Basic Interpreter, required at execution time, occupies about 3K bytes of memory in addition to the object program's requirements.

The Interactive Basic System accepts commands, program instructions, and data values from users at local or remote terminals. Commands cause the requested functions to be performed immediately; program instructions are stored for later execution; and data values are entered in response to program requests. The results of each program are routed to the originating terminal. The Basic source language is converted to an internal form that can be efficiently executed on a B 1900 system. Extensive text editing and debugging facilities are provided to facilitate programming. Burroughs' Interactive Basic language includes all the facilities of ANSI's Minimal Basic plus enhancements in these areas: string handling, array handling, mathematical functions, external file handling, and formatted output. The Interactive Basic System requires about 17K bytes of memory exclusive of the MCP.

B 1900 Micro Implementation Language (MIL) is a compiler-level language that produces microcode that is directly executable on a B 1900. Register-to-register operations; variable-length operations; bit field extraction; control memory overlay; and shift, rotate, and compare functions are possible. Read/Write/Swap of 1 to 24 bits forward or backward in main memory, with incrementing and decrementing of length attributes, is performed in one microinstruction. Scratchpad storage of main memory pointers and a 16- or 32-level pushdown stack for microcode return linkage are addressable. To use MIL, a knowledge of gating functions of timing of hardware events is not required. A single microinstruction will bias the microprocessor mode for data type, which may be binary, 4-bit decimal, or EBCDIC. Data field length can be from one to 65,536 bits. MIL requires 44K bytes of memory exclusive of MCP.

B 1900 Software Development Language (SDL) is a compiler-level system language that is procedure-oriented with extensive subscripting, indexing, and data concatenation capabilities. Data declarations include arrays and substructures in bit or character formats. Data space can be allocated as permanent, dynamic (shared space local to procedures), and virtual. Dynamic space is calculated at run time. SDL requires 20K bytes of memory exclusive of MCP.

DATA BASE MANAGEMENT: *Data Management System II* (DMS II): is a data base management system consisting of two components: a Data and Structure Definition language (DASDL), which provides for the logical description of data sets or subsets and for mapping the logical data onto physical structures, and a Cobol interface. ▶

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▶Specifically, B 1900 DMS-II is a logical subset of B 5/6/7000 DMS-II. The Cobol constructs used in B 1900 Series Cobol programs for accessing the data base are syntactically compatible with those used in B 5/6/7000 Cobol. However, The physical mapping algorithms for structuring the data base records on direct-access storage differ, so that a B 1900 DMS-II data base must be reloaded before being transferred to B 5/6/7000 DMS-II. The B 1900 DMS-II DASDL parameters and DMS statements in Cobol programs are compatible with B 5/6/7000 DMS-II, eliminating the necessity of converting DMS-II Cobol user programs and user DASDL or the DASDL definition of the data base.

DMS-II Inquiry provides access to a data base from any terminal. In addition to extracting information from the data base, DMS-II Inquiry allows the terminal user to interrogate the description of a data base. Inquiry statements are composed of basic functions tied together by English-like connectors. Inquiry statements include HELP, which provides information to the user on how to use Inquiry; SHOW, which allows the user to list on a terminal all or selected portions of a data base; REPEAT, which allows the user to repeat a previous statement; GENERATE, for creation of a private copy of a portion of a data base; DEFINE, for creation of statement abbreviations; and INQUIRY, which provides a means of selecting records of interest and naming the information to be displayed.

DMS-II requires 128K bytes of memory for operation; this includes space for MCP, the network controller, and DMS-II. Additional users of the same data base will require 32K bytes each.

COMMUNICATIONS SOFTWARE: *Network Definition Language (NDL)* is 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 his 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. NDL runs under MCP on any B 1900 Series system. NDL requires a minimum of 12K bytes of memory exclusive of MCP.

User Programming Language (UPL) is an Algol-like compiler language designed to facilitate the solution of complex logic and decision-making problems, primarily in the design of data communications message control programs. UPL is a procedure-oriented language with extensive subscripting, string manipulation, and data concatenation facilities. Arrays and data substructures can be defined in bit or character formats. The UPL Compiler and its object programs operate under MCP supervision on a B 1900 Series system. UPL can be used to prepare a customized Message Control System (MCS) for use with an NDL-generated Network Controller when the user wishes to exert control over system decisions such as security, file control, error handling, preprocessing, or postprocessing. UPL requires a minimum of 20K bytes of memory exclusive of MCP.

Generalized Message Control System (GEMCOS): GEMCOS is a generalized system that uses parameters for generating an installation-tailored Message Control System (MCS). The MCS provides the interface between the network controller and user application programs by decoding and directing incoming messages to the appropriate user program for processing. The system can accommodate user-written code and contains facilities for exchange of data between application programs. Recovery capabilities include dynamic restoration of the network configuration, an audit mechanism for logging specified messages, and a network control command for orderly system shutdown in the event of system failure. The recovery mechanism can be synchronized with DMS II recovery to insure data base integrity. A password security system is provided to control access to the communications network. The system also includes an auxiliary program to permit network commands to be entered into the MCS from the console printer or a card reader. GEMCOS also provides a transaction translation feature which translates data from the format required by the workstation to the format required by the application program. GEMCOS requires a minimum of 24K bytes of main memory exclusive of MCP.

Command And Edit (CANDE): Provides generalized file preparation and updating in an interactive terminial-oriented environment. B 1900 CANDE is similar to B 5/6/7000 CANDE and conforms to the same functional behavior. B 1900 CANDE is an MCS (Message Control System) that runs in conjunction with NDL. The NDL-generated network controller performs all the data communications related functions, while CANDE performs file updating and text editing functions. CANDE can support a maximum of 16 terminals. A basic user code/password type of security is available with the system. CANDE also provides a recovery system. CANDE requires 22K bytes of memory for one terminal plus 2K bytes for each additional terminal when specific file functions such as "GET" are used. MCP and NDL are not included in the memory requirements of CANDE.

System Communication Module (SYCOM): Provides a mechanism for linking two B 1900, B 1800, or B 1700 computers to permit file transfers, remote execution from the console keyboard, and program communication between the systems. SYCOM contains its own data communications handler and operates under MCP control, permitting the SYCOM functions to be combined with on-site work in a multiprogramming job mix. SYCOM operates in point-to-point mode via a switched or leased communications line. Available features include auto answer, auto call, EBCDIC transparent and nontransparent, space compression/expansion, and buffer sizes ranging from 405 to 4095 bytes. The SYCOM program requires a minimum of 20K bytes of main memory plus a single-line, dual-line or multi-line communications control with a standard synchronous, binary synchronous, or direct-connect adapter.

HASP Remote Terminal Program: Permits a B 1900 Series system to function as a remote batch terminal on-line to IBM System/360 or 370 computer systems that utilize the HASP Binary Synchronous Multileaving Protocol. With the HASP Remote Terminal Program, a B 1900 system can be made functionally equivalent to a standard IBM 360/20 HASP workstation. Communication between the B 1900 and the central system are conducted utilizing the standard IBM binary synchronous line procedures. The transmission code is EBCDIC. Two modes of operation are supported. In the Spool Mode, input data from the B 1900 peripheral devices is compressed, blocked, and stored on a disk file for later transmission to the central processor, and data records returned from the central system are stored on disk for subsequent output to printers or card punches. In the Direct Mode, input data is blocked and transmitted to the central system, and data records returned from the central system are immediately deblocked and routed to the appropriate output devices.

The B 1900 HASP Remote Terminal Program operates under the MCP operating system, permitting the remote job entry function to be multiprogrammed with local processing. Line speeds of up to 9,600 bps are supported over leased or ▶

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▶ dial-up lines in half-duplex mode. The program requires 32K bytes of main memory in addition to that required for MCP.

RJE Terminal Programs: Burroughs offers two programs for RJE. One permits entry to a B 6000/B 7000; the second, to a B 2000/B 3000/B 4000. These programs make a B 1900 appear as a remote terminal to the above systems and enable direct entry to the host computer with printer or punch output returned. Both programs require 24K bytes of memory.

Burroughs Network Architecture (BNA): A set of software facilities 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 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 NDL and MCS.

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 Line Control Procedures (HDLC), the protocol standard developed by the International Standards Organization (ISO) and the European Computer Manufacturers Association (ECMA), and Advanced Data Communications Control Procedure (ADCCP), the protocol standard developed by the American National Standards 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 at 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 connot 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 multi-point 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.

Logic Information and Network Compiler (LINC): is a programmer's aid which is used for ease in developing on-line business real-time applications software. LINC is available separately or as part of the BP–1–SY Business Partner basic system.

CMS DOMAIN: Provides an interactive method of identification and development of file maintenance and inquiry programs via a terminal. With Domain, the user can create a disk file; add, delete, or maintain records in a disk file, or inquire into records in a disk file. CMS Domain is for the B1955–CMS system only.

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 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.

B 1900 Text/Editor (TEI): This remote text editing program runs under control of the MCP operating system and provides facilities for source file maintenance operations concurrently with batch and other remote processing. The ▶

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►system provides a conversational English-language command language which includes editing, manipulation, and control commands that can be entered from TD 700 series remote terminals. Each terminal user is provided with a re-entrant copy of the Text/Editor program in order to insure effective response. The Text/Editor requires at least 9.1K bytes of memory exclusive of MCP, network controller, and message buffer space.

TEI supplies a wide range of data sampling techniques, including systematic, tandem, and stratified. Selection of data can be based upon weighting and validation criteria, pattern matching, arithmetic expressions, and range intervals. Statistical parameters can be automatically calculated.

UTILITIES/AIDS: A variety of utilities and aids are offered for the B 1900.

A disk sort program sorts records into ascending or descending sequence in accordance with specification cards that describe the input and output files, the key field or fields, and various options. The sort function can also be invoked from within a Cobol or RPG source program. The user can specify either of two sorting techniques; vector replacement (the one most commonly used) or in-place (which minimizes the amount of disk storage space required).

The systems SORT provides for both sorting or merging utilizing tape or disk. The program requires 3K bytes of memory for the sort generator, 8K bytes for the tape, disk, or inplace sort, and 8K bytes for the merge. User options in using the sort utility include sorting technique, memory allocation, and percentage of byte in order.

Other B 1900 Series utility routines include System Loading Procedures, Disk File Copy, Memory Dump, Memory Dump Analyzer, File/Loader, File/Puncher, and DM-PALL. The last-named routine is a flexible listing and reproducing program for printing the contents of files and transcribing data from one medium to another.

On-Line Data Entry System (ODESY): A sophisticated data entry and validation system using multiple on-line visual display units, ODESY provides a generalized and generative "front end" for the existing B 1900 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.

APPLICATION PROGRAMS: Burroughs offers a number of application programs for the B 1900 Series, including the following:

Burroughs Inventory Planning Analysis and Simulation System (BIPASS)
Business Planning System (BPS)
Distribution Information System (DIS)
General Business Management System

Hospital Management System
Infostats (forecasting and statistics)
Item Processing System
Manufacturing Management System
Production Control System III
SCHOLASTIC Education Programs
Screen Oriented Program Editor (SCOPE)
Tax Assessment and Collection System (TACS)
Text Management and Communications System
Thrift On-Line System
Total Banking System
Utility Billing System

PRICING

CONTRACT TERMS: The B 1900 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 eight consecutive hours per day on Monday through Friday only; extended maintenance coverage is available at higher rates.

All maintenance charges listed in this report are for "metro 1" (city) districts. Super city rates (e.g., New York or Chicago) are five 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 1900 systems are offered under either an Unlimited-Time License Plan, for a one-time charge 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 Systems Analyst Assistance 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, and fall into the following broad categories: Systems Support, Operations, Languages, Environmental (data base and data communications), and Applications.

EQUIPMENT: The components and prices of the packaged B 1900 Series Systems are listed in the "Equipment Prices" section, which follows. Downgrading or substitution of items with lower list prices is not allowed. Substitution of similar items with higher prices may be made by adding the current price differentials to the basic package price. ►

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EQUIPMENT PRICES

		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
PACKAGED SYSTEMS					
B 1905-SYS	Basic system, includes one B 1905CP 4-MHz CPU with 131K bytes of main memory, 8K bytes of cache memory, one B 9361-23 Display, one B 1348-52 Console Control, one B 1486-1 Disk Control, one B 9484-2 Disk Drive (65.2 megabytes), one B 1249 Printer Control, one B 9246-3 320 lpm Printer and one B 1351-2 Universal Single-Line Control.	$62, 475	$407	$2,317	$1,820
B 1913-SYS	Basic system, includes one B 1913CP 4-MHz CPU with 262K bytes of main memory, 8K bytes of cache memory, one B 9361-23 Display, one B 1348-52 Console Control, one B 1486-1 Disk Control, one B 9484-2 Disk Pack Drive (65.2 megabytes), one B 1249 Printer Control, one B 9246-3 320 lpm Printer, one B 9137-4 1000 dpm Reader/Sorter, one B 9937-50 Imprinter/Endorser, one B 1130 Reader/Sorter Control, one B 1351-2 Universal Single-Line Control. Note: B 1900 RDP software is required (TCS-II is not required).	122,750	1,028	4,444	3,694
B 1955-CMS	Basic system, includes the B 1955CP 6-MHz CPU with 525K bytes of main memory, one B 9361-23 Display, one B 1348-52 Console Control, one B 1486-1 Disk Control, one B 9484-2 Disk Pack Drive (65.2 megabytes), one B 1249 Printer Control, one B 9246-6 650 lpm Printer, one B 1362 CMS DCP-4 Base, and one B 1661 TDI Dual Adapter.	99,750	698	3,738	3,177
B 1955-SYS	Basic system, includes one B 1955CP 6-MHz CPU with 524K bytes of memory, 8K bytes of cache memory, one B 9361-23 Display, one B 1348-52 Console Control, one B 1486-1 Disk Control, one B 9484-2 Disk Pack Drive (65. 2megabytes), one B 1249 Printer Control, one B 9246-6 650 lpm Printer, and one B 1352 8-line Multi-Line Control.	109,200	594	4,265	3,559
B 1955-1SY	Same as B 1955-SYS basic system except that the B 9484-2 Disk Pack Drive, B 1249 Printer Control, and B 9246-6 Printer are omitted.	91,825	369	3,055	2,617
BP-1-SYS	Business Partner basic system, includes one B 1955CP 6-MHz CPU with 1048K bytes of main memory, one B 9361-23 Display, one B 1348-52 Console Control, one B 1486-1 Disk Control, one B 9484-51 Disk Pack Drive (130.4 megabytes), one B 1249 Printer Control, one B 9246-6 Printer, one 1352 8-line Multi- Line Control, B 1650-7 Asynchronous Adapter, two MT 985 CRT Displays, two TP110 keyboards, two XC 015 TDI Connectors, and the following software: MPC, Sort, Utilities, Network Definition Language, GEMCOS (Total) with UPL, CANDE, Data Management System II, DMS II Inquiry, Cobol 74, and Logic Information with Network Compiler.	180,000	773	7,088	6,101
B 1985-SYS	Basic system, includes two B 1985CP 6-MHz CPUs with 524K bytes of main memory, 8K bytes of cache memory, one B 9361-23 Display, one B 1348-52 Console Control, one B 1486-1 Disk Control, one B 9484-51 Disk Pack Drive (130.4 megabytes), one B 1249 Printer Control, one B 9246-6 650 lpm Printer, one B 1352 8-line Multi-Line Control, and one B 1058 Expansion Cabinet.	156,400	713	5,066	4,340
B 1985-1SY	Same as B 1985-SYS basic system except that the B 9484-51 Disk Pack Drive, B 1249 Printer Control, and B 9246-6 Printer are omitted.	132,135	426	4,377	3,750
SYSTEM OPTIONS					
B 1051	6-MHz Clock Kit for the B 1905, and B 1913	5,250	13	178	144
B 1052	1.0MB Memory Base for the B 1905 and B 1913	1,050	13	34	29
B 1059	Expansion Cabinet for the B 1905 and B 1913	10,500	45	348	293
B 1306	I/O Expansion (5 controls) for the B 1905, B 1913 and B 1955	1,671	12	48	41
B 1053	2.0MB Memory Base for the B 1955	1,050	13	37	30
B 1058	Expansion Cabinet for the B 1955	17,035	97	579	500
B 1057	Power Booster for the B 1955	6,222	24	205	172
B 1985-Kit	Dual Processor Kit includes one B 1985CP Processor	40,310	105	1,322	1,133
ADD-ON MAIN MEMORY					
B 1005-131	131K-byte increment for the B 1905 and B 1913	3,623	19	122	105
B 1155-262	262K-byte increment for all B 1900 models	3,020	33	205	172
B 1155-512	512K-byte increment for the B 1955, B 1955-1, B 1985, and B 1985-1	6,040	68	410	343
B 1155-1MB	1M-byte increment for the B 1955, B 1955-1, B 1985, and B 1985–1	12,080	132	810	685

*For 5-day, 8-hour service.
**Includes 7-day, 24-hour maintenance coverage.

Burroughs B 1900 Series

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
MASS STORAGE					
B 1486-1	Disk Pack Drive Control	6,684	84	229	188
B 9484-51	Dual Disk Pack Drive; 130.4 megabytes	21,000	132	815	664
B 9494-41	Fixed-disk Drive; 360/402 megabytes	25,200	94	847	643
B 9494-42	Fixed-disk DataBank; includes two B 9494-41 drives, 720 804 megabytes	42,000	187	1,694	1,286
B 9494-43	Fixed-disk DataBank; includes three B 9494-41 drives, 1080/1206 megabytes	59,850	259	2,541	1,929
B 9494-44	Fixed-disk DataBank; includes four B 9494-41 drives, 1440/1608 megabytes	78,750	334	3,388	2,572
B 9987-1	Dual Port Feature for the B 9494-41 Drive	5,880	23	188	155
B 9489-17	Industry Compatible Minicomputer Drive, 243K bytes, 30-inch cabinet	2,100	33	111	89
B 9489-16	Industry Compatible Minicomputer Drive, 486K bytes, 44-inch cabinet	1,800	38	166	111
B 1489	Mini-Disk Control for the B 9489-17 and B 9489-16	4,457	19	142	118
MAGNETIC TAPE UNITS					
B 9490-25	Cassette Station; 10 ips, NRZ	1,774	13	74	66
B 9491-4	Magnetic Tape Unit; 9-track, PE, 40KBS	13,231	84	539	449
B 9491-5	Add-on Magnetic Tape Unit; 40 KBS	4,500	78	417	372
B 9495-8	Magnetic Tape Unit; 80 KBS, requires B 9499-33/34/35 Master Electronics Exchange	11,551	130	447	364
B 9495-45	Magnetic Tape Subsystem; includes 1 x 4 Master Electronics Exchange and B 9495-8 drive	17,860	135	600	495
B 9499-31	1x4 Master Electronics Exchange; for B 9495-8 (low boy)	2,000	44	415	325
B 9499-33	1x4 Master Electronics Exchange; for B 9495-8	11,465	40	413	316
B 9499-34	1x8 Master Electronics Exchange; for B 9495-8	12,350	40	443	345
B 9499-35	2x8 Master Electronics Exchange; for B 9495-8	14,465	87	520	402
B 9495-82	Magnetic Tape Unit; 9-track, 1600 BPI, 120 KBS (requires B 9499-5X Master Electronics Exchange)	18,100	135	705	547
B 9495-83	Magnetic Tape Unit; 9-track, 1600 BPI, 200 KBS (requires B 9499-5X Master Electronics Exchange	22,447	154	895	693
B 9499-50	1x4 Master Electronics Exchange; for B 9495-82/82 Series only	19,100	123	729	557
B 9499-51	1x8 Master Electronics Exchange; for B 9495-82/83 Series only	21,060	123	770	589
B 9499-52	2x8 Master Electronics Exchange; for B 9495-82/82 Series only	51,240	258	2,089	1,211
B 9499-53	2x16 Master Electronics Exchange; for B 9495-82/83 Series only	53,940	258	2,198	1,401
B 9499-54	3x16 Master Electronics Exchange; for B 9495-82/83 Series only	83,310	382	3,260	2,210
B 9499-55	4x16 Master Electronics Exchange; for B 9495-82/83 Series only	110,200	505	4,267	2,910
B 9999-4	PE/NRZ Switchable Feature; allows B 9495-82/83 Series to operate in NRZ mode	788	6	29	24
B 9999-5	NRZ Option; for use with B 9499-5X Series only	2,731	38	89	73
B 9497-11	Magnetic Tape Unit; Freestanding NRZ Cassette Drive, 10 ips	1,774	13	71	61
LINE PRINTERS					
B 9246-6	Band Printer; 600 lpm, 132 positions	14,701	182	551	475
B 9247-14	Train Printer; 1100 lpm, 132 positions	25,000	454	1,544	1,374
B 9247-15	Train Printer; 1500 lpm, 132 positions	33,000	567	2,096	1,686
B 9246-13	Band Printer; 1250 lpm	42,500	420	1,635	1,360
B 9246-20	Train Printer; 2000 lpm, 132 positions	69,300	648	3,100	2,500
B 9249-375	Chain Printer, 375/500 lpm, 64/48 character set	8,915	91	398	341
B 9249-31	Chain Printer, 270/370 lpm, 64/48 character set	9,800	400	360	79
B 1249	Printer Control for B 9246 Printers	1,448	17	60	60
B 1247-4	Printer Control for B 9247-14 Printers	6,016	48	178	142
B 1247-5	Printer Control for B 9247-15 Printers	8,355	45	288	240
B 1240	Printer Control for B 9246-20 Printers	9,450	24	332	276
PUNCHED CARD EQUIPMENT					
B 9115	Card Reader; 300 cpm, 80-column	8,608	66	332	293
B 9116	Card Reader; 600 cpm, 80-column	11,372	93	442	391
B 9117	Card Reader; 800 cpm, 80-column	12,952	114	499	383
B 9119-1	Card Reader; 300 cpm, 96-column	4,781	55	135	117
B 9419-2	Card Reader/Punch/Data Recorder; 300 cpm Read, 60 cpm Punch/Print and Keyboard; 96-column (Card Read only on CMS systems)	9,496	158	376	324
B 9419-6	Multi-Purpose Card Unit; 300 cpm Read, 60 cpm Punch/Print and Keyboard, 96-column	10,005	189	450	370
B 1115	Card Reader Control for 9115/6	2,407	19	66	53
B 1119	Card Reader Control for B 9119-1	2,596	17	106	88
B 1418	Reader/Punch Control for B 9418-2	7,521	50	218	183
B 1419	Card Reader/Punch/Data Recorder Control for B 9419	2,596	26	106	88

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Burroughs B 1900 Series

EQUIPMENT PRICES

READER-SORTER AND DOCUMENT PROCESSOR		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
B 9137-4	Reader-Sorter; 100 dpm, 8 pockets	53,336	691	1,835	1,554
B 9190-2	Document Processor; 1625 dpm, 4 pockets	42,525	681	2,299	1,951
B 1130	Reader-Sorter Control for B 9137 and B 9190	7,218	72	288	240

FEATURES FOR B 9137-4:

B 9937-11	Four-Pocket Module	15,574	78	442	427
B 9937-50	Impact Endorser for B 9137-4	8,781	121	271	240
B 9937-70	Basic Off-Line Sort; 2 fields only	1,298	11	38	37
B 9937-71	Eight-Pocket Basic Off-Line Sort; 2 fields only	1,558	11	47	45
B 9937-73	Extended Sort Control	2,596	33	75	73
B 9937-76	Zero Kill; maximum of 3	519	2	16	16
B 9937-77	No Field-No Digit; maximum of 3	519	2	16	16
B 9937-78	Digit Override; maximum of 3	519	2	16	16
B 9937-79	Digit Edit; maximum of 3	519	2	16	16
B 9937-80	Field Override; maximum of 3	519	2	16	16
B 9937-81	Field Edit; maximum of 3	519	2	16	16
B 9937-82	Stacker Overflow	519	2	16	16
B 9937-83	Batch Ticket Detector	519	2	16	16
B 9937-84	Resettable Item Counter	260	2	9	9
B 9937-85	Non-Resettable Item Counter	260	2	9	9
B 9937-86	Running Time Meter	260	0	9	9
B 9937-87	Mobile Carrier	163	0	0	0
B 9937-90	Control Interface-3A Host Control	1,733	2	56	47
B 9937-91	Control Interface-4A Host Control	1,733	2	56	47
B 9938-1	Multi-Track-E13B	17,560	143	509	434

FEATURES FOR B 9190-2:

B 9990-21	MICR E13B Module; Single Track	15,430	61	505	431
B 9990-22	MICR E13B Module; Double Read	40,478	122	1,345	1,145
B 9990-32	OCR 7B Module (Credit Card)	52,815	164	1,723	1,460
B 9990-33	OCR A/1428 Module	52,815	164	1,723	1,460
B 9990-34	OCR B/1403/407 Module	52,815	164	1,723	1,460
B 9990-90	4A Host Control or DLP Interface	1,733	4	53	43
B 9990-91	3A Host Control Interface	1,733	4	53	43
B 9990-50	Impact Endorser with Digital Advance	15,730	81	541	463
B 9990-53	Modular Non-Impact Endorser	34,545	221	1,108	940
B 9990-55	Impact Endorser; No Digital Advance	15,121	77	520	442
B 9990-60	Microfilm Module	85,470	613	3,214	2,731
B 9990-70	Off-Line Sort Package	5,198	40	142	121
B 9990-25	Short Document Feature (51-column cards)	1,208	1	32	27

TERMINALS

TD73X Series	Self-Scan II Display/Control Unit; displays 480 characters, 2000-character display memory, 3000-character data communications buffer, Burroughs standard basic data communications procedures, asynchronous or synchronous data set communications interface	1,500	—	126	120
TT650-1	Logic and Display Unit; 26-Key Keyboard, 150-character buffer, data set interface, Burroughs synchronous/asynchronous multipoint, MCR and P.I.N potential	1,045	—	54	51
TT650-2	Same as TT650-1, except with 30-Key Keyboard and 256-character buffer	1,134	—	56	53
TT651-1	Logic and Display Unit; 26-Key Keyboard, 150-character buffer, direct connect, Burroughs asynchronous multipoint, MCR and P.I.N. potential	1,045	—	54	51
TT651-2	Same as TT651-1, except with 30-Key Keyboard and 256-character buffer	1,134	—	56	53
TU 1806	Teller Terminal; alpha, keyboard	8,495	—	352	334
TU 1807	Teller Terminal; alpha, screen	10,700	—	489	465
TU 1856	Teller Terminal; alpha, APR	9,702	—	413	392
TU 1857	Teller Terminal; alpha, screen APR	10,879	—	550	522
DE 700	Data Entry Workstation; 12-inch green phosphor non-glare screen, with DE 119 Source Data Keyboard	3,995	—	200	190
MT 1500	Shop Floor/Distribution Terminal (requires an MT 785 or MT 795)	3,676	—	123	117
MT 1541	Hospital Input/Display Station with Keyboard	6,773	—	232	220
MT 355	Printer-based Terminal; 4 ½-inch Validation/Journal and Processor	3,035	—	132	125
MT 337	Printer-based Terminal; 8 ½-inch Validation/Journal, with front feed MTS II Processor	3,875	—	167	155
MT 755	Display-based Programmable Terminal System; 5-inch, 600-character Display Monitor and Processor	2,788	—	138	131
MT 795	Display-based Programmable Terminal System; 9-inch, 960-/1920-Character Display Monitor and Processor	2,862	—	143	136

*For 5-day, 8-hour service.
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Burroughs B 1900 Series

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
MT 785	Display-based Programmable Terminal System; 12-inch, 960-/1920-Character Display Monitor and Processor	3,072	—	154	146
AP 310	Remote Journal Printer; 90 cps, tear-off blade, asynchronous/synchronous modem connect	1,895	—	97	92
AP 380	Remote Passbook Only Printer; 90 cps	4,715	—	197	187
AP 100	Shared Printer; 90 cps	5,408	—	206	196
AP 150	Shared Printer with APR; 90 cps	6,489	—	244	232
AP 1300	Letter-Quality Printer; teletype model, (RS-232-C) Receive Only	4,568	—	190	179
AP 1301	Letter-Quality Printer; Burroughs Poll Select model, Receive Only	4,568	—	190	179

DATA COMMUNICATIONS CONTROLS

B 1351	Single Line Control	3,245	19	115	88
B 1351-1	Dual Line Control	5,408	35	178	153
B 1351-2	Universal Single Line Control-Asynchronous/Synchronous	3,151	32	122	109
B 1351-3	Universal Single Line Control-Bisynchronous	3,151	30	122	109
B 1352	Multi-line Controller (8-lines)	9,734	67	279	240
B 1353	Multi-line Controller Extension (8-lines)	9,734	50	279	240
B 1354	Multi-line Controller (4-lines)	7,350	48	249	216

LINE ADAPTERS

B 1352-2	Wideband Adapter	12,438	84	358	297
B 1650-1	Asynchronous Data Set Connect; up to 1200 bps	1,623	19	75	58
B 1650-2	Asynchronous Data Set Connect; up to 1800 bps	1,947	24	92	75
B 1650-5	Asynchronous Direct Connect; up to 2400 bps	1,623	19	75	58
B 1650-6	Asynchronous Direct Connect; up to 4800 bps	1,947	24	92	75
B 1650-7	Asynchronous Direct Connect; up to 19,200 bps	2,272	28	115	92
B 1651-1	Synchronous Data Set Connect; up to 2400 bps	1,623	19	75	58
B 1651-2	Synchronous Data Set Connect; up to 4800 bps	1,947	24	92	75
B 1651-3	Synchronous Data Set Connect; up to 9600 bps	2,272	28	115	92
B 1652-1	Asynchronous Data Set Connect; for teletypewriters	1,623	19	75	58
B 1652-5	Asynchronous Direct Connect; for teletypewriters	1,623	19	75	58
B 1653-1	Binary Synchronous Data Set Connect; up to 2400 bps	4,759	77	194	165
B 1653-2	Binary Synchronous Data Set Connect; up to 4800 bps	5,354	82	211	178
B 1653-3	Binary Synchronous Data Set Connect; up to 9600 bps	5,949	86	223	188
B 1654-1	BDLC Half Duplex Adapter	3,151	38	159	127
B 1654-2	BDLC Full Duplex Adapter	6,300	76	316	255
B 1654-9	BDLC Adapter Upgrade HDX to FDX	3,151	38	159	127
B 1667-2	Burroughs Direct Interface (BDI) Adapter to 19,200 bps	2,596	19	85	58
B 1667-5	Automatic Dial-Out (ADO) Adapter	1,623	19	75	58

ASYNCHRONOUS DATA SETS (Free Standing)

TA 1201	Data Set; up to 1200 bps, up to 1800 bps with conditioned leased lines, optional switched line operation	746	6	30	29
TA 1203	Data Set; up to 1200 bps, for switched lines with auto answer capability, optional auto dial capability optional	1,012	8	32	31
TA 1801	Data Set; up to 1800 bps with leased lines-no line conditioning required, up to 1200 bps with switched lines and manual dial/answer	1,063	8	33	32
TA 1802	Same as 1801 with the addition of two business machine ports	1,179	9	44	41
TA 1804	Data Set; 1200/1800 bps with manual switching, up to 1800 bps with leased lines-no line conditioning required, up to 1200 bps on switched lines with manual dial/answer, manual switching between leased and switched lines.	1,179	9	44	41

DATA COMMUNICATIONS-CMS ONLY

B 1362	CMS DCP-4 Base	5,400	81	334	221
B 1367	CMS DCP-4 Extension	4,500	60	269	175
B 1660	DCI Adapter	2,941	27	147	120
B 1661	Terminal Direct Interface (TDI) Dual Adapter	525	36	24	14
B 1662	Dual Half-Duplex D/S Adapter	1,681	36	57	49
B 1663	Single Full-Duplex D/S Adapter	1,681	36	57	49
B 1664	Single Full-Duplex SDLC D/S Adapter	1,681	36	57	49
B 1667	TDI/Half-Duplex Adapter	1,681	19	97	62

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Burroughs B 1900 Series

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
SYNCHRONOUS DATA SETS					
TA 2401	Data Set; up to 2400 bps with leased lines, up to 2400 bps with switched lines and manual dial/answer	1,444	14	68	64
TA 2403	Data Set; up to 2400 bps with switched lines, auto answer capability, optional 1200 bps operation, optional auto dial capability	1,675	14	86	81
TA 2404	Data Set; up to 2400 bps with leased or switched lines, manually switchable between leased and switched lines, manual dial/answer, optional 1200 bps operation	1,906	14	104	98
TA 2405	Data Set; up to 2400 bps with automatic switching capability between leased/switched lines, automatic answer capability, automatic dialing capability	2,137	14	121	116
TA 4801	Data Set; up to 4800 bps, with leased or switched lines and manual dial/ answer	4,283	29	152	144
CP 1004	Synchronous 4800 bps MP modem	3,000	NA	172	140
CP 1009	Synchronous 9600 bps MP modem	6,500	NA	373	303
CP 1009R	Synchronous 9600 bps MP modem	6,800	NA	390	317
CP 1009T	Synchronous 9600 bps LSI modem	3,000	NA	172	140
CP 1021	4-channel multiplexer for CP 1009	1,150	NA	66	54
CP 1034	Dual-call auto answer kit for CP 1000 modems	1,200	NA	68	56
CP 1038-3	Switched line fall-back option (auto answer) for CP 1000 modems	1,900	NA	110	89
CP 1042	72-inch modem cabinet	2,400	NA	137	112

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SOFTWARE PRICES

	UNLIMITED TIME PLAN		LIMITED TIME PLAN	
	Initial Charge (Single Pymt.)	Initial Charge (12 Mo. Pymnts.)	Annual License Fee	Monthly License Fee
CMS System Software				
Transaction Control System I includes: MCP, Utilities, NDL, Network Definition Language, CANDE, ODESY, GEMCOS, and one compiler or the following:	8,250	NA	1,320	275
CMS Cobol	1,179	NA	225	43
CMS RPG	1,179	NA	225	43
CMS MPL II	1,179	NA	225	43
CMS SYCOM	3,274	NA	623	118
RJE	1,733	NA	278	59
3270 Protocol	3,438	NA	550	59
360/20 HASP	1,733	NA	278	59
2780/3780 RJE	1,733	NA	278	59
Transaction Control System III includes: MCP2, Sort, Utilities, ODESY, Text Editor or CANDE, NDL Network Definition Language, and one compiler. Note: for B 1905 only	9,100	NA	1,725	300
Transaction Control System IV includes: MCP2, Sort, Utilities, GEMCOS (Basic) and User Programming Language or Supervisory MCS, DE 1, (Text Editor or CANDE), DM2/DM1 Data Management Systems, or RP2/RP0 Reporting Systems, NDL Network Definition Language, and one compiler. Note: for B1955 or B1985 only	21,780	NA	3,487	743
Basic	3,630	NA	690	121
Cobol ANSI 68	3,630	NA	690	121
Fortran	3,630	NA	690	121
RPG	3,630	NA	690	121
Cobol 74	2,743	NA	521	92
Fortran 77	4,356	NA	835	146
MIL Compiler (Micro Implementation Language)†	3,739	359	678	NA
SDL Compiler (Systems Definition Language)†	3,739	359	678	NA
Domain	3,355	NA	135	146
Remote Network Services (includes BDLC Station Group)	NA	NA	NA	110
UPL User Programming Language	NA	NA	NA	249
LINC	75,000	7,188	14,250	2,679
Power RJE	1,430	138	275	48
HASP RJE	1,430	138	275	48
B 7000/B 6000/B 4000/B 3000/B 2000 Remote Job Entry Terminal Program	1,359	131	171	46

†Available only to universities and colleges under a special Program Products License.
NA means prices are not available.

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REPRODUCTION PROHIBITED

Burroughs B 1900 Series

SOFTWARE PRICES	UNLIMITED TIME PLAN		LIMITED TIME PLAN	
	Initial Charge (Single Pymt.)	Initial Charge (12 Mo. Pymnts.)	Annual License Fee	Monthly License Fee
GEMCOS (Basic)	6,010	577	1,142	216
GEMCOS (Basic) and UPL	8,012	768	1,523	288
GEMCOS (Advanced)	8,012	768	1,523	288
GEMCOS (Advanced and UPL)	10,015	961	1,903	359
GEMCOS (Total)	10,015	961	1,903	359
GEMCOS (Total) with UPL	12,018	1,153	2,384	431
GEMCOS Format Generator	4,582	440	872	164
Supervisory Message Control System (SMCS)	1,700	163	325	58
System Communication (SYCOM)	3,967	381	755	142
Text Editor	1,997	192	380	68
CANDE	3,878	372	737	129
SCOPE	3,630	NA	0	NA
ODESY	6,121	587	1,164	219
Audit REPORTER	19,741	1,894	3,751	706
Advanced REPORTER II	14,439	1,385	2,744	516
REPORTER II	9,163	879	1,742	328
On-Line REPORTER	1,349	130	257	49
DMS Data Management System II	15,318	1,469	2,910	512
DMS II Inquiry	1,650	159	314	55
NDL Network Definition Language	NA	NA	NA	58

APPLICATION PROGRAMS

General Business Management Systems
GBMS On-Line Payroll	9,158	879	1,008	328
GBMS General Ledger	6,716	645	740	241
GBMS Accounts Payable	6,716	645	740	241

Hospital Business Management System
HMS Patient Accounting	20,202	1,938	2,223	723
HMS Reservation/Admission	10,101	969	1,113	363
HMS Medical Records Index	7,548	724	831	271
HMS Order Processing	20,202	1,938	1,223	723

Hospital Information Processing System
Distributed Patient Accounting	13,676	1,312	1,505	489

Manufacturing-Production Control System II
Engineering Data Control	4,476	430	494	161
Inventory Control	4,476	430	494	161
Requirements Planning	4,476	430	494	161
Work-In Process	4,476	430	494	161
On-Line Inquiry	3,358	322	370	120
On-Line File Maintenance	4,850	466	534	174
Capacity Planning	4,476	430	494	161
Forecasting/Inventory Analysis	4,446	427	534	174
Operating Schedule and Loading	4,922	472	592	192
Production Scheduling	4,103	394	494	161

Manufacturing-Production Control System III
Manufacturing Management System	23,932	2,296	2,394	777
Production Scheduling	4,103	394	411	134
Operating Schedule and Loading	4,922	472	493	160
Capacity Planning	4,103	394	411	134
Forecasting/Inventory Analysis	4,446	427	445	145
Order Entry and Invoicing	4,336	416	434	141
Accounts Receivable	3,145	302	315	103

Distribution Application
Distribution Information System includes: Order Processing, Inventory Accounting, Accounts Receivable Database Manager (requires DMS11), Transaction Manager (requires GEMCOS Total-MCT)	14,286	NA	1,572	511

Inventory Planning Analysis and Simulation System
BIPASS-Analysis	8,316	798	NA	297
BIPASS-Operation	6,369	611	NA	228
BIPASS-On-Line Inquiry	3,124	300	NA	112

Hotels
Reservation System	18,315	1,757	2,016	655
Front Office	18,315	1,757	2,016	655
Back Office	18,315	1,757	2,016	655
Food and Beverage	6,105	586	673	219

Government/Education Systems
FISCAL Budgetary Accounting	12,638	1,212	1,391	452
Government and Education Payroll	12,638	1,212	1,391	452
Utility Billing	12,638	1,212	1,391	452

NA means prices are not available.

JUNE 1983

Burroughs B 1900 Series

➤ ## SOFTWARE PRICES

	UNLIMITED TIME PLAN		LIMITED TIME PLAN	
	Initial Charge (Single Pymt.)	Initial Charge (12 Mo. Pymnts.)	Annual License Fee	Monthly License Fee
Scholastic System				
School Scheduling System	6,802	653	750	244
Scheduler On-Line Data Entry	2,893	278	319	104
Financial	4,433	426	0	159
Financial On-Line Data Entry	2,606	250	0	94
Student Records	3,725	358	411	134
Student Record On-Line Data Entry	2,893	278	319	104
Student Records Inquiry	2,893	278	319	104
Payroll	3,988	383	0	142
Instructional Materials	3,355	322	0	120
Total Bank System				
Total Bank System 1 includes: TDE, TSV, TIL, TGL, TCI, TCL, TOD, TCD, and TDO	81,000	N/A	11,935	N/A
Total Bank System 2 includes: TDE, TSV, TIL, TCD, TGL, TCI, TCL, TOD, TDO and TDO and a choice of TMS or TIP	92,000	N/A	13,530	N/A
Total Bank System 3 includes: TDE, TSV, TCD, TCL, TGL, TOD, and TIP	76,450	N/A	11,253	N/A
TDE Demand Deposit Accounting	15,500	N/A	1,750	N/A
TSV Savings Accounting	11,500	N/A	1,265	N/A
TCD Certificates of Deposit	11,500	N/A	1,265	N/A
TIL Installment Loan	13,500	N/A	1,485	N/A
TCL Commercial Loan	13,500	N/A	1,485	N/A
TGL General Ledger	12,500	N/A	1,375	N/A
TCI Customer Information System	12,500	N/A	1,375	N/A
TOD On-Line/Data Entry	15,500	N/A	1,705	N/A
TDO Documentation System	2,775	N/A	306	N/A
TML Mortgage Loan	14,500	N/A	1,595	N/A
TFL Dealer Floor Plan	5,200	N/A	572	N/A
TRC Check Reconciliation	4,200	N/A	462	N/A
TFT Funds Transfer	5,200	N/A	572	N/A
TSH Stockholder	3,200	N/A	352	N/A
TSB Safe Deposit Billing	3,200	N/A	352	N/A
TIP Proof and Transit	13,000	N/A	1,430	N/A
Item Processing System				
TCS for Remote Document Processing includes: MCP11 (MP2), Sort (SRT), Utilities (UTL), Network Definition Language (NDL), Cobol (COB), and Remote Document Processor (RDP). Select one of the following: IBM HASP RJE (HAS), or IBM Power RJE (PWR).	8,325	N/A	916	298
Remote Document Processor	1,476	142	180	53
Document Processor	2,609	251	287	94
Proof Management System				
Proof Controller System	20,535	1,968	2,259	734
Office Automation Systems				
Word Management System	3,050	293	122	127
OMS-Shared Resource	1,500	144	165	63
OMS-Electronic Mail	3,000	288	330	125
OMS-Productivity Tools	3,000	288	330	125
OMS-DP Interface	750	72	83	32
Text Management and Communication System	9,158	878	1,008	328
Production Accounting and Control				
Production Module includes: Product Definition, Product Structure, Inventory Control, Shop Order Release, Bill of Material, Work Center and Routing, and Standard Costing.	5,550	770	385	527
Payroll	2,415	232	N/A	101
Accounts Payable Purchase Orders	2,415	232	N/A	101
General Ledger	2,415	232	N/A	101
Order Entry/Invoicing	2,363	227	N/A	99
Asset Management	788	76	N/A	34
Material Requirements Planning	3,728	358	N/A	156
Job Cost	2,389	230	N/A	100
Accounts Receivable	2,415	232	N/A	101
Data Management (not for use with the following: Production Module, Order Entry/Invoicing, or Material Requirements Planning)	4,778	459	N/A	200

N/A means prices are not available.■