Burroughs B 1800 Series

MANAGEMENT SUMMARY

Introduced in November 1976, the Burroughs B 1800 Series computers are the small- to medium-scale members of the Burroughs "800" computer family. The B 1800 systems are object-code-compatible with their counterpart systems in the older Burroughs "700" family, the B 1700 systems. Thus, programs written for the B 1700 can be run on the B 1800 without modification. The B 1800 systems are also compatible with the Computer Management System (CMS) released recently with the entry-level Burroughs B 80 computer system.

According to Burroughs, the use of faster and more compact logic and memory circuits, processor performance improvements, and—in the larger B 1800 systems—the use of high-speed microinstruction cache memory and fast system disk memory, enable the B 1800 systems to provide up to 40 percent more throughput for about the same price and in about 50 percent less floor space than the B 1700 systems. The largest B 1800 system has 3.5 times the processing power of the minimum B 1700 system.

As with the B 1700 Series, Burroughs has incorporated into the B 1800 systems nearly all of today's most advanced hardware and software concepts, including semiconductor main memories, integrated-circuit logic, dynamically variable microprogramming, automatic multiprogramming, and virtual memory—and all at a very attractive price. A basic B 1830 system can be rented for about $2,660 per month on an extended-term lease and be expanded to a large B 1870 system in the $13,000-per-month range. Shipments of the B 1800 systems are scheduled to begin in the second quarter of 1977.

The B 1800 Series of small- to medium-scale business data processing systems provides up to 40 percent more throughput at about the same price as the older B 1700 systems. As you've come to expect from Burroughs, these new systems feature advanced technology and sophisticated software, and have been designed with the user in mind.

CHARACTERISTICS

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

Burroughs is generally considered to be one of the strongest competitors in the data processing marketplace, with a broad line of computer equipment spanning the range from small, entry-level systems to very large, multi-user, multiprocessor systems. In addition to data processing equipment, Burroughs also markets magnetic media; business forms and supplies; document counting, encoding, signing, protecting, and disbursing equipment; programmable and nonprogrammable desktop calculators; specialized banking equipment; and other related products. Burroughs is international in scope and employs some 50,000 people in more than 120 countries around the globe.

MODELS: B 1830, B 1860, and B 1870 Data Processing Systems.

DATE ANNOUNCED: November 1976.

DATE OF FIRST DELIVERY: Scheduled for second quarter of 1977.

DATA FORMATS

The B 1800 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

The B 1830, smallest member of the new Burroughs small-to-medium-scale computer family, offers 48K to 262K bytes of MOS memory. The unit in the foreground is Burroughs' new AE 412 Audit Entry Data Preparation System.

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One of the most innovative features of the B 1800 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.

PROCESSOR MODELS

The three models currently offered in the B 1800 Series are the B 1830, B 1860, and B 1870, which differ principally in central processor speed, main memory capacity, and the use of cache memory and system disk memory. The B 1830 processor operates at 5 MHz (millions of cycles per second) and can have from 49K to 262K bytes of main memory. The B 1860 and B 1870 central processors operate at 6 MHz. The B 1860 can have from 65K to 393K bytes of main memory. The B 1870 can have from 98K to 524K bytes of main memory and includes 5.9 million bytes of high-speed system disk memory. In addition, the B 1860 and B 1870 systems feature a high-speed bipolar microinstruction cache memory that operates at six times the speed of main memory.

All three of the B 1800 systems can have up to 14 individual channels for input/output devices and subsystems. All channels are fully buffered, allowing processor and peripheral units to run independently at their full rated speeds.

The distinguishing characteristics of the three B 1800 systems are shown in the accompanying table.

PERIPHERALS

The peripheral equipment for the B 1800 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 a console printer and displays.

Four removable dual disk pack subsystems can be used with the B 1800 systems, with capacities ranging from 65 million bytes up to 174 million bytes per drive. Each subsystem can have up to four drives, and a B 1800 can use two subsystems, thus providing a maximum on-line disk pack capacity of up to 1.395 billion bytes. A family of low-cost disk cartridge drives provides 4.6, 9.2, or 18.4 million bytes of data storage on each dual-disk cartridge for all B 1800 systems. Also available are industry-compatible mini-disk drives, first introduced with the Burroughs B 80 system. These drives use floppy disks and have a data storage capacity of 243,000 bytes, with an average access time of either 260 or 343 milliseconds.

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.

MAIN STORAGE

STORAGE TYPE: MOS/LSI semiconductor.

CAPACITY: B 1830—49,152 to 262,144 eight-bit bytes in increments of 16,384, 32,768, and 65,536 bytes. B 1860—65,536 to 393,216 bytes in increments of 32,768, 65,536, and 132,072 bytes. B 1870—98,304 to 524,288 bytes in increments of 32,768 and 132,072 bytes.

CYCLE TIME: See table.

CHECKING: Parity bit associated with each byte (8 data bits) is generated during writing and checked during reading.

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

CENTRAL PROCESSORS

The B 1800 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 1800 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 1800 programming language, Burroughs has defined an "ideal machine" and developed a specialized microprogram, called an Interpreter, that makes the B 1800 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 1800 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.

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CHARACTERISTICS OF THE B 1800 SYSTEMS

	B 1830	B 1860	B 1870
CENTRAL PROCESSORS			
Processor cycle time, nanoseconds	200	167	167
Maximum number of I/O controls	14	14	14
MAIN MEMORY			
Minimum capacity, bytes	49,152	65,536	98,304
Maximum capacity, bytes	262,144	393,216	542,288
Read cycle time, microseconds (per byte)	0.40	0.333	0.333
Write cycle time, microseconds (per byte)	0.40	0.167	0.167
MICRO INSTRUCTION CACHE MEMORY			
Minimum capacity, bytes	0	4,096	4,096
Maximum capacity, bytes	0	4,096	4,096
Read cycle time, nanoseconds (per byte)	—	83	83
Write cycle time, nanoseconds (per byte)	—	83	83
MAXIMUM I/O SPEEDS			
80-column card reading	1400 cpm	1400 cpm	1400 cpm
80-column card punching	300 cpm	300 cpm	300 cpm
96-column card reading	1000 cpm	1000 cpm	1000 cpm
96-column card punching	60 cpm	60 cpm	60 cpm
Printing (standard character sets)	1500 lpm	1500 lpm	1500 lpm
Magnetic tape I/O	120 KBS	120 KBS	120 KBS
MICR document input	1625 dpm	1625 dpm	1625 dpm
AVAILABILITY OF PERIPHERALS			
Disk cartridge drives	Yes	Yes	Yes
Dual disk pack drive	Yes	Yes	Yes
Head-per-track systems memory	No	No	Yes
Head-per-track memory banks	No	No	Yes
Single-line communications control	Yes	Yes	Yes
Multi-line communications control	No	Yes	Yes

Exclusive on the B 1870 is the system memory disk, a head-per-track disk file that can store from 5.9 to 23.6 million bytes of information and has an average access time of 5 milliseconds—about 7 times faster than most removable disk pack drives. The data transfer rate for the system memory disk is 650,000 bytes per second.

The 9490 Cassette Tape Subsystem can serve as a low-cost alternative to punched cards for use as an input medium and for program storage and file backup. The tape cassettes are interchangeable between the B 1800 systems and other Burroughs business data processing systems, the extensive line of TC Series Terminal computers, and the Audit Entry Preparation Systems.

Four ½-inch magnetic tape units are available with the B 1800 systems. These are 9-track units with a density of either 1600 bpi in PE mode or 800 bpi in NRZI mode. They provide maximum data transfer rates of 10K, 40K, 80K, or 120K bytes per second.

The MICR reader/sorters available for the B 1800 systems can handle 900 or 1625 documents per minute and can have from 8 to 32 pockets. The larger, faster model can also read and sort documents encoded with OCR fonts.

There are currently seven models of line printers available with the B 1800 systems, with printing speeds ranging

All B 1800 Series processor models are program-compatible and generally similar in architecture, with one major exception. The B 1860 and B 1870 systems have a high-speed, bipolar microinstruction cache memory that operates at 83 nanoseconds per byte and has a capacity of 4,096 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.

CONTROL STORAGE: See table.

INTERRUPTS: The B 1800 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.

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 "slot" in the central processor. The maximum number of I/O controls is 14.

SIMULTANEOUS OPERATIONS: All I/O controls are buffered to permit overlapped read/write/compute operations. In addition, the Multi-Line Communications Control is connected directly to the Port Interchange, which controls access to main memory, rather than to the processor.

CONFIGURATION RULES: The B 1830 basic system consists of a 5-MHz central processor, a console display and

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MAXIMUM NUMBERS OF I/O CONTROLS

Control Types	Basic Systems		With B 1304 Expansion		With B 1305 Expansion	
	B 1830	B 1860/B 1870	B 1830	B 1860/B 1870	B 1830	B 1860/B 1870
A	5	8	7	10	10	13
B	2	5	3	6	4	7
C	1	0	2	1	2	1
Total A, B, & C	5	8	7	10	10	13
Total D, E, F, G, H, J, & K	5	5	4	4	4	4
Total System	10	13	11	14	14	14

from 85 to 1500 lines per minute. The latest entry in the line is the B 9247-15 Train Printer, a 1500-line-per-minute model previously released for use with Burroughs' larger systems.

DATA COMMUNICATIONS

With the introduction of the B 1800 Series, Burroughs has added new and improved data communications capabilities. To supplement the Single-Line and Multi-Line Controls (for up to 16 lines) available with the B 1700 systems, a new Dual-Line Control (for 2 lines) has been added to the B 1800's. Also, a Wideband Adapter has been added to permit binary synchronous transmission of data in transparent and nontransparent modes at speeds of 19,200 or 50,000 bits per second. Full error checking is provided by a cyclic redundancy check on the EBCDIC code transmitted.

The B 1352 Multi-Line Controller (MLC) provides the capability to handle multiple-line networks. 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 1800 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.

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.

control, and 49,152 bytes of main memory, expandable to a maximum of 262K.

The B 1860 basic system consists of a 6-MHz central processor, a console display and control, 65,536 bytes of main memory, expandable to a maximum of 393K, and 4096 bytes of cache memory.

The B 1870 basic system consists of a 6-MHz central processor, a console display and control, 98,304 bytes of main memory, expandable to 524K, 4096 bytes of cache memory, and a B 9470-2 system memory disk unit and control.

The B 1800 systems have eight different types of I/O subsystem "slots" which determine the number and types of I/O controls that can be connected. The allowable combinations of controls, however, are limited by various interrelationships and by the overall maximum limit of 14 controls. See the table on the fourth page of this report for the various combinations allowed.

The types of I/O controls required by the various I/O units used with the B 1800 systems are as follows:

Control Type A

All 80-column card readers
All 80-column card punches
9249 Printers

Control Type B

Integrated console cassette
All 96-column card readers
9418 80-column Reader/Punch Data Recorder
9419 96-column Multi-Purpose Card Unit
9247 Printers
MICR reader-sorters
9490 Cassette Tape Subsystem
9484, 9499 Disk Drives
9489 Mini-Disk Drives
9495, 9496 PE Magnetic Tape Units

Control Type C

All disk cartridge units

Control Type F

Single-line communications control

Control Type G

9495, 9496 NRZI Magnetic Tape Units
9491 Magnetic Tape Unit

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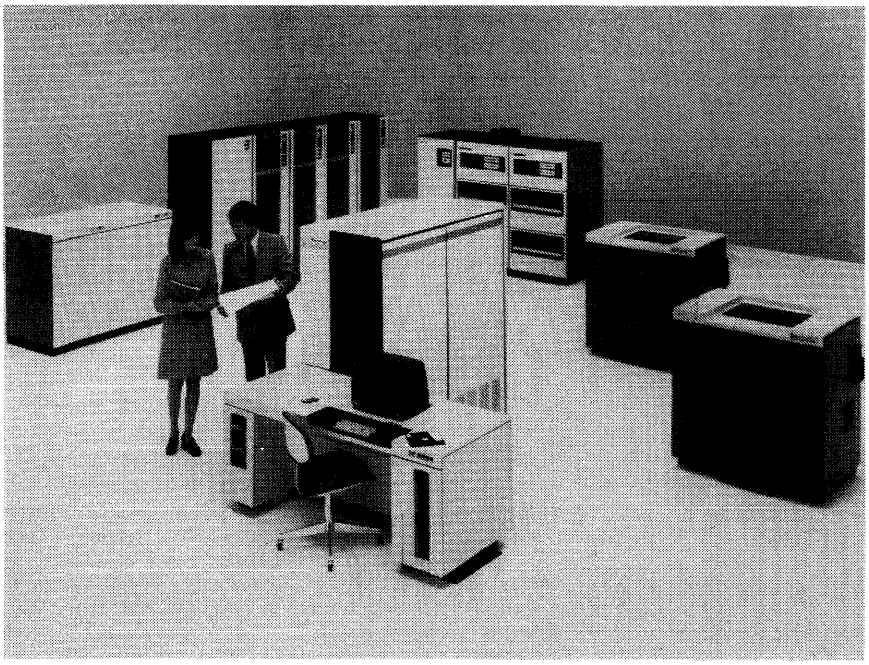

The B 1870 system is the largest member of the B 1800 family. It can have up to 524K bytes of main memory, 4,096 bytes of cache memory, and 23.6 million bytes of system disk memory.

Remote job entry applications can be implemented on the B 1800 Series systems through the HASP Remote Terminal Program Product, announced for the B 1700 Series systems in April 1974, and the Power/RJE Remote Terminal Program Product, announced in November 1976. Operating under MCP, the HASP program enables the B 1800 to multiprogram on-site processing with remote job entry to IBM System/360 or System/370 computers operating under the HASP binary synchronous multileaving protocol. Using the Power/RJE program, B 1800 systems are made to look like IBM 2770 remote workstations. Under control of the MCP, the B 1800 systems function as remote batch terminals on-line to an IBM 360/370 system running DOS/POWER.

SOFTWARE

All software support for the B 1800 Series systems is built around the Master Control Program (MCP), the integrated operating system that complements the hardware to create an unusually effective environment for multiprogrammed operation in any B 1800 system. Like the MCP operating systems for the larger Burroughs computers, the B 1800 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 1800 Series systems, like the large-scale Burroughs systems, are programmed almost exclusively in higher-level languages. Compilers are available for the COBOL, RPG, FORTRAN, and BASIC languages, but not for PL/1. 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 1800 microprogramming itself is not user-accessible.

Control Type H

Dual-line communications control

Control Type J

Multi-line communications control

Control Type K

Multi-line communications control extension

MASS STORAGE

9480/9481 DISK CARTRIDGE MEMORY SUBSYSTEMS: Provide low-cost random-access data storage on removable single-disk cartridges. Two models are available:

9480-12: dual drives, stores 4,667,120 bytes total.

9481-12: dual drives, stores 9,334,240 bytes total.

Each drive accommodates one disk cartridge and has two read/write heads, one serving each recording surface. The disk cartridge is 15 inches in diameter, 1.5 inches high, and weighs 5 pounds. The two drives are "stacked" so that the unit occupies less than five square feet of floor space. Data is recorded in 180-byte segments. Average head positioning time is 60 milliseconds, average rotational delay is 20 milliseconds, and data transfer rate is 193,000 bytes/second.

The 9480/9481 Disk Cartridge Memory Subsystem can be used with all B 1800 Series processor models. A 9480 subsystem consists of a 1480 control and one or two 9480-12 drive units, providing up to four spindles and storing up to 9.3 million bytes on-line. A 9481 subsystem consists of a 1481 control and one or two 9481-12 drive units, providing up to four spindles and storing up to 18.6 million bytes on-line. Each control has a 720-byte buffer that holds up to four 180-byte segments of data and is cleared in "rotating" fashion.

9482-32 DISK CARTRIDGE DRIVE SUBSYSTEM: A dual disk drive system with removable single-disk cartridges that provides a total storage capacity of 18,660,480 bytes.

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Burroughs is placing strong marketing emphasis on its library of Business Management Systems. These are well-designed groups of related application programs that should significantly reduce the cost and time required to get a B 1800 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 system support required to install and maintain a system.

COMPATIBILITY AND COMPETITION

The B 1800 systems provide full object-code compatibility with the architecturally similar Burroughs B 1700 systems. Integrated Interpreters, which operate under control of the MCP operating system and permit direct execution of object programs written for older computers, are available for the IBM 1401/1440/1460, the IBM 1130, and Burroughs' own B 100/200/300/500 Series computers. Another Integrated Interpreter, scheduled for delivery early in 1978, will make it possible to run Burroughs B 80 object programs on a B 1700 system without change.

Program compatibility with other computers is achieved via higher-level languages. The B 1800 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 1800 RPG compiler or translated into COBOL by the COFIRS II (COBOL from IBM RPG Specifications) routines.

The Burroughs B 1830 system is designed to compete against the IBM System/3 Model 8, the Honeywell Model 61/60, and other entry-level computer systems. The larger B 1860 and B 1870 systems compete in the range of the IBM System/3 Model 15, the IBM System/370 Model 115 and Model 125, the Univac 90/30, and the Honeywell Level 62 and Level 64 Processors. As with the earlier B 1700 Series systems, these new Burroughs offerings, with their advanced technology, sophisticated software, and user-oriented design, will give any competitive system in their class a run for the money.□

Each drive accommodates one disk cartridge and has two read/write heads, one serving each recording surface. Comparatively high throughput results from direct movement of the read/write heads from one track to another without first returning to a "home position." Independent seek operation allows the overlapping of head movement on one cartridge drive with any operation on another drive. The 9482-32 uses a 32-bit error detection/correction code. Each drive in the dual-drive unit has its own logic and power supply, and is therefore not dependent on the other drive. Average head positioning time is 35 milliseconds, average rotational delay is 20 milliseconds, and data transfer rate is 387,500 bytes/second.

The 9482-32 Disk Cartridge Drive Subsystem can be used with all B 1800 Series systems. Up to four 9482-32 dual drives can be attached to a B 1800 system, thus providing a maximum data storage capacity of 74,673,920 bytes.

9484-25 DUAL DISK SUBSYSTEM: In June 1976, Burroughs announced the 9484-25 and 9484-55 disk pack subsystems. Usable on all B 1800 systems, the 9484-25 subsystem can consist of up to eight spindles with an on-line storage capacity of 32.6 million bytes per spindle. The 9484-25 includes a 1 x 4 Disk Pack Electronics Controller; to achieve a 1 x 8 capability, a 9499-4 Controller Expansion Adapter must be configured with the system. Each 9484-25 Disk Pack Subsystem must include a 1486-1 Disk Pack Control. Average head movement time is 25 milliseconds, average rotational delay is 8.3 milliseconds, and data transfer rate is 605,000 bytes per second.

9484-55 DUAL DISK SUBSYSTEM: Usable on all B 1800 systems, the 9484-55 Disk Subsystem has the same requirements and characteristics as the 9484-25 disk subsystem but is a dual-density model with an on-line storage capacity of 65.2 million bytes per spindle.

9499-7 DUAL DISK STORAGE/CONTROLLER: Usable on all B 1800 systems, this high-performance disk pack subsystem can consist of two to eight spindles with an on-line storage capacity of 87.2 million bytes per spindle. The 9499-7 includes a 1 x 4 Disk Pack Electronics Controller; to achieve a 1 x 8 capability, 9499-9 Controller Expansion Adapter must be configured with the system. Data is recorded on an 11-disk pack that is physically compatible but not format-compatible with the IBM 2316 Disk Pack. Average head movement time is 30 milliseconds, average rotational delay is 12.5 milliseconds, and data transfer rate is 625,000 bytes per second. The 9486-4 Dual Drive Add-On and/or the 9486-45 Single Drive Add-On can be added for a maximum subsystem capacity of eight spindles and 697.6 million bytes.

9499-8 DUAL DISK STORAGE/CONTROLLER: Usable on all B 1800 systems, this disk pack subsystem consists of two spindles of on-line storage with a storage capacity of 43.6 million bytes per spindle. Every 9499-8 must include a 1486-1 Disk Pack Control. Data is recorded on an 11-disk pack that is physically compatible but not format-compatible with the IBM 2316 Disk Pack. Average head movement time is 30 milliseconds, average rotational delay is 12.5 milliseconds, and data transfer rate is 625,000 bytes per second. There are no add-on increments for the 9499-8; however, the 9499-8 Dual Disk Storage/Controller can be field-upgraded to the 9499-7 Dual Disk Storage/Controller.

9470 HEAD-PER-TRACK SYSTEM MEMORY DISK: Usable on the B 1870 system only, this unit provides rapid random access to system software and to compile, sort, and program work space on a nonremovable disk file with a fixed read/write head serving each track. The 9470-2 System Memory Module stores 5.9 million bytes with an average access time of 5 milliseconds. The 9470-12 Add-On Module also stores 5.9 million bytes. Up to four 9470 modules (two 9470-2's and two 9470-12's) can be used with the B 1870 system, providing a maximum storage capacity of 23.6 million bytes. Since the 9470-12 derives its power and air supply from the 9470-2, there must be a corresponding 9470-2 module unit for each 9470-12. The data transfer rate for the 9470 subsystem is 650,000 bytes per second. The 9471-6 Disk Electronics Unit furnishes the necessary electronics to service up to four 9470 disk modules and is housed in the 9470-2 primary storage unit.

B 9489-17 OR -18 INDUSTRY-COMPATIBLE MINIDISK (ICMD) DRIVES: These floppy disk drives are available only as free-standing units. A subsystem is composed of a controller and either a dual ICMD drive or up to two single ICMD drives. Each diskette stores 243K bytes of data, with 128 bytes per sector, 26 sectors per track, and 77 tracks per diskette, including three alternates. Track-to-track access time is 20 milliseconds per single step, and settling time is 10 milliseconds. Average access time is 343 milliseconds, and the data transfer rate is 31K bytes per second.

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B 9489-15 OR -16 INDUSTRY-COMPATIBLE MINI-DISK (ICMD) DRIVES: Introduced in November 1976 and scheduled for delivery for B 1800 systems in the third quarter of 1977, these units are architecturally the same as the B 9489-16 and 17 units and use the same IBM-compatible floppy disks. The B 9489-15 houses one drive, and the B 9489-16 houses two drives. Average access time is 260 milliseconds.

INPUT/OUTPUT UNITS

AUDIT ENTRY DATA PREPARATION SYSTEMS: The Burroughs AE systems are minicomputer-based systems that edit, validate, and capture ready-to-process data on magnetic tape cassettes, industry-compatible floppy disks, or Burroughs Super Minidisks for batch transmission to a host computer. Errors are detected and corrected at the point of original entry. The AE systems simultaneously print an audit journal to assist the operator and to permit subsequent auditing.

There are currently five audit entry data preparation system models offered by Burroughs. The AE 501 system is the oldest entry in the current line, having been announced in September 1975. The AE 412, AE 422, AE 511, and AE 513 were all introduced in November 1976 and are scheduled for delivery beginning in the second quarter of 1977.

All AE systems include a 28K processor, a standard Burroughs alphanumeric keyboard, a separate 10-key numeric pad, special function keys, and 16 program select keys. All systems have a data communications capability and can have up to twice the data storage capacity of the basic system.

The basic AE 412 also includes a 60-cps matrix printer, a Burroughs Self-Scan 240-character visual display panel, and a 243,000-byte industry-compatible minidisk drive.

The basic AE 422 is a nonprinting version of the AE 412, having the same characteristics with the exception of the omitted matrix printer.

The basic AE 511 and AE 513 have the same characteristics as the AE 412 with the exception of the data storage media.

The AE 511 uses a 239,000-byte magnetic tape cassette for data storage, and the AE 513 uses a Burroughs Super Minidisk having 1 million bytes of data storage capacity.

The basic AE 501 system includes the matrix printer, a magnetic tape cassette unit with a data storage capacity of 204,800 bytes, and one asynchronous or synchronous data communications line.

The AE systems can communicate in either asynchronous or synchronous mode with a central computer or another terminal over leased or switched lines, via a Two-Wire Direct Interface (TDI) at up to 1000 feet, or via a Burroughs Direct Interface (BDI) at up to 15,000 feet. The line protocols available with the AE systems include Burroughs Basic Mode, Point-to-Point Batch, and the bit-oriented Burroughs Data Link Control (BDLC) procedures.

DIRECT DATA ENTRY: B 1800 direct data entry systems are designed to provide a variety of users with the ability to directly enter and/or retrieve information from the central system, as and when required, without leaving the user departments. Direct data entry systems can be configured with the B 1800 processors utilizing Burroughs TD 730 visual display units connected either directly or via data sets. These systems can use the Burroughs Data Entry Software (DEI) and, for remote programming facilities, the Burroughs Text Editor. The Data Entry Software (DEI) is a completely generative program product used to format input procedures to fit internal documents and to format output files to be used by application programs. This provides the user with the ability to interface with Burroughs standard program products.

A more comprehensive direct data entry system is a B 1800 processor utilizing Burroughs TD 730 and/or TD 830 visual display units connected directly or via data sets. Combined with Burroughs' On-Line Data Entry System, ODESY (DE2), NDL and, for remote programming capability, Burroughs' Command And Edit (CANDE), this system provides the user with substantial flexibility.

9490-25 CASSETTE TAPE SUBSYSTEM: Consists of a 1490 cassette control and one 9490-25 Cassette Tape Station. Records at a density of 800 bits per inch and has a capacity of up to 861 256-byte records. The data transfer rate is 1,000 bytes per second. Available for all B 1800 Series systems.

9491-2 MAGNETIC TAPE DRIVE: Reads and records data on ½-inch tape in the IBM-compatible 9-track NRZI mode at 800 bpi. Tape speed is 12.5 inches/second, data transfer rate is 10,000 bytes/second, and rewind speed is 50 inches/second. Standard vertical and horizontal parity checking are performed. The compact, table-top units accommodate 7-inch reels which hold 600 feet of tape. An optional stand/cabinet supports two of the tape drives and provides storage space for tape reels underneath. A 9491-2 tape subsystem, usable with all of the B 1800 Series processor models, consists of a 1491 Magnetic Tape Control and from one to four 9491-2 drives.

9495-2, 9496-2, AND 9496-4 MAGNETIC TAPE UNITS: Burroughs offers three models of free-standing tape drives for use in B 1800 Series systems. All three models read and record data on ½-inch tape in IBM-compatible formats. Their individual characteristics are as follows:

9495-2:	9-track phase-encoded, 1600 bpi, 120,000 bytes/second; up to 8 drives per 1495-2 Control.
9496-2:	9-track phase encoded, 1600 bpi, 40,000 bytes/second; up to 8 drives per 1496-4 Control.
9496-4:	9-track phase-encoded, 1600 bpi, 80,000 bytes/second; up to 8 drives per 1496-4 Control.

9115 CARD READER: Reads standard 80-column cards serially by column at a rated speed of 300 cpm. Reads EBCDIC or binary-coded cards. Cards are read photoelectrically, with a double strobe comparison for each column to help ensure reading accuracy. A single input hopper and output stacker hold up to 1000 cards each. Usable with any B 1800 Series system.

9116 CARD READER: Reads up to 600 cpm. Otherwise, has the same characteristics as the B 9115 described above.

9117 CARD READER: Reads up to 800 cpm. Otherwise, has the same characteristics as the B 9115 desribed above.

9111/9112 CARD READER: Reads standard 80-column cards serially by column, on demand, at up to 800 cpm (9111) or 1400 cpm (9112). The feed hopper and stacker hold up to 2400 cards each and can be loaded and unloaded while the reader is operating. Usable with any B 1800 Series system.

B 9212 CARD PUNCH: Punches standard 80-column cards at up to 150 cards per minute. Usable with any B 1800 Series system.

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9213 CARD PUNCH: Punches standard 80-column cards at up to 300 cpm. The feed hopper holds up to 2200 cards, and three program-selectable stackers hold at least 1400 cards each. Usable with any B 1800 Series system.

9119-1 CARD READER: Reads 96-column cards at 300 cpm. Includes a 600-card input hopper and one 600-card stacker. Fits on a tabletop, where it occupies less than 1.5 square feet. Usable with any B 1800 Series system.

9119-2 CARD READER: Reads 96-column cards at 1000 cpm. Usable with any B 1800 Series system.

9418-2 CARD READER PUNCH/DATA RECORDER: Reads 80-column cards at 200 cpm, and punches and/or prints full cards at 45 cpm; higher punching speeds are possible if fewer columns are punched. The single card feed path includes: 600-card primary input hopper, 400-card secondary input hopper, read station, visible wait station, punch station, punch check station, print station, and two 400-card stackers. The unit features a 64-character movable keyboard, 64-character printing, a full 80-column print line, and 80-column read, punch, and print buffers. Usable with any B 1800 Series system.

9419-2 CARD READER PUNCH/DATA RECORDER: Reads 96-column cards at 300 cpm, and punches and/or prints full cards at 60 cpm; higher punching speeds are possible if fewer columns are punched. The single card feed path includes: 600-card primary input hopper, 400-card secondary input hopper, read station, visible wait station, punch station, punch check station, print station, and two 400-card stackers. The print station permits printed interpretation of the punched data at 60 cpm, with three 32-character lines per card. Input and output data is buffered, and the unit features a keyboard that permits off-line use as a 96-column keypunch or verifier. Program storage for four format-control programs is included. Usable with any B 1800 Series system.

9419-6 MULTI-PURPOSE CARD UNIT: Provides the same 300-cpm reading, 60-cpm punching, and 60-cpm printing facilities and data recorder keyboard as the 9419-2 Card Reader Punch/Data Recorder described above, plus the ability to sort cards into any of six 400-card stackers under program control at 300 cpm. Can be used off-line for sorting, keypunching, or verifying. Numeric sorting requires 1.5 passes per card column, while alphabetic sorting requires 2.5 passes per card column. Usable with any B 1800 Series system.

LINE PRINTERS: Burroughs offers seven printers that span a range of speeds from 85 to 1500 lines per minute. All seven models are usable with any B 1800 system. Their model numbers, rated speeds, and printing techniques are as follows:

B 9249-1:	85-lpm Chain Printer
B 9249-2:	160-lpm Chain Printer
B 9249-3:	250-lpm Chain Printer
B 9247-12:	400-lpm Train Printer
B 9247-13:	750-lpm Train Printer
B 9247-14:	1100-lpm Train Printer
B 9247-15:	1500-lpm Train Printer

All of the printers have 132 print positions. The 9247 Train Printers achieve their rated speeds with the standard 48-character train module; other interchangeable modules containing 16, 64, or 96 printable characters are also available, and the 96-character set contains both upper and lower case alphabetics. The 9247 Train Printers handle vertical format control through either the Burroughs Forms-Self Align System, which uses codes preprinted on the forms, or a 12-channel carriage control tape.

MICR READER-SORTERS: The four MICR Reader-Sorters available for use with the B 1800 Series systems have the following characteristics:

9135-2:	900 dpm, 8 stacker pockets.
9135-3:	900 dpm, 12 stacker pockets.
9134-1:	1625 dpm, 4, 8, 12, or 16 stacker pockets.
9137-1:	1625 dpm, 4, 8, 12, or 16 stacker pockets; has "double read" capability to reduce the number of reject items.

The 9135 Reader-Sorters can process intermixed documents of varying lengths, widths, and weights. The input hopper holds a 17.5-inch stack of documents, and each of 8 or 12 pockets can hold a 3.5-inch stack. Documents can be loaded and removed while the unit is in operation. Other features include positive detection of mis-sorts and double documents, a resettable item counter, and a basic off-line sorting capability.

The 9134-1 and 9137-1 are high-performance units that can be equipped with a variety of optional features, including a numeric optical character recognition feature. In addition, the 9137-1 is equipped with a double read capability so that MICR characters are read twice during each pass by two separate read heads. The first read is called a "deep" read, in which an attempt is made to interpret imperfect characters, and the second is a "shallow" read which is capable of reading perfect MICR characters.

COMMUNICATIONS CONTROL

1351 SINGLE-LINE CONTROL: Provides the interface between a single leased or switched communications line and a B 1800 processor. The maximum number of single-line controls that can be connected to a B 1800 Series processor is two. Each control must be equipped with an appropriate line adapter. Thirteen different line adapters, as listed in the Equipment Prices section, permit communication with Teletype terminals and with the full range of Burroughs computers and terminal equipment.

1351-1 DUAL-LINE CONTROL: Provides the interface between two leased or switched communications lines and a B 1800 processor. Otherwise similar to the Single-Line Control described above.

1352 MULTI-LINE CONTROLLER: Provides the interface between B 1860/1870 Processors and up to eight leased or switched communications lines. With the 1353 Controller Extension, a total of up to 16 lines can be serviced. The 1352 MLC must be equipped with an appropriate line adapter for each line. Thirteen different line adapters, as listed in the Equipment Prices section, permit communication 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. The transmission code is 7-bit ASCII plus parity.

The 1352 MLC interfaces directly with the B 1860/1870 system's 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.

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SOFTWARE

OPERATING SYSTEM: The central component of Burroughs software support for the B 1800 systems is the MCP (Master Control Program), a modular operating system that manages and controls all operations of the system. It performs the following principal functions: 1) 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 total memory residence requirement for the MCP is approximately 24K bytes at present.

LANGUAGES: The B 1800 Series computer systems support COBOL, RPG, FORTRAN, BASIC, Network Definition Language, and User Definition Language.

The *B 1800 COBOL* language is an essentially complete implementation of full American National Standard COBOL except for the Report Writer module, which is omitted from the B 1800 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 1800 system. The compiler requires about 12K 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.

Recent enhancements to B 1800 COBOL include a new queue handling technique and a new sort capability that includes a tag search, a restart facility, vertical collating sequence, and tape sorting.

The *B 1800 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 1800 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 1800 system. The compiler requires about 8K bytes of memory. The RPG Interpreter occupies about 3K bytes of memory at execution time in addition to the object program's requirements.

The *B 1800 FORTRAN* language is compatible with American National Standard FORTRAN and includes certain Burroughs extensions to provide features available in IBM FORTRAN IV Level II. The compiler requires about 16K 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 1800 BASIC, like RPG, is a compiler-driven language. The compiler will accept source programs written in a language that generally corresponds to the original Dartmouth BASIC (Beginners' All-purpose Symbolic Instruction Code). The batch-mode BASIC compiler requires about 8K bytes of memory. 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. At a later date, Burroughs plans to deliver a BASIC compiler that will permit interactive, conversational problem-solving.

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 1800 Series system.

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 or character formats. The UPL Compiler and its object programs operate under MCP supervision on an B 1800 Series system. UPL can be used to prepare a customized Message Control System (MCS) for use with an NDL-generated Nework Controller when the user wishes to exert control over system decisions such as security, file control, error handling, preprocessing, or postprocessing.

GENERALIZED MESSAGE CONTROL SYSTEM (GEMCOS): GEMCOS is a generalized system that uses parameters for generating installation-tailored Message Control Programs. The Message Control Program 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. 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 requires a minimum of 24K bytes of main memory for Message Control Program generation (not including

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MCP and Network Definition Language memory requirements), plus a console printer, card reader, line printer and 4.6 million bytes of disk storage, exclusive of MCP and NDL requirements.

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.

Specifically, B 1800 DMS-II is a logical subset of B 6700/6800 DMS-II. The COBOL constructs used in B 1800 Series COBOL programs for accessing the data base are syntactically and semantically compatible with those used in B 6700 COBOL. However, the physical mapping algorithms for structuring the data base records on direct-access storage differ, so that a B 1800 DMS-II data base must be reloaded before being transferred to B 6700 DMS-II. The B 1800 DMS-II DASDL parameters and DMS statements in COBOL programs are compatible with B 6700 DMS-II, eliminating the necessity of converting DMS-II COBOL user programs and user DASDL or the DASDL definition of the data base.

REPORTER: The Reporter System enables users to generate customized report programs from simplified free-form statements describing the contents of the reports to be produced. Its output is COBOL source code, ready for compilation and execution on either a one-shot or production basis. Reports can be created from information contained in standard disk, tape, or card files or from data base files created by DMS-II. To describe the files and generate the necessary vocabulary (a one-time operation), VOCAL (Vocabulary Language) allows direct reference to COBOL data names and file layouts in existing COBOL source programs; alternatively, the data names and descriptions can be entered separately in standard COBOL notation.

The reports to be reproduced are described in a concise, English-like language that is largely self-documenting. Numerous default features make it unnecessary to specify each option. The user specifies each data element by name only, and is not required to know its size or format. In similar fashion, the user need only specify the column headings, and the system will automatically handle all other aspects of formatting the output. A security system denies access to sensitive data items by unauthorized users.

B 1800 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 system provides a conversational English-language command language which includes editing, manipulation, and control commands that can be entered from TD 700 or TD 800 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 minimum 49K system supports the execution of two copies of Text/Editor executing on two TD 701 terminals attached to one single-line communications control.

HASP REMOTE TERMINAL PROGRAM: Permits a B 1800 Series system to function as a remote batch terminal on-line to IBM System/360 and 370 computer systems that utilize the HASP Binary Synchronous Multileaving Protocol. With the HASP Remote Terminal Program, a B 1800 system can be made functionally equivalent to a standard IBM 360/20 HASP workstation. Communication between the the B 1800 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 1800 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 1800 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 dial-up lines in half-duplex mode. The program requires 32K bytes of main memory (in addition to that required for MCP).

B 100/200/300/500 EMULATOR: This emulator enables any B 1800 Series system to execute object programs written for the second-generation Burroughs B 100, 200, 300, or 500 Series computers. The emulator is essentially a microcoded B 300 Series instruction set that has been implemented in the variable micrologic of the B 1800 Series. The following B 300 Series peripheral devices are directly replaced by their B 1800 Series counterparts: 80-column card readers and punches, buffered line printers, magnetic tape units, disk files, and the supervisory printer. On-line banking systems, data communications terminals, MICR reader-sorters, and 6-tape listers, however, are not supported under emulation.

IBM 1401, 1440, 1460 EMULATOR: This emulator enables any B 1800 Series system to execute object programs written for an IBM 1401, 1440, or 1460 computer. The emulator is essentially a microcoded IBM 1400 Series instruction set that has been implemented in the variable micrologic of the B 1800 Series. The emulator supports most of the 1401/1440/1460 processor functions and all of the standard peripheral equipment except MICR, OCR, paper tape, and data communications devices. Burroughs states that the emulator will normally execute instructions two to three times as fast as the original 1400 Series system, while the I/O operations will normally be performed at peripheral speeds.

CONVERSION AIDS: In addition to emulators, Burroughs offers the following language translators as aids for converting from competitive computer systems: Honeywell Easycoder to B 1800 COBOL, NCR Century Series COBOL to B 1800 COBOL, IBM Autocoder to B 1800 COBOL, NCR NEAT/3 to B 1800 COBOL, and Honeywell COBOL to B 1800 COBOL.

UTILITY ROUTINES: 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).

Other B 1800 Series utility routines include System Loading Procedures, Disk Cartridge Initializer, Disk File Copy, Memory Dump, Memory Dump Analyzer, File/Loader, File/Puncher, and DMPALL. 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.

Disk-FORTE II is a file management system that enables a user to structure and maintain data files in disk storage. The files may have any of four distinct types of organization: indexed sequential, random, indexed random, and un-

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ordered. Appropriate search strategies are used to access the data records in each type of file. "Pointers" can be defined to establish chaining and linking network structures among the files. Disk-FORTE II generates COBOL source code which is compiled along with the user's application programs.

The latest Program Product offerings by Burroughs, introduced with the B 1800 Series, are the Time and Analysis Billing System (TABS) and the On-Line Data Entry System (ODESY).

TABS is designed to provide B 1800 system users with a comprehensive analysis of the SYSTEM/LOG, which is automatically maintained by the MCP. TABS provides information for system mix and peripheral utilization reports, program execution reports, and services-rendered reports. The automatic logging function of the MCP creates the SYSTEM/LOG, which contains information about all significant events in a multiprogramming system. The analysis function of TABS extracts and generates machine utilization statistics and program performance. As the selected reports are produced, month-to-date statistics are maintained in TABS data files. The statistics, together with information on installation costs supplied by the user, can be used to distribute the system cost equitably among individuals, departments, or applications using the data processing services.

ODESY is a sophisticated data entry system using multiple on-line visual display units. It provides a generalized and generative "front end" for the existing B 1800 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: The following applications programs are available for B 1800 Series systems:

Business Management System
- Accounts Receivable
- Accounts Payable
- Payroll
- General Ledger

Bank Management System
- Demand Deposit Accounting
- Proof and Transit
- Savings
- Installment Loans
- Certificate of Deposit
- General Ledger
- COS Reporting Module
- CIS On-Line Inquiry
- CIS On-Line Update
- Commercial Loans

Hospital Management System
- Patient Accounting
- General Ledger
- Medical Records
- Payroll
- Accounts Payable

Utility Management System
- Utility Business Management System
- Utility Billing System

Local Government Utility Management System
- Local Government and Utility Management System
- Local Government Management System
- Municipal Budgetary System

Auto Dealer Management System
- Auto Dealer System
- General Accounting
- Payroll
- Parts Inventory
- Leasing

Scholastic
- Test Scorer
- Scheduling
- Financial System
- Student Record
- Payroll

Motor Freight
- General Ledger and Reporting System
- Vehicle Maintenance and Asset Control
- Accounts Receivable and Freight
- Payroll
- Accounts Payable

Contractor Management System
- Contractor System
- Payroll and Labor Cost
- Accounts Payable
- Equipment Cost
- Job Cost Reporting
- General Ledger

Hotel Back Office Business Management System
- Hotel System
- Accounts Payable
- City Ledger
- General Ledger
- Payroll

Production Control System
- Engineering Data Control Module
- Inventory Control Module
- Requirements Planning Module
- Work In Process Module
- On-Line Inquiry Module
- On-Line File Maintenance Module
- Capacity Requirements Planning Module
- Forecasting and Inventory Analyses Module

On-Line Wholesale Distribution System
- Order Entry
- Warehouse Picking Lists
- Multiple Scheduled Shipments
- Backorder Processing
- Invoicing
- Inventory Updating and Reporting
- Open Items Accounts Receivable
- Customer Accounts Receivable Statements
- Aged Trial Balance
- Sales Analysis
- On-Line Inquiry

Manifest
- General Ledger, Management Reporting and Cost Accounting
- Payroll
- Vehicle Maintenance and Asset Control
- Accounts Receivable, Freight Billing and Revenue Reporting
- Accounts Payable

PRICING

EQUIPMENT: The following systems are representative of the types of B 1800 Series systems that are likely to be commonly installed and are supported by the standard Burroughs software. Prices for the basic systems are shown in

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the Equipment Prices section at the end of this report. In the configurations that follow, all necessary control units are included in the indicated prices. The quoted rental prices are for the basic one-year lease and include equipment maintenance.

TYPICAL B 1830 SYSTEM: Consists of 48K B 1830 Central Processor, console, 300-cpm card reader, 160-lpm printer, and dual-disk cartridge and control (4.6 million bytes). Monthly rental and purchase prices are approximately $2,660 and $108,700, respectively.

TYPICAL B 1860 SYSTEM: Consists of 128K B 1860 Central Processor, console, 600-cpm card reader, 750-lpm printer, and disk storage/controller (130.4 million bytes). Monthly rental and purchase prices are approximately $5,240 and $230,000 respectively.

TYPICAL B 1870 SYSTEM: Consists of 393K B 1870 Central Processor, console, 12 million bytes of head-per-track system memory, disk storage/controller (348.8 million bytes), 4 magnetic tape units, 1500-lpm printer, 1400-cpm card reader, 300-cpm card punch, and 8 data communications controls. Monthly rental and purchase prices are approximately $13,000 and $550,000, respectively.

SOFTWARE: The appropriate Master Control Program, sort package, and utility routines are provided to all B 1800 users at no additional cost. The compilers and other "program development aids" are offered at the monthly license fees listed under "Software Prices" at the end of this report. All applications software is separately priced under Burroughs' Program Products plan. The Program Products 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 during either a 3-year or 5-year lease term. The available Program Products and their associated license fees are listed under "Software Prices" at the end of this report.

TECHNICAL SUPPORT: B 1800 users can purchase Burroughs technical assistance in three ways: (1) as part of a Business Management System (see "Software Prices"); (2) under a System Analyst Assistance Agreement, for $2,000 per year; or (3) on a per-diem basis, when available, for $150 per day.

EDUCATION: B 1800 users can obtain the necessary training: 1) as part of a Business Management System (see "Software Prices"); or 2) by paying for individual courses. The 10 separately priced courses announced to date range from 3 to 8 days in length and cost $40 per day for each attendee.

DEBUGGING TIME: One hour per $1,000 of rental or per $48,000 of purchase price, not to exceed 120 hours.

CONTRACT TERMS: The standard equipment lease agreement includes equipment maintenance and entitles the customer to unlimited use of the equipment. The standard agreement covers maintenance of the equipment for eight consecutive hours a day, Monday through Friday.

In addition to the standard 1-year lease, Burroughs offers 3-year and 5-year leases at prices approximately 10 and 15 percent lower, respectively, than the 1-year lease prices shown in the equipment price list. An alternative 5-year lease plan that provides unlimited maintenance coverage (24 hours/day, 7 days/week) is available at a discount of approximately 10 percent from the 1-year lease price.

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

EQUIPMENT PRICES

PROCESSORS AND MAIN STORAGE		Purchase Price	Monthly Maint.	Rental (1-year lease)*
B 1830	Basic system; includes processor, 48K bytes of main memory, I/O base, display console	$ 76,000	$194.00	$2,100
B 1860	Basic system; includes processor, 64K bytes of main memory, 4K bytes of cache memory, I/O base, display console	125,000	242.00	3,413
B 1870	Basic system; includes processor, 96K bytes of main memory, 4K bytes of cache memory, 4K bytes of cache memory, 5.9-million-byte HPT system memory disk and control, display console	180,000	386.00	4,935
I/O subsystems				
B 1304	I/O expansion (2 controls)	1,250	3.50	27
B 1305	I/O expansion (5 controls)	1,500	3.50	33
Processor options for B 1830 system				
B 1348-33	Desk-level TD 800 display	1,000	22.90	26
B 1346-33	Desk-level TC 4000 printing/display	6,200	9.60	163
B 1301	Model I Power	1,700	3.50	47
B 1302	Model II Power	300	1.25	11
Processor options for B 1860/B 1870 systems				
B 1099	Power booster	4,000	9.00	105
B 1098-1	Expansion cabinet	9,900	18.00	238
Memory Options for B 1830:				
B 1030-65	64K bytes total memory	3,000	16.00	79
B 1030-81	80K bytes total memory	8,000	32.00	210
B 1030-98	96K bytes total memory	12,000	48.00	315
B 1030-131	128K bytes total memory	20,000	80.00	525
B 1030-163	160K bytes total memory	29,000	112.00	761
B 1030-196	192K bytes total memory	37,000	144.00	971
B 1030-262	265K bytes total memory	54,000	208.00	1,418

*Rental prices include equipment maintenance.

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EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
PROCESSORS AND MAIN STORAGE (Continued)				
Memory Options for B 1860:				
B 1060-98	96K bytes total memory	$ 10,000	$ 20.00	$ 263
B 1060-131	128K bytes total memory	16,000	40.00	420
B 1060-163	160K bytes total memory	26,000	60.00	683
B 1060-196	192K bytes total memory	34,000	80.00	893
B 1060-262	256K bytes total memory	50,000	120.00	1,313
B 1060-327	320K bytes total memory	68,000	160.00	1,785
B 1060-393	384K bytes total memory	84,000	200.00	2,205
Memory Options for B 1870:				
B 1070-131	128K bytes total memory	6,000	20.00	158
B 1070-163	160K bytes total memory	16,000	40.00	420
B 1070-196	192K bytes total memory	24,000	60.00	630
B 1070-262	256K bytes total memory	40,000	100.00	1,050
B 1070-327	320K bytes total memory	58,000	140.00	1,523
B 1070-393	384K bytes total memory	74,000	180.00	1,943
B 1070-524	512K bytes total memory	108,000	260.00	2,835
MASS STORAGE				
B 9480-12	4.6MB Dual Disk Cartridge Drive	11,900	69.50	342
B 9481-12	9.2MB Dual Disk Cartridge Drive	14,900	94.40	502
B 9482-32	19.2MB Dual Disk Cartridge Drive	20,600	143.00	533
B 1480	Control (B 1860/B 1870) for B 9480-12 and B 9481-12	3,500	19.30	104
B 1480-80	Control (B 1830) for B 9480-12 and B 9481-12	3,500	19.30	104
B 1482	Control (B 1860/B 1870) for B 9482-32	4,000	19.30	119
B 1482-80	Control (B 1830) for B 9482-32	4,000	19.30	119
B 9499-7	Disk Storage/Controller, 174.4M bytes	49,250	306.00	1,397
B 9499-8	Disk Storage/Controller, 87.2M bytes	38,000	306.00	932
B 9484-25	Disk Storage/Controller, 65.2M bytes	34,000	177.00	850
B 9484-55	Disk Storage/Controller, 130.4M bytes	42,000	177.00	1,050
B 9486-4	Dual-Drive Increment; 174.4M bytes	36,250	222.00	968
B 9484-5	130.4M-Byte Increment	31,150	147.00	770
B 1486-1	Disk Pack Control (B 1860/B 1870)	6,000	45.00	168
B 1486-81	Disk Pack Control (B 1830)	6,000	45.00	168
B 9499-9	Controller Expansion Feature (enables Expansion of B 9499-7 to 1 x 8)	2,420	—	57
B 9499-4	Controller Expansion Feature (enables Expansion of B 9484 to 1 x 8)	2,000	—	70
B 9470-2	Head-per-Track Systems Memory primary storage; 5.9 million bytes	34,000	71.40	850
B 9470-12	Head-per-Track Systems Memory add-on storage; 5.9 million bytes	28,000	69.20	700
B 9489-15	Industry-Compatible Minidisk storage; single unit, 243K bytes	4,090	12.50	114
B 9489-16	Industry-Compatible Minidisk storage; dual unit, 243K bytes per unit, 30" cabinet	6,340	25.00	176
B 9489-17	Industry-Compatible Minidisk storage; single unit, 243K bytes, 30" cabinet	3,200	22.10	89
B 9489-18	Industry-Compatible Minidisk storage; dual unit, 243K bytes per unit, 30" cabinet	5,000	44.20	139
B 1489	Minidisk control; for B 9489-15/-16/-17/-18	4,000	11.10	105
MAGNETIC TAPE EQUIPMENT				
B 9490-25	10 IPS Magnetic Tape Cassette Unit	1,640	8.10	55
B 9491-2	10KB Magnetic Tape Unit; 9-track	8,900	25.10	226
B 9496-2	40KB Magnetic Tape Unit; 9-track, 1600 bpi (Requires B 9499-3x Master Elec. Exchg.)	11,500	77.40	283
B 9496-4	80KB Magnetic Tape Unit; 9-track, 1600 bpi (Requires B 9499-3x Master Elec. Exchg.)	13,770	90.40	357
B 9495-2	120KB Magnetic Tape Unit; 9-track, 1600 bpi (Requires B 9499-1x Master Elec. Exchg.)	14,990	88.10	440
B 1381	Control (B 1860/B 1870) for 9-Track NRZ Tape	6,000	48.90	268
B 1381-80	Control (B 1830) for 9-Track NRZ Tape	6,000	48.90	268
B 1490-25	Cassette Control (B 1860/B 1870) (1 x 1) for B 9490-25	2,200	38.60	84
B 1490-85	Cassette Control (B 1830) (1 x 1) for B 9490-25	2,200	38.60	84
B 1491	Control (B 1860/B 1870) for B 9491-2 Tape Unit	10,368	38.60	231
B 1491-81	Control (B 1830) for B 9491-2 Tape Unit	3,900	38.60	214
B 1496-4	Control (B 1860/B 1870) for B 9496 PE Units	13,500	68.30	353
B 1496-84	Control (B 1830) for B 9496 PE Units	13,500	68.30	353
B 1495-2	Control (B 1860/B 1870) for B 9495 PE Units	16,520	68.30	500
B 1495-82	Control (B 1830) for B 9495 PE Units	16,520	68.30	500
B 1496-15	Control (B 1860/B 1870) for B 9496 PE/NRZ Units (Requires B 9999-1)	14,550	110.80	499
B 1496-85	Control (B 1830) for B 9496 PE/NRZ Units (Requires B 9999-1)	14,550	110.80	499

*Rental prices include equipment maintenance.

Burroughs B 1800 Series

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
MAGNETIC TAPE EQUIPMENT (Continued)				
B 1495-15	Control (B 1860/B 1870) for B 9495 PE/NRZ Units (Requires B 9999-2)	$ 17,570	$ 110.80	$ 614
B 1495-85	Control (B 1830) for B 9495 PE/NRZ Units (Requires B 9999-2)	17,570	110.80	614
B 9999-1	PE/NRZ Option for B 9496	1,000	3.50	21
B 9999-2	PE/NRZ Option for B 9495	1,000	3.50	21
B 9499-10	1 x 4 Master Electronics Exchange (for B 9495 series only)	5,700	26.90	145
B 9499-11	1 x 8 Master Electronics Exchange (for B 9495 series only)	8,200	26.90	207
B 9499-12	2 x 8 Master Electronics Exchange (for B 9496 series only)	16,650	25.80	435
B 9499-30	1 x 4 Master Electronics Exchange (for B 9496 series only)	4,950	25.80	131
B 9499-31	1 x 8 Master Electronics Exchange (for B 9496 series only)	8,000	55.40	209
B 9499-32	2 x 8 Master Electronics Exchange (for B 9496 series only)	11,900	56.60	314
80-COLUMN CARD EQUIPMENT				
B 9115	Card Reader; 300 cpm	5,075	39.20	135
B 9116	Card Reader; 600 cpm	7,135	54.90	213
B 9117	Card Reader; 800 cpm	9,875	67.30	274
B 9111	Card Reader; 800 cpm	18,165	107.00	384
B 9112	Card Reader; 1400 cpm	24,145	162.00	532
B 1111	Card Reader Control (B 1860/B 1870); for B 9111/B 9112	2,332	9.10	51
B 1111-80	Card Reader Control (B 1830); for B 9111/B 9112	2,332	9.10	51
B 1115	Card Reader Control (B 1860/B 1870); for B 9115/6/7	2,160	10.30	48
B 1115-80	Card Reader Control (B 1830); for B 9115/6/7	2,160	10.30	48
B 9915	51-Column Read Feature for B 9115/6/7	780	—	17
B 9917	Card Counter for B 9111/2/3	250	—	6
B 9918	Postal Money Order Feature for B 9111/2/3	1,490	—	30
B 9991-2	Stand for B 9115/6/7	130	—	7
B 9212	Card Punch; 150 cpm	22,635	142.00	472
B 9213	Card Punch; 300 cpm	27,905	182.00	572
B 1213	Card Punch Control (B 1860/B 1870); for B 9212/3	4,320	17.90	97
B 1213-80	Card Punch Control (B 1830); for B 9212/3	4,320	17.90	97
B 9418-2	Reader/Punch; 200 cpm read, 45 cpm punch/print	12,060	109.00	321
B 1418	Reader/Punch Control (B 1860/B 1870); for B 9418-2	6,750	27.10	161
B 1418-80	Reader/Punch Control (B 1830); for B 9418-2	6,750	27.10	161
96-COLUMN CARD EQUIPMENT				
B 9119-1	Card Reader; 300 cpm	4,420	32.80	110
B 9119-2	Card Reader; 1000 cpm	9,940	65.50	231
B 1119	Card Reader Control (B 1860/B 1870); for B 9119-1/-2	2,332	9.10	81
B 1119-80	Card Reader Control (B 1830); for B 9119-1/-2	2,332	9.10	81
B 9419-2	Card Reader Punch/Data Recorder; 300 cpm read/60 cpm punch/60 cpm print & keyboard	8,750	—	274
B 9419-6	Multi-Purpose Card Unit; 300 cpm read/60 cpm punch/60 cpm print & keyboard	9,250	—	326
B 1419	Card Reader Punch/Data Recorder Control (B 1860/B 1870); for B 9419	2,332	14.30	81
B 1419-80	Card Reader Punch/Data Recorder Control (B 1830); for B 9419	2,332	14.30	81
LINE PRINTERS				
B 9249-1	85 lpm, 132 print positions	8,500	75.10	252
B 9249-2	160 lpm, 132 print positions	9,900	87.60	293
B 9249-3	250 lpm, 132 print positions	13,400	118.00	392
B 9247-12	400 lpm, 132 print positions (includes 12-channel format tape reader)	21,550	173.00	613
B 9247-13	750 lpm, 132 print positions (includes 12-channel format tape reader)	35,000	235.00	968
B 9247-14	1100 lpm, 132 print positions (includes 12-channel format tape reader)	43,550	284.00	1,150
B 9247-15	1500 lpm, 132 print positions (includes 12-channel format tape reader)	52,200	470.00	1,450
B 1249	Control (B 1860/B 1870) for B 9249-3 printer	1,300	9.10	48
B 1249-80	Control (B 1830) for B 9249-3 printer	1,300	9.10	48
B 1247	Control (B 1860/B 1870) for B 9247-12/-13 printers	4,320	17.90	97
B 1247-80	Control (B 1830) for B 9247-12/-13 printers	4,320	17.90	97
B 1247-4	Control (B 1860/B 1870) for B 9247-14 printer	5,400	25.80	129
B 1247-84	Control (B 1830) for B 9247-14 printer	5,400	25.80	129
B 1247-5	Control (B 1860/B 1870) for B 9247-15 printer	7,500	26.60	215
B 1247-85	Control (B 1830) for B 9247-15 printer	7,500	26.60	215
B 9942-9	Add'l. Train Module for B 9247-12/-13	3,500	—	68
B 9942-10	Add'l. Train Module for B 9247-14	3,150	—	99

*Rental prices include equipment maintenance.

Burroughs B 1800 Series

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
MICR READER-SORTERS				
B 9134-1	Reader/Sorter; 4 pockets, 1625 dpm (requires B 9938-1 or B 9938-6)	$ 49,200	$ 460	$ 1,072
B 9135-2	Reader/Sorter; 8 pockets, 900 dpm, E-13B, off-line sorting	48,230	505	1,097
B 9135-3	Reader/Sorter; 12 pockets, 900 dpm, E-13B, off-line sorting	59,250	612	1,428
B 9137-1	Reader/Sorter; 4 pockets, 1625 dpm (requires B 9937-22 or B 9937-30)	50,000	460	1,139
B 1130	Control (B 1860/B 1870) for B 9134/B 9135	6,480	38.60	214
B 1130-80	Control (B 1830) for B 9134/B 9135	6,480	38.60	214
B 9930-3	Mobile Carrier	150		
B 9930-4	One-Tray Document Rack	60	69.40	
B 9932-1	Endorser—1625 dpm	9,000	1.40	209
B 9932-4	Batch Ticket Detector	480	2.70	11
B 9932-5	Short Document Read Feature	480		11
B 9932-6	Short Document Module Expander	240	7.00	6
B 9933-1	Basic Off-Line Sort (provides for off-line sort in two fields only)	1,200	7.00	27
B 9933-2	8-Pocket Basic Off-Line Sort (provides for off-line sort in two fields only)	1,440		32
B 9933-3	Expanded Off-Line Field Sort (provides for one add'l. field sort up to a max. of 8 fields)	240	20.80	6
B 9933-4	Extended Sort Control	2,400	1.40	53
B 9933-5	Zero Kill (max. of three installable in one Reader/Sorter)	480	1.40	11
B 9933-6	No Field—No Digit (same note as B 9933-5)	480	1.40	11
B 9933-7	Digit Override (same note as B 9933-5)	480	1.40	11
B 9933-8	Digit Edit (same note as B 9933-5)	480	1.40	11
B 9933-9	Field Override (same note as B 9933-5)	480	1.40	11
B 9933-10	Field Edit (same note as B 9933-5)	480	1.40	11
B 9935-1	Expansion Feature (pockets 17—32)	4,800	13.90	105
B 9935-2	Four Pocket Module (pockets 5—16)	14,400	48.60	314
B 9935-3	Four Pocket Module (pockets 17—32)	14,400	48.60	314
B 9936-1	Stacker Overflow	480	1.40	11
B 9937-1	Valid Character Check	240	1.40	6
B 9938-1	Multi-Track E-13B (1625 dpm)	18,000	70.70	392
B 9938-6	Numeric OCR "A" (Size 1) Optical Character Recognition System	46,000	152.00	1,045
B 9939-3	Resettable Item Counter	240	1.40	6
B 9939-4	Non-Resettable Item Counter	240	1.40	6
B 9939-5	Running Time Meter	240	1.40	6
Controls and Features for B 9137-1				
B 1130	Control (B 1860/B 1870)	6,480	38.60	214
B 9937-22	Double Read—MICR E-13B (B 9137-1 only)	31,000	117.00	725
B 9937-51	Endorser—3 Lines Non-Impact (B 9137-1 only)	22,000	129.00	518
B 9937-52	Printer—1 Line Non-Impact (B 9137-1 only)	17,000	81.60	398
B 9937-53	Endorser/Printer—3 Lines/1 Line Non-Impact (B 9137-1 only)	26,500	164.00	621
B 9937-60	Microfilm Module (B 9137-1)	92,500	391.00	2,174
B 9937-10	Expansion Feature (pockets 17—32)	4,800	13.90	105
B 9937-11	Four-Pocket Module (pockets 5—16)	14,400	48.60	314
B 9937-12	Four-Pocket Module (pockets 17—32)	14,400	48.60	314
B 9937-24	Dual Read Option (1625 dpm)	7,200	34.80	157
B 9937-25	Short Document Read Feature	480	2.70	11
B 9937-26	Short Document Module Expander	240		6
B 9937-30	Numeric OCR "A" (Size 1) Optical Character Recognition System	46,000	152.00	1,045
B 9937-70	Basic Off-Line Sort (provides for off-line sort in two fields only)	1,200	7.00	27
B 9937-71	8-Pocket Basic Off-Line Sort (provides for off-line sort in two fields only)	1,440	7.00	32
B 9937-72	Expanded Off-Line Field Sort (provides for one additional field sort up to a maximum of 8 fields)	240		6
B 9937-73	Extended Sort Control	2,400	20.80	53
B 9937-74	Valid Character Check	240	1.40	6
B 9937-76	Zero Kill (maximum of three installable in one Reader/Sorter)	480	1.40	11
B 9937-77	No Field—No Digit (same note as B 9937-76)	480	1.40	11
B 9937-78	Digit Override (same note as B 9937-76)	480	1.40	11
B 9937-79	Digit Edit (same note as B 9937-76)	480	1.40	11
B 9937-80	Field Override (same note as B 9937-76)	480	1.40	11
B 9937-81	Field Edit (same note as B 9937-76)	480	1.40	11
B 9937-82	Stacker Overflow	480	1.40	11
B 9937-83	Batch Ticket Detector	480	1.40	11
B 9937-84	Resettable Item Counter	240	1.40	6
B 9937-85	Non-Resettable Item Counter	240	1.40	6
B 9937-86	Running Time Meter	240	1.40	6
B 9937-87	Mobile Carrier	150		
B 9937-88	One-Tray Document Rack	60		

*Rental prices include equipment maintenance.

Burroughs B 1800 Series

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
COMMUNICATIONS CONTROLS				
B 1351	Single-Line Control (B 1860/B 1870)	$ 3,000	$ 10.30	$ 84
B 1351-80	Single-Line Control (B 1830)	3,000	10.30	84
B 1351-1	Dual-Line Control (B 1860/B 1870)	5,000	20.60	137
B 1351-81	Dual-Line Control (B 1830)	5,000	20.60	137
B 1352	Multi-Line Controller and Port Interchange (B 1860/B 1870) (8 Lines)	9,000	36.10	214
B 1353	Multi-Line Controller Extension (B 1860/B 1870) (8 Lines)	6,750	27.10	161
Line Adapters for B 1860/1870 Systems				
B 1352-2	Wide Band Direct Connect; up to 50,000 bps	11,500	41.70	273
B 1650-1	Asynchronous Data-Set Connect; up to 1200 bps	1,500	10.30	54
B 1650-2	Asynchronous Data-Set Connect; up to 1800 bps	1,800	12.90	69
B 1650-5	Asynchronous Direct Connect; up to 2400 bps	1,500	10.30	54
B 1650-6	Asynchronous Direct Connect; up to 4800 bps	1,800	12.90	69
B 1650-7	Asynchronous Direct Connect; up to 9600 bps	2,100	15.40	86
B 1651-1	Synchronous Data-Set Connect; up to 2400 bps	1,500	10.30	54
B 1651-2	Synchronous Data-Set Connect; up to 4800 bps	1,800	12.90	69
B 1651-3	Synchronous Data-Set Connect; up to 9600 bps	2,100	15.40	86
B 1652-1	TTY Asynchronous Data-Set Connect	1,500	10.30	54
B 1652-5	TTY Asynchronous Direct Connect	1,500	10.30	54
B 1653-1	Binary Synchronous Data-Set Connect; up to 2400 bps	8,800	38.10	214
B 1653-2	Binary Synchronous Data-Set Connect; up to 4800 bps	9,900	40.50	242
B 1653-3	Binary Synchronous Data-Set Connect; up to 9600 bps	11,000	42.90	268
B 1667-2	BDI Adapter	2,400	9.60	63
Line Adapters for B 1830 System				
B 1352-82	Wide-Band Direct Connect; up to 50,000 bps	11,500	41.70	273
B 1650-81	Asynchronous Data-Set Connect; up to 1200 bps	1,500	10.30	54
B 1650-82	Asynchronous Data-Set Connect; up to 1800 bps	1,800	12.90	69
B 1650-85	Asynchronous Direct Connect; up to 2400 bps	1,500	10.30	54
B 1650-86	Asynchronous Direct Connect; up to 4800 bps	1,800	12.90	69
B 1650-87	Asynchronous Direct Connect; up to 9600 bps	2,100	15.40	86
B 1651-81	Synchronous Data-Set Connect; up to 2400 bps	1,500	10.30	54
B 1651-82	Synchronous Data-Set Connect; up to 4800 bps	1,800	12.90	69
B 1651-83	Synchronous Data-Set Connect; up to 9600 bps	2,100	15.40	86
B 1652-81	TTY Asynchronous Data-Set Connect	1,500	10.30	54
B 1652-85	TTY Asynchronous Direct Connect	1,500	10.30	54
B 1653-81	Binary Synchronous Data-Set Connect; up to 2400 bps	8,800	38.10	214
B 1653-82	Binary Synchronous Data-Set Connect; up to 4800 bps	9,900	40.50	242
B 1653-83	Binary Synchronous Data-Set Connect; up to 9600 bps	11,000	42.90	268
B 1667-82	BDI Adapter	2,400	9.60	63

SOFTWARE PRICES

		Monthly License Fee
SYSTEM SOFTWARE		
B 1800 MP2	MCP	$ 0
B 1800 COB	COBOL	50
B 1800 RPG	RPG	50
B 1800 FOR	FORTRAN	100
B 1800 BAS	BASIC	70
B 1800 UTL	UTILITIES	0
B 1800 SRT	SORT	0

		Single Payment	12 Monthly Payments	Annual License Fee
B 1800 REP	REPORTER	$ 3,000	$ 275	$ 300
B 1800 DM2	Data Management System II	12,000	1,100	1,200
B 1800 MCS	GEMCOS	—	—	—
B 1800 TEI	Text Editor	1,500	138	150
B 1800 CEI	CANDE	3,000	280	300
B 1800 TAB	TABS	1,000	92	100
B 1800 DEI	Data Entry	2,400	220	150
B 1800 DE2	ODESY	4,000	367	200
PROGRAM PRODUCT CONVERSION AIDS				
CS 1800 114	IM 1401/1440/1460 Emulator	8,250	756	825
CS 1800 B3E	B100/B200/B300/B500 Emulator	—	—	—
CS 1800 BAC	B300/B500 Baisc/Advanced Assembly Language to Burroughs ANSI COBOL Translator	0	0	0
CS 1800 HN4	Honeywell COBOL to Burroughs COBOL Translator	3,600	330	360
CS 1800 N3C	NCR NEAT/3 Level 1 to COBOL Translator	8,250	756	825
CS 1800 14M	IBM 1400 Interpreter	—	—	—
CS 1800 B31	B100/B200/B300/B500 Interpreter	—	—	—
CS 1800 B113	IBM 1130 Interpreter	—	—	—

*Rental prices include equipment maintenance.