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Burroughs B 2700, B 3700, & B 4700

MANAGEMENT SUMMARY

The Burroughs B 2700, B 3700, and B 4700 product line now offers medium-scale computer users a choice of 13 data processing systems: one model of the B 2700 system, four models of the B 3700 system, and eight models of the B 4700 series. Although somewhat eclipsed by Burroughs' recently announced "800 Series" of medium-scale systems, the B 3700 and B 4700 systems are still actively marketed and will remain in new production throughout 1976.

The newest member of the product line, the B 3721, was released in December 1975 along with the new B 2800, B 3800, and B 4800 models. The B 3721 replaces the now discontinued B 2700 processor as Burroughs' direct competition for the IBM System/370 Model 125.

Together, the B 2700/3700/4700 models span a broad range of performance and price, with central processors of four different speeds, main memory capacities ranging from 60,000 to 2 million bytes, and system rental prices ranging from about $6,000 to $90,000 per month. Thus, the B 2700/3700/4700 product line partially overlaps the small-scale Burroughs B 1700 series, extends into the low end of the large-scale processing arena of the B 6700 computer systems, and covers virtually every conceivable price/performance increment in between.

The B 2700/3700/4700 systems retain and extend the successful hardware and software concepts of the earlier B 2500/3500 systems, which Burroughs introduced in 1966, while delivering significant price/performance improvements. The B 2500/3500 systems have been particularly renowned for their user-oriented software and dynamic multiprogramming capabilities. The B 2700/3700/4700 systems preserve all of the B 2500/3500 features and add improved computing capabilities, provisions for multiple- ▷

Burroughs' broad and continually evolving line of medium-scale computers now includes 13 models, of which 9 are still actively marketed. Although somewhat overshadowed by the newly announced B 2800/3800/4800 family, the new B 3721 and many other B 3700 and B 4700 systems are still in new production. All recently announced software enhancements for the new "B 800" medium systems will also be available to B 2700/3700/4700 users.

CHARACTERISTICS

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

MODELS: B 2700, B 3700, and B 4700 Data Processing Systems; see table on following pages for characteristics of the 13 currently marketed models.

DATA FORMATS

BASIC UNIT: 16-bit word (plus parity bit). Each word can hold two 8-bit bytes or four 4-bit BCD digits. Main storage is addressable by digit position.

FIXED-POINT OPERANDS: Can range from 1 to 100 decimal digits or bytes for most instructions. Data in 4-bit format can be either signed (with 4-bit sign digit in leftmost position) or unsigned. Data in 8-bit format is always unsigned.

FLOATING-POINT OPERANDS: Consist of a 2-digit exponent and a fraction ranging from 1 to 100 decimal digits in length; the signs of the exponent and fraction each occupy an additional digit position.

The optional Fixed-Length Floating-Point Arithmetic capability for the B 3700 and B 4700 central processors provides high-speed arithmetic operations on either "short" ▶

The B 4790, announced in October 1974, was the most powerful central processor in the Burroughs medium-scale product line, providing one or two central processors and up to 2 million bytes of memory. The B 4790 has been replaced by the B 4800, a new model that incorporates the B 4790 processor plus an enhanced I/O Subsystem.

REFERENCE EDITION. This is a mature product line, and no significant further developments are anticipated. Because of its importance, coverage is being continued, but no future update is planned.

Burroughs B 2700, B 3700, & B 4700

CHARACTERISTICS OF THE B 2700 & B 3700 SYSTEMS

	B 2771-1	B 3721	B 3741-1	B 3771	B 3772
CENTRAL PROCESSORS					
No. of processors per system	1	1	1	1	2
Processor cycle time, nanoseconds	500	500	500	333	333
Add time (5 digits), microseconds	37.5	34*	34*	23*	23*
Multiply time (5 digits), microseconds)	208	183*	183*	122*	122*
MAIN STORAGE					
Type of storage	Core	MOS	MOS	MOS	MOS
Minimum capacity, bytes	60,000	100,000	100,000	100,000	200,000
Maximum capacity, bytes	300,000	300,000	300,000	300,000	600,000
Increment size, bytes	30,000	50,000	50,000	50,000	50,000
Cycle time, microseconds	1.0	2	2	2	2
I/O CONTROL					
No. of I/O channels—standard	6	8	8	8	18
No. of I/O channels—maximum	20	20	20	20	40
Type B channels—standard	3	4	4	4	10
Type B channels—maximum	10	10	10	10	20
Maximum total I/O data rate, bytes/second	2,000,000	3,000,000	3,000,000	3,000,000	6,000,000
File Protect Memory facility	Optional	Optional	Optional	Optional	Standard
Disk File Exchanges (standard)	0	0	0	0	0
Disk File Controls (standard)	1**	0	1**	0	2
AVAILABLE PERIPHERALS					
20-msec Disk File storage	Yes**	Yes	Yes**	Yes	Yes
23-msec Disk File storage	Yes	Yes	Yes	Yes	Yes
40-msec Data Memory Banks	Yes	Yes	Yes	Yes	Yes
Disk pack drives	Yes	Yes	Yes	Yes	Yes
Data Communications Processor	Yes	Yes	Yes	Yes	Yes

* Estimated.
** Head-per-Track Systems Disk containing 8 million bytes of 20-millisecond storage is standard.

processor configurations and shared disk files, a programmable data communications processor, and several high-performance peripheral devices.

The principal characteristics of all the currently marketed models of the B 2700/3700/4700 systems are summarized in the comparison charts on these two pages.

For systems with two or more processors, Burroughs provides software that supports "parallel multiprogramming," with all processors working from the same operating system in disk storage. Each central processor, however, has its own dedicated main storage unit and its own job stream, and each services its own I/O operations. It is not possible for the processors to share a common main storage unit, nor for jobs to be dynamically interchanged among the processors. Within each processor, multiple independent jobs can be processed in multiprogramming fashion, and all processors in a system can jointly access the on-line disk files. File Protect Memory, an exclusive Burroughs feature, provides hardware-level protection at the record level against interference when two or more programs and/or two or more processors simultaneously attempt to access the same data record on a head-per-track disk file or disk pack drive. Thus, the B 2700/3700/4700 systems are particularly well suited for installations where two or more processors, each with its own dedicated workload, must share a common data base. Considerable flexibility is provided for reconfiguring the system resources, through both manual switching and (for disk files and tape drives connected

or "long" operands. Short operands have an exponent of 2 decimal digits plus sign and a fraction of 8 decimal digits plus sign. Long operands have an exponent of 2 digits plus sign and a fraction of 16 digits plus sign.

INSTRUCTIONS: May consist of from one to four 6-digit and/or 8-digit "syllables," a single 8-digit or 10-digit "syllable," or a single 2-digit "syllable" consisting of an op code only. Each instruction may contain from 0 to 3 memory addresses.

INTERNAL CODE: EBCDIC (standard) or ASCII, depending upon the setting of a mode flip-flop.

MAIN STORAGE

STORAGE TYPE: Magnetic core in all B 2700 and early B 4700 systems; MOS/LSI semiconductor in all B 3700 systems and the B 4771, B 4781, B 4782, B 4783, and B 4784; bipolar semiconductor in the B 4790, B 4791, and B 4792 (see table).

CAPACITY: See table and price list.

CYCLE TIME: See table.

CHECKING: In systems with core memory, a parity bit with each byte is generated during writing and checked during reading. In systems with semiconductor memory, the memory includes a "self-correcting" feature that automatically corrects single-bit memory errors.

STORAGE PROTECTION: Provided by a base register and a limit register. The high-order 3 digits of generated memory addresses are checked to ascertain that they fall within the range defined by these two registers.

CENTRAL PROCESSORS

INDEX REGISTERS: Three 8-digit index registers for each program are stored in reserved main memory locations.

Burroughs B 2700, B 3700, & B 4700

CHARACTERISTICS OF THE B 4700 SYSTEMS

	B 4771	B 4781	B 4782	B 4783	B 4784	B 4790	B 4791	B 4792
CENTRAL PROCESSORS								
No. of processors per system	1	1	2	3	4	1	1	2
Processor cycle time, nanoseconds	250	250	250	250	250	125	125	125
Add time (5 digits), microseconds	17*	17*	17*	17*	17*	**	**	**
Multiply time (5 digits), microseconds	91*	91*	91*	91*	91*	**	**	**
MAIN STORAGE								
Type of storage	MOS	MOS	MOS	MOS	MOS	Bipolar	Bipolar	Bipolar
Minimum capacity, bytes	150,000	150,000	300,000	450,000	600,000	300,000	300,000	600,000
Maximum capacity, bytes	500,000	500,000	1,000,000	1,500,000	2,000,000	1,000,000	1,000,000	2,000,000
Increment size, bytes	50,000	50,000	50,000	50,000	50,000	100,000	100,000	100,000
Cycle time, microseconds	0.5	0.5	0.5	0.5	0.5	0.250	0.250	0.250
Bytes fetched per cycle	2	2	2	2	2	2	2	2
I/O CONTROL								
No. of I/O channels—standard	8	10	18	26	34	16	20	36
No. of I/O channels—maximum	20	20	40	60	80	40	40	80
Type B channels—standard	4	5	10	15	20	8	10	20
Type B channels—maximum	10	10	20	30	40	20	20	40
Maximum total I/O data rate, bytes/second	4,000,000	4,000,000	8,000,000	12,000,000	16,000,000	8,000,000	8,000,000	16,000,00
File Protect Memory facility	Optional	Standard	Standard	Standard	Standard	No	Standard	Standard
Disk File Exchanges (standard)	0	1	1	1	1	1	1	1
Disk File Controls (standard)	0	1	2	3	4	1	1	2
AVAILABLE PERIPHERALS								
20-msec Disk File storage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23-msec Disk File storage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
40-msec Data Memory Banks	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Disk pack drives	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data Communications Processor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Estimated.
**Not available from Burroughs.

through electronic exchange units) under program control.

PROCESSOR MODELS

Burroughs announced the first five models of the B 4700 series—the B 4704, 4711, 4712, 4713, and 4714—in October 1971, and simultaneously began making customer deliveries of the system and its supporting software. This rare achievement was possible because (1) the B 4700 is completely program-compatible with the earlier B 2500 and B 3500 systems, and (2) the B 4700 is an improved successor to the B 4500 system, which Burroughs announced in March 1970 but elected not to manufacture.

The B 4700 has an expanded addressing structure and instruction repertoire which include the B 2500/3500 addressing structure and instruction repertoire as a subset. Thus, a B 4700 can directly execute all programs written for the smaller systems.

The original models of the B 4700 offered an internal speed that averaged about 2.3 times that of the B 3500 in typical business applications, achieved through the following design enhancements:

● The B 4700 had a processor cycling speed of 4 million cycles per second, a main memory access time of 500

INDIRECT ADDRESSING: Can be specified within the first digit of any instruction address field. If so, the indicated memory location is considered to hold the address of the required operand rather than the operand itself. Multi-level indirect addressing to any depth is possible.

INSTRUCTION REPERTOIRE: The standard instructions provide for efficient arithmetic, comparison, and data movement operations on variable-length operands in either 4-bit numeric or 8-bit alphanumeric code. Included are 3-address add, subtract, multiply, and divide commands and 2-address add and subtract commands, as well as convenient edit, search, and translate instructions. No binary arithmetic is possible, but logical AND, OR, and NOT instructions are included.

Floating-point decimal arithmetic is an optional feature for all models. In B 2700 systems, variable-length operands are used in all floating-point instructions. B 3700 and B 4700 systems include an additional standard set of floating-point instructions that use fixed-length operands and operate at far higher speeds.

A number of the standard instructions, including Initiate I/O, are "privileged" and may not be used in normal user-written programs.

INSTRUCTION TIMES: The comparison charts show the add times and multiply times, where available, for 3-address instructions operating on signed 5-digit fields.

INPUT/OUTPUT CONTROL

I/O CHANNELS: The table shows the standard and maximum number of channels available for each system.

Burroughs B 2700, B 3700, & B 4700

nanoseconds per 2-byte access, and a high-speed address with a 50-nanosecond access time—all double the speeds of the B 3500.

- The B 4700 used a "new generation" of CTL integrated circuits and MSI (medium-scale integration) devices for greater speed and economy, together with hard-wired circuits to control its logic sequences (in place of read-only memory in the B 3500).

- The B 4700 had a redesigned Instruction Fetch process that reduced the number of processor cycles required to execute most instructions.

- The B 4700 offered a new fixed-length floating-point arithmetic capability in addition to the B 3500's variable-length floating-point instructions, and provided a new FORTRAN compiler that utilized the new instructions to execute FORTRAN-coded scientific programs from 6 to 20 times as fast as the B 3500.

Since the initial unveiling of the B 4700 in 1971, a total of 18 processor models has been announced for the B 4700 family alone. In May 1972, Burroughs added five new models to the B 4700 line-up—the B 4708, 4731, 4732, 4733, and 4734—with twice the I/O throughput rate for each central processor. Customer deliveries of these newer models began in January 1973.

During the summer of 1973, Burroughs announced five more B 4700 processor models—the B 4771, 4781, 4782, 4783, and 4784. These new models have the same functional capabilities as the earlier B 4708, 4731, 4732, 4733, and 4734, respectively, but the new models feature MOS/LSI main memory in place of the core memory used in the earlier B 4700 processors. Although the basic 150KB versions of the new MOS-memory processors were priced slightly above their core-memory counterparts, additional MOS memory for the new models was priced at only about two-thirds the cost of additional core memory for the earlier models. At the same time, significant reductions were made in the purchase and rental prices of the B 4708, 4731, 4732, 4733, and 4734 central processors. Deliveries of the five new B 4700 systems began in the second quarter of 1974.

Then, in July 1974, Burroughs lowered the rental and purchase prices of the B 4700 (and B 3700) processors and main memory, putting the B 4700 systems on a competitive plane with the IBM System 370/135 and the newly announced medium-scale Honeywell Series 60 systems.

Two months later, in September 1974, Burroughs unveiled the latest additions to the B 4700 line-up. The B 4790, B 4791, and B 4792 are upward extensions of the B 4700 series, with typical system rentals ranging from $25,000 to $90,000 per month on a one-year lease. Burroughs claims that the B 4790 processor models offer twice the performance of the B 4771 processors through the following hardware enhancements:

- The B 4790 systems feature bipolar main memories with a cycle time of 250 nanoseconds for two bytes—twice the speed of previous B 4700 models. ▷

CONFIGURATION RULES: One I/O channel is required for each I/O control unit, and each type of peripheral device requires a different control unit. There are two types of I/O channels, designated Type A and Type B. In general, Type A channels are used for the slower I/O devices (card readers, punches, printers, etc.), while Type B channels are required for the faster or more complex peripherals (magnetic tape, disk files, communications, etc.).

SIMULTANEOUS OPERATIONS: One input or output operation on each installed I/O channel can occur simultaneously with computing. Maximum total I/O data rates are shown in the table.

I/O INTERFERENCE: Only one main storage cycle is required for each unit of I/O data transferred (1 character at a time for Type A channels, and 2 characters in parallel for Type B channels).

MASS STORAGE

B 9371-18 HEAD-PER-TRACK SYSTEMS DISK: This fixed-head disk file, introduced in March 1973, offers economical random-access storage for systems software and/or moderate amounts of data. The basic B 9371-18 stores 8 million bytes. Its capacity can be expanded to a maximum of 40 million bytes by adding from one to four B 9374-18 Add-On Increments of 8 million bytes each. Average access time is 20 milliseconds, and average data transfer rate is 231,000 bytes/second. Data is recorded in 100-byte segments.

The basic B 9371-18, with its associated disk file control and electronics unit, is a standard component of the B 2761-1, B 2771-1, and B 3741-1 Central Systems. It can also be used with any of the other B 2700/3700/4700 systems. The B 9371-18, however, cannot be connected to a Disk File Exchange and cannot share I/O channels, disk file controls, or disk file electronics units with any of the other Burroughs Head-Per-Track Disk Files described below. Deliveries of the B 9371-18 began in July 1973.

HEAD-PER-TRACK DISK FILES: Burroughs offers three other models of its fixed-head disk files, with varying capacities and access times, for use with the B 2700, B 3700, and B 4700 systems. All three models utilize noninterchangeable disks and have a fixed read/write head serving each data track. Various mixes of these models can be included in a single disk subsystem through the use of appropriate control units, electronic units, and Disk File Exchange units. Moreover, a single disk subsystem can include one, two, or four control units, each capable of servicing any of the connected disk files. Simultaneous disk read and write operations can occur in a subsystem with two or more control units.

The B 9372-12 Disk File provides 10 million bytes of storage with an average access time of 20 milliseconds. Maximum data transfer rate is 235,000 bytes/sec. Data is recorded in 100-byte segments. The B 9372-12 includes one Disk File Electronics Unit (DFEU) and can accommodate up to four B 9374-12 Additional 10-Million-Byte Storage Increments. Additional DFEU's can be used if desired to increase the number of simultaneous access paths to the disk files.

The B 9373-3 Disk File provides 20 million bytes of storage with an average access time of 23 milliseconds. The B 9373-3 includes one DFEU and can accommodate up to four B 9374-3 Additional 20-Million-Byte Storage Increments. Additional DFEU's can be used to increase the number of access paths.

The B 9375-4 Head-per-Track Memory Bank provides 100 million bytes of storage with an average access time of 40 milliseconds. Data is recorded in 100-byte segments, and maximum data transfer rate is 216,000 bytes/sec. The capacity can be expanded to a maximum of 2 billion bytes per subsystem through the use of B 9376-5 Additional 20-Million-Byte Storage Increments. The Memory Bank prices include one DFEU for each 100 million bytes or fraction thereof. Additional DFEU's can be used to increase the number of access paths. In March 1973, Burroughs announced that the B 9375-4 is no longer available for new systems orders. ▶

Burroughs B 2700, B 3700, & B 4700

▷ • The B 4790 processor cycling speed was doubled to 8 million cycles per second, compared to the 4 megahertz cycling rate of the earlier B 4700 systems.

• The B 4790 systems have a high-speed address memory with a 25-nanosecond access time.

• The input/output subsystem for the B 4790 systems has a maximum data rate of 8 million bytes per second, and the number of I/O channels ranges from 16 to 40 per processor.

The B 4790 group included three models which were distinguished by the following characteristics:

• The B 4791 included one central processor, from 300,000 to 1,000,000 bytes of main memory, and 16 I/O channels, expandable to 40 per central processor.

• The B 4790 also featured one central processor, from 300,000 to 1,000,000 bytes of main memory, 20 I/O channels (optionally expandable to 40), and a File Protect Memory to permit multiple programs to share a common disk-stored data base.

• The B 4792 basic system included two central processors, each with from 300,000 to 1,000,000 bytes of main memory, a maximum of 40 I/O channels per processor, and a File Protect Memory System.

Although originally scheduled for first customer delivery in the fourth quarter of 1975, the 4790 group in fact was never installed in a customer site, and was made subject to availability with the announcement of the B 2800, B 3800, and B 4800 systems in December 1975. As a result, the current lineup of B 4700 systems now includes the B 4771, B 4781, B 4782, B 4783, and B 4784. Earlier B 4700 processor models are sold on an as-available basis.

The B 3700 uses a somewhat slower version of the B 4700 central processor, with the same expanded instruction set. The three original B 3700 models incorporate MOS/LSI semiconductor main memories with a 650-nanosecond cycle time per 2-byte access. The net result is internal processing speed that falls midway between the B 2700 and B 4700 systems and is about 1.5 times as fast as the earlier B 3500. Customer deliveries of the B 3771 and B 3772 began in December 1972. The B 3741 was introduced in March 1973 as a slower and considerably less expensive version of the B 3771.

The newest entry-level system in the product line, the B 3721 Basic System, includes a central processor with a 500-nanosecond cycle time, 100,000 bytes of MOS main memory with a cycle time of 650 nanoseconds to access two bytes, eight input/output channels, and an I/O subsystem with a maximum aggregate throughput of 1.5 million bytes per second. Main memory is expandable in 50K-byte increments to a maximum of 300,000 bytes, and the input/output capacities of the system can be expanded up to a total of 20 I/O channels and a maximum input/output data rate of three million bytes per second.

All four B 3700 processor models are being actively marketed by Burroughs at this writing. ▷

▶ FILE PROTECT MEMORY: This feature permits multiple programs, residing in either single or multiple processors, to share a common data base stored on Burroughs head-per-track disk files or disk pack drives. The feature makes it possible to "lock" specific disk record addresses, thus guarding against the errors that can occur when one program attempts to access a data record while it is being updated by another program.

The basic File Protect Memory (FPM) consists of a series of registers and sixteen 40-bit words of memory, permitting simultaneous locking of up to 16 disk record addresses. Up to 7 additional 16-word modules of FPM may be added, for a total capacity of 128 words. The FPM can interface into as many as four Disk File Controls, enabling up to four processors to share a common data base. All processors also share a common MCP residing on disk, a common File Directory, and a common Disk Available Table.

FPM is a standard component of all multiple-processor B 3700 and B 4700 systems and of the single-processor B 4711, B 4731, B 4781, and B 4791 systems.

B 9384 DISK PACK DRIVE SUBSYSTEMS: These new disk pack drives, announced in September 1974, replace the earlier B 9388 "head-per-track look-alike" disk pack drives originally released in August 1973, and permit currently released programs written for the Burroughs head-per-track disk files to be used without modification. The entry-level B 9384-6 Disk Pack Drive Subsystem consists of a single B 9484-6 Head-Per-Track Compatible Controller and a Dual-Spindle Drive capable of storing 129.5 million bytes of data; it is not expandable. The B 9384-7 Disk Pack Drive Subsystem consists of a B 9484-7 Dual Controller and one dual drive containing 129.5 million bytes, and is expandable to four dual drives or a total of 518 million bytes. The B 9384-8 Disk Pack Drive Subsystem consists of a B 9484-7 Dual Controller and a minimum of five dual drives for a total of 647.5 million bytes of storage, and is expandable to eight dual drives for a total on-line storage capacity of 1.036 billion bytes.

Both the B 9384-7 and B 9384-8 subsystems utilize the B 9388-2 Head-Per-Track Compatible Dual-Drive Increment to achieve maximum configuration sizes. Each B 9388-2 houses two Magnetic Actuator Disk Pack Drives that provide a total of 129.5 million bytes of data storage. Data is recorded on an 11-high disk pack which is physically compatible, but not format-compatible, with the IBM 2316 Disk Pack. There are 80 sectors per track, with 100 bytes per sector, for a total of 64.8 million bytes per pack. Average head movement time is 30 milliseconds, average rotational delay is 12.5 milliseconds, and effective data transfer rate is 625,000 bytes per second. One B X304 Disk Pack Drive Control is required for each B 9384-6 subsystem, and two B X304 Disk Pack Drive Controls are required for each B 9384-7 and B 9384-8 subsystem. The B 9384 subsystems are available only for B 2700/3700/4700 computer systems, and cannot currently be used in conjunction with the File Protect Memory. At least one module of head-per-track storage is recommended for MCP residence.

B 9383 DISK PACK DRIVE SUBSYSTEMS: These dual-spindle disk pack drives, announced in September 1974, provide from 174.4 million to 1.395 billion bytes of on-line removable disk pack storage for B 2700/3700/4700 systems. Three models of the B 9383 subsystem are available, featuring two independent disk pack drives per module and either single- or dual-access control units. The B 9383-6 Disk Pack Drive Subsystem includes a single controller and from one to four dual drives for a total of from 174.4 to 697.6 million bytes; one B X304 Disk Drive Control is required with this configuration. The B 9383-7 subsystem features a dual controller and from one to four dual drives, and requires two B X304 Disk Drive Control Units. The minimum B 9383-8 subsystem includes a dual controller and five dual drives, and is expandable to eight dual drives for a total of from 872 million to 1.395 billion bytes of disk storage; two B X304 Disk Drive Control Units are required. Either the B 9486-4 Dual Drive Increment or the B 9486-45 Single Drive Increment can be added to B 9383-6, B 9383-7, or B 9383-8 subsystems to achieve modular storage capacities. ▶

Burroughs B 2700, B 3700, & B 4700

The B 9340-1 Operator Display Console facilitates man/machine communications and provides regularly updated status displays that list the active programs in the multiprogramming mix.

▷ The B 2700 series uses essentially the same central processors as the earlier B 2500/3500 systems, but at the time of its announcement featured price/performance improvements, a wider range of model choices, a dual-processor configuration (the B 2772), and the availability of a front-end communications processor. The B 2700 has the same instruction set as the B 2500 and lacks the expanded addressing structure and instruction repertoire of the faster B 3700 and B 4700 central processors. B 2700 customer deliveries began in August 1972.

In a May 1974 realignment of its medium-scale processor line, Burroughs eliminated all but one B 2700 model, the B 2771-1, from the list of actively marketed processors. The B 2731 and B 2751 processor models were made subject to availability, and the B 2761-1 and B 2772 systems were withdrawn from the product line. At the same time, Burroughs removed the remaining B 3500 computer systems, the B 3506, B 3508, B 3510, and B 3514, from the list of available products. (The B 2501, B 2502, B 2510, B 2520, and B 3501 had been previously withdrawn in June 1973.)

Along with its price cuts on the older B 4700 systems, Burroughs also radically reduced the purchase and rental prices of the remaining B 2700 and B 3700 models in its restructured medium-scale product line, with cuts of about 20 percent on the central processor and memory units. The reduced prices were aimed at increasing the attractiveness of these systems in price/performance comparisons with the IBM System/370 and other competitive equipment and to provide an additional inducement to the remaining B 2500 and B 3500 users to move to the B 2700/3700/4700 fold.

HARDWARE FEATURES

Within the B 2700/3700/4700 systems, data can be represented in the form of variable-length fields composed of either 8-bit bytes or 4-bit digits. Although the memory word length is two bytes (16 data bits), each 4-bit digit ▷

▶ Each 11-high disk pack contains 87.2 million bytes and is physically compatible, but not format-compatible, with the IBM 2316 Disk Pack. Average arm movement time is 30 milliseconds, average rotational delay is 12.5 milliseconds, and data transfer rate is 625,000 bytes per second. The B 9383 Disk Pack Drive Subsystems replace the earlier B 9494/9485 Disk Pack Drives, which have been withdrawn from the Burroughs product line.

INPUT/OUTPUT UNITS

MAGNETIC TAPE CLUSTERS: Contain two, three, or four tape drives in a single compact cabinet. The feed and take-up reels for each tape drive are mounted on concentric vertical shafts, with the feed reel directly above the take-up reel. Pinch rollers and short vacuum-column buffers are employed. Each of the tape drives has its own drive mechanism, but they share a common power supply and read/write circuitry. Up to eight tape drives (two clusters) can be connected to a Cluster Control. Two of the drives in a cluster can read and/or write simultaneously if two Cluster Controls and an Exchange unit are used.

Burroughs offers numerous models of the Magnetic Tape Clusters, as listed in the Equipment Prices section of this report. All models use standard 1/2-inch tape, can read either forward or backward, and record in IBM-compatible formats at a tape speed of 22.5 or 45 inches per second. The 9381 series units record in 9-track NRZI mode at 800 bpi and transfer data at either 18,000 or 36,000 bytes/sec; these units can alternatively be equipped to operate in the 7-track NRZI mode at densities of 200, 556, or 800 bpi. The 9382 series units record in 9-track phase-encoded mode at 1600 bpi and transfer data at either 36,000 or 72,000 bytes/sec. The 9383 series units are 9-track models that can operate in either the 800-bpi NRZI or 1600-bpi phase-encoded mode, with data transfer rates of either 18/36KB or 36/72 KB.

B 9390 SERIES MAGNETIC TAPE UNITS: These units record data on 1/2-inch tape in IBM-compatible formats. Each tape drive is housed in a separate cabinet of the conventional vertical type. Pinch rollers and vacuum-column buffers are employed. Tape can be read in either the forward or reverse direction. Up to 10 free-standing tape drives can be connected to a Tape Control. Simultaneous read/write operations are possible if two Tape Controls and an Exchange unit are employed.

Seven models of the free-standing tape units are available, with the following recording modes, tape speeds (in inches per second), recording densities (in bits per inch), and data transfer rates (in bytes or characters per second):

B 9391: 7 tracks; 90 ips; 200/556 bpi; 18,000 or 50,000 char/sec.

B 9391: 7 tracks; 90 ips; 200/556/800 bpi; 18,000, 50,000, or 72,000 char/sec.

B 9392: 9 tracks; 90 ips; 200/800 bpi; 18,000 or 72,000 bytes/sec.

B 9393-1: 9 tracks; 90 ips; 1600 bpi; 144,000 bytes/sec.

B 9393-3: 9 tracks, 150 ips; 1600 bpi; 240,000 bytes/sec.

B 9394-1: 7 tracks; 120 ips; 200/556/800 bpi; 24,000, 66,700, or 96,000 char/sec.

B 9394-2: 9 tracks; 120 ips; 200/800 bpi; 24,000 or 96,000 bytes/sec.

B 9495-5 & B 9495-6 MAGNETIC TAPE UNITS: These high-performance 9-track units, usable only with B 4700 systems, record data on 1/2-inch tape in IBM-compatible phase-encoded mode at 1600 bpi. The B 9495-5 has a tape speed of 200 ips and a data transfer rate of 320,000 bytes/second, while the B 9495-6 has a tape speed of 250 ips and a data transfer rate of 400,000 bytes/second. Both models have a rewind speed of 700 ips, enabling a 2400-foot reel to be rewound in less than 45 seconds. Both drives feature a single vacuum-driven capstan, a sealed ▶

Burroughs B 2700, B 3700, & B 4700

position can be individually addressed. Numeric fields expressed in the 4-bit and 8-bit modes can be combined in decimal arithmetic operations without the need for prior format conversion. No binary arithmetic facilities are included.

The B 2700/3700/4700 central processors operate in either the Normal State or Control State. The Normal State is used for execution of user programs. An interrupt signal causes the processor to enter the Control State and transfer control to the Master Control Program whenever an I/O operation is completed or an abnormal condition is encountered. A group of "privileged" instructions, executable only in the Control State, enable the MCP to initiate I/O operations, control the storage protection registers, set the 6-digit interval timer, and perform other system control functions.

Burroughs has taken several steps toward improved reliability and maintainability in the B 3700 and B 4700 systems. Special test instructions and new diagnostic software aid field engineers in pinpointing malfunctions. Burroughs states that if just 6 percent of the central processor circuitry is "healthy," it will be possible to run basic diagnostic routines that will isolate the problems. A new centralized power supply for each processor and its associated main memory and I/O controls reduces the number of places where malfunctions can occur. The semiconductor main memory in the B 3700 and B 4700 models includes an error-correction feature that provides automatic recovery from single-bit memory errors. Most significantly, the high redundancy possible in multiple-processor configurations permits "fail-soft" operation; if one processor fails, the operator can switch the required peripheral devices to another processor and use the MCP's "audit trail" capability to pick up the work load that was being executed by the processor that failed.

PERIPHERALS

The Burroughs "700 Systems" are strongly oriented toward data communications. In addition to the single-line and multi-line communications controls originally used with B 2500/3500 systems, B 2700/3700/4700 buyers can choose a new Model 774 System and Communications Processor that was unveiled along with the 4790. The 744 Communications Processor replaces the earlier Data Communications Processor (which is no longer offered by Burroughs); it can control up to 32 half-duplex lines and is programmed in Burroughs' Network Definition Language (NDL). A maximum of eight B 774's can be connected to a host computer system. The Burroughs product line also includes an audio response system, on-line banking terminals, general-purpose terminals, remote peripheral controllers, and remote terminal concentrators.

In addition to its substantial line-up of communications products, Burroughs offers an unusually wide choice of on-site peripheral equipment for the B 2700/3700/4700 systems. Buyers who need mass storage can choose either head-per-track disk files or disk pack drives. The head-per-track disk files that have been a key element in most Burroughs computer systems for the past decade are still offered in a broad range of capacities and access speeds. Disk pack drives, which were conspicuously absent from the Burroughs product line until late 1970, are now ▷

tape-path chamber, a power access window, a positive reel latch, automatic tape threading and loading, and "on-the-fly" detection and correction of most errors. A unique "coaxial" hub mounts the feed reel directly in front of the take-up reel, reducing the overall width of the unit to just 24 inches.

A basic B 9495-5 or B 9495-6 subsystem consists of a Dual I/O Control (which permits simultaneous read/write operations), a Basic Electronics/Exchange, and up to 8 tape drives. The addition of an Electronics/Exchange Extenion permits the use of a second Dual I/O Control and up to 16 tape drives. B 9495-5 and B 9595-6 Tape Units cannot be intermixed in the same subsystem.

B 9495-2 & B 9495-3 MAGNETIC TAPE UNITS: These 9-track units, released in August 1973, offer all the features of the faster B 9495-5 and B 9495-6 units described above. Data is recorded on 1/2-inch tape in IBM-compatible phase-encoded mode at 1600 bpi. Data transfer rate is 120,000 bytes/second for the B 9495-2 and 200,000 bytes/second for the B 9495-3. Both models can optionally be equipped to operate in NRZI mode at 800 bpi, at half the above data transfer rates. These units can be used with any B 2700/3700/4700 computer in a subsystem consisting of up to 4 tape controls, up to 16 tape units, and an appropriate Master Electronic Exchange (1 x 4, 1 x 8, 2 x 8, 2 x 16, or 4 x 16).

B 9496-2 & B 9496-4 MAGNETIC TAPE UNITS: Introduced in August 1973, these low-cost tape drives feature improved reliability and "low-boy" cabinets (44 inches high). Data is recorded on 1/2-inch tape in IBM-compatible phase-encoded mode at 1600 bpi. The B 9496-2 has a tape speed of 25 ips and a data rate of 40,000 bytes/second, while the B 9496-4 has a tape speed of 50 ips and a data rate of 80,000 bytes/second. These units can be used with any B 2700/3700/4700 computer in a subsystem consisting of one or two tape controls, up to eight tape units, and an appropriate Master Electronic Exchange (1 x 4, 1 x 8, or 2 x 8).

B 9110 CARD READER: Reads 80-column cards serially by column, on demand, at up to 200 cpm. EBCDIC is the standard card code, and BCL or binary cards can also be read. The feed hopper and stacker hold 450 cards each.

B 9111 CARD READER: Reads 80-column cards of either standard or postcard thickness serially by column, on demand, at up to 800 cpm. Can also read 51-, 60-, or 66-column cards. EBCDIC is the standard card code, and BCL or binary cards can also be read. The feed hopper and stacker hold up to 2400 cards each and can be loaded and unloaded while the reader is operating. Optional features permit reading of 40-column Treasury Checks and/or round-holed Postal Money Orders.

B 9112 CARD READER: Reads up to 1400 cpm. Otherwise, has the same characteristics and features as the B 9111 Card Reader described above.

B 9113 CARD READER: Reads up to 475 cpm. Otherwise, has the same characteristics and features as the B 9111 Card Reader described above.

B 9115 CARD READER: A compact, table-top unit that reads 80-column cards serially by column at a rated speed of 300 cpm. Cards are read photoelectrically, with a double strobe comparison for each column to help ensure reading accuracy. The single input hopper and output stacker hold up to 1000 cards each. An optional feature permits reading of 51-column cards.

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

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

B 9210 CARD PUNCH: Punches and read-checks 80-column cards at 100 cpm. EBCDIC is the standard card code, and BCL or binary cards can also be punched. The feed hopper and single stacker hold 800 cards each. The associated control unit contains a full-card buffer. The B 9210 is not available with new B 3700 or B 4700 systems. ▶

Burroughs B 2700, B 3700, & B 4700

▷ supplanting the earlier head-per-track disk files. The new drives are available in models that provide up to 1.395 billion bytes of removable disk pack storage or 518 million bytes of "head-per-track look-alike" disk storage. Burroughs' File Protect Memory, which had previously been offered only for the head-per-track disk subsystems, became available for disk pack subsystems in November 1974. Choosing the most suitable type and model of mass storage for a B 2700/3700/4700 installation will require careful consideration of throughput requirements, processing techniques (random vs. sequential), data security, backup considerations, etc.

Magnetic tape units are available with transfer rates ranging from 18KB to 400KB. Line Printers feature simplified operation and a unique "Forms Self-Align" facility that uses preprinted marks on the edge of the forms as well as a conventional tape loop to control the vertical format. Two high-performance printers are available. The B 9246-2 is a drum printer capable of printing up to 1800 lines per minute with a 36-character set, and the B 9247-14 is a train printer rated at 1100 lines per minute. Burroughs also supplies reader/sorters with both MICR and OCR capabilities to support its extensive customer base in the banking industry.

SOFTWARE AND SUPPORT

All software support for the B 2700/3700/4700 systems is built around the MCP, the integrated operating system that complements the hardware to create an unusually effective environment for multiprogrammed operation. Perhaps the most striking feature of the MCP is the fact that it is truly user-oriented and much easier to understand and use than most of the competitive operating systems. The MCP receives its orders through unusually straightforward messages entered via control cards or the console keyboard.

The newest version of MCP, called MCP VI, was announced with the B 2800/3800/4800 systems in December 1975 and will also be available for the B 2700/3700/4700 systems. MCP VI represents a restructuring of the earlier MCP V and provides for flexible management of overlayable user-program segments. An enhancement of the job control language provides device independence among card, tape, and disk files for more flexible use of system resources. In addition, the initial release of MCP VI will incorporate the Work Flow Management System, a system audit and security facility for controlling access to the system and data files, and the Time Analysis and Billing System (TABS). The Work Flow Management System, previously available for B 6700 and B 7700 systems, is an extension of the MCP job control language that provides sophisticated facilities for controlling and scheduling the computer system. TABS analyzes the MCP log of system resources utilized by each user program and prepares reports allocating the costs of use of system resources to each user. A subsequent release of MCP VI will include Burroughs' highly regarded DMS-II data base management system, an ANS-74 COBOL compiler, and enhanced time-sharing facilities, including the provision for a dynamic time-sharing partition.

The complement of B 2700/3700/4700 software also includes compilers for the COBOL, FORTRAN, and ▷

▶ B 9212 CARD PUNCH: Punches 80-column cards at up to 150 cpm.

B 9213 CARD PUNCH: Punches 80-column cards at up to 300 cpm. EBCDIC is the standard card code, and BCL or binary cards can also be punched. The feed hopper holds up to 2200 cards, and three program-selectable stackers hold at least 1400 cards each. The associated control unit contains a full-card buffer.

B 9120 PAPER TAPE READER: Reads 5-, 6-, 7-, or 8-level punched tape at 500 or 1000 characters per second. The lower speed must be used for fanfold or metallized Mylar tape. Handles reels either 5.5 or 7 inches in diameter. A standard channel-select plugboard and optional Input Code Translator permit wide flexibility in codes.

B 9220 PAPER TAPE PUNCH: Punches 5-, 6-, 7-, or 8-level tape at 100 characters per second. Handles supply reels up to 8 inches in diameter and 5.5- or 7-inch take-up reels. A standard channel-select plugboard and optional Output Code Translator permit wide flexibility in codes.

LINE PRINTERS (B 2700 SYSTEMS): Fourteen printers of the conventional rotating-drum type provide printing speeds ranging from 475 to 1100 lines per minute for the B 2700 systems. All models have a tape-controlled carriage capable of handling continuous forms 5 to 20 inches in width, vertical spacing of 6 to 8 lines per inch, and a standard skipping speed of 25 inches per second. Characteristics of the various models are as follows:

B 9240-4: 475 lpm; 120 or 132 print positions.

B 9240-5: 700 lpm; 120 or 132 print positions.

B 9242-1: 860 lpm; 120 or 132 print positions.

B 9242-2: 725 lpm; 120 or 132 print positions; OCR "A" numeric and standard alphabetic character set.

B 9242-3: 725 lpm; 120 or 132 print positions; OCR "B" alphanumeric set.

B 9243-1: 1100 lpm; 120 or 132 print positions.

B 9243-2: 900 lpm; 120 or 132 print positions; OCR "A" numeric and standard alphabetic character set.

B 9243-3: 900 lpm; 120 or 132 print positions; OCR "B" alphanumeric set.

B 9242-11: 860 lpm; 120 or 132 print positions.

B 9242-12: 725 lpm; 120 or 132 print positions; OCR "A" numeric and standard alphabetic set.

B 9243-13: 725 lpm; 120 or 132 print positions; OCR "B" alphanumeric set.

B 9243-11: 1100 lpm; 120 or 132 print positions.

B 9243-12: 900 lpm; 120 or 132 print positions; OCR "A" numeric and standard alphabetic set.

B 9243-13: 900 lpm; 120 or 132 print positions; OCR "B" alphanumeric set.

The printers feature a Burroughs innovation called "Forms Self-Align." With this feature, forms are advanced under program control to printed marks on the right-hand edge of the forms, eliminating the need for a format control tape. The three standard marks are line, field, and end-of-page. The Burroughs Business Forms and Supplies Group offers both stock and custom forms with the require Forms Self-Align markings. A switch allows the operator to select vertical format control by means of either the Forms Self-Align marks or a conventional 12-channel paper tape loop.

B 9246-2 HIGH-SPEED PRINTER: This fast drum-type printer, announced in June 1973, prints 1800 lines per minute when using only the first 36 characters of its 64-character set. The speed is 1250 lpm when the full character set is used, and normal alphanumeric character mixes should result in a throughput of 1500-plus lpm. An ▶

Burroughs B 2700, B 3700, & B 4700

BASIC languages and COFIRS, an RPG-to-COBOL translation facility, but not RPG or PL/1 to date. Since the new "800 Series" computers will be source-code-compatible with the B 2700/3700/4700 systems, users of the "700" medium systems can expect to transfer their programs to the new systems without the need for program recompilation.

In May 1972, Burroughs partially unbundled the B 2700/3700/4700 software by placing separate license fees on most of the application programs and on certain program development aids and utility routines. The MCP and compilers, along with normal technical support and training, are still offered on a bundled basis at no additional cost.

COMPATIBILITY

Burroughs emphasizes that programs written for B 2700/3700/4700 systems can run without modification on the new "800" systems, permitting users to upgrade to the increased processing power of the new systems without incurring costly program or file conversions. There is, however, no object-level program capability between the "700" medium-scale systems and the larger B 6700 or B 7700 systems. Burroughs provides "filter" programs from one Burroughs computer to another. Moreover, the latest COBOL compiler for the B 6700/7700 systems accepts B 2700/3700/4700 ANS COBOL directly, eliminating the need for filtering.

The B 2700/3700/4700 systems use the same byte-oriented data structure, EBCDIC internal code, and magnetic tape formats as the IBM System/360 and 370 computers, but there is no direct program compatibility between them at the machine-language or assembly-language level. Most programs written in ANS COBOL, FORTRAN, or RPG for the IBM computers, however, should be transferable to the B 2700/3700/4700 systems without undue conversion difficulty. COFIRS (COBOL From IBM RPG Specifications) has proven to be a particularly effective conversion aid for IBM 360/20 users. Other conversion aids recently announced by Burroughs translate Honeywell Series 200/2000 COBOL or UNIVAC (ex-RCA) Series 70 COBOL or BAL to B 2700/3700/4700 COBOL.

PRICING

During the marketing life of a computer family, computer manufacturers rely on both product enhancements and pricing adjustments to achieve the price/performance ratios required to remain competitive in the computer marketplace. In the case of the B 2700/3700/4700 series, the first pricing incentive offered was the introduction in March 1973 of a five-year lease plan offering unlimited use and unlimited maintenance coverage at a discount of seven percent from the basic one-year lease rate. Customers who need only single-shift maintenance coverage on a 5-year lease get a discount of 11 percent from the 1-year lease rate.

Shortly afterward, in the summer of 1973, Burroughs unveiled five new B 4700 models featuring state-of-the-art MOS/LSI main memory, and substantially reduced the

optional 64-character set with OCR A numeric characters and 4 special characters yields a print speed of 1200 lpm when the first 46 chracters are used and 925 lpm for the full character set. The B 9246-2 is fully buffered, has 132 print positions, prints 6 or 8 lines to the inch, and has a skipping speed of 36 inches/second. It can be connected to a B 3700 or B 4700 computer system via the B 3240-1 or B 4240 Printer Control, respectively.

B 9247-3 TRAIN PRINTER: This 750-lpm train printer, introduced with the B 1700 Series computers in June 1972, was added to the B 2700/3700/4700 peripheral line-up in March 1973. The B 9247-3 achieves its rated 750-lpm speed with the standard 48-character set. It can be equipped with other interchangeable train modules containing 16, 64, or 96 printable characters and yielding speeds of 1200, 610, or 440 lpm, respectively. The 96-character set contains both upper and lower case alphabetics. The B 9247-3 handles vertical format control through either the Burroughs Forms-Self-Align system, which uses codes preprinted on the forms, or a standard 12-channel carriage control tape. The standard number of print positions is 132.

B 9247-12 TRAIN PRINTER: This train printer achieves its rated 400-lpm speed with the standard 48-character set. It can be equipped with other interchangeable train modules containing 16, 64, or 96 printable characters. The 96-character set contains both upper and lower case alphabetics. The B 9247-12 handles vertical format control through either the Burroughs-Forms-Self-Align system, which uses codes preprinted on the forms, or a standard 12-channel carriage control tape. The standard number of print positions is 132. The B 9247-12 is available for B 2700, B 3700, B 4700, B 1726, and B 1728 computer systems.

B 9247-14 TRAIN PRINTER: This high-performance train printer, announced in August 1973, prints 1100 lines per minute and has 132 print positions. It can be equipped with other interchangeable train modules containing 16, 64, or 96 printable characters. The 96-character set contains both upper and lower case alphabetics. A 12-channel format tape is used for vertical format control. The B 9247-14 can be used with any B 2700/3700/4700 system and also with B 6700/7700 systems. Deliveries began in the third quarter of 1974.

B 9244 TAPE LISTER: Produces printed listings of documents read by a MICR Sorter-Reader on 6, 12, or 18 adding-machine tapes, each 2.5 inches wide, which can be individually advanced. The B 9244-1 Master Lister has 6 tapes, and one or two 6-tape B 9244-2 Slave Listers can be connected to it. Maximum printing speed is 1565 lpm when printing is restricted to the digits 0 through 9 and six special characters, or 800 lpm when the full 40-character alphanumeric set is used.

B 9340 CONSOLE PRINTER/KEYBOARD: A Teletype Keyboard Send/Receive unit, used to provide keyboard input and console printouts.

B9348-2 OPERATOR DISPLAY CONSOLE: Provides console input via a typewriter-style keyboard and output via a CRT display. Has a 960-character buffer and displays up to 24 80-character lines of data. A B 2700/3700/4700 central processor can be equipped with either a B 9340 Printer/Keyboard, one or more B 9348-2 Operator Display Consoles, or both. Multiple-processor systems can have one or more B 9348-2 Display Consoles per processor. Software support for the B 9340-1 (which adds 2K bytes to the MCP main storage requirements) interrogates the MCP tables every 10 seconds to determine the system status, formats the information, and displays it on the screen. A log of all console messages is maintained on disk and listed on a line printer upon request.

MICR READER-SORTERS: Read MICR-encoded documents at up to 1565 items per minute. Can also operate in demand mode, feeding one document at a time at up to 400 items per minute. Models B 9131 and B 9132 have 13 and 16 pockets, respectively. Both models are also usable for off-line sorting. Optional features include an endorser, validity checking, and an item counter. The B 9130 is a similar, 13-pocket unit designed solely for off-line use. The ▶

Burroughs B 2700, B 3700, & B 4700

purchase and rental prices on the superseded B 4708, 4731, 4732, 4733, and 4734 processors as well as the smaller B 2751, 2772, 3771, and 3772 processors.

Nearly a year later, in May 1974, Burroughs quietly lowered both purchase and rental prices on a streamlined medium-scale product line. Prices were lowered for both central processors and main memories: B 2771 central processors were reduced by approximately 30 percent and add-on memory modules by over 40 percent, and B 3700 and B 4700 central processor and memory prices were reduced by approximately 20 to 40 percent. Since peripheral prices were unaffected, Burroughs estimated that overall system prices for its medium-scale product line would be lowered by 5 to 10 percent.

Following closely on the heels of this price reduction came the announcement of the B 4790 models, offering an estimated 2 to 4 times the performance of the previous B 4700 generation for about an 85 percent increase in price for a basic system (as compared to the B 4771 basic system).

And finally, in December 1975, Burroughs released the newest and probably final processor model in the B 2700/3700/4700 series: the entry-level B 3271, which offers performance comparable to that of the earlier B 3741 but is priced under the B 2771-1 which it replaces.

In November 1975, Burroughs followed the lead of Honeywell and IBM in announcing an across-the-board increase in purchase and rental prices and maintenance charges. Both purchase and rental prices for peripheral units and associated controls were increased 3.5 to 4 percent, and the cost of maintenance for most products was increased on an average of 9 percent. Purchase and base prices for the medium- and large-scale computer mainframes were increased by 2.5 to 4 percent.

BURROUGHS VS. THE COMPETITORS

The models in the B 2700/3700/4700 family originally were marketed as upgrades for users of Burroughs' own "500 systems," as well as for the many users of IBM System/360 Models 20 through 50, IBM System/370 Models 115 through 145, and other competitive models. The substantial price reductions on both purchase and rental prices of central processors and main memory units introduced by Burroughs in May of 1974 then effectively realigned the Burroughs medium systems' competitive stance vis-a-vis the IBM System/370 line.

The B 3721 is priced to compete as an entry-level in the B 2700/3700/4700 series and in most cases shoule be less expensive than comparable System/370 Model 125 configurations.

The B 3700 and B 4700 systems were originally designed as program-compatible upgrade machines for B 3500 users and as replacements for IBM System/360 Model 40 and 50 systems. In both performance and pricing, the larger B 3700 models are targeted at the IBM System/370 Model 125 and Model 135; the B 4771 is priced to compete with larger IBM System/370 Model 135 configurations; and the B 4780 and B 4790 systems are aimed at the System/370 Model 145.

B 9131-1 is a 13-pocket, on-line model with a lower rated speed of 1000 items per minute.

B 9134-1 READER-SORTER: Reads optically and/or magnetically encoded numeric documents at up to 1625 documents per minute. Can handle both types of documents of varying sizes and weights in intermixed fashion. The sorting section is available in modules of 4 pockets each, and is expandable to a maximum of 32 pockets. Can be used either on-line or off-line.

B 9410 PERIPHERAL SWITCHING UNIT: Permits peripheral devices to be manually switched between two control units, which may be connected to different central processors. (The B 9410 will generally be used for card readers, printers, and other low-speed I/O devices; electronic Exchange units permit magnetic tape units and disk files to be shared by two or more processors.)

COMMUNICATION CONTROLS

SINGLE-LINE CONTROL: Provides a connection between a single Type B I/O channel and a single communications line. Contains a one-character buffer. Requires an appropriate line adapter, which determines transmission rate, code sensitivity, and character structure. Numerous adapters permit half-duplex communication with a wide range of equipment over dialed, leased, or directly connected lines at speeds of 74.2 to 9600 bits per second.

Burroughs announced two new, special-purpose single-line controls in mid-1973. The Binary Synchronous Single-Line Control is designed for computer-to-computer communications in the BSC mode at speeds of 2400 to 9600 bits per second. The Broadband Single-Line Control handles computer-to-computer communications with other Burroughs medium-scale systems at 50,000 bits per second.

MULTI-LINE CONTROL: Permits the connection of multiple simultaneously-operating communications lines to a pair of Type B I/O channels. Requires an appropriate line adapter for each line. The basic Multi-Line Control houses up to 4 line adapters. Optional 8-line extensions permit a total of up to 36 lines to be connected. A "scratchpad" memory holds control information and provides a one-character buffer for each line. Numerous adapters permit half-duplex communication with a wide range of equipment over dialed, leased, or directly connected lines at speeds of 74.2 to 9600 bits per second.

B 774-1 COMMUNICATIONS PROCESSOR: A microprogrammed front-end communications processor that performs the specialized functions associated with the transmission and reception of data, including error recovery, code translation, line discipline management, and most network control functions for a host processor. A basic 774 communications processor consists of a 1.7-megahertz processor with 12K bytes of microprogrammed MOS control memory and 8K bytes of MOS main memory with an access time of 500 nanoseconds for two bytes, expandable to 98K bytes. An adapter cluster contains a byte-line scanner capable of interfacing up to 16 dual-line adapters that can service up to 32 half-duplex or 16 full-duplex communications lines. Dual-line adapters that interface two half-duplex lines or one full-duplex line can accommodate asynchronous line speeds up to 1800 bits per second and synchronous or binary synchronous line speeds up to 9600 bits per second. Direct connect and automatic dial-out adapters are also available. Data is transferred between the communications processor and the host central processor at a rate of 1,000,000 bytes per second.

A maximum of eight 774 Communications Processors can be attached to a single host computer system to support a total of 256 half-duplex lines. Each 774 Communications Processor is attached to the host communications processor thorugh a B X303 control unit that attaches to a Type B channel. A Network Definition Language (NDL) is available to prepare customized network, control programs containing tables, system code, and microprograms for each B 774 Communications Processor. The network control program is compiled on the host central processor and loaded from the host system disk to the communications processor

Burroughs B 2700, B 3700, & B 4700

▷ The new B 2800, B 3800, and B 4800 systems, which offer noteworthy price/performance improvements over the B 2700/3700/4700 family, will further enhance Burroughs' competitive position in the medium-scale segment of the computer market.

USER REACTION

In the 1975 Datapro survey of general-purpose computer users, 71 responses were received from users of Burroughs B 2700, B 3700, and B 4700 computer systems. The breakdown of responses by model included 24 responses on the B 2700 (reporting on 25 systems), 17 responses on the B 3700 (19 systems), and 30 responses on the B 4700 (37 systems).

Of the total of 71 responses, 57 indicated that the current Burroughs system replaced an earlier system. In the Burroughs B 2700 category, 73 percent of the systems replaced competitive equipment, including Honeywell Models 115, 125, and 200, an NCR Century 100, a UNIVAC 9400, and IBM 360/20, 360/25, 360/30, and 1130 systems, plus an unidentified DEC minicomputer. The remaining 27 percent of the B 2700 systems represented upgrades of previously installed Burroughs equipment. The proportion of systems which represented upgrades of previously installed Burroughs equipment increased with the size of the system. Sixty-four percent of those who described their B 3700 systems as replacements for earlier computer equipment named Burroughs systems as the upgraded computers, primarily B 3500 systems. The remaining 36 percent replaced a Honeywell 200, RCA 301/501 systems, an NCR 315, and an IBM 360/30 and 360/40. The overwhelming majority of the B 4700 computers (82 percent) were upgrades of Burroughs installations, again primarily B 3500's, while the remaining 18 percent attracted new business to Burroughs by replacing a Honeywell 120, an RCA 301/501, a UNIVAC 418 II, an IBM 1130, and an IBM System 360/40.

The majority of these systems were performing multiple functions, for example, business data processing plus data communications and data base management. The overall distribution of applications for all three models was as follows; 48 percent—business data processing; 3 percent—scientific and engineering; 5 percent—real-time; 27 percent—data communications; 12 percent—data base management; and 7 percent—others (typesetting, financial accounting, administrative data processing, government, and bank MICR processing were some of the "others").

Seventy-four percent of those who responded specified that their systems were acquired through rental agreements with Burroughs, 17 percent stated that their systems were purchased, and 9 percent acquired their systems through third-party leasing arrangements. The highest proportion of purchased systems occurred among the B 4700's, where 30 percent of the systems were purchased. The average length of time installed was 20 months for the B 2700, 9 months for the B 3700, and 16 months for the B 4700 systems. The average main memory size by processor model was 164K bytes for the B 2700's, 205K bytes for the B 3700's, and 280K bytes for the B 4700 systems. ▷

▶ through an MCP command. The B 774 Communications Process was announced in August 1974 and was delivered in the fourth quarter of 1974.

AUDIO RESPONSE SYSTEM: Provides responses, in recorded human-voice form, to digital inquiries from push-button telephones. Accommodates up to 128 lines, in 2-line increments. Spoken words or phrases are recorded on film wrapped around a revolving drum. The drum contains 63 audio tracks, each capable of storing either one phrase (up to 1.5 seconds in length), the same word recorded three times, or three different words. The Audio Response Generator is used in conjunction with a Multi-Line Control.

SOFTWARE

MASTER CONTROL PROGRAM: The principal component of Burroughs software support for the B 2700/3700/4700 systems is the MCP, a modular operating system that schedules and controls all operations of the system. The MCP requires from 14K to 50K bytes of main memory, up to 400K bytes of disk storage, at least one magnetic tape unit, a card or paper tape reader, and a console typewriter or display console. A high-speed trace option adds another 7.5K bytes to the main memory requirements, and support for the B 9340-1 Operator Display Console requires another 8K bytes. In its largest version, the MCP handles all standard peripherals plus MICR and multi-line data communications, controls up to 80 simultaneous programs, and accommodates up to 80 I/O devices and an 80-request I/O queue.

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

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

To schedule I/O operations, the MCP maintains tables that show the status of each I/O unit and the priority of each I/O request awaiting initiation. Disk files can be processed either sequentially or randomly.

Burroughs states that the current version of the Master Control Program, called MCP V, yields a 10 to 15 percent increase in overall systems throughput over its predecessor. Among the new features of MCP V are: (1) support of the File Protect Memory hardware, enabling multiple programs to open and share the same head-per-track disk files at the same time; (2) a "STOQUE" capability that permits asynchronous transfers of data between programs; (3) a 3-level priority system that permits assignment of separate priorities for scheduling, processing, and memory utilization; (4) a 3-level logging system that provides an SPO Log of all system messages, a Maintenance Log showing the performance of each system component, and a Run Log that facilitates cost distribution and system audits; (5) ability to relocate the MCP modules in main memory; (6) ▶

Burroughs B 2700, B 3700, & B 4700

▷ These Burroughs users tapped a variety of sources to meet their programming needs, many of them checking off three or four of the available categories. While 94 percent of the respondents indicated that at least some of their programs were written by in-house personnel, 25 percent stated that they also obtained programming services from the manufacturer's personnel, 32 percent were using "ready-made" programs from the manufacturer, 32 percent were using proprietary software packages, and 23 percent had used the services of a contract programming house.

A summary of the ratings given by the 71 users is presented below:

	Excellent	Good	Fair	Poor	WA*
Ease of operation	58	10	1	0	3.8
Reliability of mainframe	29	35	5	0	3.3
Reliability of peripherals	2	37	27	3	2.6
Maintenance service:					
Responsiveness	20	31	14	4	3.0
Effectiveness	14	29	21	5	2.8
Technical support	5	26	29	8	2.4
Operating system	58	10	1	0	3.8
Compilers and assemblers	45	19	5	0	3.6
Applications programs	7	17	25	5	2.5
Ease of programming	45	23	1	0	3.6
Ease of conversion	22	37	5	1	3.2
Overall satisfaction	24	36	7	1	3.2

*Weighted Average on a scale of 4.0 for Excellent.

When these ratings are compared to the overall averages derived from the ratings supplied by all the computer users who responded to the 1975 Datapro survey, it becomes evident that Burroughs has achieved some notable successes with its medium-scale product line. In the two important categories of "Ease of use" and "Operating system," the B 2700/3700/4700 systems topped all competitive equipment, achieving a weighted average of 3.8 in each category and substantiating Burroughs' claim that the MCP and its software facilities are significantly easier to understand and use than most competitive products.

The survey respondents were nearly unanimous in expressing their satisfaction with the B 2700/3700/4700 systems software support, with well over 90 percent of them citing the operating system and/or the ease of programming and operation as the principal advantages of the system. Comments such as "simple to use," "ease of programming and operating," "designed for the user," "ease of operation and powerful operating system," and "outstanding software" were used to express the users' overwhelming satisfaction with these features of the Burroughs systems. Compliments were also given for Burroughs' data communications software, COBOL compiler, and mainframe reliability.

The biggest source of dissatisfaction with the Burroughs medium-scale systems, as expressed by these users, was technical support. Some problems were also experienced with peripheral reliability, particularly with the older magnetic tape clusters and disk pack drives. (Both of these products have been superseded in the Burroughs peripheral product line by later models, including a new family of high-performance random-access storage devices which were announced for the B 2800/3800/4800 systems.) ◁

▷ ability to overlap MCP I/O operations (such as opening files) with computing; (7) redesigned I/O routines with higher execution speeds; (8) improved directory management and searching techniques; and (9) improved checkpoint/restart facilities.

MCP VI, announced in December 1975, represents a major revision of the operating system and contains additional enhancements to permit more flexible main memory management and the capability to dynamically alter card, tape, and disk file assignments at run time by setting parameters in an execute card. The new MCP VI, mutiprogramming executive has the capability to supervise the execution of up to 256 concurrent jobs. Under MCP IV, user programs can be divided into a resident portion that must reside in main memory for program execution and a series of overlayable segments that can be brought into main memory only when required for program execution. The compiler builds a segment dictionary reflecting the program organization and computes the memory requirements for containing the resident portions of the program plus the minimum main memory space required for accommodating the largest single overlayable segment of the program. During program execution, the MCP uses the segment dictionary to locate required program segments and loads them from disk storage into the user-program "quick overlay" area. When adequate main memory space is available, program overlay segments are allowed to remain in main memory until the space is required by another program.

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

The Workflow Management System, previously available only for B 6700/7700 systems, is also included in MCP VI for the medium-scale systems. It is an extension of the MCP job control language that provides facilities for detailed scheduling of the computer's workload and resources. The Workflow Management Language Compiler can be used to define each job as a network of interrelated tasks, to describe the operational characteristics of each job and tasks within the job, and to define resource requirements at the task level, job sequencing, and run-time conditions. Jobs are placed in "service structures" (job queues), each of which has an associated set of parameters which define the maximum amount of processor time, I/O time, lines of output, etc., permitted for each job in the queue. Workflow Management also allows the user to specify the number of jobs from each queue that can be executed concurrently. Jobs are assigned to the job queues through job control statements, by user code, according to the location from which they are submitted, or by default in the event that no user directives are supplied. Facilities for displaying detailed operator instructions on the system console are also provided. The Workflow Management Language Compiler examines the control statements for correct syntax and stores the compiled executable code in a Job File on disk storage. Workflow Management source statements also can be maintained in disk storage to facilitate retrieval for maintenance and updating.

MCP VI, including systems audit and security, the Workflow Management System, TABS, and overlay support, is scheduled for availability in 1976. A future release including support for the DMS-II Data Base Management System and an ANS-1974 COBOL compiler is scheduled for the first quarter of 1977. MCP VI main memory residence requirements were not available at this writing. The earlier CP 14 and CP 40 versions of the MCP will also be supported for smaller configurations.

COBOL: Three COBOL compilers are available for operation under the B 2700/3700/4700 MCP. All three versions offer identical language facilities, but the larger ones provide faster compilation and higher limits on the number ▷

Burroughs B 2700, B 3700, & B 4700

▷ On the whole, however, these users expressed a high regard for their Burroughs equipment and its supporting software, supplying an average rating of 3.2 for overall satisfaction. These systems, with their unusually effective facilities for multiprogramming, data communications, and multiprocessing, have established a strong position for Burroughs in the medium-to-large-scale marketplace and a good foundation on which to build with the succeeding B 2800, B 3800, and B 4800 family.□

▶ of data names, procedure names, and pictures that can be used. The smallest compiler, called simply "COBOL," requires 17K bytes of main memory and 190K bytes of disk storage. The second compiler, called "COBOL L," requires 30K bytes of main memory and 240K bytes of disk storage. The largest and newest compiler, called "COBOL V," requires 45K bytes of main memory, runs only on the B 3700 and B 4700 central processors, and makes use of the extended addressing and 4-digit adders of these processors to generate more efficient object programs.

The B 2700/3700/4700 COBOL language is generally consistent with American National Standard COBOL and includes most of its facilities, although the Report Writer module has not been implemented. Effective (though non-standard) language facilities are included for the control of data communications, MICR sorter-readers, and multi-tape listers.

The COBOL Cross-Reference Utility System accepts COBOL source programs as input and generates convenient flowcharts and/or cross-reference listings that show where each data name, internal program switch, and special register is used.

FORTRAN: The original B 2500/3500 FORTRAN compiler, called "FORTRAN," can be used without change on the B 2700/3700/4700 systems. It requires 27K bytes of main memory (in addition to the MCP requirements) and a card or paper tape reader and line printer. Also required is 200K bytes of disk storage for the compiler, plus 340K bytes of working storage for each 1000 source-program cards. The language conforms with American National Standard FORTRAN.

Two newer FORTRAN compilers, called "FORT IV" and "XFORTN," provide expanded language facilities which are compatible with IBM FORTRAN IV Level H, include the full ANS FORTRAN language plus numerous extensions, and are upward-compatible with the FORTRAN compilers for the larger 700 Series systems. Both compilers require 45K bytes of main memory. FORT IV runs only on the B 3700 and B 4700 central processors and makes use of their fixed-length floating-point arithmetic instructions, extended addressing capabilities, and 4-digit adders to achieve significantly higher object program execution speeds. XFORTN makes the same extended language capabilities available to users of the slower B 2500, B 2700, and B 3500 processors.

BASIC: Burroughs offers two different compilers for the BASIC language, a Core-Sharing version and a Batch version. Core-Sharing BASIC provides interactive compilation of programs entered from remote terminals. Batch BASIC compiles source programs entered via a card reader. Both versions implement a language that generally corresponds to the original Dartmouth BASIC system, and both provide immediate execution of successfully compiled programs.

REPORT PROGRAM GENERATOR: For users accustomed to programming in the IBM 360/20 RPG language, Burroughs offers a software tool called COFIRS (COBOL From IBM RPG Specifications). COFIRS accepts 360/20 RPG source statements and generates a COBOL source program reflecting the RPG program logic, which is then compiled and executed. Although COFIRS was developed primarily to facilitate conversions from the 360/20, Burroughs maintains that it can also be used effectively on a continuing basis by RPG-oriented installations.

COFIRS II, an RPG-to-COBOL translator originally developed for the B 1700 systems, was released for B 2700/3700/4700 sytems in July 1974. COFIRS II converts source programs written in B 1700 RPG language, which is largely compatible with IBM's RPG II, into COBOL source programs.

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 and maintained by Disk FORTE or Disk FORTE/2. To describe the files and generate the necessary vocabulary (a one-time operation), the Reporter System 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 produced are described in a concise, English-like language that is largely self-documenting. Numerous default features make it unnecessary for the user 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. Burroughs states that the Reporter System is already being used in more than 100 installations.

PROBLEM ORIENTED LANGUAGE GENERATOR: POLGEN provides the facilities for creating problem-oriented languages (POLs) that enable users to access the computer using free-form statements in a vocabulary that is relevant to the application environment. The POLs created by POLGEN are designed primarily for interactive processing applications, but can also be executed in batch mode. POLGEN includes a COBOL-like grammar definition language for defining a language syntax, using terminology commonly used in the application environment, and for establishing a list of user-supplied procedures to accomplish the processing objectives of the language. COBOL procedures can also be included in the user grammar description. The statements are processed by the POLGEN program, and a machine representation of the grammar description is created on a disk file for access by the POL translator. During execution, the POL processor controls all user routines, automatically provides services such as opening files and reading input, and scans incoming user statements and selects the procedures to be performed based on the grammar description. A standard POL translator can process any POL language by accessing the specific grammar file defining the language. POLGEN was announced for the B 2700/3700/4700 systems in August 1973 and is a separately priced program product.

ASSEMBLERS: Assembler Language is the symbolic programming language used to write machine-oriented programs for the B 2700, B 3700 and B 4700. The Advanced Assembler requires 11K bytes of main memory and at least 90K bytes of disk storage (in addition to MCP and working-storage requirements), plus card or paper tape reader and printer. Magnetic tape may be used for input and/or output if desired.

The Assembly Language programmer normally uses a fixed-format coding sheet whose arrangement corresponds closely with the 3-address format of the machine instructions. If the programmer chooses, he can code in a Free-Form Assembly Language which is translated into the regular Assembler format by the Free-Form Translator and then assembled in the usual manner. The Advanced Assembler provides numerous macro and pseudo operations, including data communications control macros. Facilities such as blocking, label checking, and comprehensive error recovery procedures are provided by the MCP.

A Burroughs Program Language (BPL) Compiler, delivered in April 1972, enables B 2700/3700/4700 programmers to code in a higher-level language that permits complete ▶

Burroughs B 2700, B 3700, & B 4700

► control of all machine-level facilities, including instruction modification, indexing, incrementation, and character or bit manipulation. Data declarations are required, and facilities for macro instructions and program segmentation are provided. Burroughs emphasizes that BPL is not a COBOL or FORTRAN replacement language, but a replacement for the Assembler for programs that require extensive modification of instructions.

DISK FORTE/2: Announced in August 1973 as an improved version of Burroughs' original Disk FORTE, Disk FORTE/2 is a file management system that provides the ability to structure and maintain a data base on Burroughs head-per-track disk files, disk pack drives, or disk cartridge drives. Up to 999 managed files with 16,000,000 or more records per file can be defined using a free-form keyword language. Six access methods are supported for data retrieval from the data base: index-random, random, index-sequential, index-sequential-grouped, ordered lists, and unordered lists. 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. A Resource Optimizing Feature permits elements of a data base to be combined on a single disk file to reduce buffer space requirements.

Disk FORTE/2 permits user library routines written in COBOL to be included at generation time to handle such functions as defining item-level record layouts, data validation, and exit handling. Disk FORTE/2 generates COBOL source code which is compiled along with the user's application program. A filter program is available to convert FORTE control files and programs to the new FORTE/2 specifications. Disk FORTE/2 files are interchangeable between B 1700, B 2700/3700/4700, and B 6700/7700 systems. Future enhancements include a search feature, a remap feature for restructuring the data base, and an automatic audit/recovery capability.

DMS-II: Burroughs' DMS-II data base management system, which was originally released for the large-scale B 6700 and B 7700 systems, is scheduled for release for B 2800/3800/4800 and B 2700/3700/4700 systems in March 1977. A detailed description of DMS-II can be found in Report 70E-112-01.

MEDIUM SYSTEMS TIME-SHARING SYSTEM: The MCP V Time-Sharing System, announced in July 1974, combines Editor, a new Command and Edit (CANDE) language for terminal user communications, and the BASIC programming language into a time-sharing facility that operates concurrently with other modes of operation under control of the MCP operating system. Support for on-line program development and maintenance in COBOL, FORTRAN, and BPL is also provided. The Editor language permits terminal users to enter symbolic programs as permanent disk files, compile and execute the programs, load and update previously created symbolic programs, and perform various other operations. An edited file can be a source language file for the BASIC compiler or a data file. Both the BASIC and Editor modules are re-entrant to allow their use by multiple users. The BASIC compiler includes a powerful file handling capability that permits up to 16 data files to be opened by one program at a time and provides string variable operators and functions for problem solving. A DEBUG facility permits the time-sharing user to perform interactive program debugging and to trace his program during execution.

The Time-Sharing System operates under control of the Time-Sharing Monitor extension of MCP, which controls swapping of user data areas, overlaying of programs, and user accounting functions. The estimated MCP residence requirement for a time-sharing system is 64K bytes, including a time-sharing handler and tables. Editor requires 22.5K bytes of memory, the BASIC translator occupies 22.5K bytes, the BASIC code generator requires 22.5K bytes, and the BASIC interpreter requires 37.5K bytes. Burroughs estimates that the total main memory requirements (including MCP) for servicing 20 users are 114.5K bytes for compilation and execution of BASIC programs and 129.5K bytes when extensive debugging aids are required for program development.

NETWORK DEFINITION LANGUAGE: NDL enables users to generate customized data communications control programs. The NDL generator runs on a B 2700/3700/4700 system and produces communications control programs for the 774 Communications Processor. It can also be used to develop a Message Control System for the host processor that interfaces to a 774 and/or to the Single-Line and Multi-Line Communications Controls. Alternatively, a user-developed Message Control System can be written in COBOL or the Burroughs Program Language (BPL). The NDL compiler requires a minimum of 90K bytes of main memory.

UTILITY ROUTINES: A Sort Program Generator accepts parameters entered by the user and generates disk or tape sort programs tailored to meet his specific requirements. It can also utilize the "intrinsic sort" capability of the MCP to perform immediate sorts without generating specialized programs. When disk units are used to hold the work files, either a tag sort or a full-record sort can be performed. For tape sorting, from 3 to 8 tape units can be used. A merge capability permits from 2 to 8 properly sequenced input files to be combined into a single output file.

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

The Source Language Library Maintenance system facilitates the maintenance of source-language programs residing on magnetic tape files. The system provides facilities for either temporary or permanent program changes, for test compilations and executions, and for program listings.

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

Burroughs offers a number of conversion programs designed to assist users in converting from other Burroughs and competitive computers to the B 2700/3700/4700 systems. Translation programs are available to facilitate conversions from (1) Burroughs B 500 or B 5500 COBOL to B 2700/3700/4700 COBOL; (2) Burroughs B 300/500 Basic or Advanced Assembler to B 2700/3700/4700 Assembler; (3) Burroughs B 300/500 Basic and Advanced Assembler to B 2700/3700/4700 COBOL; (4) IBM System/360 RPG and RPG II to B 2700/3700/4700 COBOL; (5) IBM 1400 Series Autocoder or SPS to B 2700/3700/4700 COBOL; (6) UNIVAC (ex-RCA) Series 70 COBOL or BAL to B 2700/3700/4700 COBOL; (7) Honeywell Series 200/2000 COBOL to B 2700/3700/4700 COBOL; (8) Honeywell Series 200 Easycoder to B 2700/3700/4700 COBOL; and (9) NCR Century Series NEAT/3 Level 1 to B 2700/3700/4700 COBOL.

APPLICATION PROGRAMS: The steadily expanding array of Burroughs applications software for the B 2700/3700/4700 systems currently includes the following facilities:

Advanced Linear Programming System (ALPS)
Assist (integrated statistical system)
Burroughs Hospital Administrative System (BHAS)
Burroughs Inventory Control System (BICS)
Burroughs Numerical Control System (ADAPT)
Burroughs On-Line Order Entry System
Commercial Bank Item Processing System
Central Information File System ►

Burroughs B 2700, B 3700, & B 4700

▶ Commercial Loan Accounting System
Demand Deposit System
Federal Reserve Bank Item Processing System
GASP (FORTRAN-based discrete-change simulation language)
Installment Loan System
Materials Requirements Planning
On-Line Financial System (savings and loan)
On-Line Wholesale Distribution Package
Personal Trust System
Production Control System (PCS)
Production Planning and Scheduling
Project Oriented Management Information System (PROMIS)
Time Deposit System.

PRICING

In November 1975 Burroughs announced increases in the purchase, lease, and maintenance prices for its computer product line. Lease prices for the small-scale B 1700 systems were increased by 2.5 percent, and both purchase and lease prices on the medium- and large-scale computers were increased by 2.5 to 4 percent. Both purchase and lease prices for peripheral products and associated controllers were increased 3.5 percent to 4 percent. Maintenance charges for most products were increased by an average of 9 percent. These increases are *not* reflected in the system prices that follow because the new price list was not available at our press deadline.

EQUIPMENT: The following systems are representative of the types of B 2700/3700/4700 systems that are likely to be commonly installed and are supported by the standard Burroughs software. All necessary control units and exchange units are included in the indicated prices. The quoted rental prices are for the basic one-year lease and include equipment maintenance.

BASIC B 2771 TAPE/DISK SYSTEM: Consists of 60K B 2771 Central Processor with 6 I/O channels, Console with Printer and Keyboard, 8 million bytes of 20-millisecond Systems Disk storage, B 9381-12 dual-drive Magnetic Tape Cluster (18 KB), 600-cpm Card Reader, 150-cpm Card Punch, and 475-lpm Printer. Monthly rental and purchase prices are approximately $6,500 and $276,900, respectively.

B 3741 TAPE DISK SYSTEM: Consists of 100K B 3741 Central Processor with 8 I/O channels, Console and Printer and Keyboard, 8 million bytes of 20-millisecond Systems Memory, B 9383-6 Dual-Drive Disk Subsystem (174.4 million bytes), two B 9495-5 Magnetic Tape Units (120 KB) and control, 860-lpm Printer with 132 positions, 800-cpm Card Reader, and 150-cpm Card Punch. Monthly rental and purchase prices are approximately $10,800 and $500,000, respectively.

B 4771 TAPE/DISK SYSTEM: Consists of 250K B 4771 Central Processor with 8 I/O channels and Floating Point Arithmetic option, Operator Display Console, B 9373-3

Disk File storage (20 million bytes), B 9383-6 Dual Drive Disk System (523.2 million bytes), four B 9495-2 Magnetic Tape Units (120 KB) and control, 1,100-lpm Printer with 132 positions, 1,400-cpm Card Reader, and 300-cpm Card Punch. Monthly rental and purchase prices are approximately $20,600 and $928,900, respectively.

B 4790 TAPE/DISK SYSTEM: Consists of 400K B 4790 Central Processor with 20 I/O channels and Floating Point Arithmetic Option, Operator Display Console, B 9373-3 Disk File storage (20 million bytes), B 9383-8 Dual Disk Drive system (872 million bytes), eight B 9495-5 Magnetic Tape Units (320 KB), two 1,100-lpm Printers with 132 positions, 1,400-cpm Card Reader, and 300-cpm Card Punch. Monthly rental and purchase prices are approximately $33,000 and $1,523,400, respectively.

SOFTWARE: On May 4, 1972, Burroughs announced a Program Products marketing plan covering most of the application programs and certain program development aids and utility routines for the B 2700/3700/4700 systems. The Program Products are offered under either an Un-limited-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. The B 2700/3700/4700 Master Control Program, compilers, and all other software facilities not classified as Program Products are still available to users at no extra cost.

TECHNICAL SUPPORT: The B 2700/3700/4700 hardware prices include "normal and reasonable" technical support to assist in training and advising the customer in the use of his system.

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. (No 176-hour nor Measured Time Usage lease plans are available for the B 2700/3700/4700 systems.)

In addition to the standard 1-year lease, Burroughs offers 3-year and 5-year leases at prices 7 and 11 percent lower, respectively, than the 1-year lease prices shown in the equipment price list. A 5-year lease plan providing un-limited maintenance coverage (24 hours/day, 7 days/week) is available at a 7 percent discount from the 1-year lease price.

All lease plans may include Option to Purchase provisions, which 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. ∎

Burroughs B 2700, B 3700, & B 4700

EQUIPMENT PRICES

NOTE: The following prices do not reflect the price increases announced by Burroughs in November 1975 because the new prices were not available from Burroughs as of our press deadline. Purchase and lease prices were raised 2.5 to 4 percent for the medium-scale computers and 3.5 to 4 percent for peripheral products and controllers. Maintenance charges for most products were increased by an average of 9 percent.

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
B 2700 PROCESSORS AND MAIN STORAGE				
B 2731†	Central Processor, 6 I/O Channels, and 30KB Core Memory	75,020	186.00	1,675
B 2751†	Central Processor, 6 I/O Channels, and 30KB Core Memory	143,680	186.00	3,043
B 2771-1	Central Processor, 6 I/O Channels, 60KB Core Memory, Systems Disk (8 million bytes, 20 msec), DFEU, and Systems Disk Control	170,907	459.00	3,746
B 2098	Optional Independent Auxiliary Power Cabinet (for File Protect Memory and/or Disk File or Magnetic Tape Exchange units)	12,000	11.00	250
B 2099	Floating-Point Arithmetic feature	4,800	7.80	54
B 2301	Additional Type A I/O Channel	1,296	5.60	27
B 2302	Additional Type B I/O Channel	2,592	11.00	54
B 2342	Console (standing-level; required with all systems)	720	—	15
B 2340-1	Console Printer Control	3,888	16.60	81
B 9340	Console Printer and Keyboard	2,640	17.90	55
B 2341	Operator Display Console Control	10,800	21.00	225
B 9340-1	Operator Display Console	9,548	38.10	217
Memory Expansion Modules for B 2731/2751:				
B 2001-2†	Expansion to 40,000 bytes	13,060	11.00	305
B 2002-2†	Expansion to 50,000 bytes	26,120	16.60	610
B 2003-2†	Expansion to 60,000 bytes	39,180	23.20	915
Memory Expansion Modules for B 2771-1:				
B 2099-2	Expansion to 90,000 bytes	25,380	23.20	540
B 2012-2	Expansion to 120,000 bytes	50,760	45.30	1,080
B 2015-2	Expansion to 150,000 bytes	76,140	68.40	1,620
B 2018-2	Expansion to 180,000 bytes	104,340	103.00	2,220
B 2021-2	Expansion to 210,000 bytes	132,540	136.00	2,820
B 2024-2	Expansion to 240,000 bytes	160,740	170.00	3,420
B 2030-2	Expansion to 300,000 bytes	217,140	238.00	4,620
B 3700 PROCESSORS AND MAIN STORAGE				
B 3721	Central Processor, 100 KB IC Memory, I/O Subsystem, and 8 I/O Channels, expandable to 10	126,800	339.00	3,170
B 3305	Additional Peripheral Control Cabinet; allows 10 additional channels	22,000	32.00	550
B 3306	Extended Power Module	20,000	28.00	500
B 3741-1	Central Processor, 100KB IC Memory, 8 I/O Channels, Systems Disk (8 million bytes, 20 msec), DFEU, and Systems Disk Control	223,500	607.00	4,805
B 3771	Central Processor, 100KB IC Memory, and 8 I/O Channels	248,119	379.00	5,371
B 3772	Two Central Processors, each with 100KB IC Memory; 18 I/O Channels, 2 Disk File Controls and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	554,870	950.00	11,926
B 3098	Optional Independent Auxiliary Power Cabinet (for File Protect Memory and/or Disk File or Magnetic Tape Exchange units)	12,000	11.60	250
B 3099	Floating-Point Arithmetic feature	7,200	11.60	150
B 3301	Additional Type A I/O Channel	3,360	11.60	70
B 3302	Additional Type B I/O Channel	4,560	11.60	95
B 3342	Console (standing-level; required with all systems)	1,440	—	30
B 3340-1	Console Printer Control	6,480	17.30	135
B 9340	Console Printer and Keyboard	2,640	20.00	55
B 3341	Operator Display Console Control	10,800	22.00	225
B 9340-1	Operator Display Console	9,548	38.10	217
Memory Expansion Modules for B 3741/3771/3772:				
B 3015-1	Expansion to 150,000 bytes	23,100	34.20	500
B 3020-1	Expansion to 200,000 bytes	46,200	68.40	1,000
B 3025-1	Expansion to 250,000 bytes	69,300	103.00	1,500
B 3030-1	Expansion to 300,000 bytes	92,400	137.00	2,000
Memory Expansion Modules for B 3771/3772:				
B 3035-2	Expansion to 350,000 bytes	115,500	171.00	2,500
B 3040-2	Expansion to 400,000 bytes	138,600	205.00	3,000
B 3045-2	Expansion to 450,000 bytes	161,700	239.00	3,500
B 3050-2	Expansion to 500,000 bytes	184,800	273.00	4,000
B 4700 PROCESSORS AND MAIN STORAGE				
B 4704-1†	Central Processor, 150KB Core Memory, and 8 I/O Channels	284,408	421.00	6,156
B 4711-1†	Central Processor, 150KB Core Memory, 10 I/O Channels, 1 Disk File Control and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	356,157	625.00	7,652

*Rental prices include equipment maintenance.
†Subject to availability.

Burroughs B 2700, B 3700, & B 4700

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
B 4700 PROCESSORS AND MAIN STORAGE (continued)				
B 4712-1†	Two Central Processors, each with 150KB Core Memory; 18 I/O Channels, 2 Disk File Controls and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	545,422	1,075.00	11,734
B 4713-1†	Three Central Processors, each with 150KB Core Memory; 26 I/O Channels, 3 Disk File Controls and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	848,448	1,525.00	18,279
B 4714-1†	Four Central Processors, each with 150KB Core Memory; 34 I/O Channels, 4 Disk File Controls and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	1,151,475	1,976.00	24,819
B 4708†	Central Processor, 150KB Core Memory, and 8 I/O Channels	299,376	443.00	6,480
B 4731†	Central Processor, 150KB Core Memory, 10 I/O Channels, 1 Disk File Control and 1 Exchange, File, File Protect Memory, and Auxiliary Power Cabinet	371,121	625.00	7,976
B 4732†	Two Central Processors, each with 150KB Core Memory; 18 I/O Channels, 2 Disk File Controls and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	569,371	1,119.00	12,253
B 4733†	Three Central Processors, each with 150KB Core Memory; 26 I/O Channels, 3 Disk File Controls and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	887,366	1,591.00	19,116
B 4734†	Four Central Processors, each with 150KB Core Memory; 34 I/O Channels, 4 Disk File Controls and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	1,205,361	2,064.00	25,985
B 4771	Central Processor, 150KB IC Memory, and 8 I/O Channels	320,490	413.00	6,912
B 4781	Central Processor, 150KB IC Memory, 10 I/O Channels, 1 Disk File Control and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	392,240	604.00	8,408
B 4782	Two Central Processors, each with 150KB IC Memory; 18 I/O Channels, 2 Disk File Controls and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	601,307	1,035.00	12,944
B 4783	Three Central Processors, each with 150KB IC Memory; 26 I/O Channels, 3 Disk File Controls and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	940,415	1,465.00	20,245
B 4784	Four Central Processors, each with 150KB IC Memory; 34 I/O Channels, 4 Disk File Controls and 1 Exchange, File Protect Memory, and Auxiliary Power Cabinet	1,279,525	1,896.00	27,540
B 4790	Central Processor, 300KB IC Memory, 16 I/O Channels, and Operator Console Table	591,360	625.00	12,800
B 4791	Central Processor, 300KB IC Memory, 20 I/O Channels, Disk File Control and Exchange, File Protect Memory, Operator Console Table, and Auxiliary Power Cabinet	657,790	819.00	14,185
B 4792	Two Central Processors, 2 I/O Subsystems with 36 I/O Channels, 2 Disk File Controls and Exchange, File Protect Memory, 2 Operator Console Tables, and Auxiliary Power Cabinet	1,029,850	1,500.00	22,225
B 4098	Optional Independent Auxiliary Power Cabinet (for File Protect Memory and/or Disk File or Magnetic Tape Exchange units)	12,000	11.90	250
B 4099	Floating-Point Arithmetic feature	7,200	11.90	150
B 4301	Additional Type A I/O Channel	3,360	11.90	70
B 4302	Additional Type B I/O Channel	4,560	11.90	95
B 4342	Console (standing-level; required with all systems)	1,440	—	30
B 4340	Console Printer Control	6,480	17.90	135
B 9340	Console Printer and Keyboard	2,640	17.90	55
B 4341	Operator Display Console Control	10,800	22.60	225
B 9340-1	Operator Display Console	9,548	38.10	217
Core Memory Expansion Modules for B 4704 through B 4734 Systems:				
B 4020-1†	Expansion to 200,000 Bytes	29,105	53.20	630
B 4025-1†	Expansion to 250,000 Bytes	58,210	106.00	1,260
B 4030-1†	Expansion to 300,000 Bytes	87,315	178.00	1,890
B 4035-1†	Expansion to 350,000 Bytes	116,420	248.00	2,520
B 4040-1†	Expansion to 400,000 Bytes	145,525	302.00	3,150
B 4045-1†	Expansion to 450,000 Bytes	174,630	355.00	3,780
B 4050-1†	Expansion to 500,000 Bytes	203,735	391.00	4,410
IC Memory Expansion Modules for B 4771 through B 4784 Systems:				
B 4020-2	Expansion to 200,000 Bytes	30,175	41.90	630
B 4025-2	Expansion to 250,000 Bytes	60,350	83.80	1,260
B 4030-2	Expansion to 300,000 Bytes	90,525	126.00	1,890
B 4035-2	Expansion to 350,000 Bytes	120,700	168.00	2,520
B 4040-2	Expansion to 400,000 Bytes	150,875	210.00	3,150
B 4045-2	Expansion to 450,000 Bytes	181,050	251.00	3,780
B 4050-2	Expansion to 500,000 Bytes	211,225	293.00	4,410
IC Memory Expansion Modules for B 4790/4791/4792 Systems:				
B 4040-5	Expansion to 400,000 bytes	58,210	79.80	1,260
B 4050-5	Expansion to 500,000 bytes	116,420	160.00	2,520
B 4060-5	Expansion to 600,000 bytes	174,630	239.00	2,780
B 4070-5	Expansion to 700,000 bytes	232,840	319.00	5,040
B 4080-5	Expansion to 800,000 bytes	291,050	399.00	6,300
B 4090-5	Expansion to 900,000 bytes	349,260	479.00	7,560
B 4100-5	Expansion to 1,000,000 bytes	407,470	559.00	8,820

*Rental prices include equipment maintenance.
†Subject to availability.

Burroughs B 2700, B 3700, & B 4700

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
HEAD-PER-TRACK DISK FILES				
B 9371-18	Systems Disk; 8 million bytes, 20 msec (includes DFEU)	28,800	237.00	606
B 9374-18	Additional Systems Disk Increment; 8 million bytes, 20 msec (max. of 4 per B 9371-18)	19,200	113.00	404
B 2373-3	Systems Disk Control (for B 2700)	10,368	13.20	216
B 3373-3/4373-3	Systems Disk Control (for B 3700/4700)	16,080	13.20	335
B 9372-12	Disk File; 10 million bytes, 20 msec (includes 1 DFEU)	57,600	232.00	1,212
B 9374-12	Additional Disk File Increment; 10 million bytes, 20 msec (max. of 4 per B 9372-12)	36,000	113.00	505
B 9373-3	Disk File; 20 million bytes, 23 msec (includes 1 DFEU)	88,800	232.00	2,015
B 9374-3	Additional Disk File Increment; 20 million bytes, 23 msec (max. of 4 per 9373-3)	38,880	141.00	545
B 9371-1	Disk File Electronics Unit (DFEU) for B 9372-12	31,200	90.40	657
B 2373-1	Disk File Control (for B 2700)	10,368	13.20	216
B 3373-1/4373	Disk File Control (for B 3700/4700)	16,080	13.20	335
B 2375-1	Disk File Combination Control (for B 2700)	12,960	13.20	270
B 3375-1/4375	Disk File Combination Control (for B 3700/4700)	19,200	13.20	400
B 2472**	Basic Disk File Exchange, N1 x N2 (up to 4 x 20 with appropriate adapters, below)	10,368	11.00	216
B 2472-5**	Control Adapter (for N1 side; up to 4 allowed)	2,592	3.40	54
B 2472-6**	DFEU Adapter (for N2 side; up to 20 allowed)	1,555	1.20	32
B 2472-7**	Exchange Extension (required for over 10 DFEU's)	7,776	11.00	162
B 2376**	File Protect Memory (16 40-bit words)	31,200	123.00	657
B 2376-1**	FPM Disk File Control Adapter (1 required per control; max. of 4)	2,880	10.00	60
B 2376-2**	FPM Memory Module (16 40-bit words)	3,600	13.20	76
DISK PACK DRIVES				
B 9383-6	Disk Storage/Single Controller (174.4 MB)	93,500	325.00	2,050
B 9383-7	Disk Storage/Dual Controller (174.4 MB)	140,500	376.00	3,000
B 9383-8	Disk Storage/Dual Controller (872.0 MB)	306,000	1,211.00	6,390
B 9486-4	Dual-Drive Increment (174.4 MB) for B 9383-6, B 9383-7, or B 9383-8	43,000	195.00	934
B 9486-45	Single-Drive Increment (87.2 MB) for B 9383-6, B 9383-7, or B 9383-8	32,500	152.00	707
B 2304**	Disk-Pack Drive Control	4,000	15.80	150
B 9974-4	Certified Disk Pack	690	—	30
B 9384-6***	Disk-Pack Drive, HPT-compatible; single controller and one dual (129.5MB) drive	93,500	347.00	2,050
B 9384-7***	Disk-Pack Drive, HPT-compatible; dual controller and one dual (129.5MB) drive	140,500	409.00	3,000
B 9384-8***	Disk-Pack Drive, HPT-compatible; dual controller and five dual (647.5MB) drives	306,000	1,242.00	6,390
B 9388-2	Dual Drive HPT-compatible increment (129.5MB) for B 9384-7 and B 9384-8 only)	43,000	222.00	934
B 2304**	Disk-Pack Drive Control	4,000	15.80	150
B 9974-4	Certified Disk Pack	690	—	30
B 9383-5	Disk Storage/Single Controller (95.5 MB)	56,000	324.00	1,325
B 9486-3	Dual Drive Increment (95.5 MB) for B 9383-5	33,600	119.00	707
MAGNETIC TAPE UNITS				
B 9381-12	2-Station Cluster, 800 bpi, 18KB	25,200	197.00	530
B 9381-13	3-Station Cluster; 800 bpi, 18KB	26,960	221.00	576
B 9381-14	4-Station Cluster; 800 bpi, 18KB	32,160	266.00	687
B 9381-22	2-Station Cluster; 800 bpi, 36KB	33,600	226.00	707
B 9381-23	3-Station Cluster; 800 bpi, 36KB	43,200	260.00	909
B 9381-24	4-Station Cluster; 800 bpi, 36KB	52,800	294.00	1,111
B 9382-12	2-Station Cluster; 1600 bpi, 36KB	29,760	226.00	626
B 9382-13	3-Station Cluster; 1600 bpi, 36KB	34,320	266.00	722
B 9382-14	4-Station Cluster; 1600 bpi, 36KB	40,560	306.00	853
B 9382-22	2-Station Cluster; 1600 bpi, 72KB	34,800	255.00	732
B 9382-23	3-Station Cluster; 1600 bpi, 72KB	45,600	294.00	960
B 9382-24	4-Station Cluster; 1600 bpi, 72KB	56,400	333.00	1,187
B 9383-12	2-Station Cluster; 800/1600 bpi, 18/36KB	30,720	255.00	646
B 9383-13	3-Station Cluster; 800/1600 bpi, 18/36KB	36,000	300.00	758
B 9383-14	4-Station Cluster; 800/1600 bpi, 18/36KB	43,200	346.00	909
B 9383-22	2-Station Cluster; 800/1600 bpi, 36/72KB	36,000	283.00	758
B 9383-23	3-Station Cluster; 800/1600 bpi, 36/72KB	48,000	328.00	1,010
B 9383-24	4-Station Cluster; 800/1600 bpi, 36/72KB	60,000	373.00	1,263
B 9390	Magnetic Tape Unit; 7 tracks, 18/50KC	15,860	164.00	333
B 9391	Magnetic Tape Unit; 7 tracks, 18/50/72KC	18,000	186.00	379
B 9392	Magnetic Tape Unit; 9 tracks, 72KB	20,400	186.00	429
B 9393-1	Magnetic Tape Unit; 9 tracks, 144KB	19,440	164.00	409
B 9393-3	Magnetic Tape Unit; 9 tracks, 240KB	24,960	175.00	525
B 9394-1	Magnetic Tape Unit; 7 tracks, 24/66/96KC	18,000	192.00	379
B 9394-2	Magnetic Tape Unit; 9 tracks, 96KB	20,400	192.00	429

* Rental prices include equipment maintenance.
** These units are for B 2700 systems; corresponding units for B 3700 and B 4700 systems are simularly priced, with "3" or "4" generally replacing "2" as first digit of model number.
*** These subsystems require 9484-6 and/or 9484-7 controller system software (see PROGRAM DEVELOPMENT AIDS).

FEBRUARY 1976

Burroughs B 2700, B 3700, & B 4700

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
MAGNETIC TAPE UNITS (Continued)				
B 9495-2	Magnetic Tape Unit; 9 tracks, 120KB	16,650	81.60	404
B 9495-3	Magnetic Tape Unit; 9 tracks, 200KB	21,100	92.60	512
B 9495-5	Magnetic Tape Unit; 9 tracks, 320KB	29,760	120.00	626
B 9495-6	Magnetic Tape Unit; 9 tracks, 400KB	34,080	188.00	717
B 9496-2	Magnetic Tape Unit; 9 tracks, 40KB	12,800	71.70	273
B 9496-4	Magnetic Tape Unit; 9 tracks, 80KB	15,300	76.10	323
B 2381-21	Cluster Control; 800 bpi, 18/36KB	19,200	13.20	400
B 3381-21/4381-11	Cluster Control; 800 bpi, 18/36KB (B3700/4700)	24,720	13.20	515
B 2381-22**	Cluster Control; 1600 bpi, 36/72KB	25,200	16.60	525
B 2381-24**	Dual Cluster Control; 800 bpi, 18/36KB	36,000	34.20	750
B 2381-25**	Dual Cluster Control; 1600 bpi, 36/72KB	43,200	34.20	900
B 2381-26**	Dual Cluster Control; 800/1600 bpi, 18/36/72KB	45,600	34.20	950
B 2391-11**	Tape Control; 7 tracks, 18/50KC	14,160	13.20	295
B 2391-13**	Tape Control; 7 tracks, 18/50/72KC	15,360	13.20	320
B 2391-14**	Tape Control; 7 tracks, 24/66/96KC	15,360	16.60	320
B 2393-11**	Tape Control; 9 tracks, 72KC	16,800	13.20	350
B 2393-12**	Tape Control; 9 tracks, 144/240KB	12,000	16.60	250
B 2393-13**	Tape Control; 9 tracks, 96KB	16,800	16.60	350
B 2394-4**	Tape Control; 9 tracks 40/80KB	15,740	58.50	325
B 2395-2**	Tape Control; 9 tracks 120/200KB	21,060	60.70	515
B 4395-5	Dual Tape Control; 9 tracks, 320/400KB (for B 4700 only)	54,000	47.50	1,125
B 4395-7	Tape Control; 9 tracks, 320/400 KB (for B 3700/4700 only)	21,060	60.70	515
B 2490-10**	Magnetic Tape Unit Exchange; 2 x 10 for B 9390/91/92	12,220	11.00	260
B 2493-1**	Common Electronics Exchange; 1 x 8, for B 9393 series only	19,920	50.80	415
B 2493-2**	Common Electronics Exchange; 2 x 8, for B 9393 series only	39,840	101.00	830
B 4495-1	Basic Electronics/Exchange; 2 x 8, for B 9495 series only	14,400	89.00	300
B 4495-2	Electronics/Exchange Extension; extendds B 4495-1 to 4 x 16	24,000	101.00	500
B 9499-10	Master Electronic Exchange; 1 x 4, for B 9495-2/3	5,500	22.10	125
B 9499-11	Master Electronic Exchange; 1 x 8, for B 9495-2/3	8,800	22.10	200
B 9499-12	Master Electronic Exchange; 2 x 8, for B 9495-2/3	13,200	47.50	300
B 9499-13	Master Electronic Exchange; 2 x 16, for B 9495-2/3	22,000	47.50	500
B 9499-14	Master Electronic Exchange; 4 x 16, for B 9495-2/3	38,400	72.80	800
B 9499-30	Master Electronic Excahnge; 1 x 4, for B 9496-2/4	5,500	22.10	125
B 9499-31	Master Electronic Exchange; 1 x 8, for B 9496-2/4	8,800	22.10	200
B 9499-32	Master Electronic Exchange; 2 x 8, for B 9496-2/4	13,200	47.50	300
B 2680-1**	7-track NRZ Control Adapter for B 2381-21, -24, or -26	2,400	11.00	50
B 9980	Unit Designate Switch for B 9381 series Tape Clusters	480	1.20	10
B 9989	7-track NRZ Station Adapter for B 9381 series Tape Clusters	2,400	11.00	50
OTHER INPUT/OUTPUT UNITS				
B 9110	Card Reader; 200 cpm	8,400	47.70	177
B 9111	Card Reader; 800 cpm	17,550	98.90	354
B 9112	Card Reader; 1400 cpm	23,325	150.00	490
B 9113	Card Reader; 475 cpm	12,480	83.40	303
B 2110-2	Card Reader Control (B 2700)	2,592	8.80	54
B 3110-2/4110	Card Reader Control (B 3700/4700)	3,360	9.24	70
B 9117	Card Counter (for B 9111, 9112 or 9113)	240	—	—
B 9118	Postal Money Order feature (for B 9111, 9112, or 9113)	1,440	5.00	30
B 9119	40-Column Read Switch (for 9111, 9112, or 9113)	190	—	—
B 9115	Card Reader; 30 cpm	4,500	27.60	111
B 9116	Card Reader; 600 cpm	6,500	38.60	197
B 9117	Card Reader; 800 cpm	9,000	47.50	253
B 2110-5**	Card Reader Control (for B 9115/9116/9117)	3,150	8.80	66
B 9210	Card Punch; 100 cpm	12,000	77.40	253
B 9212	Card Punch; 150 cpm	20,640	125.00	434
B 9213	Card Punch; 300 cpm	25,440	160.00	535
B 2212-2	Card Punch Control (B 2700)	2,592	8.80	54
B 3212-2/4212	Card Punch Control (B 3700/4700)	3,360	9.20	70
B 2610	BCL-BCL Code Translator (for B 2212-2)	720	5.60	15
B 3610	BCK-BCL Code Translator (for B 3212-2 or 4212)	960	5.60	20
B 9120	Paper Tape Reader; 500-1000 cps	16,000	83.40	303
B 2120-2	Paper Tape Reader Control (B 2700)	2,592	8.50	54
B 3120-2/4120	Paper Tape Reader Control (B 3700/4700)	3,360	9.20	70
B 9926	Input Code Translator	6,960	11.90	145
B 9220	Paper Tape Punch; 100 cps	15,300	77.40	263
B 92220-2	Paper Tape Punch Control (B 2700)	2,592	8.00	54
B 9220-2/4220	Paper Tape Punch Control (B 3700/4700)	3,360	8.00	70
B 9928	Output Code Translator	6,850	11.90	131
B 9240-4	Printer; 475 lpm, 120 positions	17,500	197.00	435
B 9240-5	Printer; 700 lpm, 120 positions	29,000	204.00	585
B 9242-1	Printer; 860 lpm, 120 positions	48,575	210.00	872
B 9242-2	Printer; 725 lpm, 120 positions, OCR A	48,575	210.00	872
B 9242-3	Printer; 725 lpm, 120 positions, OCR B	48,575	210.00	872
B 9243-1	Printer; 1100 lpm, 120 positions	48,850	234.00	987
B 9243-2	Printer; 900 lpm, 120 positions, OCR A	48,850	234.00	987
B 9243-3	Printer; 900 lpm, 120 positions, OCR B	48,850	234.00	987
B 9242-11	Printer; 860 lpm, 120 positions	50,400	222.00	919
B 9242-12	Printer; 725 lpm, 120 positions, OCR A	50,400	222.00	919
B 9242-13	Printer; 725 lpm, 120 positions, OCR B	50,400	222.00	919

* Rental prices include equipment maintenance.
** These units are B 2700 systems; corresponding units for B 3700 and B 4700 systems are
simularly priced with "3" or "4" generally replacing "2" as first digit of model number.

Burroughs B 2700, B 3700, & B 4700

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
OTHER INPUT/OUTPUT UNITS (Continued)				
B 9243-11	Printer; 1100 lpm, 120 positions	50,750	246.00	1,025
B 9243-12	Printer; 900 lpm, 120 positions, OCR A	50,750	246.00	1,025
B 9243-13	Printer; 900 lpm, 120 positions, OCR B	50,750	246.00	1,025
B 9246-2	Printer; 1800 lpm, 132 positions	65,000	326.00	1,566
B 2240-1	Printer Control (for B 2700, with B 9943)	3,760	8.80	80
B 2242-1	Printer Control (for B 2700, without B 9943)	3,760	13.20	80
B 3240-1/4240	Printer Control (for B 3700/4700, with B 9943)	4,800	11.60	100
B 3242-1/4242	Printer Control (for B 3700/4700, without B 9943)	4,800	11.60	100
B 9940	High-Speed Slew (for B 9242/9243 Printers)	3,000	23.80	60
B 9941	12 Additional Print Positions (for all 120-position printers)	2,000	11.90	40
B 9943	Printer Memory (for B 9242/9243 Printers)	4,800	11.90	100
B 9247-3	Train Printer; 750 lpm, 132 positions	33,000	181.00	717
B 9942-9	Additional Train Module (for B 9247-3)	3,500	19.90	66
B 2243-1**	Printer Control (for B 9247-3 and 9247-12)	9,600	22.00	200
B 9247-12	Train Printer; 400 lpm, 132 positions	49,550	139.00	1,111
B 9247-14	Train Printer; 1100 lpm, 132 positions	46,500	268.00	1,010
B 9942-10	Additional Train Module (for B 9247-14)	3,150	19.90	96
B 2247-4**	Train Printer Control (for B 9247-14)	9,600	22.00	202
B 9244-1	Master Tape Lister; 1565 lpm	67,500	379.00	1,364
B 9244-2	Slave Tape Lister; 1565 lpm	32,500	234.00	657
B 2244-1	Lister Control	3,600	8.80	75
B 3244-1/4244	Lister Control	4,800	8.80	100
B 9130	MICR Reader-Sorter; 1565 dpm, 13 pockets	90,720	595.00	1,909
B 9131	MICR Reader-Sorter; 1565 dpm, 13 pockets	91,200	595.00	1,919
B 9131-1	MICR Reader-Sorter; 1000 dpm, 13 pockets	57,600	536.00	1,212
B 9132	MICR Reader-Sorter; 1565 dpm, 16 pockets	105,600	732.00	2,222
B 9134-1	MICR/OCR Reader-Sorter; 1625 dpm, 4 pockets	49,200	388.00	1,035
B 2130-6	MICR Reader-Sorter Control (for B 9130, 9131, 9131-1, & 9132)	4,935	16.60	105
B 3130-6/4130	MICR Reader-Sorter Control (for B 9130, 9131, 9131-1, & 9132)	6,480	16.60	135
B 9932	Endorser (for B 9131, 9131-1, & 9132)	9,000	59.50	200
B 9933	Extended Sort Control (for B 9130, 9131, & 9131-1)	2,400	17.90	50
B 9937	Validity Checking (for B 9130, 9131, 9131-1, & 9132)	450	—	10
B 2130-7	Reader-Sorter Control (for B 9134-1; MICR only)	4,800	16.60	100
B 2130-8	Reader-Sorter Control (for B 9134-1; MICR/OCR)	7,200	16.60	150
B 3130-7/4130-1	Reader-Sorter Control (for B 9134-1; MICR only)	6,240	16.60	130
B 3130-8/4130-2	Reader-Sorter Control (for B 9134-1; MICR/OCR)	9,360	16.60	195
B 9932-1	Endorser (1625 dpm, for B 9134-1)	9,000	59.50	202
B 9935-1	Expansion Feature (for over 16 pockets on B 9134-1)	4,800	11.90	101
B 9935-2	Four-Pocket Module (pockets 5-16 on B 9134-1)	14,400	41.70	303
B 9935-3	Four-Pocket Module (pockets 17-32 on B 9134-1)	14,400	41.70	303
B 9938-1	Multi-Track E 13B Feature (for B 9134-1)	18,000	65.50	379
B 9938-6	Numeric OCR A (size 1) Optical Character Recognition System (for B 9134-1; uses Dual Read Option, below)	46,000	141.00	1,010
B 9938-9	Dual Read Option (for B 9134-1)	7,200	29.80	152
B 9410	Peripheral Switching Unit (basic switch)	7,200	17.90	152
B 9410-1	Switch Relay Module	1,440	3.60	30
DATA COMMUNICATIONS CONTROLS				
B 2351-2	Single-Line Control (for B 2700)	6,110	15.40	130
B 3351-2/4351	Single-Line Control (for B 3700/4700)	8,160	16.20	170
B 2352-1	Binary Synchronous Single-Line Control (for B 2700)	20,160	27.60	420
B 3352-1/4352-1	Binary Synchronous Single-Line Control (for B 3700/4700)	24,960	27.60	520
B 2352-2	Broadband Single-Line Control (for B 2700)	23,520	38.60	490
B 3352-2/4352-2	Broadband Single-Line Control (for B 3700/4700)	27,190	38.60	590
B 2352**	Data Communications Processor Control	12,240	33.10	255
B 2353-1**	Basic Multi-Line Control	23,040	34.20	480
B 2354-1**	8-Channel Extension for Multi-Line Control	7,200	11.00	150
Communications Line Adapters for B 2700 Systems:				
B 2651-1	For Typewriter Inquiry Station	1,440	5.60	31
B 2652-3	For TXW/Remote Typewriter	1,440	5.60	31
B 2652-4	For TWX/Remote Typewriter with ADO	2,160	11.00	47
B 2653-5	For B 2500/3500/2700/3700/4700	2,400	5.60	53
B 2653-6	For B 2500/3500/2700/3700/4700 with ADO	3,290	11.00	71
B 2654-3	For UNIVAC DCT 2000	4,230	5.60	91
B 2654-4	For UNIVAC DCT 2000 with ADO	4,935	11.00	106
B 2655-3	For IBM 1050	3,055	5.60	66
B 2655-4	For IBM 1050 with ADO	3,760	11.00	81
B 2656-2	For IBM 1030	2,400	5.60	53
B 2657-1	For Teletype Model 35 or 8A1 Selective Call Service	1,440	5.60	31
B 2662-1	For Typetype Model 28 on 83B3 Service	1,920	5.60	40
B 2663-1	Audio Dual Line Adapter (for B 2354-1)	5,170	16.60	101
B 2667-1	Burroughs Standard Adapter—Direct Connect	2,115	5.60	45
B 2667-2	For TU 100—Direct Control	1,440	5.60	30
B 2667-5	Burroughs Standard Adapter—Asynchronous	2,400	5.60	5
B 2667-6	For B 606 and/or TC 700 (with MLC only)	2,585	5.60	5
B 2667-7	For TU 100—Modem Connect	1,680	5.60	35
B 2667-10	Burroughs Standard Adapter—Synchronous	3,055	5.60	66
B 2667-15	Automatic Dial-Out for B 2667-5 and -10	720	4.40	15
B 2667-16	Speed Adapter, for up to 1800 bps on B 2667-1 and -5	720	5.60	15
B 2667-17	Speed Adapter, for up to 2400 bps on B 2667-1	1,440	5.60	30
B 2667-18	Speed Adapter, for up to 4800 bps on B 2667-1 and -10	1,920	5.60	40
B 2667-19	Speed Adapter, for up to 9600 bps on B 2667-1	2,400	5.60	50

* Rental prices include equipment maintenance.
**These units are for B 2700 systems; corresponding units for B 3700 and B 4700 systems are simularly priced, with "3" or "4" generally replacing "2" as first digit of model number.

Burroughs B 2700, B 3700, & B 4700

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Rental (1-year lease)*
DATA COMMUNICATIONS CONTROLS (Continued)				
Communications Line Adapters for B 3700/4700 Systems:				
B 3651-1/4651	For Typewriter Inquiry Station	1,920	5.60	40
B 3652-3/4652-1	For TWX/Remote Typewriter	1,920	5.60	40
B 3652-4/5652-2	For TWX/Remote Typewriter with ADO	2,640	11.60	56
B 3653-5/4653-1	For B 2500/3500/2700/3700/4700	3,264	11.60	69
B 3653-6/4653-2	For B 2500/3500/2700/3700/4700 with ADO	3,840	11.60	81
B 3654-3	For UNIVAC DCT 2000	4,230	5.60	91
B 3654-4	For UNIVAC DCT 2000 with ADO	4,935	11.60	106
B 3655-3	For IBM 1050	3,055	5.60	66
B 3655-4	For IBM 1050 with ADO	3,760	11.60	82
B 3656-2/4656-1	For IBM 1030	3,360	11.60	71
B 3657-1/4657	For Teletype Model 35 on 8A1 Service	1,920	5.60	40
B 3662-1/4662	For Teletype Model 28 on 83B3 Service	2,640	5.60	56
B 3663-1/4663	Audio Dual Line Adapter	4,800	11.60	110
B 3667-1/4665-1	Burroughs Standard Adapter—Direct Connect	2,640	5.60	56
B 3667-2/4665-2	For TU 100—Direct Connect	1,440	5.60	30
B 3667-5/4665-5	Burroughs Standard Adapter—Asynchronous	3,264	8.10	69
B 3667-6/4665-6	For B 606 and/or TC 700 (with MLC only)	2,400	5.60	53
B 3667-7/4665-7	For TU 100—Modem Connect	1,680	8.10	35
B 3667-10/4665-10	Burroughs Standard Adapter—Synchronous	3,840	8.10	81
B 3667-15/4665-15	Automatic Dial-Out for B 3667-5, 3667-10, 4665-5, and 4665-10	720	1.20	15
B 3667-16/4665-16	Speed Adapter, for up to 1800 bps on B 3667-1, 3667-5, 4665-1, and 4665-5	720	1.20	15
B 3667-17/4665-17	Speed Adapter, for up to 2400 bps on B 3667-1 and 4665-1	1,440	1.20	30
B 3667-18/4665-18	Speed Adapter, for up to 4800 bps on B 3667-1, 3667-5, 4665-1, and 4665-5	1,920	3.50	40
B 3667-19/4665-19	Speed Adapter, for up to 9600 bps on B 3667-1 and 4665-1	2,400	3.50	50
B 9350	Typewriter Inquiry Station	2,640	12.00	56
B 2355-1**	Voice Response Generator	37,200	35.30	803
B 9955-1	Audio Recording (Special)	2,575	—	—
B 9955-2	Audio Recording (Library)	750	—	—
B 774 SYSTEM AND COMMUNICATIONS PROCESSOR				
B 774-1	System and Communications Processor; includes microprogrammed processor (1.7MHz), 12,288 bytes control storage, integrated host interface, 32-line adapter	29,900	105.00	678
B 0001-8	8,192 Bytes IC Memory (for B 774-1)	4,400	8.80	101
B 0001-12	12,288 Bytes IC Memory	6,160	13.20	141
B 0001-16	16,384 Bytes IC Memory	7,920	17.70	182
B 0001-20	20,480 Bytes IC Memory	9,680	22.10	222
B 0001-24	24,567 Bytes IC Memory	11,440	26.50	263
B 0001-28	28,672 Bytes IC Memory	13,200	30.90	303
B 0001-32	32,768 Bytes IC Memory	14,960	35.30	343
B 0001-40	40,960 Bytes IC Memory	23,100	66.20	530
B 0001-48	49,152 Bytes IC Memory	26,620	75.00	611
B 0001-64	65,536 Bytes IC Memory	34,100	92.60	783
B 0001-80	81,920 Bytes IC Memory	41,800	110.00	960
B 0001-96	98,304 Bytes IC Memory	49,500	128.00	1,136
B 0551-1	Two-Wire Direct Connect Dual Adapter; to 9600 bps each	1,540	3.40	35
B 0551-5	Asynchronous Data Set Connect Dual Adapter; to 1800 bps each	1,540	3.40	35
B 0551-10	Synchronous Data Set Connect Dual Adapter; to 9600 bps each	3,080	6.70	71
B 0551-15	Automatic Dial-Out Dual Adapter	2,200	5.60	51
B 2303**	B 774 Control (connects B 774 to a B 2700/3700/4700 processor)	4,400	11.10	100

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Burroughs B 2700, B 3700, & B 4700

SOFTWARE PRICES

		UNLIMITED TIME PLAN			LIMITED-TIME PLANS	
		Single Payment	12 Monthly Payments	Annual Maint. Charge	Monthly Fee (3-Year Plan)	Monthly Fee (5-Year Plan)
FINANCIAL MANAGEMENT SYSTEMS						
PTS	Personal Trust	30,000	2,750	900	900	864
CUS	Credit Union	20,000	1,835	600	600	576
TDS	Time Deposit	7,500	690	100	100	96
IPS	Commercial Bank Item Processing System	9,720	891	216	216	207
LCB	Large Commercial Bank Item Processing System I	14,040	1,296	324	324	311
LCS	Large Commercial Bank Item Processing System II	19,980	1,836	486	486	466
FRB	Federal Reserve Bank Item Processing System I	14,040	1,296	324	324	311
FRS	Federal Reserve Bank Item Processing System II	19,980	1,836	486	486	466
AIC	IPS Automatic Item Correction	1,080	102	27	27	25
TIM	Total Information File Manager	9,000	825	250	250	240
TII	Total Information File Inquiry	7,000	650	200	200	192
OFS	On-Line Financial Structure	9,000	825	250	250	240
OTP	Transaction Processor	3,500	320	100	100	96
OGL	On-Line General Ledger	4,000	370	100	100	96
CBS	Commercial Banking System	44,900	4,120	1,080	1,080	1,040
INDUSTRIAL MANAGEMENT SYSTEMS						
PRT	PROMIS Time	5,000	460	150	150	144
OES	Order Entry (no ongoing maintenance)	15,000	1,375	NA	NA	NA
NCS	APT III	6,300	580	150	150	144
BIA	Burroughs Inventory Control System Analysis	12,600	1,160	300	300	290
BIC	Burroughs Inventory Control System Control	8,400	770	200	200	192
PCE	Engineering Data Control	4,500	415	100	100	96
PCR	Requirements Planning	4,500	415	100	100	96
PCI	Production Control System Inventory	4,500	415	100	100	96
PCW	Work in Process	6,000	550	140	140	135
HSA	Hospital Patient Accounting	0	0	0	0	0
HSB	Hospital Medicare Billing	0	0	0	0	0
HSG	Hospital General Ledger	0	0	0	0	0
HSR	Hospital Medical Records	2,200	200	50	50	48
SCHOLASTIC						
SSR	Student Records System	2,700	250	75	75	72
SSI	School Scheduling System	5,000	460	150	150	144
TSS	Test Screen System	3,400	310	95	95	91
SFS	School Financial System	3,600	330	100	100	96
SCIENTIFIC PROGRAM PRODUCTS						
AST	Assist	7,350	675	175	175	168
ALP	ALPS (provided on an "as is" basic)	0	0	0	0	0
GAS	GASP	3,150	290	75	75	72
PROGRAM PRODUCT DEVELOPMENT AIDS						
REP	Reporter	3,000	275	75	75	72
NDL	Network Definition Language Compiler	2,000	180	150	50	48
FOT	Disk FORTE II	11,000	1,808	275	275	264
POL	Problem Oriented Language Generator	5,000	460	125	125	120
BOI	UNIVAC Series 70 BAL to Burroughs COBOL Translator	12,600	1,155	350	350	—
FIO	UNIVAC Series 70 COBOL to Burroughs COBOL Translator	5,400	495	150	150	—
HNI	Honeywell COBOL to Burroughs COBOL Translator	3,600	330	100	100	—
9484-6	Head-per-track compatible controller system software (for B 9384-6)	12,900	1,183	129	300††	—
9484-7	Head-per-track compatible controller system software (for B 9384-7 and B 9384-8)	25,800	2,365	258	600††	—

†† For 1-year plan.