

# Burroughs B 2900, B 3900, and B 4900

## MANAGEMENT SUMMARY

The B 2900 and B 3900 Series systems represent the medium-scale members of Burroughs "900 Series" of computer systems, with regard to processor performance. The B 2925 offers twice the memory capacity of the previous B 2910. The B 3955 provides a 47 percent reduction in floor space requirements and a 25 percent reduction in power and air conditioning requirements over the previous B 3950.

The B 4925, introduced in January 1984, is fully compatible with the B 2900 and B 3900 systems. Within Burroughs' product line, it fits between the B 3955 and the B 4955 in terms of processor performance. When compared with IBM's product line, the B 4925's performance falls between that of the 4361 Model Group 5 and the 4381 Model Group 1, according to Burroughs.

The top-of-the-line B 4955 is also compatible with the B 2900 and B 3900 systems; however, in terms of performance, the B 4955 fits between Burroughs' large-scale B 6900 and B 7900 systems and between IBM's 4381 Model Group 1 and Model Group 2.

According to Burroughs, the B 3955 provides a 50 percent performance improvement over the B 2925. The B 4925 provides a 50 percent performance improvement over the B 3955 and the B 4955 provides a 60 percent performance increase over the B 4925.

The B 2900, B 3900, and B 4900 systems feature asynchronous pipelined architecture, which Burroughs calls "micro-modular concurrent" architecture. Each central processor is composed of a series of processing elements that can operate concurrently to perform such operations as instruc-

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

**MODELS:** B 2925, B 3955, B 4925 and B 4955.

**CONFIGURATION:** From 1 to 4 CPUs, 1 to 5 megabytes of main memory, 6 to 64 DLPs, and up to 288 communications lines.

**COMPETITION:** Honeywell DPS 7 and DPS 8, IBM 4300 Series, IPL Systems 4400 Series and Sperry System 80 and 1100/60.

**PRICING:** Purchase prices for Central Systems range from \$125,000 to \$780,000.

## CHARACTERISTICS

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

**MODELS:** B 2925, B 3955, B 4925 and B 4955.

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

**DATE ANNOUNCED:** See Table 1.

**DATE OF FIRST DELIVERY:** B 2925—first quarter 1983; B 3955—fourth quarter 1981; B 4925—second quarter 1984; B 4955—third quarter 1983.



*The B 4955 computer system, pictured in the foreground, is available in either single or multiple processor configurations. Through a Shared System Processor (SSP), up to four processors can be connected to share common disk data files. The B 3955, pictured in the background, is available with two to five megabytes of main memory.*

## Burroughs B 2900, B 3900, and B 4900

▷ tion prefetch and data address calculation, data fetching and manipulation, instruction execution, and independent I/O initiation and transfer.

The Input/Output Processor (IOP) initiates data transfers between the memory and peripheral subsystems asynchronously and independently of the central processor. The IOP is interfaced to the peripheral subsystems through Data Link Processors (DLPs). Each DLP is an independent microprocessor programmed to service a specific category of peripheral devices.

The basic B 2925 system includes one megabyte of main memory, an operator keyboard/display terminal, a DLP base and two 5¼-inch minidisk (diskette) drives. One minidisk drive is used for data loading or unloading. Four DLPs are standard. The B 2925 can be field upgraded to a B 3955.

The basic B 3955 system includes two megabytes of main memory, an operator keyboard/display terminal, two DLP bases, six DLPs, and two 5¼-inch minidisk drives. The system is expandable to five megabytes of main memory and 32 DLPs.

The basic B 4925 system includes 2.5 megabytes of main memory, expandable to five megabytes. The central system also includes an operator display terminal, two 5¼-inch minidisk drives, three DLP bases and six DLPs. The system can be expanded to include up to 32 DLPs.

The basic B 4955 system includes five megabytes of main memory. The B 4955 central system also includes an operator display terminal, two 5¼-inch minidisk drives, three DLP bases, and six DLPs. The system can be expanded to include up to 64 DLPs.

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

### PERIPHERALS AND COMMUNICATIONS

The peripheral equipment for the B 2900/B 3900/B 4900 includes mass storage media with capacities of 5.5 to 542 megabytes, magnetic tape units with data transfer rates of 80K to 200K bytes per second PE and 470K to 1250K bytes per second GCR/PE, line printers with speeds from 650 to 2000 lines per minute, a 30 page/minute nonimpact printer, card readers rated at 300 to 800 cards per minute, and

### ▶ DATA FORMAT

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

### MAIN STORAGE

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

CYCLE TIME: See Table 1.

CAPACITY: See Table 1.

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

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

### CENTRAL PROCESSOR

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

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

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

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

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

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

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

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

## Burroughs B 2900, B 3900, and B 4900

TABLE 1. Characteristics of the B 2900/B 3900/B 4900 Systems

	B 2925	B3955	B 4925	B 4955
<b>CENTRAL PROCESSORS</b>				
Date of introduction	March 1983	September 1982	January 1984	September 1982
Number of Processors per system	1 to 4	1 to 4	1 to 4	1 to 4
Relative Performance	1.0	1.6	2.5	4.0
Field Upgradeability	3955	—	4955	—
<b>MAIN STORAGE</b>				
Type	64K-bit MOS	64K-bit MOS	64K-bit MOS	64K-bit MOS
Cycle time, nanoseconds	571	571	440	440
Minimum capacity, bytes	1,048,576	2,097,152	2,621,442	5,242,884
Maximum capacity, bytes	2,097,152	5,242,884	5,242,884	5,242,884
Increment size, bytes	1,048,576	1,048,576	2,621,442	None
Bytes fetched per cycle	4	4	5	5
Error correction	Standard	Standard	Standard	Standard
Interleaving	No	No	2-way	4-way
<b>I/O AND COMMUNICATIONS</b>				
Number of DLPs	6 to 16	7 to 32	6 to 32	6 to 64
Aggregate I/O data rate, bytes per second	7,000,000	7,000,000	8,000,000	16,000,000
Number of B 874 SCPs per CPU	Up to 10	Up to 10	Up to 10	Up to 10
Communications lines per B 874	Up to 32	Up to 32	Up to 32	Up to 32
Number of CP 3680s per CPU	1	1	1	1
Communications lines per CP 3680	Up to 288	Up to 288	Up to 288	Up to 288

➤ MICR and MICR/OCR readers/sorters rated at 1000, 1625, and 2600 documents per minute.

Communications facilities are provided by the B 874 Systems and Communications Processor, the Uniline Data Link Processor, and the CP 3682 Data Communications System. Features available through all communications processors include standard synchronous/asynchronous communications, standard two-wire direct connect, automatic dial-out, binary synchronous, and BDLC protocols. The Uniline Data Link Processor accommodates Burroughs direct interface and modem connect arrangements.

The CP 3682 is a front-end communications system that provides on-line network generation and management capabilities for up to four B 2000/B 3000/B 4000 central processors. The CP 3682 supports two types of communications interfaces: an eight-line asynchronous adapter and a two-line asynchronous/synchronous adapter. Also available is the CP 3682-01 Redundant System, which automatically assumes control of the network in the event of a failure in the CP 3682.

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

For the CP 3682, Burroughs provides the CP 3600 Data Communications Software, a task-based operating system that includes an integrated message control system.

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

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

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

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

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

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

➤ Multiprocessor configurations of up to four central processors are possible on all B 2900, B 3900, and B 4900 systems. ➤

## Burroughs B 2900, B 3900, and B 4900

### ▷ SOFTWARE

The B 2900/B 3900 Software Facilities Program includes the Master Control Program (MCP) operating system, NDL, GEMCOS, and a language compiler. The compiler can be Pascal, Cobol, Basic, RPG II, or Fortran. The Software Facilities Program for the B 4900 includes the MCP VI and MCP IX operating systems, utilities, Burroughs Programming Language, Work Flow Language, one compiler of the user's choice, and a choice of B 874 NDL, Medium Systems NDL, Basic GEMCOS, or CP 3600 DCS.

With the introduction of the B 3955, Burroughs announced a new release of the operating system, MCP IX. MCP IX is functionally compatible with the previous release, MCP VI, and supports the same features. MCP IX has been optimized to take advantage of the B 2925, B 3955, B 4925 and B 4955 system technology and to increase total system throughput.

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

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

### COMPETITIVE POSITION

The B 2925 is positioned just below the Honeywell DPS 7 with regard to main storage capacity. The DPS 7 has a three- to four-megabyte capacity while the B 2925 has only a two-megabyte capacity. The B 3955, with five megabytes of main storage, is positioned just above the Sperry System 80, which has a four-megabyte capacity. In terms of performance, the newer B 4925 falls between IBM's 4361 Model Group 5 and 4381 Model Group 1, according to Burroughs.

### ADVANTAGES AND RESTRICTIONS

The B 2900/B 3900/B 4900 Series systems provide one of the widest performance ranges of any family of systems in the industry today, according to Burroughs. The series offers full compatibility through support of the same operational procedures, the same data files and the same object programs.

Burroughs' function processors perform concurrently many of the functions that other central processors must perform serially. This unique "pipelining" technique allows the following processing steps to be overlapped: instruction prefetch, program and data address calculations; data fetch and manipulation; instruction execution; and independent input/output initiation and transfer. This ▷

▶ The multiprocessor configurations can share the CP 3680 Data Communications System, mass storage, magnetic tape units, printers, punched card equipment, and MICR/OCR reader sorters.

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

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

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

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

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

CONTROL STORAGE: Access time to microcode is 45 nanoseconds.

### INPUT/OUTPUT CONTROL

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

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

**Burroughs B 2900, B 3900, and B 4900**

➤ technique, according to the vendor, provides for significantly increased processing power.

Some programs written in older languages may execute differently on the B 4900 than they did on previous B 2000/B 3000/B 4000 systems. Users should be aware of the possible effect this may have when replacing an older system with a B 4900. Five significant differences that may affect user programs include: performing arithmetic operations on fields that contain an undigit (a value in a numeric field that is not 0 through 9); use of variable length floating point arithmetic instructions; source fields overlapping destination fields; use of ASCII mode toggle; and the use of incompatible data types. Users are advised to check programs written in older languages for these conditions and make the necessary adjustments.

The current price list indicates a reduction in the purchase price of the B 2925 central processor; however, the basic system no longer includes an operator display DLP and a 1-by-8 controller. The reader should take note that the total price of these two components is greater than the amount of the price reduction of the B 2925 central processor.

**USER REACTION**

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

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

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

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

We interviewed three users of the B 2900 and B 3900 systems. One of the banking/finance institutions commented that they were well-satisfied with their B 2900. They said that the conversion went well and the B 2900 was more reliable (uptime was better) than the B 3700 they used to have.

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

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

**CONFIGURATION RULES**

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

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

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

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

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

**MASS STORAGE**

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

**INPUT/OUTPUT UNITS**

**B 9290-30 INTELLIGENT LASER PRINTING SYSTEM:** The 30-page per minute printing system creates images by laser diode with a resolution of 57,600 dots per square inch. Printing is done on two sides of uncoated 8½" x

## Burroughs B 2900, B 3900, and B 4900

TABLE 2. MASS STORAGE

Subsystems	B 9484-12 Disk	B 9484-51 Disk	B 9494-5 Disk*	B 9494-41 Disk
Cabinets per subsystem	—	Up to 8	—	Up to 4
Disk packs/HDAs per cabinet	Removable	2 removable	Fixed	2 fixed
Capacity, megabytes	252	130.4	542	402
Average access time, milliseconds	36.8	25	30	28
Average rotational delay	8.3	8.3	8.3	8.17
Data transfer rate, bytes/second	1,200,000	605,000	1,200,000	650,000
Controller model	B 9387-51, B 9387-52	B 9387-4X	B 9387-51, B 9387-52	B9387-4X
Comments	Requires B X304- 90 DLP	Requires B X304- 90 DLP	Requires B X304- 90 DLP	Requires B X304- 90 DLP

\*Supported on the B 4900 only.



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

Weighted Average on a scale of 4.0 for Excellent.

One of the retail/wholesale respondents indicated that they had an easy conversion from their B 3771; however, the B 2900 was not a great upgrade from the old machine and the performance was less than expected.

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

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

▶ **11" plain bond paper in either portrait or landscape format and provides collating and stacking features.**

For additional information on magnetic tape drives, printers, card readers, and MICR/OCR reader-sorters supported on the B 2900/B 3900/B 4900 systems, refer to Table 3.

### COMMUNICATIONS CONTROL

**B 874 SYSTEMS AND COMMUNICATIONS PROCESSOR (SCP):** The B 874 SCP is a microprogrammed

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

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

The B 874 Network Definition Language (NDL) is available to prepare customized network control programs containing tables, system code, and microprograms for each B 874 SCP. The network control program is compiled on the host processor and loaded from the host system disk to the communications processor through an MCP command. Also available is the Generalized Message Control System (GEMCOS), a software package designed to generate a custom-tailored Message Control System. GEMCOS is described in more detail in the "Software" section of this report.

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

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

## Burroughs B 2900, B 3900, and B 4900

TABLE 3. INPUT/OUTPUT UNITS

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

► **CP 3682 DATA COMMUNICATIONS SYSTEM:** The CP 3682 is a front-end communications system that can simultaneously service up to four Burroughs B 2000/B 3000/B 4000 host computers. Two models are available: the basic CP 3682 Data Communications System and the CP 3682-01 Redundant Communications System. The CP 3682-01, operating in a "hot standby" mode, assumes control of the network and host interfaces in the event of a CP 3682 failure.

CP 3682 capabilities include on-line network generation and management; control of all line protocol functions such as polling and selecting stations; support for polled, bisynchronous, Teletype, point-to-point, and bit-oriented protocols; user-defined protocols; control character mapping for device-independent application programs; on-line network statistics and monitoring; and queuing of inbound and outbound messages. Optional features include the Remote Diagnostic Facility and the Power Fail Recovery Option, which provides battery backup in the event of an external power failure.

The CP 3682 supports a number of commonly used communications protocols, which Burroughs has grouped into five Protocol Classes. Class 1 protocols include polled protocols such as Burroughs Poll-Select, Lear-Siegler ADM2, NCR 270 variants, NCR 796 variants, and IBM 2260. Class 2 protocols are binary synchronous protocols such as point-to-point (IBM 2780/3780), multipoint (IBM 3270), multipoint inverse (to communicate with IBM hosts), and NCR bisynch transparent (3270 variant). Class 3 protocols include Teletype, TWX, and Bell Vu-Set protocols. Class 4 protocols include point-to-point protocols such as Burroughs Remote Job Entry (B 761) and Burroughs point-to-point batch mode variant, contention mode variant, and conversational variant. Class 5 protocols include Burroughs Data Link Control (BDLC), ISO High-Level Data Link Control (HDLC), ANSI Advanced Data Communications Control Procedures (ADCCP), and IBM Synchronous Data Link Control (SDLC).

The basic CP 3682 system includes a processor with 512K bytes of memory; a 20-megabyte disk subsystem with inter-►

## Burroughs B 2900, B 3900, and B 4900

face; a real-time clock; a Dual Channel Port Controller (DCPC); a diagnostic adapter; a diagnostic modem; a system console interface; and a firmware set. A CP 3641-01 system console is required for the first CP 3682 system at each site. Also required are a host interface for each host computer and the CP 3600 Data Communications Software (DCS). If the CP 3682-01 redundant system is added, the CP 3600 Standby Communications Software (SCS) is required.

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

The CP 3682 system can be expanded to 25 I/O ports by the addition of the I/O Expansion Unit. Further expansion, to a maximum of 41 I/O ports, is accomplished by adding the I/O Port Extender. Of the total of 41 I/O ports, 36 can be used for communications interfaces. The number of line adapters cannot exceed 8 on an entry-level CP 3682, 22 on a CP 3682 with the I/O Expansion Unit, or 36 on a CP 3682 with the I/O Expansion Unit and the I/O Port Extender. A maximum CP 3682 configuration supports up to 288 asynchronous multidrop lines or 72 synchronous multidrop lines, up to 1500 terminal stations, and up to 2000 transaction types. However, when the number of terminals in the network exceeds 400, a 256K-byte memory module must be added. The CP 3682 transfers data to the host computer at a rate of 40,000 characters per second.

The table-driven CP 3600 DCS software enables users to modify, control, and monitor networks on-line. It also includes an integrated message control system that provides five-level message security, dynamic and fixed message routing, on-line forms generation, and simultaneous servicing of up to four host processors. Message control system files, forms files, and application data save areas are stored in CP 3682 memory or on the CP 3682 disk.

Existing Network Definition Language (NDL) applications will run on the CP 3682 with little or no modification, according to Burroughs. NDL applications can run concurrently with the CP 3682 resident message control system. Support for Burroughs program products that currently require a B 874 communications processor, such as GEMCOS and CANDE, is also available.

### SOFTWARE

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

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

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

or display console. A high-speed trace option adds another 7.5K bytes to the main memory requirements.

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

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

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

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

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

MCP has comprehensive facilities for accumulating data on the utilization of system resources by each executing user



## Burroughs B 2900, B 3900, and B 4900

► program. The program logs central processor utilization, peripheral use by type, and system overhead factors such as load-dumps, print-backup, and pseudo-reader, for each job executed. The log file can be analyzed by the TABS program to prepare billing reports for computer usage.

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

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

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

Also available for the B 2900/B 3900/B 4900 systems is a Cobol 68 compiler, which is compatible with the older American National Standard Cobol 68 language.

**FORTRAN:** The Fortran 66 compiler provides extended language facilities which are compatible with IBM Fortran IV Level H, includes the full ANS Fortran language plus numerous extensions, and is upward-compatible with the Fortran compilers for the larger B 5900, B 6900, and B 7900 systems. The compiler requires 45K bytes of main memory and makes use of the fixed-length floating-point arithmetic instructions, extended addressing capabilities, and 4-digit adders of the processors to achieve significantly higher object program execution speeds. A Fortan 77 compiler is also available.

**BASIC:** B 2900/B 3900/B 4900 Basic is an industry-standard implementation of the Basic language that generally corresponds to the original Dartmouth Basic.

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

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

**NETWORK DEFINITION LANGUAGE (NDL):** A special-purpose programming tool that enables users to define and generate customized Network Control programs for

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

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

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

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

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

In addition to the basic (RP2) version, Reporter II is available in an Advanced version, an Audit version, and an On-Line version. Reporter II (Advanced) adds the capabilities for generation of multiple reports in one pass through the input data, creation of summary-only (matrix) reports, and

## Burroughs B 2900, B 3900, and B 4900

► controlled formatting for special reports or preprinted forms. Audit-Reporter extends the Reporter II system by providing auditors with effective software tools for testing and evaluating the records produced by an EDP system. The OnLine Reporter is an optional module that can be added to any of the three preceding systems to provide an on-line mode of operation that enables users at remote terminals to enter, generate, compile, and execute report programs.

**LOGIC AND INFORMATION NETWORK COMPILER (LINC):** This fourth generation programming language generates complete, on-line, real-time systems, including programs, data base descriptions, screen formats, transaction management, and network management. It is designed to do so with only one set of English-like specifications. The system includes the LINC Definition Language (LDL), a high-level, nonprocedural, business-oriented language used to identify and define the user's needs. LDL allows for a single system specification without regard to actual program and application construction and provides full syntax checking. It includes both the systems and data definitions and is used to define the report and inquiry requirements. The LINC System Generator takes the defined specifications and produces the programs required to establish, maintain, and report against the business data. LINC optimizes the generated systems to the host Burroughs system, and eliminates redundant programming code and data elements as well as data and logic inconsistencies. The system provides for multiple independent accounting periods, support for batch programs, provisions for data integrity and security, transaction entry in any sequence, full on-line, real-time inquiry and maintenance of data, and an on-line "help" function.

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

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

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

**BURROUGHS NETWORK ARCHITECTURE (BNA):** A set of software designed to enhance the interaction of terminals with host CPUs in a network environment. BNA is also designed to facilitate a move into distributed data processing. Through the BNA architecture, Burroughs processors and terminals can be granted access to data bases throughout a network, job tasks and information files can be trans-

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

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

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

BDLC is based on High-Level Data Link Control Procedures (HDLC), the protocol standard developed by the International Standards Organization (ISO) and the European Computer Manufacturers Association (ECMA), and Advanced Data Communications Control Procedures (ADCCP), the protocol standard developed by the American National Standard Institute (ANSI). It is Burroughs' intention to maintain BDLC compatible with the bit-oriented protocols of selected competitors (such as IBM's SDLC).

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

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

**Burroughs B 2900, B 3900, and B 4900**

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

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

**FUNCTIONAL LOGICAL ANALYSIS OF MACHINE EFFICIENCY (FLAME):** FLAME is a performance evaluation tool designed to measure both hardware and software performance. FLAME collects raw data at specified intervals and writes it out to magnetic tape or disk for subsequent processing by the FLAMER report program. Additional program modules provide supplementary reports, report summaries, special versions of the System Run Log, disk utilization analyses, and real-time monitoring of the B 2900/B 3900/B 4900 systems.

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

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

The Time Analysis and Billing System (TABS) utilizes the MCP-created system log to analyze computer usage and disburse the costs of the computer and related services according to a hierarchy of charge numbers. The system consists of a series of daily programs that analyze central processor, peripheral, and main memory utilization, 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, compilers, program testing, and use of program utilities.

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

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

APT III (Numerical control)

BHAS II (Burroughs Hospital Administration System)

BHIPS (Burroughs Hospital Information Processing System)

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

BPS (Business Planning System)

DIS (Distribution Information System)

GBMS (General Business Management System)

Infostats (forecasting and statistical analysis)

PCS (Production Control System)

SCHOLASTIC System

THRIFT (Savings and Loan Package)

TMS (Text Management and Electronic Mail System)

IPS (Item Processing System)

Total Banking System

**PRICING**

**CONTRACT TERMS:** The B 2900, B 3900 and B 4900 systems are available for purchase or for lease under a 1-year, 3-year, or 5-year lease agreement. The standard lease agreement entitles the customer to unlimited use of the equipment and includes full-time equipment maintenance coverage (24 hours/day, 7 days/week). The standard maintenance agreement for purchased systems covers maintenance of the equipment for nine consecutive hours per day on Monday through Friday only; extended maintenance coverage is available at higher rates.

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

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

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

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

**EDUCATION:** Users can obtain the necessary training by paying for individual courses. The currently available courses range from 1 to 10 days in length, cost \$121 to \$2,053 for each attendee, and fall into the following broad categories: Systems Support, Operations, Languages, Environmental (data base and data communications), and Applications.

**EQUIPMENT:** Listed below are typical B 2900, B 3900, and B 4900 configurations. All necessary control units and exchange units are included in the indicated prices. The

## Burroughs B 2900, B 3900, and B 4900

► quoted rental prices are for a one-year lease and include maintenance service.

**B 2925 SYSTEM:** Consists of a B 2925 Central System (CPU with one megabyte of main memory, operator display terminal, two minidisk drives, DLP Base, and four DLPs) plus one B 9387-51 Disk Controller, one 402-megabyte B 9494-41 Dual Fixed-Disk Drive, one 80KBS B 9495-45 Magnetic Tape Subsystem, one 300-cpm B 9115 Card Reader, and one 650-lpm B 9246-6 Line Printer. The purchase price is \$207,668.00, monthly maintenance is \$922.90 and monthly rental is \$8,845.00.

**B 3955 SYSTEM:** Consists of a B 3955 Central System (CPU with two megabytes of main memory, operator display terminal, two minidisk drives, two DLP Bases, and six DLPs) plus one 9387-42 Disk Controller, two 402-mega-

byte B 9494-41 Dual Fixed-Disk Drives (804 megabytes total), four 120KBS B 9495-82 Magnetic Tape Units with B 9499-51 Master Electronic Exchange, one 600-cpm B 9116 Card Reader and one 1500-lpm B 9247-15 Line Printer. The purchase price is \$408,832.00, monthly maintenance is \$2,257.80, and monthly rental is \$21,063.00.

**B 4925 SYSTEM:** Consists of a B 4925 Central System (CPU with 2.5 megabytes of main memory, operator display terminal, two minidisk drives, three DLP Bases, and six DLPs) plus four 402-megabyte B 9494-41 Dual Fixed-Disk Drives (1608 megabytes total), one B 9387-41 Disk Controller, six 1250/320KBS B 9495-24 Magnetic Tape Units with B 9499-21 Magnetic Tape Controller, one 600-cpm B 9116 Card Reader, and one 2000-lpm B 9246-21 Line Printer. The purchase price is \$778,836.00, monthly maintenance is \$3,997.20, and monthly rental is \$37,978.00.

### EQUIPMENT PRICES

		<u>Purchase Price</u>	<u>Monthly Maint.*</u>	<u>1-Year Lease**</u>	<u>5-Year Lease**</u>
<b>PROCESSORS AND MAIN MEMORY</b>					
B 2925	Central System; includes CPU with one megabyte of main memory, I/O processor, operator display with keyboard, 2 mini-disk drives for system maintenance, Data Link Processor (DLP) Base, console DLP, disk drive DLP, magnetic tape DLP, and line printer DLP	\$125,000	\$ 370.00	\$ 5,336	\$ 3,780
BP-2-SYS	Business Partner Basic System includes all of the components of the B 2925 Basic System with an additional one-megabyte of main memory, a 1 x 8 disk controller and the following software: System Software Facility, GEMCOS, DMS II, DMS II Inquiry and LINC	231,000	482.00	10,600	8,100
B 3955	Central System; includes CPU with 2 megabytes of main memory, I/O processor, operator display with keyboard, 2 mini-disk drives for system maintenance, 2 DLP Bases, console DLP, 2 disk drive DLPs, magnetic tape DLP, line printer DLP, and card reader DLP	198,000	531.00	10,824	7,667
B 4925	Central System; includes CPU with 5 megabytes of main memory, 1 I/O processor, operator display with keyboard, 2 mini-disk drives for system maintenance, 3 DLP Bases, console DLP, 2 disk drive DLPs, 2 magnetic tape DLPs, and line printer DLP	375,000	1,300.00	21,674	15,913
B 4955	Central System; includes CPU with 5 megabytes of main memory, 2 I/O processors, operator display with keyboard, 2 mini-disk drives for system maintenance, 3 DLP Bases, console DLP, 2 disk drive DLPs, 2 magnetic tape DLPs, and line printer DLP	780,000	1,300.00	33,725	24,742
	One-megabyte Memory Increment for B 2900 and B 3900 systems	12,000	—	—	—
	Two and one-half-megabyte memory increment for B 4925 system	25,000	—	—	—
<b>B 2900 OPTIONS</b>					
B 2909-91	Additional DLP Base; one allowed	10,500	26.70	412	344
B 2095-91	Exchange/Base Cabinet; can house a B 2377-6 Disk File Exchange, an additional DLP Base, or a Shared System Processor	26,251	52.50	1,023	844
B 9361-23	Operator Display	3,098	26.40	133	122
B 2376-95	Shared System Processor	12,601	31.50	526	449
B 2376-92	Port Interface Adapter for B 2800 DLPs	2,588	29.70	109	98
B 2376-93	Port Interface Adapter for B 3800/B 4800 DLPs	2,588	29.70	109	98
B 2376-94	Port Interface Adapter for B X900 DLPs	2,588	29.70	109	98
B 2373-90	B 9470 Disk File DLP-3 (3 cards)	4,620	31.30	192	167
B 2304-90	B 9484/B 9494 Disk Drive DLP-2 (2 cards)	4,620	21.10	180	165
B 2395-90	B 9495-8 Magnetic Tape DLP-2 (2 cards)	4,043	21.10	165	147
B 2395-91	B 9495-82/B 9495-83 Magnetic Tape DLP-2 (2 cards)	4,043	21.10	165	147
B 2395-92	B 9495-24/B 9495-32/B 9495-33 Magnetic Tape DLP-3 (3 cards)	4,620	31.30	192	167
B 2395-93	B 9495-82/B 9495-83 NRZ Magnetic Tape DLP-2 (2 cards)	4,043	42.50	170	148
B 2246-91	B 9246-21 Line Printer DLP-2 (2 cards)	5,175	42.50	156	138
B 2246-92	B 9246-6 Line Printer DLP-2 (2 cards)	5,175	59.30	160	142
B 2247-93	B 9247-14 Line Printer DLP-2 (2 cards)	5,175	21.10	152	134
B 2247-94	B 9247-15 Line Printer DLP-2 (2 cards)	5,175	21.10	152	134
B 2110-90	B 9115/B 9116/B 9117 Card Reader DLP-2 (2 cards)	2,888	21.10	122	102
B 2137-90	B 9137/B 9190 Reader-Sorter DLP-3 (3 cards)	8,409	31.30	339	295
B 2138-90	B 9195 Reader-Sorter DLP-3 (3 cards)	9,702	31.30	391	339
B 2341-9	Operator Display DLP	4,232	28.80	172	150
B 2303-90	B 874 DLP-2 (2 cards)	3,396	21.10	140	124
B 2368-90	CP 3680 DLP	4,620	48.30	157	140
B 2351-90	Uniline DLP-3 (Modem connect; 3 cards)	3,676	31.30	151	129
B 2351-91	Uniline DLP-3 (TDI connect; 3 cards)	3,676	31.30	151	129

\*Maintenance rates are for nine hours, five days per week.  
\*\*Lease prices include 24-hour, 7-day maintenance.

## Burroughs B 2900, B 3900, and B 4900

## EQUIPMENT PRICES (Continued)

		Purchase Price	Monthly Maint.*	1-Year Lease**	5-Year Lease**
<b>B 3900 OPTIONS</b>					
B 3909-91	Additional DLP Base; maximum of 3	10,500	27.00	436	365
B 3095-91	Extension Cabinet; includes one DLP Base; can house a second DLP Base or a Shared Systems Processor	26,251	61.20	1,083	895
B 9361-21	Operator Display	3,098	22.00	133	122
B 3376-95	Shared Systems Processor	12,601	40.80	528	451
B 3376-92	Port Interface Adapter for B 2800 DLPs	2,588	29.70	109	98
B 3376-93	Port Interface Adapter for B 3800/B 4800 DLPs	2,588	29.70	109	98
B 3376-94	Port Interface Adapter for B X900 DLPs	2,588	29.70	109	98
B 3373-90	B 9470 Disk File DLP-3 (3 cards)	4,620	31.30	192	167
B 3304-90	B 9484/B 9494 Disk Drive DLP-2 (2 cards)	4,620	21.10	190	165
B 3395-90	B 9495-8 Magnetic Tape DLP-2 (2 cards)	4,043	21.10	165	147
B 3395-91	B 9495-82/B 9495-83 Magnetic Tape DLP-2 (2 cards)	4,043	21.10	165	147
B 3395-92	B 9495-24/B 9495-32/B 9495-33 Magnetic Tape DLP-3 (3 cards)	4,620	31.30	192	167
B 3395-93	B 9495-82/B 9495-83 NRZ Magnetic Tape DLP-3 (3 cards)	4,043	42.50	170	148
B 3246-91	B 9246-21 Line Printer DLP-2 (2 cards)	5,175	42.50	156	138
B 3246-92	B 9246-6 Line Printer DLP-2 (2 cards)	5,175	31.50	147	129
B 3247-93	B 9247-14 Line Printer DLP-2 (2 cards)	5,175	21.10	152	134
B 3247-94	B 9247-15 Line Printer DLP-2 (2 cards)	5,175	21.10	152	134
B 3110-90	B 9115/B 9116/B 9117 Card Reader DLP-2 (two cards)	2,888	21.10	122	102
B 3137-90	B 9137/B 9190 Reader-Sorter DLP-3 (3 cards)	8,409	31.30	339	295
B 3138-90	B 9195 Reader-Sorter DLP-3 (3 cards)	9,702	31.30	391	339
B 3303-90	B 874 DLP-2 (2 cards)	3,396	21.10	140	124
B 3368-90	CP 3680 DLP	4,620	46.00	185	160
B 3351-90	Uniline DLP-3 (modem connect; 3 cards)	3,576	31.30	151	129
B 3351-91	Uniline DLP-3 (TDI connect; 3 cards)	3,576	31.30	151	129
B 3341-9	Operator Display DLP-3 (3 cards)	4,232	17.90	170	148
<b>B 4900 OPTIONS</b>					
B 4909-91	Additional DLP Base; maximum of 5	15,000	28.80	771	521
B 4095-91	Expansion Cabinet; includes one DLP Base	51,100	65.70	2,079	1,730
B 9361-985	Operator Display	3,098	26.42	133	122
B 4376-95	Shared Systems Processor	12,601	73.70	535	458
B 4376-92	Host Interface Adapter for B 2800 DLPs	2,588	22.70	107	96
B 4376-93	Host Interface Adapter for B 3800/B 4800 DLPs	2,588	22.70	107	96
B 4376-94	Host Interface Adapter for B X900 DLPs	2,588	22.70	107	96
B 4373-90	B 9470 Disk File DLP-3 (3 cards)	4,620	45.40	195	170
B 4304-90	B 9484/B 9494 Disk Drive DLP-2 (2 cards)	4,620	45.40	195	170
B 4395-90	B 9495-8 Magnetic Tape DLP-2 (2 cards)	4,043	52.20	171	153
B 4395-91	B 9495-82/B 9495-83 Magnetic Tape DLP-2 (2 cards)	4,043	52.20	171	153
B 4395-92	B 9495-24/B 9495-32/B 9495-33 Magnetic Tape DLP-3 (3 cards)	4,620	73.70	201	176
B 4395-93	B 9495-82/B 9495-83 NRZ Magnetic Tape DLP-2 (2 cards)	4,043	52.20	172	150
B 4246-91	B 9246-21 Line Printer DLP-2 (2 cards)	5,175	45.40	157	139
B 4246-92	B 9246-6 Line Printer DLP-2 (2 cards)	5,175	45.40	157	139
B 4246-93	B 9246-12 Line Printer DLP-2 (2 cards)	5,175	45.40	157	139
B 4247-93	B 9247-14 Line Printer DLP-2 (2 cards)	5,175	45.40	157	139
B 4247-94	B 9247-15 Line Printer DLP-2 (2 cards)	5,175	45.40	157	139
B 4110-90	B 9115/B 9116/B 9117 Card Reader DLP-2 (2 cards)	2,888	45.40	127	107
B 4137-90	B 9137/B 9190 Reader-Sorter DLP-3 (3 cards)	8,409	54.40	344	300
B 4138-90	B 9195 Reader-Sorter DLP-3 (3 cards)	9,702	54.40	396	344
B 4303-90	B 874 DLP-2 (2 cards)	3,396	37.40	143	127
B 4368-90	CP 3680 DLP	4,620	52.50	187	163
B 4351-93	Uniline DLP	4,000	45.40	173	143
B 4341-9	Operator Display DLP	4,232	16.50	170	144
B 4245	Upgrade Kit for B 4925 to B 4955	385,000	100.00	19,428	13,761
<b>MASS STORAGE</b>					
B 9484-12	Disk Pack Drive; 252 megabytes	30,000	120.00	1,430	1,070
B 9484-51	Dual Disk Pack Drive; 130.4 megabytes	21,000	147.00	840	689
B 9494-41	Dual Fixed-Disk Drive; 402 megabytes	21,500	96.40	1,099	889
B 9987-1	Dual Port Feature for B 9494-41 drive	5,880	25.10	192	159
B 9387-41	Controller for B 9494 or B 9484-51 drives; 1 x 8	20,000	74.40	1,363	1,154
B 9387-42	Controller for B 9494 or B 9484-51 and B 9484-41 drives; 2 x 8	30,000	174.00	1,888	1,610
B 9387-51	Controller for B 9494 or B 9484-51 drives; 1 x 8	20,000	61.20	908	683
B 9387-52	Controller for B 9494 or B 9484-51 drives; 2 x 8	30,000	91.80	1,358	1,018
B X387-12	Exchange used with B 9387-41, -42, -51 and -52 controllers; 4 x 16	20,000	60.00	900	675
B X387-13	Controller Port Expansion for B X387-12; Expands to 6X or 12X	5,350	15.00	240	180

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

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

## Burroughs B 2900, B 3900, and B 4900

### EQUIPMENT PRICES (Continued)

		<u>Purchase Price</u>	<u>Monthly Maint.*</u>	<u>1-Year Lease**</u>	<u>5-Year Lease**</u>
B 9494-5	Fixed Disk Drive; 542 megabytes	33,000	105.00	1,615	1,210
B 9387-51	Controller for B 9484-12 and B 9494-5 drives; single path	20,000	62.20	908	683
B 9387-52	Controller for B 9484-12 and B 9494-5 drives; dual path	30,000	91.80	1,358	1,018
<b>MAGNETIC TAPE UNITS</b>					
B 9495-8	Magnetic Tape Unit; 80 KBS, 9-channel, 1600 bpi, PE: requires B 9499-33, -34, or -35 Exchange	11,551	149.00	478	395
B 9495-45	Magnetic Tape Subsystem; consists of B 9495-8 tape unit and B 9499-33 Exchange	17,860	139.00	607	502
B 9499-33	1 x 4 Master Electronic Exchange	11,465	41.20	415	318
B 9499-34	1 x 8 Master Electronic Exchange	12,350	41.20	445	347
B 9499-35	2 x 8 Master Electronic Exchange	14,465	90.10	525	407
B 9495-82	Magnetic Tape Unit; 120 KBS, 9-channel, 1600 bpi, PE; requires B 9499-5X Exchange	18,100	135.00	705	547
B 9495-83	Magnetic Tape Unit; 120 KBS, 9-channel, 1600 bpi, PE: requires B 9499-5X Exchange	22,447	154.00	895	693
B 9499-50	1 x 4 Master Electronic Exchange	19,100	127.00	736	564
B 9499-51	1 x 8 Master Electronic Exchange	21,060	127.00	736	564
B 9499-52	2 x 8 Master Electronic Exchange	51,240	266.00	2,102	1,224
B 9499-53	2 x 16 Master Electronic Exchange	53,940	266.00	2,211	1,414
B 9499-54	3 x 16 Master Electronic Exchange	83,310	393.00	3,278	2,228
B 9499-55	4 x 16 Master Electronic Exchange	110,200	520.00	4,292	2,935
B 9999-4	NRZI Option for B 9495-82 and -83 drives	788	6.80	30	25
B 9999-5	NRZI Option for B 9499-50 to -55 exchanges	2,731	40.00	91	75
B 9495-24	Magnetic Tape Unit; 1250/320KBS, 9-channel, 6250/1600 bpi, GCR/PE	36,225	240.00	1,262	1,008
B 9495-32	Magnetic Tape Unit; 470/120KBS, 9-channel, 6250/1600 bpi, GCR/PE	21,736	164.00	890	631
B 9495-32M	Same as B 9495-32, but includes formatter/controller	50,258	266.00	1,970	1,572
B 9495-33	Magnetic Tape Unit; 780/200KBS, 9 channel, 6250/1600 bpi, GCR/PE	24,917	173.00	1,012	716
B 9495-33M	Same as B 9495-33, but includes formatter/controller	53,440	273.00	2,075	1,656
B 9499-21	GCR/PE Controller; 1 x 8	42,634	239.00	1,456	1,166
B 9499-22	GCR/PE Controller; 2 x 8	85,288	476.00	2,923	2,325
B 9499-23	GCR/PE Controller, 3 x 8	127,899	717.00	4,369	3,491
B 9499-24	GCR/PE Controller; 4 x 8	170,553	956.00	5,812	4,655
B 9499-42	Electronic Exchange for B 9499-21 through-24; 2 x 16	7,571	23.20	277	215
B 9499-43	Electronic Exchange for B 9499-21 through -24; 3 x 16	9,680	31.90	359	296
B 9499-44	Electronic Exchange for B 9499-21 through -24; 4 x 16	11,356	31.90	421	334
B 9999-3	Dual Host Switch	5,624	18.40	178	145
<b>CARD READERS</b>					
B 9115	Card Reader; 300 cpm, 80 column	8,608	73.30	344	267
B 9116	Card Reader; 600 cpm, 80 column	11,372	103.00	460	357
B 9117	Card Reader; 800 cpm, 80 column	12,952	126.00	521	405
B 9915	51-column Read Feature for B 9115, B 9116, B 9117	844	0.00	26	20
<b>PRINTERS</b>					
B 9246-6	Band Printer; 650 lpm, 132 positions	14,700	182.00	551	423
B 9247-14	Train Printer; 1100 lpm, 132 positions	25,000	515.00	1,580	1,266
B 9247-15	Train Printer; 1500 lpm, 132 positions	33,000	590.00	2,137	1,727
B 9942-10	Additional Train Module	3,408	49.00	149	124
B 9246-12	Train Printer; 1250 lpm, 132 positions	42,500	420.00	1,635	1,360
B 9246-21	Train Printer; 2000 lpm, 132 positions	69,300	648.00	3,255	2,625
B 9290-30	Intelligent Laser Printing System; 30 pages/minute, 57,600 dots/square inch	65,000	—	—	—
<b>READER-SORTERS</b>					
B 9190-1	Document Processor; 1000 dpm, 4 pocket base; includes MICR E13B, basic off-line sort, 12 pockets, and control interface	76,662	933.00	3,909	3,314
B 9190-2	MICR/OCR Reader-Sorter; 1625 dpm, 4 pockets; requires one control interface and at least one character recognition module	47,205	842.00	2,555	2,165
B 9990-10	Four-Pocket Module; pockets 17 to 20	23,550	120.00	913	783
B 9990-11	Four-Pocket Module; pockets 5 to 16	17,450	75.70	600	510
B 9990-12	Four-Pocket Module; pockets 21 to 32	17,450	75.70	600	510
B 9990-21	MICR E13B; Single Read	16,973	77.30	589	504
B 9990-22	MICR E13B; Double Read	46,695	153.00	1,710	1,480
B 9990-90	4A Control or DLP Interface	2,085	5.00	109	92

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

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

## Burroughs B 2900, B 3900, and B 4900

## EQUIPMENT PRICES (Continued)

		<u>Purchase Price</u>	<u>Monthly Maint.*</u>	<u>1-Year Lease**</u>	<u>5-Year Lease**</u>
B 9990-91	3A Control Interface	1,752	4.80	69	50
B 9990-50	Impact Endorser with Digital Advance	15,905	98.20	624	539
B 9990-53	Modular Non-Impact Endorser	38,000	265.00	1,186	1,018
B 9990-55	Impact Endorser, No Digital Advance	15,285	93.20	603	514
B 9990-60	Microfilm Module (Duo-Duplex)	90,017	736.00	3,431	2,948
B 9990-70	Off-Line Sort Package	6,235	49.00	190	170
B 9990-25	Short Document Feature (51 Column Cards)	1,220	1.70	37	31
B 9990-26	Short Document Feature (One Required Per Pocket Module)	535	1.70	19	16
B 9195-20	Document Processor; 20 pockets	348,414	3,511.00	13,367	11,319
B 9195-24	Document Processor; 24 pockets	378,669	3,772.00	14,406	12,197
B 9195-28	Document Processor; 28 pockets	405,795	4,032.00	15,456	13,087
B 9195-32	Document Processor; 32 pockets	434,382	4,295.00	16,503	13,978
B 9995-72	Additional Memory; 4K bytes	9,999	26.90	416	344
B 9995-53	Modular Non-Impact Endorser	48,013	475.00	1,293	1,125
B 9995-60	Microfilm Module	131,840	1,027.00	3,613	3,130
<b>COMMUNICATIONS EQUIPMENT</b>					
B 874-1	Systems and Communications Processor (SCP); includes 1.7-mega-hertz processor, 12K bytes of control storage, integrated host interface, and 32-line adapter cluster	10,500	165.00	467	357
B 874-4	Similar to B 874-1, but includes 4-megahertz processor and 16K bytes of control storage	27,300	233.00	929	806
B 1-4	4K bytes of user memory for B 874	783	9.30	27	20
B 32-2	16K bytes of user memory for B 874	2,521	37.20	108	97
B 74-1	Memory Expansion Module for B 874 systems over 32K bytes	5,550	87.00	210	176
B 74-5	Dual Host Switch for B 874-4 processor	2,794	29.20	95	78
B 74-7	BDLC Feature for B 874-4 processor	1,849	15.60	63	52
B 551-1	Direct Connect Dual Line Adapter, two-wire; maximum data rate 9600 bps	2,006	9.80	54	44
B 551-2	Direct Connect Dual Line Adapter, TTY-compatible; maximum data rate 38,500 bps	1,175	9.80	44	39
B 551-3	Direct Connect Dual Line Adapter, Balanced Differential Interface; maximum data rate 19,200 bps	1,644	9.80	56	51
B 551-6	Synchronous/Asynchronous Data Set Dual Line Adapter; maximum data rate 9600 bps	1,234	9.80	44	39
B 551-7	BDLC Single Line Adapter for B 874-4; maximum data rate 9600 bps	1,481	13.70	51	44
B 551-12	Synchronous/Asynchronous Single Line Adapter with addressing; maximum data rate 9600 bps	1,029	9.80	39	33
CP 3682	Data Communications System; includes processor with 512K bytes of memory; 20MB disk subsystem with interface, real-time clock, Dual Channel Port Controller (DCPC), diagnostic adapter, diagnostic modem, console adapter, firmware set and system cabinet	53,822	617.00	2,874	2,298
CP 3682-01	Redundant Data Communications System; includes second CP 3682 system plus CP 3643-01 Dual Port Interface Unit with cable, CP 3644-01 Dual System I/O Interface Unit with cable, CP 3645-01 I/O Expansion Cabinet, and CP 3646-01 I/O Port Extender	52,225	539.00	2,749	2,199
CP 3610	Memory Module, 256K bytes	9,323	107.00	424	340
CP 3620-01	Host Interface Unit; one required for each host CPU (available through the first quarter of 1982)	2,626	17.80	116	95
CP 3620-03	Host Interface Unit; one required for each host CPU (available the second quarter of 1982)	2,626	17.80	116	95
CP 3630-01	Eight-Line Asynchronous Communications Adapter	5,408	35.60	246	197
CP 3631-01	Two-Line Synchronous/Asynchronous Communications Adapter	2,416	21.40	110	88
CP 3632-01	Direct Connect Interface Unit	368	2.40	19	11
CP 3633-01	Automatic Calling Unit	1,260	8.30	48	37
CP 3634-01	Line Interface Extension Cable, 50 feet	64	5.00	5	3
CP 3640-02	Diagnostic Modem	688	5.00	32	26
CP 3641-01	System Console	3,151	29.70	116	95
CP 3642-01	Power Fail Recovery System	2,626	23.80	95	84
CP 3643-01	Dual Processor Interface with cables	2,941	29.70	111	90
CP 3644-01	Dual System I/O Interface Unit with cables	3,833	33.30	142	116
CP 3645-01	I/O Port Expansion Cabinet with CP 3646-01	21,001	189.00	814	630
CP 3646-01	I/O Port Extender with Dual Channel Port Controller	18,271	173.00	672	546

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

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

## Burroughs B 2900, B 3900, and B 4900

### SOFTWARE PRICES

		Unlimited Time Plan		Limited-Time Plan	
		Initial Charge			
		Single Payment	12 Monthly Payments	Annual License Fee	Monthly License
SSF	Software Facilities Program; includes MCP, MCB, NDL, B 874 NDL, and one compiler	\$25,410	\$2,437	\$4,828	\$ 847
SSF	Software Facilities Program for B 2900 and B 3900; includes MCP IX, utilities, Burroughs Programming Language, Software Management System, one compiler, and one data communications option	25,000	2,398	—	834
SSF	Software Facilities Program for B 4900; includes MCP IX and MCP IV, utilities, Burroughs Programming Language, Software Management System, WFL Language, one compiler, and one data communications option	32,000	3,069	—	1,067
CBV	Cobol '68 Compiler	NC	NC	NC	NC
COB	Cobol '74 Compiler	3,630	349	690	121
RPG	RPG II Compiler	3,630	349	690	121
BAS	Basic Compiler	3,630	349	690	121
FTV	Fortran Compiler (IBM Level H compatible)	3,630	349	690	121
BPL	Burroughs Programming Language	NC	NC	NC	NC
TAB	TABS Analysis System	NC	NC	NC	NC
CE1	CANDE	2,475	238	473	83
DE2	ODESY	6,121	587	1,164	219
MCA	GEMCOS Advanced	14,157	1,358	2,691	506
MCT	GEMCOS Total	18,202	1,746	3,459	651
RP2	Reporter II Basic	9,163	879	1,742	328
RPO	On-Line Reporter	1,349	130	257	49
AUD	Audit Reporter	19,741	1,894	3,751	706
ARP	Advanced Reporter II	14,439	1,385	2,744	516
DM2	Data Management System II (DMS II)	13,200	1,266	2,508	440
LNC	LINC	72,000	6,900	—	2,900
DM1	DMS II Inquiry	3,300	317	627	110
WFL	Work Flow Management System	1,815	175	346	61
MC7	Message Control System Generator	3,249	312	358	117
FLM	FLAME Monitor	2,640	254	423	220
CP 3680 Software					
	CP 3600 DCS Data Communications Software for CP 3680	11,000	—	2,090	330
	CP 3600 SCS Standby Communications Software for CP 3680-01	5,500	—	1,045	165

\*Price depends on level of support selected.