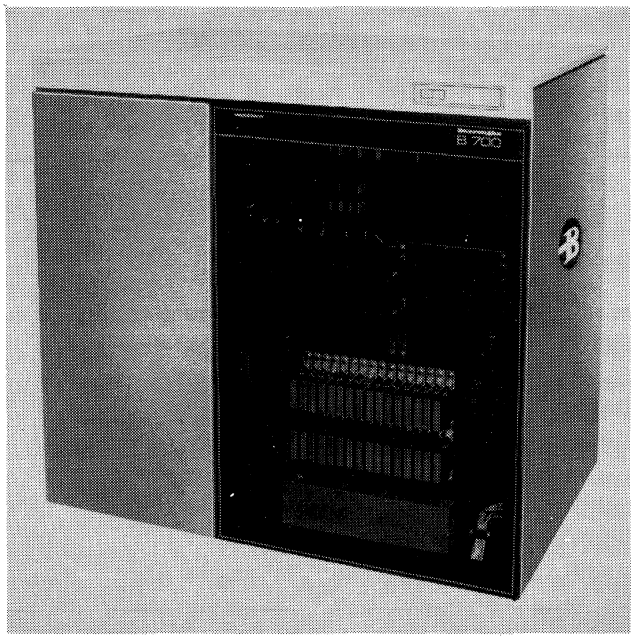
Burroughs B 774 and B 776 Communications Processors



The B 774 front end accommodates up to 32 communications lines for Burroughs computer systems. It can also be used remotely for line concentration and control functions. Its application is limited to the Burroughs generated communications control microcode.

A pair of front-end microprogrammable processors used with Burroughs B 2700, B 3700, B 4700, B 5700, B 6700, and B 7700 host computer systems.

The B 774 can handle up to 32 communications lines; main memory ranges between 8K bytes and 96K bytes. Up to eight B 774 processors can be accommodated in a single host computer system. The B 774 can also be used remotely.

The B 776 is user programmable and supports up to 32 communications lines plus peripheral devices. The B 776 can interface two independent host systems.

Low- to high-speed asynchronous, synchronous, and BDLC lines can be handled. Full software support is offered with the systems including operating systems, application programs, and diagnostics.

A basic B 774 with 8K bytes of memory and adapters for 32 communications lines costs about $885 per month, including monthly maintenance on a 1-year lease. The B 776 costs about the same.

MANAGEMENT SUMMARY

In August 1974 Burroughs announced the first of its 700 series of communications processors designed to operate with the Burroughs computers. This processor, the B 774, is a front-end system designed for the medium scale Burroughs system, the B 2700, B 3700 and B 4700. The processor is a small programmable system suited for front-end processing, remote job entry, and time-sharing applications. First installations were made in January 1975.

In June 1975, Burroughs announced the second member of the 700 line, the B 776. This system is a user programmable front-end processor that can also function as a remote concentrator or a distributed network processor. It can also be used with the medium scale Burroughs computers as well as the larger B 5700, B 6700 and B 7700 systems. The first system was installed in December 1975.

The B 774 is microprogrammed and will support Burroughs, Teletype, and IBM bisynchronous terminals. No peripherals devices are offered with the system. The B 776 is similar in design although memory cycle time is slower (1000 nanoseconds compared with 500 on the B 774). It will support the same terminals, but additionally is offered with an array of peripherals devices including disk, tape, and punched card units. Another important difference is that the B 774 is limited to communication with one host computer, while the B 776 can communicate with up to two host computer systems.

CHARACTERISTICS

VENDOR: Burroughs Corporation, Second Avenue at Burroughs, Detroit, Michigan 48232. Telephone (313) 972-7000.

DATE OF ANNOUNCEMENT: B 774–August 1974; B 776–June 1975.

DATE OF FIRST DELIVERY: B 774–January 1975; B 776–December 1975.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: Burroughs Corporation.

MODELS

B 774–A microprogrammable communications processor handling up to 32 communications lines and from 8K to 96K bytes of memory. It is used primarily as a front-end for the Burroughs B 2700, B 3700 and B 4700 computer systems. It can also be used as an RJE terminal or for time-sharing applications.

B 776–A user programmable communications processor used primarily with Burroughs B 4700, B 5700, B 6700 and B 7700 computer systems. It can be used as a front-end processor or as an intelligent terminal in a distributed

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B 774 and B 776 System Characteristics

	B 774	B 776
Computer System Interfaced	B 2700, B 3700, B 4700	B 4700, B 5700, B 6700, B 7700
Supported Applications–		
IBM 270X	No	No
IBM 370X	No	No
Front-end processing	Yes	Yes
Message switching	Custom	Yes
Remote concentration	No	Yes
Other	RJE, timesharing	Distributed communications
Communications Lines–		
Maximum number supported (half-duplex)	32	32
Line Discipline	Asynch., Synch., BDLC	Asynch., synch., BDLC
Processor–		
Cycle time (nanoseconds)	500	1000
Memory capacity (bytes)	8K to 96K	8K to 96K
Software–		
Operating system	Yes	Yes
Message control	Host	Yes
Assembly	No	Yes
Cross assembler	Yes	No
Terminals Supported	Burroughs, Teletype, bisynch	Burroughs, Teletype, bisynch
Pricing–		
Rental (1 yr. basic)	$648/mo.	$540/mo.
Purchase price (basic)	$29,900	$23,500

Neither system is offered as IBM 270X or 370X emulators and consequently are limited to Burroughs host computers, although the company does indicate the custom applications are possible. The B 776 is somewhat more versatile, being user programmable. The accompanying chart gives system characteristics of each model and allows for comparison between them.

Both systems appear to have gained customer acceptance and Burroughs is actively manufacturing both models. The company has declined to give specific installation numbers; however, at this time, most B 774 systems are being installed as front-end processors and as intelligent terminals and controllers. Applications for the B 776, while being generally limited to Burroughs computers, are more numerous and include communication network control, data collection, line and terminal data concentration, and store and forward message switching.

USER REACTION

Datapro was able to conduct a limited interview of users of the B 700 systems. The survey of 5 users includes four B 774 and one B 776 installation. In all cases the processors were being used with Burroughs computers, including B 2700, B 3700, B 4700 and B 6700 systems. Ratings assigned by the users are summarized below.

	Excellent	Good	Fair	Poor	WA*
Overall satisfaction	3	2	0	0	3.6
Ease of installation	2	2	1	0	3.2
Throughput	3	2	0	0	3.6
Hardware reliability	2	2	1	0	3.2
Manufacturer's maintenance					
Promptness	4	1	0	0	3.8
Quality	4	1	0	0	3.8

processing network. The B 776 will handle up to 32 communications lines with 8K to 96K bytes of memory.

CONFIGURATION

The B 774 is comprised of six major components which are described below:

- Processor–controls Host Interface, Adapter Cluster, and Dual Line Adapters.
- Host Interface Adapter–controls communications with the host computer.
- Control storage–consists of 12K bytes that stores the microcode for the processor.
- Main memory–ranges from 8K to 96K bytes.
- Adapter Cluster – provides the buffering and operation coordination between the processor and Dual Line Adapters, only one is permitted.
- Dual Line Adapter–handles two half-duplex lines or one full-duplex line. Sixteen Dual Line Adapters can be connected to an Adapter Cluster.

Up to eight B 774's may be connected to a single host system.

The B 776 is comprised of a central processing unit; up to two separately functioning data communications processors, each handling up to 16 communications lines; main memory of from 8K to 96K bytes; a control memory of 32K bytes for program control; and an I/O controller for handling up to 9 peripheral units. Peripherals include an operator console, disk units, magnetic tape units, magnetic tape cassette units, line printer, card reader, and card reader/punch.

For additional details on the B 774 and B 776, please refer to the accompanying configuration charts.

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	Excellent	Good	Fair	Poor	WA*
Manufacturer's software	2	3	0	0	3.4
Technical support	4	1	0	0	3.8

*Weighted Average on a scale of 4.0 for Excellent.

As can be seen by the results of the survey, users indicate a very high degree of satisfaction with the B 774 and B 776 systems. This can be partially attributed to the front-end processor and host computer system being from the same manufacturer, which allows to solve problems at either end without the proverbial "finger pointing". In any event, satisfied users listed a number of major advantages of the system, which included modularity and flexibility, price/performance, hardware reliability, and company technical and maintenance support.

No disadvantages were cited by the users, except for a few minor ones concerning down time during installation and some related hardware and software problems. However, for the most part, these early problems were resolved once the systems were up and running. □

TRANSMISSION SPECIFICATIONS

The B 774 communicates with a host computer by means of the Host Interface Adapter at up to one million bytes per second utilizing a direct memory access channel. Each of the up to 16 dual adapters handle 2 half-duplex or 1 full duplex line using four different types of line adapters including:

- **Direct Connect–a two user direct connection interfacing for up to two lines at up to 1000 feet away operating at up 9600 bps each.**
- **Data Set Connect–asynchronous Dual Adapter interfaces to two half-duplex or one full-duplex lines at up to 1800 bps via data sets. Synchronous Dual Adapter connects to two half-duplex or one full-duplex data set at up to 9600 bps.**
- **Automatic Dialing–the Automatic Dial Out Dual Adapter provides an automatic dialing feature and is used in conjunction with an Automatic Calling Unit Bell 801A, or equivalent, and any switched line adapter.**

The B 776 communicates with up to two host computers using direct memory access channel and a Host Interface Adapter.

To handle communications lines, the B 776 has up to two independent data communications processors, which handle up to 16 communications lines each. These processors operate asynchronously with the B 776 control processor. Line characteristics are controlled by the data communications processors and are programmable for each line through the Network Definition Language Compiler. Communication line characteristic available include half-or full-duplex asynchronous transmission up to 1800 bps, synchronous transmission up to 9600 bps, direct Connect up to 9600 bps, direct Connect to 19,200 bps, and broadband transmission up to 50,000 bps.

To allow for interfacing, three different styles of line adapters are available. In asynchronous transmission, up to fourteen different asynchronous clock rates may be accommodated by one data communications processor.

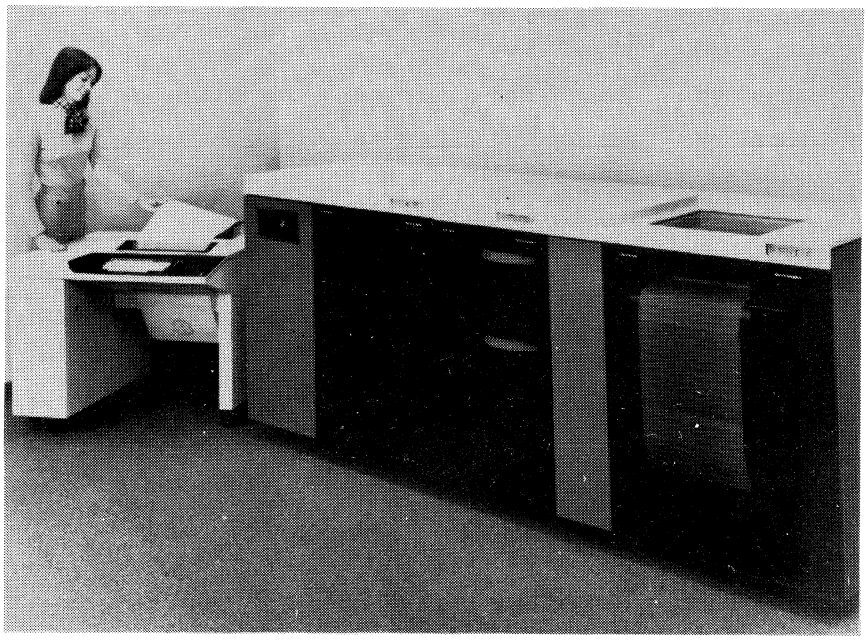
An Auto Dial Adapter is available to permit automatic dial out on two lines of each Data Communication Processor.

The Burroughs systems can also utilize the new synchronous, bit oriented line control procedure called Burroughs Data Link Control (BDLC), which is analogous to IBM's SDLC, and incorporates similar features. However, SDLC and BDLC are not compatible protocols.

SOFTWARE

There are two major software programs for the B 774 which are the Network Definition Language (NDL) and the operating control microcode.

NDL is a descriptive language that creates various tables, systems code, and the microcode. The systems code and required tables are stored in main memory, while the microprogram is stored in control memory. NDL is divided into various sections that describe terminal characteristics,



The B 776 is intended for larger Burroughs computer systems. Using a different internal architecture than the B 774, it can also handle up to 32 lines and, in addition, has capabilities for including local peripheral devices, as shown above, and user programming.

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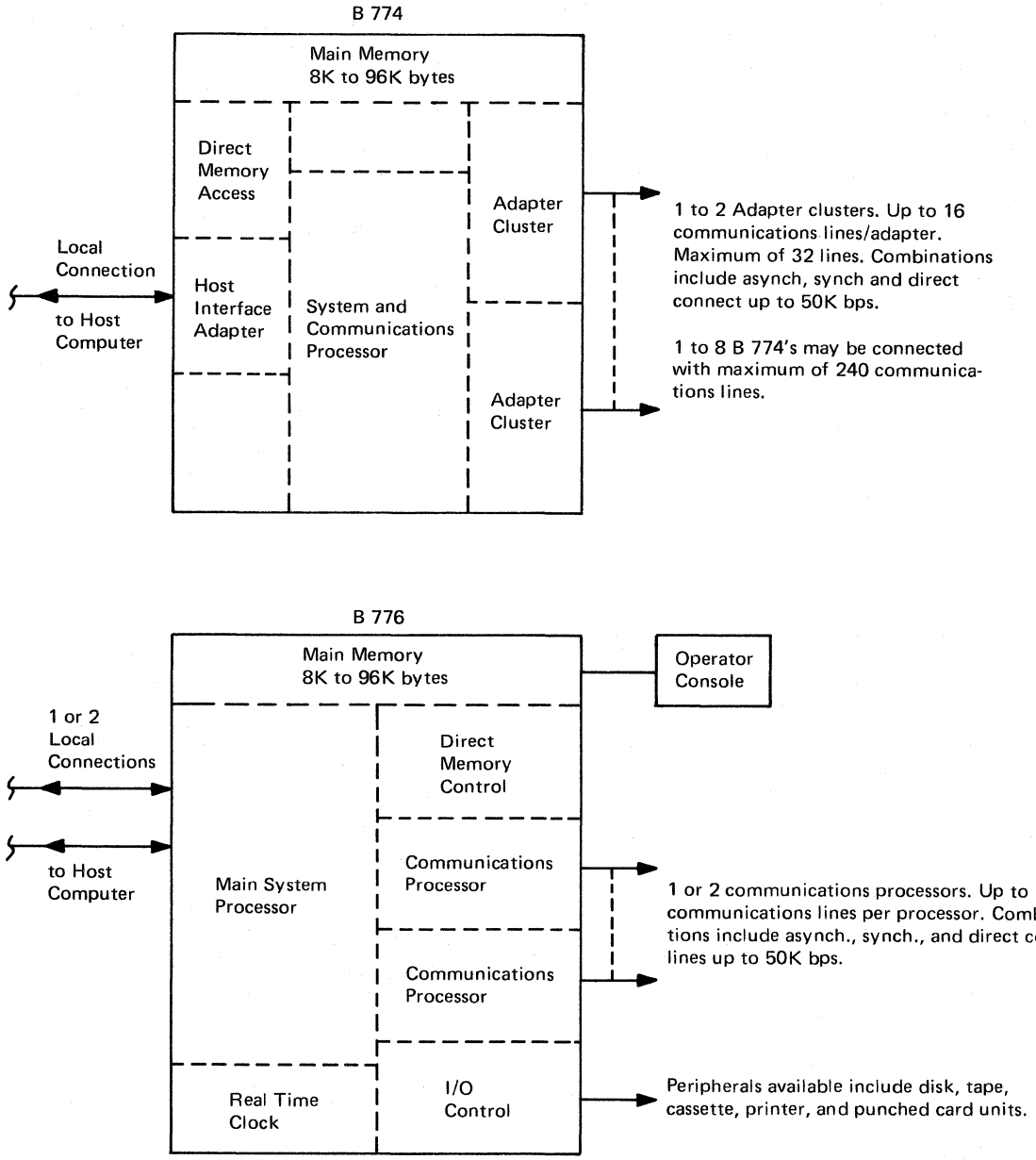
Configurations



data set characteristics, and data communications line disciplines; this relieves the user of having to design and program individual networks in assembly language.

The microcode for executing the system code consists of four major routines:

- Line Scanner–controls the Adapter Cluster and the Dual Line Adapters.
- Host Interface–communicates with the host system and performs the functions requested by the host software.
- NDL Interpreter–fetches from main storage and executes the NDL System Code produced by the NDL compilation process.
- Manager–a controlling microcode routine that senses Adapter Cluster and Host System interrupts and transfers control to the proper procedures.

The B 774 relies on the Burroughs host computer system for other software requirements and programs, primarily the Message Control System (MCS) which provides message control and high-level management for the system.

Software for the B 776 consists of a Communications Control Program (CCP), a Network Definition Language (NDL), a Message Processing Language (MPL), and application development languages.

CCP is the operating system for the B 776, and is an integral part of the main system Interpreter, allowing users to communicate in English language statements. CCP provides for concurrent operation of up to six programs in a multiprogramming mode, including one batch program. The number of programs that can be in concurrent operation is a function of main memory availability and processor demand.

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➤ NDL is a high-level language that permits the user to describe his communications network in simple statements, defining line characteristics, modems, and terminals. The NDL compiler generates the appropriate tables and code required for the network. The B 776 differs significantly from the B 774 in application program support. MPL is a high-level language designed for development of host system programs (MCS) or for development of application programs. Additionally COBOL and RPG, which are high-level, user-oriented application development languages, are available on the B 776.

A number of problem diagnostic features are available for the B 700 systems including a Line Monitor that analyzes line events and data flow and a Data Tester that provides direct analysis of line and data set operations.

PRICING

The Burroughs processors are available for purchase or a one-year lease, which includes maintenance. A separate maintenance contract is available for purchased systems.

	Monthly Rental* 1 year lease	Purchase	Monthly Maint.
B 774			
Basic System (includes processor, 12K bytes control storage, host interface and 32 line adapter cluster)	$ 684	$29,900	$113.00
IC Memory			
8K bytes	101	4,400	9.50
12K bytes	142	6,160	14.30
16K bytes	182	7,920	19.00
20K bytes	223	9,680	23.90
24K bytes	263	11,440	28.60
28K bytes	304	13,200	33.40
32K bytes	344	14,960	38.10
40K bytes	533	23,100	71.50
49K bytes	614	26,620	81.00
65K bytes	786	34,100	100.00
81K bytes	964	41,800	119.00
98K bytes	1,141	49,500	138.00
Direct Connect Dual Adapter	35	1,540	3.70
Asynchronous Dual Adapter	35	1,540	3.70
Synchronous Dual Adapter	71	3,080	7.10
Automatic Dual Out Dual Adapter	51	2,200	6.00
B 776			
Basic System (includes processor, 32K bytes of control memory, I/O Base, Direct Memory Access Control and Real Time Clock)	540	23,500	133.00
Input/Output Expansion Module	76	3,300	11.90
User Memory			
8K bytes	62	2,280	18.35
16K bytes	124	4,560	36.70
24K bytes	186	6,840	55.10
32K bytes	248	9,120	73.40
40K bytes	311	11,400	91.80
49K bytes	373	13,680	110.00
57K bytes	435	15,960	124.00
65K bytes	497	18,240	147.00
Operator Console			
10 cps keyboard	58	2,640	19.30
60 cps keyboard	133	5,100	24.80

*Includes monthly maintenance. ■