

AT&T 3B2 Family

MANAGEMENT SUMMARY

UPDATE: Several changes have taken place since this report first appeared. AT&T has added to the 3B2 Family by introducing two models, the 3B2/310 and the 3B2/400, while reducing base prices on the 3B2/300. In addition to the two new models, the vendor announced a tape controller, an intelligent serial controller, and an expansion disk controller. Also, AT&T enhanced the 3B2 Family with the addition of the AT&T XM, an expansion module capable of adding tape backup, enlarging disk capacity, and hooking up multiple floppy drives to the system. Finally, AT&T has made available numerous Unix software packages.

AT&T's supermicrocomputer product line, the 3B2 Family, has grown into a three-model product line. The 3B2 Family offers a Unix-based supermicro system that can connect up to 46 workstations. Targeted for general computing applications, including office and scientific environments, the 3B2 Family is compatible with AT&T's 3B supermini product line. The 32-bit 3B2 Family can be connected by AT&T's networking interfaces—3BNet, Information Systems Network, and PC Interface.

The 3B2/310 differs from the 3B2/300 in that it is based on a WE 32100 microprocessor. The 3B2/310 supports from one to 4MB of main memory, a 1MB floppy disk drive, and from 30MB to 432MB of disk storage. The system supports up to 18 workstations and can handle up to 14 active users. Like all of the models in the 3B2 Family, the 3B2/310 can be networked as a file server for PCs using PC Interface or AT&T's STARLAN NETWORK.

The 3B2/400 is also based on the WE 32100 microprocessor. Main memory can be configured from one to four megabytes, a 720KB floppy disk drive is integral, and from ▶

The 3B2 Family models are desktop multiuser supermicros. The systems are targeted toward a range of applications, including general-purpose computing for office, industry-specific, and graphics applications. The 3B2 Family runs AT&T's Unix System V. A variety of networking products provide communications among both the 3B2 systems and Unix-based and non-Unix-based computers from other vendors.

MODELS: 3B2/300; 3B2/310; 3B2/400.

MEMORY: 512KB to 4MB.

DISK CAPACITY: 10MB to 720MB.

WORKSTATIONS: Up to 46.

PRICE: \$8,200 to \$36,500 (base system prices).

CHARACTERISTICS

VENDOR: AT&T Information Systems, 1 Speedwell Avenue, Morristown, New Jersey 07690. Telephone (201) 898-2000.

CANADIAN ADDRESS: AT&T Canada, Inc., 1500 Don Mills Road, Suite 500, Don Mills, Ontario, Canada, M3B 3K4. Telephone (416) 449-4300.

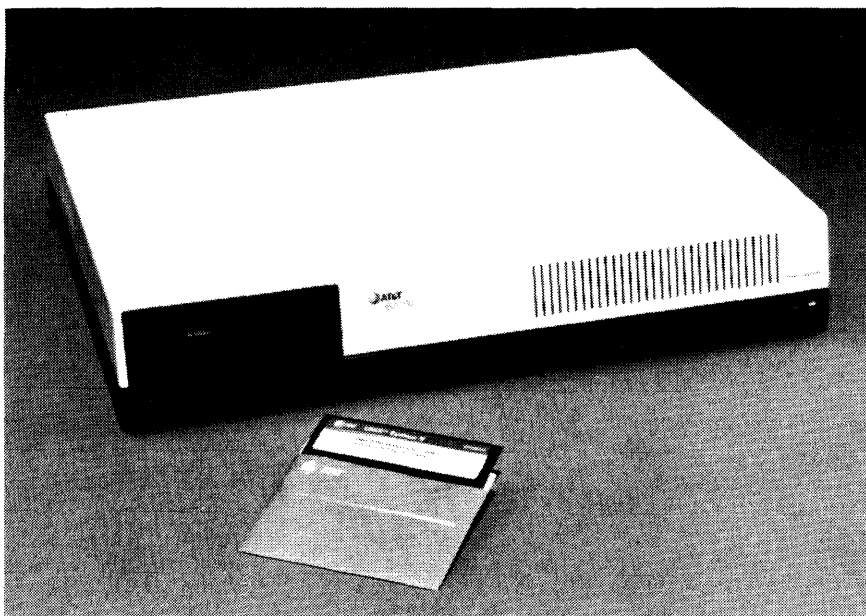
DATA FORMAT

BASIC UNIT: 32-bit word. Data types include bytes (8-bits) and halfwords (16-bits).

INTERNAL CODE: ASCII.

MAIN STORAGE

Dual-ported dynamic RAM (DPDRAM) is the main storage type for the 3B2 Family. Dual-ported means that the CPU ▶



AT&T's 3B2/310 supports up to 14 simultaneous users and employs a WE 32100 processor. The 3B2/310 supports up to 4MB of RAM and a maximum of 432MB of hard disk storage.

AT&T 3B2 Family

CHART A. SYSTEM COMPARISON

MODEL	3B2/300	3B2/310	3B2/400
SYSTEM CHARACTERISTICS			
Date of introduction	March 1984	October 1985	June 1985
Date of first delivery	March 1984	—	June 1985
Microprocessor type	WE 32000	WE 32100	WE 32100
Microprocessor cycle time	7.2MHz	10MHz	10MHz
Operating system	Unix System V Version 2.0.5	Unix System V Version 2.0.5	Unix System V Version 2.0.5
Upgradable from	Not applicable	3B2/300	Not applicable
Upgradable to	3B2/310	Not applicable	Not applicable
Number of serial/parallel I/O ports	18/4	18/4	46/11
Number of expansion slots	4	4	11
MEMORY			
Minimum capacity (bytes)	512KB	1MB	1MB
Maximum capacity (bytes)	4MB	4MB	4MB
DISK STORAGE			
Minimum capacity (bytes)	10MB	30MB	30MB
Maximum capacity (bytes)	432MB	432MB	720MB
NUMBER OF WORKSTATIONS			
COMMUNICATIONS PROTOCOLS	Up to 18 (10 active) Async, 3BNet, Ethernet, TTY, ISN, PC Interface, Star- LAN, SNA/3270, BSC/ 3270, X.25, TCP/IP, BSC 3780	Up to 18 (14 active) Async, 3BNet, Ethernet, TTY, ISN, PC Interface, Star- LAN, SNA/3270, BSC/ 3270, X.25, TCP/IP, BSC 3780	46 (25 active) Async, 3BNet, Ethernet, TTY, ISN, PC Interface, Star- LAN, SNA/3270, BSC/ 3270, X.25, TCP/IP, BSC 3780

Note: A dash (—) in a column indicates that the information is unavailable from the vendor.

➤ 30MB to 720MB of disk storage can be added to the system. The 3B2/400 also includes an integral tape drive and two integral disks. Up to 46 workstations can be connected, with 25 concurrent users on the system. The 3B2/400 can be networked as a file server for MS-DOS microcomputers, AT&T Unix PCs, and all 3B computers.

For system expansion, the AT&T XM enhances the capabilities of the 3B2 Family. The XM is an expansion module that can add tape backup facilities, enlarge disk capacity, and allow for multiple floppy disk drives. A 23MB cartridge tape drive may be installed in the XM, along with a dual device controller, which supports one tape drive and one floppy drive, for installation in one feature card slot.

The Optional Cartridge Tape Controller (CTC) is a feature card that supports one cartridge tape drive and a floppy disk drive. The CTC allows the addition of floppy disk space and backup, as needed. It also allows users to restore a small number of lost files without logging off.

The Intelligent Serial Controller (ISC) is a general-purpose feature card that allows communications over synchronous channels, like IBM's Systems Network Architecture (SNA)/SDLC and Bisync, by loading the appropriate software from the 3B2/300, 3B2/310, or 3B2/400 onto the ISC. It is available as a feature option for existing 3B2 systems. The ISC provides 3B2 users access to IBM host computers.

The Expansion Disk Controller (XDC) optional feature card, allows the addition of disk drives to the 3B2 line. Beyond the two hard disk drives supported by every 3B2, each XDC permits attachment of two hard disk drives. The 3B2/300 and the 3B2/310 support up to two XDCs and the 3B2/400 up to four XDCs.

➤ uses one port of main memory, while the I/O bus and the DMA controller share the other port. The purpose is to improve system performance by allowing program (that is CPU) and I/O requests to access memory simultaneously. The Dual Port Memory Controller arbitrates between requests for main memory from the I/O and CPU. Main memory utilizes 256KB DRAM chips. Main memory RAM is not physically mounted on the system board; it is located on memory array cards that plug into the system board. There are two memory card connectors on the system board, each holding one memory array card. Maximum main storage is 4MB. Memory protection is provided by byte parity. And, minimum memory required for the Unix System V Kernel and drivers on the 3B2 Family is about 300KB.

PROCESSING COMPONENTS

The processor used in the 3B2/300 computer is based on the WE 32000 microprocessor. It has a 32-bit data and address bus. CPU performance is 0.61 MIPS, measured by AT&T Bell Labs.

The WE 32000-based CPU includes the following components: sixteen 32-bit registers; an Address Arithmetic Unit (AAU); a 33-bit Arithmetic Logic Unit (ALU); a 32-bit barrel switch; 170 opcodes implemented in on-chip Programmable Logic Array (PLA) and a macro ROM for executing operating system instructions and microsequences; a 12-byte instruction queue; a Program Counter (PC); a Process Status Word (PSW); and a parity tree.

The processor in each 3B2/300 system performs address and data calculations independently. The 32-bit CBUS carries the results of data manipulation, while the 32-bit ABUS handles instruction stream and memory board operand accesses. Data is passed between the ABUS and the CBUS over a 32-bit bidirectional bus multiplexer.

The processor used in the 3B2/310 and the 3B2/400 is based on the WE 32100 microprocessor. The Memory Management Unit (MMU) is based on a WE 32101 processor. Silicon technology is CMOS (Complementary Metal Oxide Semiconductor.) The WE 32100 comprises a 32-bit internal data path and 32-bits address bus. Operations are 8, 16, or

AT&T 3B2 Family

➤ The 3B2/300 is the low-end system in AT&T's 3B computer family. It is based on AT&T's older WE 32000 microprocessor. The 3B2/300 features a single-board CPU and can support from 512KB to 4MB of plug-in memory. The system board includes two asynchronous RS-232-C serial I/O ports; four feature card slots in the 3B2/300 allow configuration of up to four I/O expansion cards, each of which adds four more RS-232-C ports and a parallel peripheral port. The 3B2/300 is used as a multiuser system; it can support up to ten concurrently active users (although up to 18 workstations can be configured). To connect the 3B2 to both AT&T systems and those from other vendors, AT&T offers four principal networking products: 3BNet, Information Systems Network (ISN), PC Interface, and StarLAN.

As previously mentioned, the 3B2 system runs AT&T's Unix System V, a general-purpose, multiuser, multitasking, interactive operating system. The two major components of Unix System V are the file system and the shell, or command language.

The Unix System V file system consists of a uniform set of directories and files arranged in a tree-like structure. The Unix System V shell is the user/system interface program that interprets command links input by the user from a terminal. The shell is not only an interactive command language, but also a full programming language. Unix System V also provides support for development, diagnostics support, system administration, system services, and text processing tools.

Languages available for the 3B2 Family include the C language, Basic, Fortran 77, and RM/Cobol (Ryan-McFarland Corporation's implementation of ANSI 74 standard Cobol). Other languages include UX-Basic, Level II Cobol, Level II Cobol/ET, UNIBOL, Integrated Compiler Products (ICP), and Visual/menu. Most of the software the company currently offers has been developed by third-party vendors, although it is available through AT&T's auspices.

COMPETITIVE POSITION

AT&T is focusing on general purpose departmental office applications, as well as specialty areas such as graphics and industry-specific applications. The company aims to deliver complete systems that offer a simple migration path to protect the customer's software investment, while offering strong communications capabilities. From the 3B2 system, users can follow a software migration path upwards to AT&T's larger 3B5, 3B15, and 3B20 systems. The Unix-based systems can also be linked into a uniform work environment.

In addressing the marketplace for departmental office applications, the 3B2 Family must compete primarily against IBM and Digital Equipment Corporation. The system also faces off against Plexus Computers.

Specifically, the 3B2/400 competes against Digital Equipment's MicroVAX II. Both systems have full 32-bit micro- ➤

➤ 32 bit. On-chip cache memory is 64-by-32 bit instruction cache. The fetch controller is an 8-byte instruction queue and 32-bit-wide Address Arithmetic Unit (AAU). The system includes nine all-user-accessible general-purpose registers. The processor has seven dedicated registers. CPU clock speed is 10MHz and CPU performance for both models is 1.12 MIPS, as measured by AT&T Bell Labs. Virtual and physical address spaces are both 4GB. Standard memory management is swapping; demand paging is optional.

INPUT/OUTPUT CONTROL

On the 3B2 Family, peripheral interfaces are controlled by the asynchronous, multiplexed I/O bus. The I/O bus has a 16-bit data path and a 24-bit address facility, and can support direct addressability up to 16MB. The I/O bus supports both 8-bit and 16-bit peripherals—both programmed and intelligent—as well as single- and multiple-data transfers per cycle.

Access by the I/O bus and CPU to main memory is controlled by the DPDRAM controller, which supports four basic modes, listed here in order of their priority; assigned by the bus arbiter; refresh; I/O access of main memory by a feature card or the integral DMA controller; CPU access of main memory; CPU access of I/O, in which the CPU reaches across the main memory to communicate directly with feature cards or with the system-board-resident DMA controller.

The DMA controller features four independent DMA channels and provides service for the hard disk controller, the floppy disk controller, and the transmit ports of the dual asynchronous serial RS-232-C ports, which all attach to the I/O bus and follow the same bus protocol as feature cards. To support the integral controllers and ports, the DMA controller accepts DMA requests, acquires the bus, and generates both a DPDRAM address and appropriate peripheral bus signals to accomplish the transfer. All data transfers between the DMA controller and main memory or the CPU are 8 bits wide.

CONFIGURATION RULES

AT&T Information Systems offers three configurations of the 3B2/300: basic, standard, and expanded standard. Each has the same core hardware and firmware, including system board, cabinet, power supply, fan, internal and external cables, connectors, Unix System V core software and six user-installable Unix System V utilities packages, a backup copy of core Unix software, system and user documentation, a 720KB floppy disk drive, and two RS-232-C cables. The basic configuration comes with 512KB of main memory and a 10MB hard disk. The standard configuration includes 1MB of memory and a 32MB hard disk. The expanded standard configuration includes 1MB of main memory, a 32MB hard disk, and an expanded I/O feature card that provides four additional serial ports and a parallel peripheral port; the system can support up to 18 serial and four parallel I/O ports. The 3B2/300 can support up to 4MB of main memory and up to 432MB of disk. Various main memory, I/O, terminal, and printer options can be added to the core configurations.

On the 3B2/300, four I/O expansion slots are available to support feature cards.

In configuring the 3B2/300, the following rules must be observed:

- A maximum of two 256KB or two 1MB memory cards can be used; 256KB and 1MB cards cannot be mixed. ➤

AT&T 3B2 Family

CHART B. DISK/DISKETTE DEVICES

MODEL	10MB	36.6MB	85.9MB	1MB
Type	Winchester	Winchester	Winchester	Diskette-96 TPI
Size (inches)	5¼	5¼	5¼	5¼
Number of surfaces	2	3	5	2
Formatted capacity per drive (bytes)	10MB	30MB	72MB	1MB
Interface/controller	ST-506	ST-506	ST-506	Integral (TM-100)
Number of drives per interface/controller	2	2	2	1
Average access time	85 ms	45 ms	35 ms	90 ms
Data transfer rate	5M bps	5M bps	5M bps	250K bps
Sectors/tracks per surface	32	18	18	80
Bytes per sector/track	512/sector	512/sector	512/sector	6KB

processors. The AT&T system supports less memory (4MB) and disk storage (720MB) than the MicroVAX II. The MicroVAX II supports 9MB of memory and has a 1.8GB disk capacity. However, the 3B2/400 supports about the same number of workstations (46 workstations—25 active users) as the Digital system. Digital says that the maximum number of stations the MicroVAX II supports is application dependent, but one configuration offered supports up to 33 users. However, the MicroVAX II runs at 0.9 MIPS, compared to 1.12 MIPS for the 3B2/400. Both systems offer advanced floating-point capabilities for technical applications.

IBM's major competitor for the 3B2/310 is the low-end System/36 model, the 5362. The IBM system supports less memory (1MB) than the AT&T model (4MB) and less disk (432MB for the 3B2/310 versus 120MB for the S/36). The low-end S/36 allows a maximum of 28 local and 64 remote workstations, as compared with up to 18 local workstations on the 3B2/400. Also, the 3B2 Family offers much more in the way of networking than IBM does.

The 3B2/400 also competes with the Plexus Series, Model P/55. The 3B2/400 configures less memory than the Plexus system; 4MB versus 8MB for the P/55. But the 3B2/400's disk capacity is larger, supporting up to 720MB of disk. The P/55 support 435MBs of disk. The systems are similar in that both use Unix System V as their operating systems. The P/55 is targeted for governmental and central data processing applications. Up to 32 users can be supported on the P/55; the 3B2/400 can support 46 workstations and 25 active users.

Technologically, the 3B2 Family exhibits both competitive strengths and weaknesses. The 3B2 Family is well positioned, from a technological standpoint, to compete with other supermicros. The WE 32000 and WE 32100 microprocessors on which it is based are true 32-bit microprocessors, that is, they employ both a 32-bit data path and a 32-bit address bus.

ADVANTAGES AND RESTRICTIONS

The 3B2 Family has both advantages and disadvantages. AT&T is actively developing application products both internally and in conjunction with third-party suppliers; many products are available through AT&T Information Systems. Unix System V is becoming a standard for Unix, at least insofar as it incorporates features that the bulk of

Double-width feature cards can be used; they occupy two feature card slots.

- The sum of RS-232-C baud rates cannot exceed 38.4K baud per I/O expansion feature card; no individual baud rate can exceed 19.2K.
- Only one computer network feature card need be configured per 3B2/300. (This card uses one feature card slot on the backplane.)
- A terminal must be connected to the integral RS-232-C console port.
- Parallel printers should not be located further than 10 feet from the computer.
- To operate at a maximum of 19.2K baud, all asynchronous serial EIA peripherals must be located within 50 feet of the computer; greater distance will reduce operating speed.

AT&T recommends that when multiple terminals are to be attached or a Teletype Dot-Mapped Display (DMD) terminal is to be used, the system configuration should include a 32MB disk and at least 1MB of memory.

The 3B2/310 is configured with a WE 32100 processor, 1MB of RAM, a 720KB floppy disk, and a 30 or 72MB hard disk. The maximum number of integral hard disks allowed is one. Four I/O expansion slots are supplied. Optional features include an additional 1.5MB of RAM and the addition of two hard disk drives. The 3B2/310 supports up to two XDCs, for a maximum disk capacity of 432MB and supports up to 4MB of main memory. Other optional features include a 23MB tape-drive for backup, a Math Acceleration Unit, and 18 serial and four parallel connections.

The 3B2/400 is also configured with a WE 32100 processor, 1MB to 4MB of RAM, a 720KB floppy disk, and a 30 or 72MB hard disk. The maximum number of integral hard disks allowed is two. Eleven I/O expansion slots are supplied. Optional features include 3.5MB more of RAM, a 30 or 72MB hard disk, and 720MB maximum disk storage, using the XM expansion module and XDC feature cards. A 23MB tape backup device is integral to the system, and a Math Acceleration Unit is also available optionally. The maximum number of connections allowed is 46 serial and 11 parallel.

INPUT/OUTPUT UNITS

See Chart B for disk and diskette devices, Chart C for workstations, and Chart D for printers.

For system expansion, the AT&T XM expansion module supports the addition of tape backup facilities, larger disk capacity, and multiple floppy disk drives for the 3B2 Family. Up to three 5¼-inch peripherals may be housed in each XM; a maximum of two may be removable. The expansion mod-

AT&T 3B2 Family

➤ users appear to want. Moreover, AT&T has promulgated a System V Interface Definition, which spells out the requirements that allow various versions of Unix to achieve compatibility with AT&T's system. These occurrences are likely to spur further development of System V-compatible applications.

Although there is no direct hardware upgrade, except 3B2/300 to 3B2/310, the 3B2 Family offers software compatibility with other 3B computers. Because all 3B Computers use Unix-based operating systems, all offer software compatibility at the source-code level; software is only object-code-compatible, however, among the 3B2, 3B5, and 3B15 systems.

The 3B2 Family exhibits significant strengths for networking and distributed processing, implemented in a variety of ways. The UUCP (Unix to Unix Copy) facility in each computer's Unix operating system permits communications with both AT&T Unix and non-AT&T Unix systems (for example, those running a version of Unix based on the University of California at Berkeley implementation). With PC Interface, a 3B2 can be networked with MS-DOS-based personal computers. The Information Systems Network links 3B computer systems to non-AT&T systems (Digital VAX systems, for example) running Unix System V; it also supports protocol converters for SNA/SDLC communications. The 3BNet LAN and StarLAN both provide local interconnection for groups of 3B2 systems and AT&T PCs. In local networking, in fact, AT&T has an advantage over IBM, which, is just developing its token ring network.

Another plus of the 3B2 Family is the service offered. AT&T has traditionally been strong in customer service, and has implemented a strong support program for the 3B2 Family.

USER REACTION

AT&T Information Systems will not divulge installed base figures as a matter of policy. AT&T-IS was thus unable to provide us with a list of users from whom we could obtain assessments of the 3B2 Family. However, Datapro was able to contact two users from the Datapro 1986 Computer Users' Survey.

The first user we contacted was in charge of a service bureau and applications development firm located on the East Coast. The user chose the 3B2/310 over a Digital Equipment Corporation VAX 11/730; he said the decision to go with the AT&T machine was based on price and performance ratios, coupled with respect for Bell Labs. The user had five terminals on site and was running accounting, inventory, and payroll processing applications on the system, in addition to developing applications. The user endorsed the 3B2/310, saying the machine should be around for a long time and that in the hands of an intelligent user it is extremely versatile. However, he found major drawbacks with the sales force. The user stated that he found the sales force uninformed technically and not conversant enough with the system to answer his detailed, technical questions. ➤

➤ The 3B2 Family comes in three solution packages. The basic XM Package Solution A features the following as standard: the XM cabinet, internal power supply, internal cabling, an integral 23MB formatted tape drive, and a dual device controller that supports one tape drive and one floppy drive for installation in one feature card slot. Solution Packages B and C include an installed fixed disk drive in addition to the basic package. The Solutions Package B configuration includes the basic package with a 30MB formatted Winchester hard disk drive. Solutions Package C includes the basic package with a 72MB formatted Winchester hard disk drive.

The XDC External Disk Controller plugs into the I/O backplane. It supports two ST506 hard disk drives located in the optional XM Expansion Module. This permits the installation of additional disks beyond those supported by the integral disk controller (IDC). It supports either the 30MB or the 72MB (formatted capacity) disk drives.

The cartridge tape unit is included in all XM Solutions packages. It is a removable device providing primary backup storage capabilities, and can be used both in streaming mode or for incremental backup. The tape drive is controlled by the cartridge tape controller, which can support one tape and one floppy disk.

COMMUNICATIONS

On the 3B2/300, the system board provides two standard serial RS-232-C asynchronous I/O ports, operating full duplex at rates up to 9.6K baud. The two serial channels feature full-duplex asynchronous communications, and programmable baud rates from 50 to 19.2K baud.

The 3B2/310 supports up to six serial ports, along with one parallel port. Six RS-232-C ports are standard on the 3B2/400; with expansion cards, 40 ports can be added. One parallel port is standard.

An *Autodial Modem* feature, along with a basic networking utility, allows the 3B2 Family to be connected to other Unix systems over a standard telephone network. The Autodial Modem unit is externally attached to the computer through a standard RS-232-C port. (No expansion port feature card is required.) Automatic dial/answer facilities are provided at data rates from 300 to 1200 baud.

The 3B2 Family can also be connected to *3BNet*, a high-speed local area network (LAN) and Information Systems Network (ISN), AT&T Information Systems' proprietary local area network for building complexes and campuses. For details on 3BNet and ISN, refer to the *AT&T 3B Computer Family Report* under Tab 11 in the volume of DATAPRO REPORTS ON MINICOMPUTERS.

SOFTWARE

AT&T offers a range of software products, both proprietary and developed by third parties. Products developed by other vendors and discussed in the following section are all available directly from AT&T.

OPERATING SYSTEM: *Unix System V*, (Version 2.0.5) the operating system for the 3B2 Family, is a general-purpose, multiuser, multitasking, interactive operating system. Unix System V for the 3B2 Family consists of a core package that incorporates the system kernel; standard device drivers; and basic commands for shell programming, directory and file management, system administration, user environment, status request, and special-purpose functions (comparing, searching, sorting, and counting data). For details on Unix System V, refer to the "Operating Systems" section of the AT&T 3B COMPUTER FAMILY report in Tab 11 of DATAPRO REPORTS ON MINICOMPUTERS. ➤

AT&T 3B2 Family

CHART C. WORKSTATIONS

MODEL	Dataspeed 4410	Dataspeed 4418	Dataspeed 4425	Dot-mapped Display 5620
DISPLAY PARAMETERS				
Max. chars./screen	1920 x 3168	1920 x 3168	1920 x 3168	800 x 1024 resolution
Buffer capacity	1 page	3 pages	3 pages	256KB or 1MB
Screen size (lines x chars.)	24 x 80 or 132	24 x 80 or 132	24 x 80 or 132	70 x 88
Tilt/swivel screen	Tilt standard	Tilt standard	Tilt standard	Not applicable
Symbol formation	5 x 7/7 x 9 dot-matrix	5 x 7/7 x 9 dot-matrix	5 x 7/7 x 9 dot-matrix	Bit-mapped
Character phosphor	White, green, or amber	Amber, white or green	White or amber	Green
Total colors/no. simult. displayed	Not applicable	Not applicable	Not applicable	Not applicable
KEYBOARD PARAMETERS				
Style	Typewriter	IBM 3278 style	Typewriter	Typewriter
Character/code set	128 ASCII	128 ASCII	128 ASCII	ANSI 3.64
Detachable	Yes	Yes	Yes	Yes
Program function keys	8 standard	24 functions	38/19 (option)	8 standard
TERMINAL INTERFACE	RS-232-C	RS-232-C	RS-232-C	RS-232-C
COMMENTS	Integrated autodial modem available	Optional integrated autodial modem	Optional integrated autodial modem; VT-100 compatible	—

CHART C. WORKSTATIONS

MODEL	513 BCT	610 BCT
DISPLAY PARAMETERS		
Max. chars./screen	1920	1920 or 3168
Buffer capacity	3 pages	1 page
Screen size (lines x chars.)	24 x 80	24 x 80 or 132
Tilt/swivel screen	Tilt standard	Tilt/swivel
Symbol formation	5 x 7/7 x 9 dot-matrix	5 x 7/7 x 9
Character phosphor	White	Green, amber, white
Total colors/no. simult. displayed	Not applicable	Not applicable
KEYBOARD PARAMETERS		
Style	Typewriter	Typewriter
Character/code set	128 ASCII	ASCII/ANSI 3.64
Detachable	Yes	Yes
Program function keys	15 fixed character sequence keys standard	16 programmable, 6 fixed
TERMINAL INTERFACE	RS-232-C	RS-232-C

Note: A dash (—) in a column indicates that the information is unavailable from the vendor.

➤ But, the user has been able to penetrate through to technical AT&T support personnel who have assisted him in making his 3B2/310 run properly.

Also, the user felt that AT&T should emphasize training for its Unix machines. He felt the presentation of Unix as reflected in AT&T literature is poor and suggested that the vendor establish regional training centers and offer Unix seminars. The user said he had difficulty teaching himself the C language on the 3B2/310 and felt that a portion of the problem was due to the vendor literature. However, since he purchased the system about a year ago, he felt, the manuals have improved. As to the system itself, the user has not experienced any difficulties with the machine. Although he would recommend the 3B2/310, he suggested that prospective users needing five or fewer terminals should also consider the 3B1, part of AT&T's PC line.

The second user we contacted was the data processing manager of a financial service firm located in the Southwest. Before purchasing the 3B2/400, the company considered the NCR Tower 32. The user said the final decision ➤

➤ Available for the 3B2/300 computer is the *Software Generation System (SGS)*, a package of tools used to create and test programs for WE 32000 series microprocessors. For details on Unix System V utilities and SGS, refer to the "Utilities" section of the AT&T 3B COMPUTER FAMILY report in Tab 11 of DATAPRO REPORTS ON MINICOMPUTERS.

DATABASE MANAGEMENT SYSTEM: Several DBMS products are available from AT&T for 3B2 computers, including standard and relational packages. Packages include *dBase II*, developed by Ashton-Tate, Inc.; *AT&T Ingres/CS* (a compatible subset of the Ingres DBMS originally developed by Relational Technology, Inc.); *Informix*, from Relational Database Systems, Inc.; and *File-it!*, an Informix-compatible file manager for personal record keeping.

LANGUAGES: Languages available for the 3B2 Family include the C language, Basic, Fortran 77, and RM/Cobol. Also, UX-Basic, Level II Cobol and Level II Cobol/ET, UNIBOL, AT&T Integrated Compiler Products (ICP), and VISUAL/menu.

COMMUNICATIONS: All 3B Computers support the *Unix-to-Unix Copy Facility (Uucp)*, which provides the ➤

AT&T 3B2 Family

CHART D. PRINTERS

MODEL	455	457	458	470	471	475
Type	Daisywheel	Daisywheel	Daisywheel	Dot-matrix	Dot-matrix	Dot-matrix
Speed	55 cps	45 cps	45 cps	120 cps	120 cps	120 cps
Bidirectional printing	Yes	Yes	Yes	Yes	Yes	Yes
Paper size	Up to 15 in.	4 to 16.7 in.	4 to 16.7 in.	4.5 to 11 in.	4.25 to 15.5 in.	4.5 to 11 in.
Character formation	Full	Full	Full	8 x 9 dot-matrix	8 x 9 dot-matrix	8 x 9 dot-matrix
Horizontal character spacing (char./inch)	10, 12, 15	10, 12, 15	10, 12, 15	5-17 cpi	5-17 cpi	5-17 cpi
Vertical line spacing (char./inch)	6/8	6/8	6/8	6/8	6/8	6/8
Character set	ASCII 96	ASCII	ASCII	ASCII 128	ASCII 128	ASCII 128
Controller/Interface	RS-232-C, Centronics parallel	Centronics parallel	RS-232-C	Centronics parallel	Centronics parallel	RS-232-C
No. of printers per controller/interface	1	1	1	1	1	1
Printer dimensions, in. (h x w x d)	7.13 x 24.5 x 15.5	5.2 x 21.6 x 12.9	5.2 x 21.6 x 12.9	5.35 x 15.6 x 11.22	5.35 x 19.8 x 11.22	5.35 x 15.6 x 11.22
Graphics capability	Yes	No	No	Yes	Yes	Yes

CHART D. PRINTERS

MODEL	478	479	5310	5320
Type	Dot-matrix	Dot-matrix	Dot-matrix	Dot-matrix
Speed	50/200	50/200	200 cps	200 cps
Bidirectional printing	Yes	Yes	Yes	Yes
Paper size	3 to 9.5 in.	3 to 15 in.	3 to 9.5 in.	3 to 15 in.
Character formation	Up to 145	Up to 240	9 x 7 dot-matrix	9 x 7 dot-matrix
Horizontal character spacing (char./inch)	5 to 18.2	5 to 18.2	5 to 16.5	5 to 16.5
Vertical line spacing (char./inch)	2,3,4,6,8,12	2,3,4,6,8,12	2,3,4,6,8,10,12	2,3,4,6,8,10,12
Character set	ASCII	ASCII	ASCII	ASCII
Controller/Interface	Centronics parallel	Centronics parallel	Serial RS232	Serial RS232
No. of printers per controller/interface	1	1	1	1
Printer dimensions, in. (h x w x d)	5.5 x 16 x 14.4	5.5 x 21 x 14.4	5.5 x 16 x 20.1	6 x 19.5 x 21.5
Graphics capability	Yes	Yes	Yes	Yes

rested on the strength of the AT&T/Bell Labs name. This user mirrored the comments of the previous user with respect to AT&T's sales support staff. He felt that the sales staff is not technically versed in the product line. But, this user praised the telephone software support staff, located in the Bell Labs office in New Jersey. He also stated that the field technical staff does not know the machines and that no parts are inventoried locally, and, thus, no parts are repairable locally.

This user was satisfied with the memory (4MB) and disk (340MB) configured on his 3B2/400, but would like to see AT&T increase the CPU cycle time. Although the machine is configured for up to 18 users with good response time, he warns prospective customers to restrict the number of users to that figure. Another suggestion was the addition of a 43MB streaming tape drive instead of the currently marketed 23MB tape drive, which he said is too small. Overall, this user gave the 3B2/400 high marks with regard to ease of operation, the reliability of the system, and the reliability of peripherals. □

► capability to copy and send files from a resident 3B2 system to a remote Unix system.

The 3B2 Family also supports *PC Interface*, a hardware/software link that interconnects 3B2 computers to personal computers running the MS-DOS operating system. The PC Interface allows multiple PCs to share files and peripherals on a central 3B2 running Unix System V. Files can be transferred back and forth from PCs to 3B2 systems; all necessary translations are performed by the Interface unit. The PC Interface supports three types of media to intercon-

nect PCs and 3B2s: RS-232 media operating at speeds up to 9.6K bps; and Ethernet, at 10M bps.

PC Interface software provides transparent sharing of files resident on 3B2's by personal computers running MS-DOS Version 2.0; transparent printer spooling, through which a PC user can obtain output from a printer on the 3B2; and, in conjunction with Unix System V, control over user access privileges.

APPLICATIONS: Both proprietary and third-party applications are available for the 3B2 Family, including general business, data management, spreadsheets, word processing, and office automation. Graphics packages include Sound Presentation, GSS-Chart, GSS-Plottalk, GSS-Drivers, and GSS-Toolkit.

OPERATING ENVIRONMENT

The 3B2/300 and 3B2/310 are housed in cabinets 3.6 inches high, 22 inches wide, and 17 inches deep; basic configurations weigh about 30 pounds. The 3B2/300 and 3B2/310 computers can be positioned either horizontally or vertically; when horizontally positioned, each can support an external load up to 60 pounds. The 3B2/300 and 3B2/310 require standard power of 115 VAC/220-240 V, 4 amps/2 amps, 60 Hz. Power consumption for the two models is less than 230 watts. Operating temperatures for both models range from 40 degrees Fahrenheit to 100 degrees Fahrenheit at 20 percent to 80 percent relative humidity, noncondensing.

The 3B2/400 is 7.2 inches high, 22 inches wide, and 17 inches deep. The 3B2/400 weighs 60 pounds and requires the same operating temperature and power parameters as the 3B2/300 and 3B2/310. Power consumption for the 3B2/400 is less than 540 watts. ►

AT&T 3B2 Family

► SUPPORT SERVICES

DOCUMENTATION: Standard user documentation includes the 3B2 Computer Model 300, Model 310, or Model 400 Owner/Operator Manual; 3B2 Computer Model 300, Model 310, or Model 400 Unix System V User Guide and Essential Utilities Reference Manual and Update Manual. Also, Documentation Roadmap, Release Notes, User Reference Manual, System Administration Reference Manual, Programmer Reference Manual, Security Administration Utilities Guide, and Unix System User Guide are all standard. Other available documentation includes AT&T Information Systems Architecture manual and the AT&T Computer Software Guide.

TRAINING/EDUCATION: AT&T provides hardware and software training at national and regional centers. The company also provides on-premises training in complex software packages.

MAINTENANCE: AT&T offers tailored maintenance agreements for 3B2 computer systems. The agreements include combinations of toll-free hotline assistance for hardware and software and on-site service by field service technicians.

Hotline service can include remote diagnostics services, in some cases. For those problems that cannot be resolved by telephone, a systems technician will be dispatched to the user's site.

On-site service options include:

- Business day service, AT&T's standard maintenance agreement, which provides coverage from 8 a.m. to 5 p.m. Monday through Friday.
- Around-the-clock service, which extends coverage to 24 hours a day, seven days a week, including holidays.

- Dedicated service, which allows customers to have technicians on-site for one, two, or three shifts a day for five, six, or seven days a week.

- Per-occurrence service on a time-and-materials basis.

AT&T also offers software-only services. Options include:

- Hotline assistance, 8 a.m. to 5 p.m. Monday through Friday in all time zones.
- Hotline assistance plus on-site visits by technicians, 8 a.m. to 5 p.m. Monday through Friday.
- Hotline assistance plus on-site visits by technicians 24 hours a day, seven days a week, including holidays.
- Hotline assistance plus on-site technicians' visits charged on a noncontract, per-occurrence, time-and-materials basis.

The 3B2 system has a 90-day warranty for both software and hardware; during that period, customers receive Business day service and hotline assistance.

PRICING

POLICY: The 3B2 Family is available for purchase or lease. (Financing is also available from AT&T Credit Corporation.) A volume discount for the system is also available. List prices for the system are quoted in the EQUIPMENT PRICES information following. The price for software is a onetime use license fee. Maintenance fees for both purchase and lease options are available on either a month-to-month basis or annual contract basis. Separate price schedules for spares and growth, software licensing, and fee schedules are also available.

EQUIPMENT PRICES

		Purchase Price (\$)	Monthly Maint.* (\$)
3B2/300 System Packages			
Basic Configuration			
7320-300	3B2/300 Computer system, including WE 32000 microprocessor, 512KB main memory, two integral RS-232-C ports, two RS-232-C cables and connectors, low-profile cabinet, 720KB minifloppy, 10MB Winchester disk, Unix System V operating system and standard utilities, three-volume set of user documentation; also includes 90-day hardware warranty and software information and update service.	9,950	—
Standard Configuration			
7320-301	3B2/300 Computer system, including WE 32000 microprocessor, 1MB main memory, two integral RS-232-C ports, two RS-232-C cables and connectors, low-profile cabinet, 720KB minifloppy, 32MB Winchester disk, Unix System V operating system and standard utilities, three-volume set of user documentation; also includes 90-day hardware warranty and software information and update service.	11,650	—
Expanded Standard Configuration			
7320-302	3B2/300 Computer system, including WE 32000 microprocessor, 1MB main memory, two integral RS-232-C ports, two RS-232-C cables and connectors, low-profile cabinet, 720KB minifloppy, 32MB Winchester disk, I/O expansion card (includes four RS-232-C ports and a Centronics parallel printer port), Unix System V operating system and standard utilities, three-volume set of user documentation; also includes 90-day hardware warranty and software information and update service.	11,950	—

AT&T 3B2 Family

EQUIPMENT PRICES

		Purchase Price (\$)	Monthly Maint.* (\$)
3B2/310 Packages			
3B2/310-A	Package includes 3B2/310 system unit with 2 RS-232-C serial ports, I/O expansion ports card (4 RS-232-C serial, 1 parallel), 1MB memory board, 30MB hard disk, 720KB floppy diskette, Unix System V Release 2.0, and 2 RS-232-C terminal cables	13,950	709
3B2/310-B	Package includes 3B2/310 system unit with 2 RS-232-C serial ports, I/O expansion ports card (4 RS-232-C serial, 1 parallel), 1MB memory board, 72MB hard disk, Unix System V Release 2.0, and 2 RS-232-C terminal cables	17,300	863
3B2/400 Packages			
3B2/400-A	Package includes 3B2/400 system with I/O expansion ports card, 1MB memory board, 30MB hard disk drive, 720KB floppy disk drive, 23MB cartridge tape backup unit, 2 RS-232-C cables, and Unix System V	19,950	986
3B2/400-B	Package includes 3B2/400 system with 2 I/O expansion ports card, 2MB memory board, 2 30MB hard disk drives, 720KB floppy disk drive, 23MB cartridge tape backup unit, 2 RS-232-C cables, and Unix System V	25,500	1,248
MEMORY OPTIONS			
73201	1MB expansion memory	2,200	—
INPUT/OUTPUT OPTIONS			
73202	I/O expansion card	660	—
PRINTERS			
3330-455	Daisywheel; 455 wide, 55 cps, 132 columns, 4 maximum paper parts; for departmental word processing applications	1,810	—
3330-457	Daisywheel; 457 wide, 45 cps, 132 columns, 5 maximum paper parts; for word processing printer applications	1,495	—
3330-458	Daisywheel; 458 wide, 45 cps, 132 columns, 5 maximum paper parts; for word processing printer applications	1,495	—
3330-470	Impact dot-matrix; 470 std., 120 cps, 80 columns, 4 maximum paper parts; for personal printer applications	545	—
3330-471	Impact dot-matrix; 471 wide, 120 cps, 132 columns, 4 maximum paper parts; for personal printer applications	795	—
3330-475	Impact dot matrix; 475 std., 120 cps, 80 columns, 4 maximum paper parts; for personal printer applications	595	—
3330-476	Impact dot-matrix; 476 wide, 120 cps, 132 columns, 4 maximum paper parts; for personal printer applications	845	—
3330-478	Impact dot-matrix; 478 std. (near-letter-quality), 200 cps, 80 columns, 6 maximum paper parts; business printer/forms tear off	1,095	—
3330-479	Impact dot-matrix; 479 wide (near-letter-quality), 200 cps, 132 columns, 6 maximum paper parts; business printer/spreadsheets	1,295	—
3353-010	Impact dot-matrix; 5310 std., 200 cps, 80 columns, 6 maximum paper parts; business printer/forms tear off	1,285	—
3353-020	Impact dot-matrix; 5320 wide; 200 cps, 132 columns, 6 maximum paper parts; business printer/integrated, modem available	1,580	—
3330-435	435 plotter (six-pen plotter only); 1 maximum paper part; six-color quality charts and graphics	1,898	—
3330-102	Line printer; Dataspeed Model 102, 300 lpm, 80 columns, 6 maximum paper parts; heavy duty roll paper	3,580	—
3330-154	Line printer; Dataspeed Model 154, 300 lpm, 80 columns, 6 maximum paper parts; heavy duty forms printer	3,180	—
3330-202	Line printer; Dataspeed Model 202, 300 lpm, 132 columns, 6 maximum paper parts; one sheet at a time	4,160	—
3330-204	445 line printer; 300 cps, 132 columns, 6 maximum paper parts; batch processing	6,475	—
3330-253	Forms access line printer; 300 lpm, 80 columns, 6 maximum paper parts; last form tear-off	3,515	—
3330-201	460 high-speed dot-matrix printer; 200 lpm, 132 columns, 6 maximum paper parts; medium duty wide platen	3,920	—
3330-447	447 line printer; high-volume computer output	10,995	—
INT02	447 line printer with EIA interface; 600 lpm, 132 columns, 6 maximum paper parts; high-volume computer output	—	—
INT09	447 line printer with parallel interface; 600 lpm, 132 columns, 6 maximum paper parts; high-volume computer output	—	—
33001	447 line printer with EIA-parallel interface; 1000 lpm, 132 columns, 6 maximum paper parts; high-volume computer output	—	—

AT&T 3B2 Family

EQUIPMENT PRICES

		Purchase Price (\$)	Monthly Maint.* (\$)
WORKSTATIONS			
500052154	5620 terminal	6,000/1MB	5,000/¼MB
**	Dataspeed 4410 terminal	945	—
**	Dataspeed 4418 terminal	1,065	—
**	Dataspeed 4425 terminal	1,295	—
**	BCT 513 terminal	1,260	29.00
**	BCT 89-key keyboard	220	3.00
**	BCT 103-key keyboard	235	3.00
COMMUNICATIONS/NETWORKING OPTIONS			
73203	3B2/300 3BNet Network Interface feature. Includes network interface card, network interface label, ground clip, three screws, block label, nylon cable clamp	1,500	—
73204	Same as 73203, plus 10-meter drop cable and transceiver	2,000	—
73205	Same as 73204, but with 30-meter cable	2,155	—
73206	Same as 73204, but with 50-meter cable	2,340	—
73210	Autodial modem	695	—

NA—Not applicable.

*National average; price will vary depending on geographic location.

**Indicates that the order number or price was not supplied by AT&T.

SOFTWARE PRICES

		List Price (\$)
The list price for software includes a one-time license fee. A dash (—) in the order number column indicates that the order number has not been supplied by the vendor.		
OPERATING SYSTEMS		
The Unix System V operating system is bundled with the 3B2 Family.		
DATABASE MANAGEMENT SYSTEMS		
1041-L00	dBase II	1,200
LANGUAGES		
1041-A01	Unix C programming language	340
1041-C02	Unix Fortran	275
1041-B00	Unix Basic Language	300
1041-D00	RM/Cobol	1,500
1041-D01	RM/Cobol RT	300
COMMUNICATIONS		
1040-001	3B2/300 (object code)	400
—	PC Interface	100
OFFICE AUTOMATION		
—	Handle, total package	2,500
—	Handle Writer/Spell/List	1,500
—	Handle Graph/Calc	1,100
APPLICATIONS		
—	AT&T Gift Registry System	3,000
—	AT&T Business Accounting System (BAC), total package	5,000
—	AT&T BAC, A/R module	1,000
—	AT&T BAC, A/P module	1,000
—	AT&T BAC, Payroll module	1,300
—	AT&T BAC, Order and Inventory module	1,300
—	AT&T BAC, G/L module	1,000
—	C-Isam	450
—	Microsoft Word	650
—	Multiplan	500 ■