

AT&T 6500 Multifunction Communication System

In this report:

Analysis -102
 Characteristics..... -106
 Pricing -110

Product Summary

Editor's Note

Release 3.3 of AT&T's controller software enables the 6544 controller to support up to four simultaneous SNA host connections. AT&T also now markets the 6542 tabletop controller. The 6578, 6579, 6580, and 6591 IBM plug-compatible displays have been superseded by AT&T's 6591D, 6592D, and 6592F plug-compatible displays.

Description

AT&T's 6500 Multifunction Communication System provides synchronous and asynchronous access to multiple computers and peripherals. AT&T markets a variety of 6500 System-compatible and IBM plug-compatible display terminals and printers. Some system-compatible displays support multitasking.

Strengths

The flexible 6544 controller supports up to four simultaneous synchronous host connections, 32 synchronous peripherals and 32 asynchronous devices or computers, and access to X.25 and token-ring networks. Support for simultaneous access to both synchronous and asynchronous sessions is a key feature of both the 6544 and 6542 controllers.

Limitations

No major limitations.

Competition

IBM, Memorex/Telex, IDEA Courier, Lee Data, and several others.

Vendor

AT&T
 Data Systems Group
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 Morristown, NJ 07960
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In Canada:
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Price

See pricing section.

Analysis

Product Strategy

In December 1985, AT&T introduced the 6500 Multifunction Communication System, a product family that provides compatibility with the synchronous IBM 3270 system, as well as asynchronous communications.

By the fourth quarter of 1987, AT&T had expanded the system's functionality with additional products and enhancements, including three new plug-compatible displays, an adapter for the 6544 controller to support plug-compatible devices, a 6500 System-compatible color graphics printer, a local channel-connection option, increased asynchronous access capabilities, and terminal session capability for IBM-compatible PCs through adapter cards.

Between April 1988 and March 1989, AT&T added the 6542 Tabletop Communication Controller, four additional plug-compatible displays, and a plug-compatible printer and printer controller. AT&T also provided system enhancements such as support for up to four simultaneous host connections, two of which could use SNA/SDLC protocols; 32 ports for synchronous devices; and 32 asynchronous connections. With Release 3.3 of AT&T's controller software in February 1990, the 6544 controller now supports up to four simultaneous SNA hosts and a token ring connection.

AT&T has long been a leader in the IBM 3270-compatible terminal market, with over 300,000 terminals installed. The company's products include the 40 Series, the 4540 family, and the E4540 line. Each product line provides basic, functional compatibility with corresponding IBM 3270 products.

Components of the 6500 Multifunction Communication System include the 6544 controller; the 6518 Basic Function Display; the 6528 and 6529 Standard Displays; the 6538 and 6539 Multitasking Displays; the 6591D, 6592D, and 6592F Plug-Compatible Displays; the 6571 and 6572 Color

Graphics Printers; the 6561 and 6562 Printer Controllers; and the 2-N-1 and Coax Attachmate (3-N-1) PC adapters.

The 6544 controller accommodates the older AT&T 4540 and E4540 displays and the AT&T 4400 family asynchronous displays. The 6500 components operate over standard twisted-pair telephone wire or previously installed coaxial cable. The 6544 controller also supports multiple hosts and devices through 12 expansion slots, which hold different combinations of the following modules:

- The Synchronous Host Module: provides three synchronous ports for the access of 3270 hosts (Bisync or SNA).
- The Synchronous Device Interface Module: allows the attachment of up to 16 synchronous displays, printers, or PCs via twisted-pair wire.
- The Asynchronous Host/Protocol Conversion Module: enables connection of up to eight asynchronous hosts or terminals; protocol conversion allows asynchronous terminals to access synchronous hosts.
- The X.25 Interface Module: provides a connector for IBM-compatible hosts supporting packet switched protocols.
- The Local Channel Interface Module: provides connection for IBM mainframe byte multiplexer, block multiplexer, or selector channel configurations in which the 6544 is within 200 feet of the host.
- The Plug-Compatible Device Interface Module: provides connection of up to 16 synchronous devices to the 6544 controller.
- The Token-Ring Logic Module: allows devices connected to a 6544 controller to access a remote or local SNA host via a token-ring network.

The 6542 Tabletop Controller accommodates one synchronous host and, with an optional expansion card, two asynchronous computers (or peripherals). Standard equipment includes four ports for plug-compatible devices. With an optional expansion card, up to eight devices can be supported. Data transmission speeds of up to 19.2K bps per port are possible.

The 6500 controllers can communicate with a variety of host computers, including the IBM S/360, S/370, 303X, 308X, 43XX, and IBM plug-compatible mainframes (PCMs) from various

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Company Profile AT&T

Corporate Headquarters

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Officers

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CFO: Morris Tanenbaum

Company Background

AT&T's business is moving and managing information, domestically and globally. That includes providing long distance telecommunications services through the company's Worldwide Intelligent Network, as well as systems, products, and services that combine communications and computers.

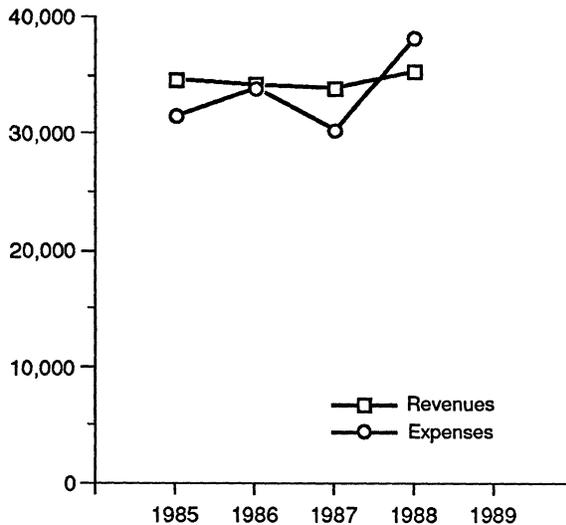
AT&T states its mission is to apply the talents, knowledge, and skills of its people to make the company the global

leader in enabling customers to reap the benefits of information technology.

The company's major customer markets are business and government, consumers, the telecommunications industry, and electronic equipment manufacturers. To business and government institutions, AT&T offers a range of voice and data transmission services as well as computer and data networking products and systems. Communications products sold, rented, and serviced by AT&T include personal computers, midrange computers, software and peripheral equipment, PBX equipment, key telephone systems, and facsimile machines.

AT&T supplies switching systems, transmission equipment, and operations support services to the telecommunications industry and manufactures advanced electronic components for high-technology firms.

Total Revenues and Expenses
(In millions)



1988 was a year of strong actions for AT&T: its revenues were the highest since divestiture on the strength of growth in product sales as well as growth in service revenues; the company shifted more of its people to sales or sales support jobs to further strengthen its market position. To meet a growing demand from its customers, AT&T decided to speed up its conversion to an all-digital long-distance network.

Higher costs and expenses reflect the decision to accelerate the modernizing of its network. It was necessary to

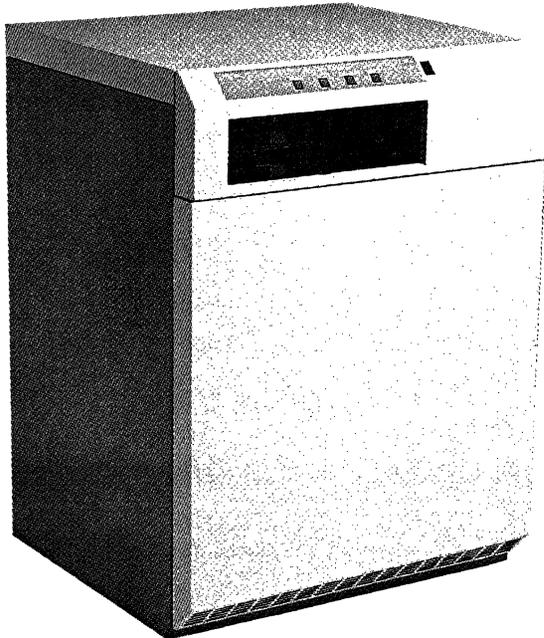
write down the value of older technology equipment, adding \$6.7 billion to its costs and expenses. This action reduced AT&T's earnings by \$3.66 a share, resulting in a loss for the year. Without this charge the company's earnings would have increased to \$2.11 per share.

AT&T's actions to increase sales, modernize, and reduce expenses enhanced its earnings potential. For the third quarter of 1989, the company reported earnings of \$699 million on revenues of \$8.9 billion.

360, S/370, 303X, 308X, 43XX, and IBM plug-compatible mainframes (PCMs) from various vendors. They can provide access to multiple hosts from the same display terminal.

Competitive Position

Over the years, AT&T's former subsidiary, Teletype, built up a large installed base of IBM 3270-compatible terminals; the company estimates that there are more than 300,000 terminals now installed, including the 40, 4540, and E4540 families.



*A View of the 6544 Controller
The backplane of the controller contains 12
expansion slots for connecting as many as four
synchronous hosts, 32 synchronous devices,
and 32 asynchronous devices.*

Prior to AT&T's divestiture, Teletype had what amounted to an exclusive market, selling products primarily to the Bell Operating Companies (BOCs) for their internal use or resale to their customers. As much as 40 percent of Teletype's business at that time was attributed to the company's relationship with the BOCs.

In 1985, AT&T Teletype became a wholly owned subsidiary of the Computer Systems Division of AT&T Information Systems. All sales activities for Teletype-manufactured products were moved to AT&T headquarters in New Jersey, and product management was folded into a DTE division of the Computer Systems Division. The Teletype name remains a legal entity for trademark, product brand name, and other purposes; as a company, however, Teletype Corporation has been swallowed up by AT&T.

The 6500 Multifunction Communication System is AT&T's most comprehensive (and ambitious) foray into the 3270 replacement market. The product line conforms to two important trends in the market:

- Integration of personal computing capabilities into the 3270 cluster; and

- Access to multiple hosts, including asynchronous computers.

The 6500 product line places AT&T in a strong position to compete with IBM, as well as other 3270-compatible vendors, including Telex, ITT Courier, Memorex, Lee Data, and Harris. IBM has taken steps to protect its huge and lucrative 3270 installed base, however.

In the third and fourth quarters of 1989, IBM released a more powerful breed of 3174 controllers which contain more powerful processors, support up to 6M bytes of memory (the former limit was 4M bytes), and run Configuration Support B microcode—new controller software that supports up to 250 physical units. The microcode also works with IBM's new Concurrent Communications Adapter to accommodate up to three synchronous host connections. Previously, only one connection was possible. In September 1989, IBM also announced another generation of display terminals offering higher resolution, greater processing speed, more functions per keystroke, and a more attractive price.

Release 2 of IBM's Configuration Support B microcode, which will be made available in June 1990, will make it possible to perform controller diagnostic procedures from a NetView console rather than through a terminal tied directly to the controller. Towards the end of 1990, IBM will also incorporate into the microcode another feature dubbed the Multi-Host Token-Ring Gateway. Using the Concurrent Communications Adapter, this feature will support communications between any token-ring workstation or device and up to three hosts via the 3174.

Vendors such as AT&T and Lee Data have competed against IBM by adding functionality to their own product lines, incorporating features such as windowing capabilities and simultaneous access to both synchronous and asynchronous hosts. Others, such as Memorex/Telex, strive to provide IBM plug-compatibility at the lowest possible price. A number of vendors have long since withdrawn from this market, unable or unwilling to match IBM's moves. The remaining participants will vie with IBM for what continues to be a growing market segment.

The Future of Display Terminals

According to International Data Corporation (IDC), IBM holds about 50 percent of the market

for 3270 display stations; Memorex/Telex and AT&T control about 20 and 9 percent respectively. IDC predicted that annual U.S. display shipments would grow from 848,900 units in 1988 to 940,400 units by 1992.

Terminals continue to enjoy popularity because of the large installed base of 3270 systems. Display terminals also take up less desk space than personal computers. Therefore, some users who don't need the disk storage capability and processing power of a standalone PC prefer terminals instead. These displays, however, must now share the spotlight with a new breed of workstations designed to fill the gap between the PC and the display terminal: the diskless workstation.

With the proliferation of LANs, users are moving away from displays controlled completely by a host to intelligent DOS-based workstations supported by a file server. Equipped with large amounts of memory, diskless workstations perform much of the processing that the host would perform for the display terminal, which improves system performance. Without disk drives and other features normally found on a standalone machine, they offer greater economy, simplicity, and security than a PC; all information is stored on the file server. Like a PC, however, the diskless workstation can run DOS applications and has the processing power to support advanced capabilities.

The 3270 terminal continues to flourish. But price wars have taken a toll on vendors, who must sell more units to make up for lower profits. To guarantee their financial stability and adjust to the changing market, more and more vendors are offering diskless workstations in addition to the traditional line of display terminals.

Decision Points

The 6500 Multifunction Communication System's key feature, reflected in its name, is multifunctionality. The 6544 controller provides multihost access, both to asynchronous and synchronous computer systems. In addition, it can support color and monochrome multitasking displays, plug-compatible displays, personal computers, printers, adapters, and older AT&T 4540 and E4540 displays.

AT&T's 6500 System-compatible display terminals offer a variety of features and capabilities not found on previous AT&T displays. Particularly

interesting are the 6538 monochrome and 6539 color multitasking systems, which can offer up to four multitasking windows that provide simultaneous access to four distinct computer sessions in any combination of synchronous and asynchronous applications.

The 6544 operates as a standard IBM 3274-type controller; through add-on modules, however, it can be upgraded to provide support for four synchronous host communications ports (including up to two local channel connections), as many as 32 synchronous devices, up to 32 peripherals and computers, one X.25 network connection, and a token-ring connection. The 6544 controller's 12 expansion slots allow new capabilities to be added to the system as communications requirements grow.

A major benefit of the 6544 and 6542 controllers is support for simultaneous synchronous and asynchronous sessions on a single terminal. This is a benefit currently shared only by Lee Data's Series 400 products.

The 6500 System puts AT&T on a strong competitive level in the 3270 market; however, since the market has been dominated for so long by IBM, AT&T must still fight for a larger market share.

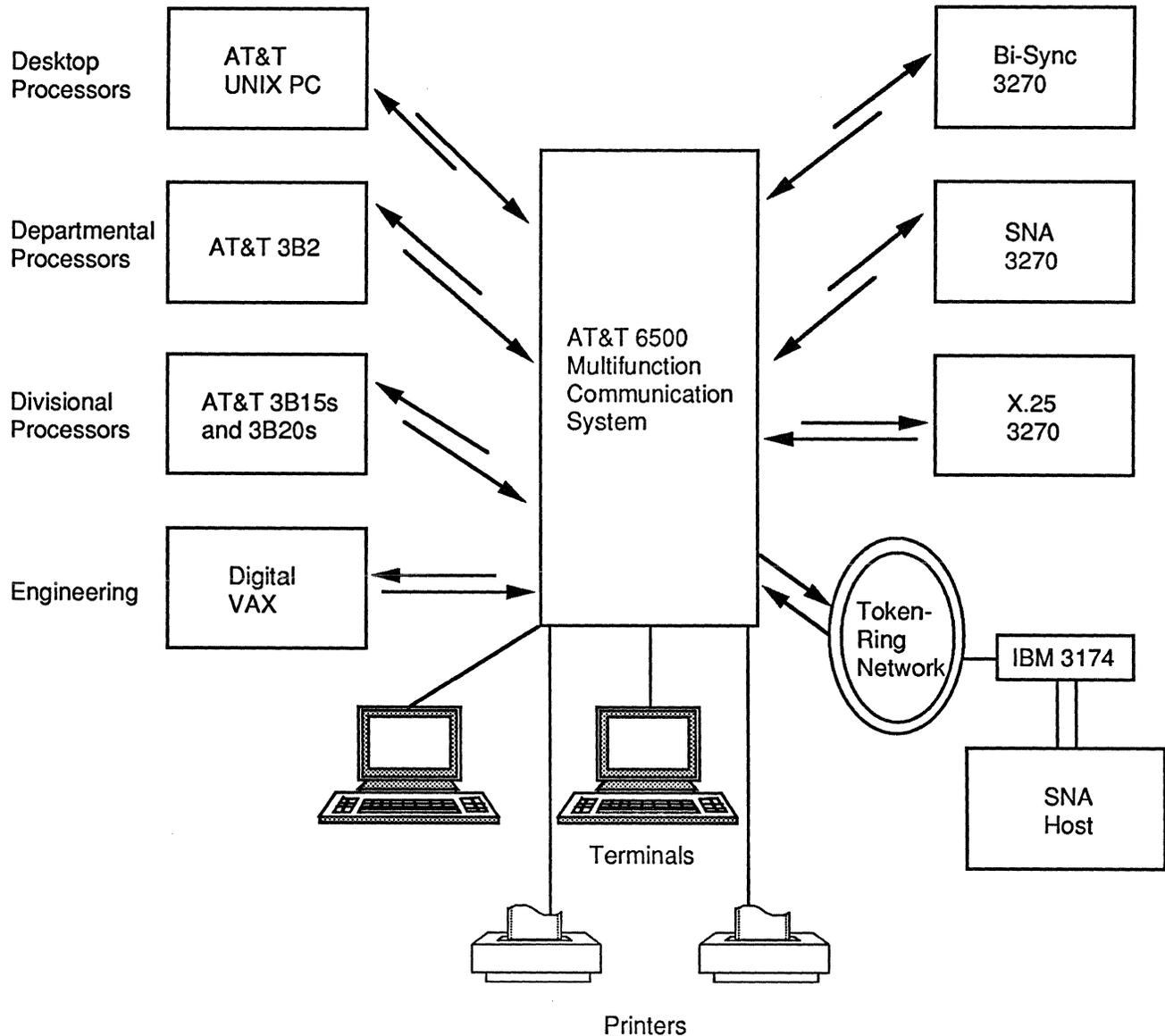
Characteristics

Models: *Hardware*—6544 Multifunction Communication Controller; 6542 Tabletop Communication Controller; 6518 Basic Function Display; 6528 and 6529 Standard Displays; 6538 and 6539 Multitasking Displays; 6591D, 6592D, and 6592F Plug-Compatible Displays; 6571 Color Graphics Printer; 6572 Plug-Compatible Printer; 6561 Printer Controller; 6562 Coax Printer Controller; the 2-N-1 Adapter; and the Coax Attachmate (3-N-1) Adapter.

Software—6500 System Controller Software Release 3.3; Attachmate Control Program.

Date of First Delivery: *Hardware*—6544 Multifunction Communication Controller—December 1985; 6542 Tabletop Communication Controller—March 1989; 6518

Figure 1.
Connections Supported by the 6544 Controller



AT&T's 6544 Multifunction Communication Controller provides access to a variety of asynchronous and synchronous computers.

Basic Function Display—December 1985; 6528 and 6529 Standard Displays—December 1985; 6538 and 6539 Multitasking Displays—December 1985; 6591D, 6592D, and 6592F Plug-Compatible Displays—March 1989; 6571 Color Graphics Printer—September 1987; 6572 Plug-Compatible Printer—September 1988; 6561 Printer Controller—March 1986; 6562 Coax Printer Controller—March 1989; the 2-N-1 Adapter—November 1987; and the Coax Attachmate (3-N-1) Adapter—November 1987.

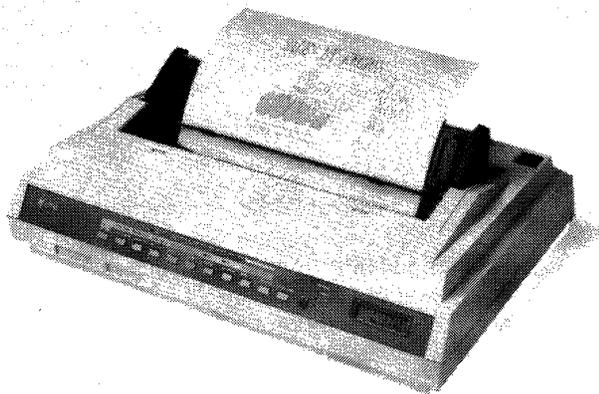
Software—6500 System Controller Software Release 3.3—February 1989; Attachmate Control Program—November 1987.

Number Delivered to Date: Vendor did not specify.

Serviced by: AT&T.

System Components

The AT&T 6500 Multifunction Communication System currently includes two communications controllers. Model 6544, AT&T's flagship product, has been marketed since 1985. Other products in the 6500 System family that work with the 6544 controller include five



The 6572 Printer is a serial, dot matrix color printer that prints at 100 cps in near letter quality or at 400 cps in draft quality. The unit's multicolor ribbons support four- or seven-color printing.

6500 System display terminals, three IBM plug-compatible display units, a 6500 system-compatible printer and printer controller, an IBM plug-compatible printer and printer controller, and nine expansion modules that extend the connectivity options of the user.

The 6542 controller, made available in March 1989, is a lower-priced, table-top controller that supports coaxial cable connections to up to eight IBM plug-compatible peripheral devices.

The 6500 System supports a variety of host computers, including the IBM S/360, S/370, 3031, 3032, 3033, 3081, 3083, 3084, 4321, 4331, and 4341; with the appropriate software, the controllers can also support the IBM 8100, Series/1, System/36, and System/38. In addition to IBM synchronous hosts, the 6500 System supports connections to IBM plug-compatible mainframes (PCMs). The 6500 supports asynchronous connections to the AT&T 3B family and UNIX PC, the Digital VAX, and most other popular minicomputer families.

Transmission Specifications

When communicating synchronously, the 6544 controller provides maximum data rates of 64K bps for hosts supporting SNA and X.25 protocols and 19.2K bps for hosts supporting Bisync protocols. The 6500 System communicates with asynchronous hosts and peripherals at a maximum 19.2K bps data transmission rate. Devices can be connected up to 5,000 feet from the 6544 controller.

The 6542 controller supports data rates of up to 19.2K bps for synchronous and asynchronous devices and hosts.

Communications Controllers

The 6544 Multifunction Communication Controller

The 6544 controller supports up to four SNA and/or BSC host connections, 32 synchronous devices, and 32 asynchronous devices or processors, depending on how it is configured. Devices can be located up to 5,000 feet from the controller.

AT&T 6500 System-compatible displays and printers are connected to the 6544 controller via twisted-pair telephone wire that is compatible with AT&T's SYSTIMAX PDS. Communications over coaxial cable is also possible through optional adapters.

Standard equipment includes a *Main Processor Module* (also referred to as the *A Card*), dual 5¼-inch diskette drives for loading software, and 14 module slots, 12 of which are available for add-on expansion modules. An optional 20M-byte hard disk drive facilitates program loading and increases controller software storage capacity.

Self-test diagnostics are standard on the 6544 controller. In addition, the 6544 supports two IBM network programs that reside on host computers: Network Problem Determination Application (NPDA) and Network Logical Data Manager (NLDM).

The 6544 not only supports the 6500 System-compatible and plug-compatible displays, but can accommodate the older AT&T 4540 and E4540 displays. For asynchronous applications, the 6544 supports the attachment of the AT&T 4400 family of displays and the AT&T 600 line, as well as other asynchronous displays such as the Digital VT220 and VT100.

Other printers, including AT&T 4540 and E4540 printer models, may be added to a 6500 System cluster using the 6561 Printer Controller; one printer controller is required for each printer.

Basic 6544 functionality provides access to a single synchronous host computer through a single 6500 System display. The following nine expansion modules are available to provide additional multifunctional features:

Synchronous Host Module (B Card): an expansion module that provides three SNA/BSC ports. Each module supports an aggregate data transfer rate of 38.4K bps. This allows two ports using the Bisync (or SDLC) protocol to operate at 19.2K bps, for example. Two Synchronous Host modules are needed in situations when there are two SNA hosts operating at higher speeds. The 6544 controller supports up to four of these modules for a maximum of four hosts.

The Synchronous Host Module may also support one SNA port operating at either 56K or 64K bps. At either of these higher speeds, only one port is used per card.

Synchronous Device Interface Module (C Card): an expansion module that provides for the attachment of up to 16 synchronous displays, printers, and personal

computers, including 6500 system-compatible devices, via twisted-pair wire. The 6544 controller accommodates two Synchronous Device Interface Modules, providing for a maximum configuration of 32 synchronous devices. This module also permits connections to personal computers using the 2-N-1 product.

Asynchronous Host/Protocol Conversion Module (D Card): an expansion module that provides port connections for up to eight asynchronous host computers or terminals. Protocol conversion allows asynchronous terminals to access synchronous hosts. The ports operate at speeds up to 19.2K bps. Four Asynchronous Host/Protocol Conversion Modules can be added, providing for a maximum configuration of 32 asynchronous connections.

X.25 Interface Module (H Card): an expansion module that provides one connector for IBM-compatible hosts supporting the Network Control Program Packet Switched Interface (NPSI) protocols. The connector supports either of the following interfaces: RS-232-C at speeds up to 19.2K bps or CCITT V.35 at speeds of 48K, 56K, or 64K bps. Only one H Card may be installed.

Local Channel Interface Module (F Card): an expansion module that provides a connection to an IBM mainframe byte multiplexer, block multiplexer, or selector channel in configurations where the 6544 controller is located within 200 cable feet of the host. Users can equip each 6544 with one or two Local Channel modules. The 6544 can support both remote and local hosts concurrently.

Plug-Compatible Device Interface Module (K Card): an expansion module that allows users to establish plug-compatibility for up to 16 synchronous devices or two multiplexers. With Release 3.2 or later of the controller software, any plug-compatible display connected to this module can run up to five concurrent sessions in the same SNA host or different hosts. Users can add a second module for a total of 32 ports (provided that no C Card is being used). This module also permits connections to personal computers using the Coax Attachmate (3-N-1) product.

Nine-Port PCM Device Logic Module (K'Card): a smaller, less expensive version of the K Card for users who need to support no more than nine plug-compatible devices or two multiplexers. This module requires Release 3.2 or later of the controller software.

Token-Ring Logic Module (T Card): enables devices connected to a 6544 controller to access a remote or local SNA host via a token-ring network. It also supports communications between token-ring devices to communicate with a local or remote SNA host via a 6544 controller.

Processor/Memory Logic Module (X Card): expands the memory capacity of the 6544 controller, allowing it to support the enhancements included in controller software Release 3.0 and later.

6542 Tabletop Controller

The 6542 supports connections to as many as eight IBM plug-compatible devices, one remote host, and up to two asynchronous devices (e.g., minicomputers, PCs, or peripherals). The 6542's ports accommodate coax connections; however, any port can also support twisted pair wire connections using AT&T's Balun Adapter. The 6542 does not support AT&T's 6500 System (non-plug-compatible) devices or any of the 6544 expansion modules.

Base 6542 functionality includes one remote synchronous host connection, an asynchronous port for remote diagnostics, a 3½-inch diskette drive, and support for four directly connected IBM plug-compatible devices.

The 6542 contains three expansion slots to accommodate three optional modules:

- A Synchronous Device Interface Module provides four additional ports, making it possible to support a maximum of eight plug-compatible devices.
- An Asynchronous Host/Protocol Conversion Module supports communications with two asynchronous devices.
- A Memory Expansion Module provides the additional memory needed to support the interface and conversion modules.

Additionally, one of the 6542's standard ports will allow the multiplexing of eight synchronous plug-compatible peripherals over a single coax cable using an IBM 3299 multiplexer. When the multiplexer is in operation, however, all other ports remain inactive.

Displays

AT&T 6500 System-Compatible Displays

AT&T offers five 6500 system-compatible display units which implement the protocols developed for the original 6500 System. All models support a tilt/swivel capability; both color and monochrome (amber or green) displays are available. The units, developed for use with the 6544 controller, are described in more detail below.

6518 Basic Function Display: This monochrome unit supports single session communications with one synchronous host; it does not support access to asynchronous hosts. The 6518 includes a 14-inch screen, with a display capacity of 1,920 characters arranged in 24 lines of 80 characters each. The 6518 is functionally compatible with IBM's 3178 and 3191 display stations.

6528 Standard Display: The 6528 monochrome display provides a "hot key" for switching between two sessions on a single host or different hosts. (Data transfer between sessions is not supported, however.) Either session may be synchronous or asynchronous. The 6528 includes a 15-inch monochrome display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6528 is functionally compatible with the IBM 3180 display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

6529 Standard Display: This 14-inch color display includes the same split-screen capability as the 6528. The 6529 provides a four- or seven-color display, with display capacities ranging from 1,920 to 3,564 characters. Screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6529 is functionally compatible with the IBM 3179 display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

6538 Multitasking Display: This monochrome display provides up to four multitasking windows in any combination of synchronous and asynchronous sessions. Window positioning/browsing/sizing speed is four inches per second horizontal and six inches per second vertical. The 6538 includes a 15-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6538 supports four screen formats, including 3270 operation, VT220 operation, full-extended attributing, and input and edit. An auxiliary I/O port and programmed symbol graphics are optionally available. The 6538 is functionally compatible with the IBM 3180 display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

6539 Multitasking Display: This color display provides up to four multitasking windows in any combination of synchronous and asynchronous sessions. Window positioning/browsing/sizing speed is four inches per second horizontal and six inches per second vertical. The 6539 includes a 14-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6539 features four- or seven-color display capability and supports four screen formats, including 3270 operation, VT220 operation, full-extended attributing, and input and edit. An auxiliary I/O port and programmed symbol graphics are optionally available. The 6539 is functionally compatible with the IBM 3279-S3G display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

Keyboards for 6500 System-Compatible Displays

The 6518 display comes with a 122-key keyboard containing 24 external program function (PF) keys. This detachable keyboard has a typewriter-style layout and a low-profile design. Security keylock is a standard feature. A three-year warranty is available with the 6518.

The 6528, 6529, 6538, and 6539 displays are modularly designed and can be upgraded or downgraded by switching logic bases and display monitors. They are all equipped with a 122-key keyboard that includes 24 program function (PF) keys and a VT220 template. The detachable keyboard contains a typewriter-style layout and a low-profile design. Security keylock is a standard feature.

IBM Plug-Compatible Displays

Each of the following three 6500 plug-compatible displays can operate with IBM 3270 controllers, the AT&T 6544 controller, and the AT&T 6542 controller. The units' display screens support tilt/swivel capabilities, and monochrome devices are available with amber or green phosphor characters.

When connected to a 6500 controller running Controller Software Release 3.2 or later, these displays support up to five simultaneous sessions with synchronous and asynchronous hosts.

6591D Plug-Compatible Display: This low-cost, monochrome display, designed for basic data entry, includes a 14-inch screen and a 122-key keyboard. The 6591D is equivalent to IBM's 3191 display family, supporting screen arrangements of 24 lines by 80 characters and 32 lines by 80 characters.

6592D Plug-Compatible Display: This monochrome display, equivalent to the IBM 3192-D display, features a 15-inch screen and a 122-key keyboard supporting record keystroke capabilities. The 6592D supports screen arrangements of 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters.

6592F Plug-Compatible Display: This display is the color equivalent of the 9592D. It includes a 14-inch, seven-color screen and a 122-key keyboard which provides record keystroke capabilities. The 6592D supports screen arrangements of 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters.

Printers and Printer Controllers

AT&T offers a 6500 system-compatible printer and printer controller as well as an IBM plug-compatible printer and printer controller. The 6500 System printer products are designed for communications with the 6544 controller alone; the plug-compatible printer products support connections to both the 6544 and 6542 controllers as well as IBM controllers.

6571 Color Matrix Printer: The 6571, a 6500 system-compatible matrix printer, provides color or monochrome text and graphics printing. The 6571 operates at speeds up to 400 cps in draft mode and 100 cps in near letter quality mode. The 6571 prints symbol graphics and supports one-, four-, and seven-color printing. The 6571 includes a full-function SNA control panel and LCD display, an operator-replaceable 18-wire printhead with half-dot shift, and a tractor- or friction-feed platen with rear or bottom feed. Paper feed/positioning controls are also included.

6572 Plug-Compatible Printer: The 6572 is a coax (plug-compatible) version of the 6571 printer, offering all the same features.

6561 Printer Controller: The 6561 is a printer controller that enables the use of older AT&T 4540 and E4540 printers as well as AT&T's newer asynchronous printers in a 6500 System cluster. The 6561 adds new functions and applications to the older printers and includes a full-function SNA control panel, LCD display, and the following interfaces: SSI (twisted pair) in, SSI out, RS-232-C out, and Centronics parallel out.

6562 Coax Printer Controller: The 6562 Printer Controller is a plug-compatible version of the 6561 that can connect to IBM 3274 or 3174 controllers. The 6562 supports both parallel and serial asynchronous printers.

Personal Computer Add-On Products

The 2-N-1 Adapter, which runs AT&T's Attachmate Control Program, provides multisession, multiwindowing capability to PCs connected to the 6500 controller via twisted pair wire. Up to seven concurrent windows are possible: four 3270 sessions, two notepads, and one PC session. While the PC cannot access multiple hosts simultaneously, it can access multiple concurrent sessions on a single host.

The Coax Attachmate (3-N-1) Card supports a connection from a PC to either the 6544 or 6542 controller via an RG62A/U coaxial cable, running AT&T's Attachmate Control Program and providing the same capabilities.

Pricing

The 6500 Multifunction Communication System components are available for purchase and lease through AT&T's direct sales force or by calling (800) 247-1212. AT&T provides installation and maintenance service through 1,000 nationwide sites.

The 6500 Multifunction Communication System products carry a warranty from the date of purchase, guaranteeing that AT&T will replace any defective part or software free of charge during the warranty period. The company offers several Equipment Maintenance Agreement Plans, including per-occurrence and contract plans.

Equipment Prices

		Purchase Price (\$)
6544	Multifunction Communication Controller	1,418
6544	Options:	
	Synchronous Host Module	383
	Synchronous Device Interface Module	5,179
	Asynchronous Host/Protocol Conversion Module	2,425
	X.25 Interface Module	1,369
	Local Channel Expansion Module	3,668
	16-Port, Plug-Compatible Logic Module	5,179
	Nine-Port PCM Device Logic Module	4,672
	Processor/Memory Logic Module	1,600
	Hard Disk Drive	1,845
6542	Tabletop Communication Controller	3,597
6542	Options:	
	Synchronous Device Interface Module	821
	Asynchronous Host/Protocol Conversion Module	887
	Memory Expansion Module	1,281
Controller Software Release 3.3		27
Displays		
6518	Basic Function Display	1,100
6528	Standard Display	1,935
6529	Standard Display	2,085
6538	Multitasking Display	2,755
6539	Multitasking Display	2,880
6591D	Plug-Compatible Display	1,300
6592D	Plug-Compatible Display	1,600
6592F	Plug-Compatible Displays	1,750
Printers and Printer Controllers		
6571	Color Graphics Printer	5,037
6572	Plug-Compatible Printer	5,037
6561	Printer Controller	1,002
6562	Coax Printer Controller	1,643
Personal Computer Options		
	The 2-N-1 Adapter	1,144
	The Coax Attachmate (3-N-1) Adapter	1,144
	Attachmate Control Program	323

AT&T

6500 Multifunction Communication System

In this report:

Analysis	-102
Characteristics.....	-106
Pricing.....	-110

Product Summary**Editor's Note**

Release 3.3 of AT&T's controller software enables the 6544 controller to support up to four simultaneous SNA host connections. AT&T also now markets the 6542 tabletop controller. The 6578, 6579, 6580, and 6591 IBM plug-compatible displays have been superseded by AT&T's 6591D, 6592D, and 6592F plug-compatible displays.

Description

AT&T's 6500 Multifunction Communication System provides synchronous and asynchronous access to multiple computers and peripherals. AT&T markets a variety of 6500 System-compatible and IBM plug-compatible display terminals and printers. Some system-compatible displays support multitasking.

Strengths

The flexible 6544 controller supports up to four simultaneous synchronous host connections, 32 synchronous peripherals and 32 asynchronous devices or computers, and access to X.25 and token-ring networks. Support for simultaneous access to both synchronous and asynchronous sessions is a key feature of both the 6544 and 6542 controllers.

Limitations

No major limitations.

Competition

IBM, Memorex/Telex, IDEA Courier, Lee Data, and several others.

Vendor

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(201) 898-6000

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3650 Victoria Park Avenue
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Price

See pricing section.

Analysis

Product Strategy

In December 1985, AT&T introduced the 6500 Multifunction Communication System, a product family that provides compatibility with the synchronous IBM 3270 system, as well as asynchronous communications.

By the fourth quarter of 1987, AT&T had expanded the system's functionality with additional products and enhancements, including three new plug-compatible displays, an adapter for the 6544 controller to support plug-compatible devices, a 6500 System-compatible color graphics printer, a local channel-connection option, increased asynchronous access capabilities, and terminal session capability for IBM-compatible PCs through adapter cards.

Between April 1988 and March 1989, AT&T added the 6542 Tabletop Communication Controller, four additional plug-compatible displays, and a plug-compatible printer and printer controller. AT&T also provided system enhancements such as support for up to four simultaneous host connections, two of which could use SNA/SDLC protocols; 32 ports for synchronous devices; and 32 asynchronous connections. With Release 3.3 of AT&T's controller software in February 1990, the 6544 controller now supports up to four simultaneous SNA hosts and a token ring connection.

AT&T has long been a leader in the IBM 3270-compatible terminal market, with over 300,000 terminals installed. The company's products include the 40 Series, the 4540 family, and the E4540 line. Each product line provides basic, functional compatibility with corresponding IBM 3270 products.

Components of the 6500 Multifunction Communication System include the 6544 controller; the 6518 Basic Function Display; the 6528 and 6529 Standard Displays; the 6538 and 6539 Multitasking Displays; the 6591D, 6592D, and 6592F Plug-Compatible Displays; the 6571 and 6572 Color

Graphics Printers; the 6561 and 6562 Printer Controllers; and the 2-N-1 and Coax Attachmate (3-N-1) PC adapters.

The 6544 controller accommodates the older AT&T 4540 and E4540 displays and the AT&T 4400 family asynchronous displays. The 6500 components operate over standard twisted-pair telephone wire or previously installed coaxial cable. The 6544 controller also supports multiple hosts and devices through 12 expansion slots, which hold different combinations of the following modules:

- The Synchronous Host Module: provides three synchronous ports for the access of 3270 hosts (Bisync or SNA).
- The Synchronous Device Interface Module: allows the attachment of up to 16 synchronous displays, printers, or PCs via twisted-pair wire.
- The Asynchronous Host/Protocol Conversion Module: enables connection of up to eight asynchronous hosts or terminals; protocol conversion allows asynchronous terminals to access synchronous hosts.
- The X.25 Interface Module: provides a connector for IBM-compatible hosts supporting packet switched protocols.
- The Local Channel Interface Module: provides connection for IBM mainframe byte multiplexer, block multiplexer, or selector channel configurations in which the 6544 is within 200 feet of the host.
- The Plug-Compatible Device Interface Module: provides connection of up to 16 synchronous devices to the 6544 controller.
- The Token-Ring Logic Module: allows devices connected to a 6544 controller to access a remote or local SNA host via a token-ring network.

The 6542 Tabletop Controller accommodates one synchronous host and, with an optional expansion card, two asynchronous computers (or peripherals). Standard equipment includes four ports for plug-compatible devices. With an optional expansion card, up to eight devices can be supported. Data transmission speeds of up to 19.2K bps per port are possible.

The 6500 controllers can communicate with a variety of host computers, including the IBM S/360, S/370, 303X, 308X, 43XX, and IBM plug-compatible mainframes (PCMs) from various

Company Profile

AT&T

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Officers

CEO: Robert E. Allen
CFO: Morris Tanenbaum

Company Background

AT&T's business is moving and managing information, domestically and globally. That includes providing long distance telecommunications services through the company's Worldwide Intelligent Network, as well as systems, products, and services that combine communications and computers.

AT&T states its mission is to apply the talents, knowledge, and skills of its people to make the company the global leader in enabling customers to reap the benefits of information technology.

The company's major customer markets are business and government, consumers, the

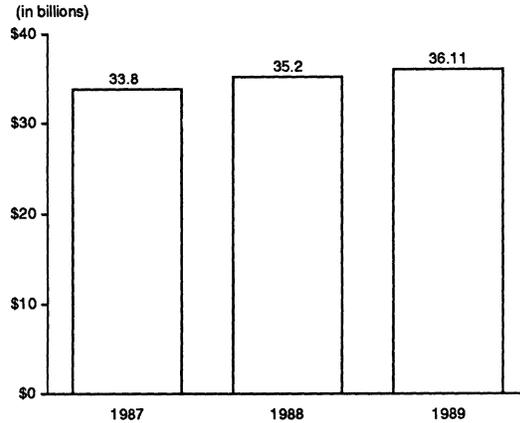
telecommunications industry, and electronic equipment manufacturers. To business and government institutions, AT&T offers a range of voice and data transmission services as well as computer and data networking products and systems. Communications products sold, rented, and serviced by AT&T include personal computers, midrange computers, software and peripheral equipment, PBX equipment, key telephone systems, and facsimile machines.

AT&T supplies switching systems, transmission equipment, and operations support services to the telecommunications industry and manufactures advanced electronic components for high-technology firms.

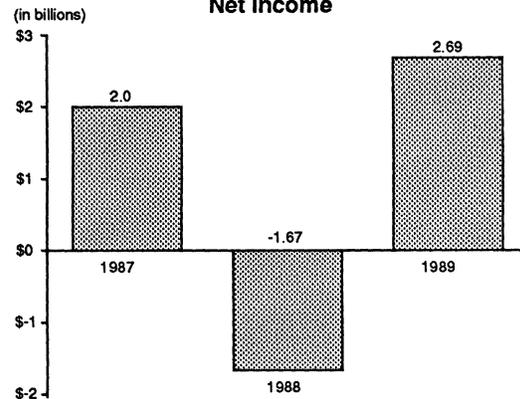
1988 was a year of strong actions for AT&T: its revenues were the highest since divestiture on the strength of growth in product sales as well as growth in service revenues; the company shifted more of its people to sales or sales support jobs to further strengthen its market position. To meet a growing demand from its customers, AT&T

AT&T Financial Results 1987-1989

Revenues



Net Income

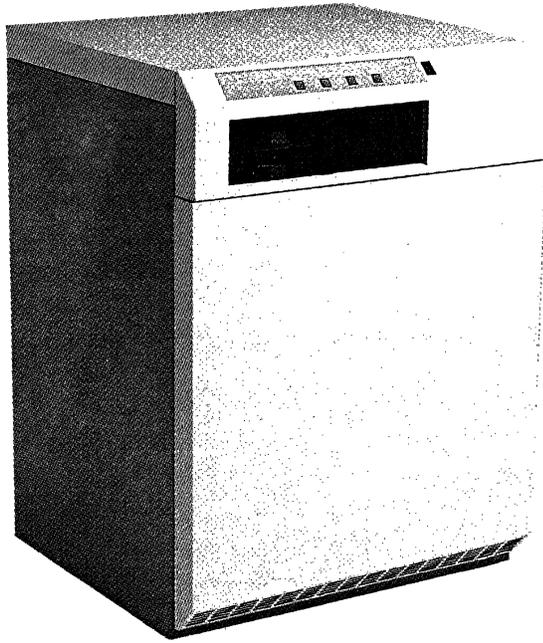


decided to speed up its conversion to an all-digital long-distance network.

Higher costs and expenses reflect the decision to accelerate the modernizing of its network. It was necessary to write down the value of older technology equipment, adding \$6.7 billion to its costs and expenses. This action reduced AT&T's earnings by \$3.66 a share, resulting in a loss for the year. Without this

charge the company's earnings would have increased to \$2.11 per share.

AT&T's actions to increase sales, modernize, and reduce expenses enhanced its earnings potential. For the third quarter of 1989, the company reported earnings of \$699 million on revenues of \$8.9 billion.



A View of the 6544 Controller
 The backplane of the controller contains 12 expansion slots for connecting as many as four synchronous hosts, 32 synchronous devices, and 32 asynchronous devices.

► *(Analysis continued)*

vendors. They can provide access to multiple hosts from the same display terminal.

Competitive Position

Over the years, AT&T's former subsidiary, Teletype, built up a large installed base of IBM 3270-compatible terminals; the company estimates that there are more than 300,000 terminals now installed, including the 40, 4540, and E4540 families. Prior to AT&T's divestiture, Teletype had what amounted to an exclusive market, selling products primarily to the Bell Operating Companies (BOCs) for their internal use or resale to their customers. As much as 40 percent of Teletype's business at that time was attributed to the company's relationship with the BOCs.

In 1985, AT&T Teletype became a wholly owned subsidiary of the Computer Systems Division of AT&T Information Systems. All sales activities for Teletype-manufactured products were moved to AT&T headquarters in New Jersey, and product management was folded into a DTE division of the Computer Systems Division. The Teletype name remains a legal entity for trademark, product brand name, and other purposes; as a com-

pany, however, Teletype Corporation has been swallowed up by AT&T.

The 6500 Multifunction Communication System is AT&T's most comprehensive (and ambitious) foray into the 3270 replacement market. The product line conforms to two important trends in the market:

- Integration of personal computing capabilities into the 3270 cluster; and
- Access to multiple hosts, including asynchronous computers.

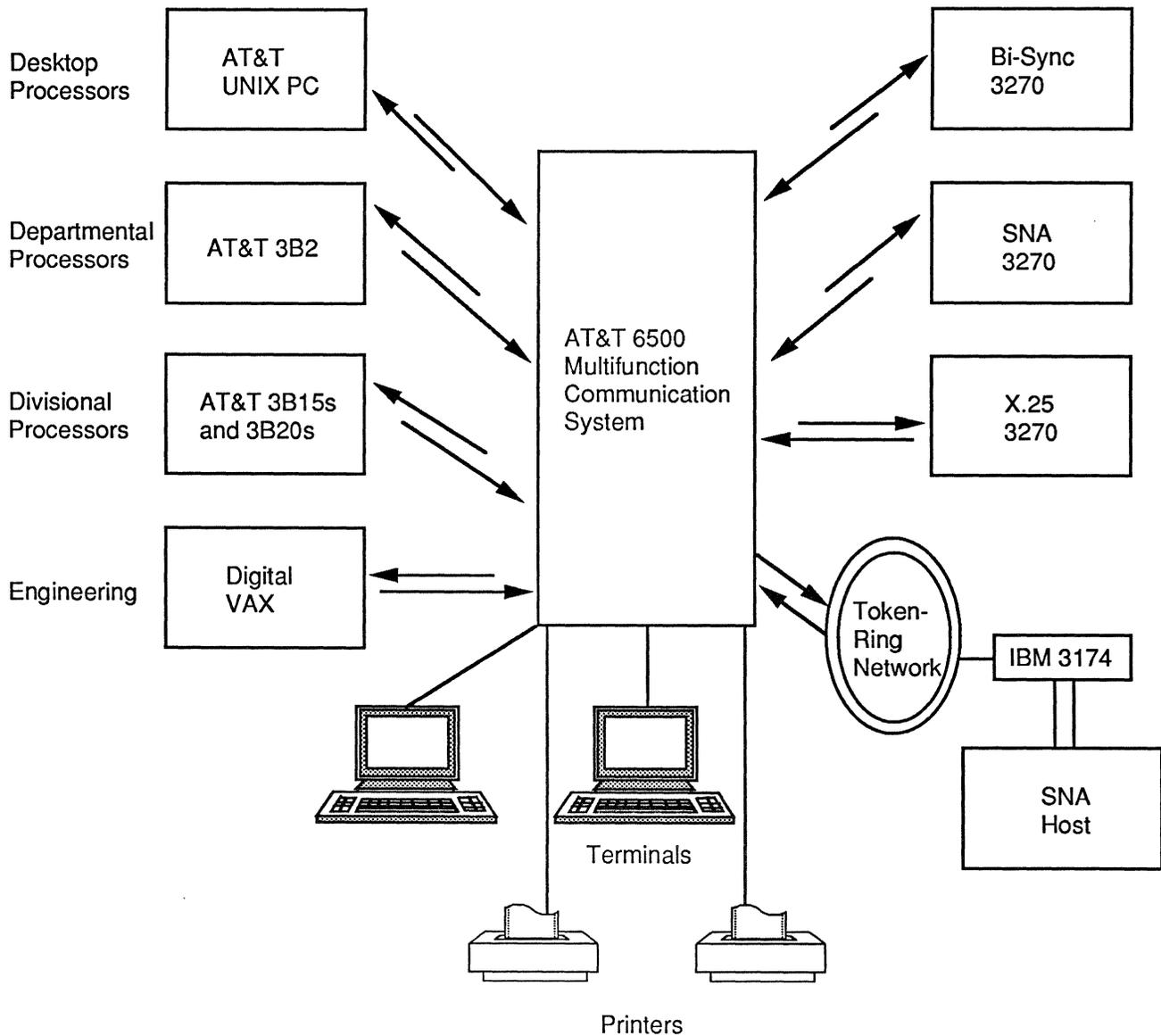
The 6500 product line places AT&T in a strong position to compete with IBM, as well as other 3270-compatible vendors, including Memorex/Telex, IDEA Courier, Lee Data, and Harris. IBM has taken steps to protect its huge and lucrative 3270 installed base, however.

In the third and fourth quarters of 1989, IBM released a more powerful breed of 3174 controllers which contain more powerful processors, support up to 6M bytes of memory (the former limit was 4M bytes), and run Configuration Support B microcode—new controller software that supports up to 250 physical units. The microcode also works with IBM's new Concurrent Communications Adapter to accommodate up to three synchronous host connections. Previously, only one connection was possible. In September 1989, IBM also announced another generation of display terminals offering higher resolution, greater processing speed, more functions per keystroke, and a more attractive price.

Release 2 of IBM's Configuration Support B microcode, which will be made available in June 1990, will make it possible to perform controller diagnostic procedures from a NetView console rather than through a terminal tied directly to the controller. Towards the end of 1990, IBM will also incorporate into the microcode another feature dubbed the Multi-Host Token-Ring Gateway. Using the Concurrent Communications Adapter, this feature will support communications between any token-ring workstation or device and up to three hosts via the 3174.

Vendors such as AT&T, Lee Data, and Memorex/Telex have introduced communications controllers that support access to as many as four synchronous hosts, with multiwindowing on both synchronous and asynchronous sessions. In the past, however, Memorex/Telex has been most successful offering IBM plug-compatible controllers

*Figure 1.
Connections Supported by the 6544 Controller*



AT&T's 6544 Multifunction Communication Controller provides access to a variety of asynchronous and synchronous computers.

and peripherals at the lowest possible price. IDEA Courier also offers a line of competitively priced IBM plug-compatible products.

The Future of Display Terminals

According to research performed by Dataquest, IBM holds about 50 percent of the market for 3270 display stations. Memorex/Telex, AT&T, and IDEA Courier follow with about 29, 8, and 5 percent of the market respectively. International Data Corporation (IDC) predicted a growth of annual U.S. display shipments from 848,900 units in 1988 to 940,400 units by 1992.

Terminals continue to enjoy popularity because of the large installed base of 3270 systems. Display terminals also take up less desk space than personal computers. Therefore, some users who don't need the disk storage capability and processing power of a standalone PC prefer terminals instead. These displays, however, must now share the spotlight with a new breed of workstations designed to fill the gap between the PC and the display terminal: the diskless workstation.

With the proliferation of LANs, users are moving away from displays controlled completely

by a host to intelligent DOS-based workstations supported by a file server. Equipped with large amounts of memory, diskless workstations perform much of the processing that the host would perform for the display terminal, which improves system performance. Without disk drives and other features normally found on a standalone machine, they offer greater economy, simplicity, and security than a PC; all information is stored on the file server. Like a PC, however, the diskless workstation can run DOS applications and has the processing power to support advanced capabilities.

The 3270 terminal continues to flourish. But price wars have taken a toll on vendors, who must sell more units to make up for lower profits. To guarantee their financial stability and adjust to the changing market, more and more vendors are offering diskless workstations in addition to the traditional line of display terminals.

Decision Points

The 6500 Multifunction Communication System's key feature, reflected in its name, is multifunctionality. The 6544 controller provides multihost access, both to asynchronous and synchronous computer systems. In addition, it can support color and monochrome multitasking displays, plug-compatible displays, personal computers, printers, adapters, and older AT&T 4540 and E4540 displays.

AT&T's 6500 System-compatible display terminals offer a variety of features and capabilities not found on previous AT&T displays. Particularly interesting are the 6538 monochrome and 6539 color multitasking systems, which can offer up to four multitasking windows that provide simultaneous access to four distinct computer sessions in any combination of synchronous and asynchronous applications.

The 6544 operates as a standard IBM 3274-type controller; through add-on modules, however, it can be upgraded to provide support for four synchronous host communications ports (including up to two local channel connections), as many as 32 synchronous devices, up to 32 peripherals and computers, one X.25 network connection, and a token-ring connection. The 6544 controller's 12 expansion slots allow new capabilities to be added to the system as communications requirements grow.

Major benefits of the 6544 and 6542 controllers are access to as many as four synchronous hosts, and support for multiple concurrent synchronous and asynchronous sessions with windowing. These capabilities, however, are also provided by Memorex's 1174 Network Controller and Lee Data's Datastar 5000 System.

The 6500 System puts AT&T on a strong competitive level in the 3270 market; however, since the market has been dominated for so long by IBM, AT&T must still fight for a larger market share.



Characteristics

Models: *Hardware*—6544 Multifunction Communication Controller; 6542 Tabletop Communication Controller; 6518 Basic Function Display; 6528 and 6529 Standard Displays; 6538 and 6539 Multitasking Displays; 6591D, 6592D, and 6592F Plug-Compatible Displays; 6571 Color Graphics Printer; 6572 Plug-Compatible Printer; 6561 Printer Controller; 6562 Coax Printer Controller; the 2-N-1 Adapter; and the Coax Attachmate (3-N-1) Adapter.

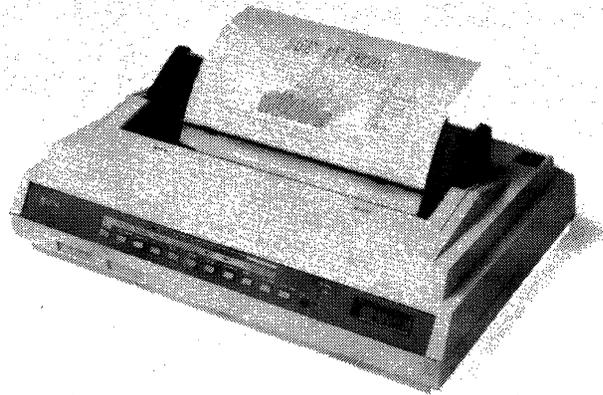
Software—6500 System Controller Software Release 3.3; Attachmate Control Program.

Date of First Delivery: *Hardware*—6544 Multifunction Communication Controller—December 1985; 6542 Tabletop Communication Controller—March 1989; 6518 Basic Function Display—December 1985; 6528 and 6529 Standard Displays—December 1985; 6538 and 6539 Multitasking Displays—December 1985; 6591D, 6592D, and 6592F Plug-Compatible Displays—March 1989; 6571 Color Graphics Printer—September 1987; 6572 Plug-Compatible Printer—September 1988; 6561 Printer Controller—March 1986; 6562 Coax Printer Controller—March 1989; the 2-N-1 Adapter—November 1987; and the Coax Attachmate (3-N-1) Adapter—November 1987.

Software—6500 System Controller Software Release 3.3—February 1989; Attachmate Control Program—November 1987.

Number Delivered to Date: Vendor did not specify.

Serviced by: AT&T.



The 6572 Printer is a serial, dot matrix color printer that prints at 100 cps in near letter quality or at 400 cps in draft quality. The unit's multicolor ribbons support four- or seven-color printing.

System Components

The AT&T 6500 Multifunction Communication System currently includes two communications controllers. Model 6544, AT&T's flagship product, has been marketed since 1985. Other products in the 6500 System family that work with the 6544 controller include five 6500 System display terminals, three IBM plug-compatible display units, a 6500 system-compatible printer and printer controller, an IBM plug-compatible printer and printer controller, and nine expansion modules that extend the connectivity options of the user.

The 6542 controller, made available in March 1989, is a lower-priced, table-top controller that supports coaxial cable connections to up to eight IBM plug-compatible peripheral devices.

The 6500 System supports a variety of host computers, including the IBM S/360, S/370, 3031, 3032, 3033, 3081, 3083, 3084, 4321, 4331, and 4341; with the appropriate software, the controllers can also support the IBM 8100, Series/1, System/36, and System/38. In addition to IBM synchronous hosts, the 6500 System supports connections to IBM plug-compatible mainframes (PCMs). The 6500 supports asynchronous connections to the AT&T 3B family and UNIX PC, the Digital VAX, and most other popular minicomputer families.

Transmission Specifications

When communicating synchronously, the 6544 controller provides maximum data rates of 64K bps for hosts supporting SNA and X.25 protocols and 19.2K bps for hosts supporting Bisync protocols. The 6500 System communicates with asynchronous hosts and peripherals at a maximum 19.2K bps data transmission rate. Devices can be connected up to 5,000 feet from the 6544 controller.

The 6542 controller supports data rates of up to 19.2K bps for synchronous and asynchronous devices and hosts.

Communications Controllers

The 6544 Multifunction Communication Controller

The 6544 controller supports up to four SNA and/or BSC host connections, 32 synchronous devices, and 32 asynchronous devices or processors, depending on how it is configured. Devices can be located up to 5,000 feet from the controller.

AT&T 6500 System-compatible displays and printers are connected to the 6544 controller via twisted-pair telephone wire that is compatible with AT&T's SYSTI-MAX PDS. Communications over coaxial cable is also possible through optional adapters.

Standard equipment includes a *Main Processor Module* (also referred to as the *A Card*), dual 5¼-inch diskette drives for loading software, and 14 module slots, 12 of which are available for add-on expansion modules. An optional 20M-byte hard disk drive facilitates program loading and increases controller software storage capacity.

Self-test diagnostics are standard on the 6544 controller. In addition, the 6544 supports two IBM network programs that reside on host computers: Network Problem Determination Application (NPDA) and Network Logical Data Manager (NLDM).

The 6544 not only supports the 6500 System-compatible and plug-compatible displays, but can accommodate the older AT&T 4540 and E4540 displays. For asynchronous applications, the 6544 supports the attachment of the AT&T 4400 family of displays and the AT&T 600 line, as well as other asynchronous displays such as the Digital VT220 and VT100.

Other printers, including AT&T 4540 and E4540 printer models, may be added to a 6500 System cluster using the 6561 Printer Controller; one printer controller is required for each printer.

Basic 6544 functionality provides access to a single synchronous host computer through a single 6500 System display. The following nine expansion modules are available to provide additional multifunctional features:

Synchronous Host Module (B Card): an expansion module that provides three SNA/BSC ports. Each module supports an aggregate data transfer rate of 38.4K bps. This allows two ports using the Bisync (or SDLC) protocol to operate at 19.2K bps, for example. Two Synchronous Host modules are needed in situations when there are two SNA hosts operating at higher speeds. The 6544 controller supports up to four of these modules for a maximum of four hosts.

The Synchronous Host Module may also support one SNA port operating at either 56K or 64K bps. At either of these higher speeds, only one port is used per card.

Synchronous Device Interface Module (C Card): an expansion module that provides for the attachment of up to 16 synchronous displays, printers, and personal computers, including 6500 system-compatible devices, via twisted-pair wire. The 6544 controller accommodates two Synchronous Device Interface Modules, providing for a maximum configuration of 32 synchronous devices. This module also permits connections to personal computers using the 2-N-1 product.

Asynchronous Host/Protocol Conversion Module (D Card): an expansion module that provides port connections for up to eight asynchronous host computers or terminals. Protocol conversion allows asynchronous terminals to access synchronous hosts. The ports operate at speeds up to 19.2K bps. Four Asynchronous Host/Protocol Conversion Modules can be added, providing for a maximum configuration of 32 asynchronous connections.

X.25 Interface Module (H Card): an expansion module that provides one connector for IBM-compatible hosts supporting the Network Control Program Packet Switched Interface (NPSI) protocols. The connector supports either of the following interfaces: RS-232-C at speeds up to 19.2K bps or CCITT V.35 at speeds of 48K, 56K, or 64K bps. Only one H Card may be installed.

Local Channel Interface Module (F Card): an expansion module that provides a connection to an IBM main-frame byte multiplexer, block multiplexer, or selector channel in configurations where the 6544 controller is located within 200 cable feet of the host. Users can equip each 6544 with one or two Local Channel modules. The 6544 can support both remote and local hosts concurrently.

Plug-Compatible Device Interface Module (K Card): an expansion module that allows users to establish plug-compatibility for up to 16 synchronous devices or two multiplexers. With Release 3.2 or later of the controller software, any plug-compatible display connected to this module can run up to five concurrent sessions in the same SNA host or different hosts. Users can add a second module for a total of 32 ports (provided that no C Card is being used). This module also permits connections to personal computers using the Coax Attachmate (3-N-1) product.

Nine-Port PCM Device Logic Module (K' Card): a smaller, less expensive version of the K Card for users who need to support no more than nine plug-compatible devices or two multiplexers. This module requires Release 3.2 or later of the controller software.

Token-Ring Logic Module (T Card): enables devices connected to a 6544 controller to access a remote or local SNA host via a token-ring network. It also supports communications between token-ring devices to communicate with a local or remote SNA host via a 6544 controller.

Processor/Memory Logic Module (X Card): expands the memory capacity of the 6544 controller, allowing it to support the enhancements included in controller software Release 3.0 and later.

6542 Tabletop Controller

The 6542 supports connections to as many as eight IBM plug-compatible devices, one remote host, and up to two asynchronous devices (e.g., minicomputers, PCs, or peripherals). The 6542's ports accommodate coax connections; however, any port can also support twisted pair wire connections using AT&T's Balun Adapter. The 6542 does not support AT&T's 6500 System (non-plug-compatible) devices or any of the 6544 expansion modules.

Base 6542 functionality includes one remote synchronous host connection, an asynchronous port for remote diagnostics, a 3½-inch diskette drive, and support for four directly connected IBM plug-compatible devices.

The 6542 contains three expansion slots to accommodate three optional modules:

- A Synchronous Device Interface Module provides four additional ports, making it possible to support a maximum of eight plug-compatible devices.
- An Asynchronous Host/Protocol Conversion Module supports communications with two asynchronous devices.
- A Memory Expansion Module provides the additional memory needed to support the interface and conversion modules.

Additionally, one of the 6542's standard ports will allow the multiplexing of eight synchronous plug-compatible peripherals over a single coax cable using an IBM 3299 multiplexer. When the multiplexer is in operation, however, all other ports remain inactive.

Displays

AT&T 6500 System-Compatible Displays

AT&T offers five 6500 system-compatible display units which implement the protocols developed for the original 6500 System. All models support a tilt/swivel capability; both color and monochrome (amber or green) displays are available. The units, developed for use with the 6544 controller, are described in more detail below.

6518 Basic Function Display: This monochrome unit supports single session communications with one synchronous host; it does not support access to asynchronous hosts. The 6518 includes a 14-inch screen, with a display capacity of 1,920 characters arranged in 24 lines of 80 characters each. The 6518 is functionally compatible with IBM's 3178 and 3191 display stations.

6528 Standard Display: The 6528 monochrome display provides a "hot key" for switching between two sessions on a single host or different hosts. (Data transfer between sessions is not supported, however.) Either session may be synchronous or asynchronous. The 6528 includes a 15-inch monochrome display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6528 is functionally compatible with the IBM 3180 display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

6529 Standard Display: This 14-inch color display includes the same split-screen capability as the 6528. The 6529 provides a four- or seven-color display, with display capacities ranging from 1,920 to 3,564 characters. Screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6529 is functionally compatible with the IBM 3179 display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

6538 Multitasking Display: This monochrome display provides up to four multitasking windows in any combination of synchronous and asynchronous sessions. Window positioning/browsing/sizing speed is four inches per second horizontal and six inches per second vertical. The 6538 includes a 15-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6538 supports four screen formats, including 3270 operation, VT220 operation, full-extended attributing, and input and edit. An auxiliary I/O port and programmed symbol graphics are optionally available. The 6538 is functionally compatible with the IBM 3180 display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

6539 Multitasking Display: This color display provides up to four multitasking windows in any combination of synchronous and asynchronous sessions. Window positioning/browsing/sizing speed is four inches per second horizontal and six inches per second vertical. The 6539 includes a 14-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6539 features four- or

seven-color display capability and supports four screen formats, including 3270 operation, VT220 operation, full-extended attributing, and input and edit. An auxiliary I/O port and programmed symbol graphics are optionally available. The 6539 is functionally compatible with the IBM 3279-S3G display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

Keyboards for 6500 System-Compatible Displays

The 6518 display comes with a 122-key keyboard containing 24 external program function (PF) keys. This detachable keyboard has a typewriter-style layout and a low-profile design. Security keylock is a standard feature. A three-year warranty is available with the 6518.

The 6528, 6529, 6538, and 6539 displays are modularly designed and can be upgraded or downgraded by switching logic bases and display monitors. They are all equipped with a 122-key keyboard that includes 24 program function (PF) keys and a VT220 template. The detachable keyboard contains a typewriter-style layout and a low-profile design. Security keylock is a standard feature.

IBM Plug-Compatible Displays

Each of the following three 6500 plug-compatible displays can operate with IBM 3270 controllers, the AT&T 6544 controller, and the AT&T 6542 controller. The units' display screens support tilt/swivel capabilities, and monochrome devices are available with amber or green phosphor characters.

When connected to a 6500 controller running Controller Software Release 3.2 or later, these displays support up to five simultaneous sessions with synchronous and asynchronous hosts.

6591D Plug-Compatible Display: This low-cost, monochrome display, designed for basic data entry, includes a 14-inch screen and a 122-key keyboard. The 6591D is equivalent to IBM's 3191 display family, supporting screen arrangements of 24 lines by 80 characters and 32 lines by 80 characters.

6592D Plug-Compatible Display: This monochrome display, equivalent to the IBM 3192-D display, features a 15-inch screen and a 122-key keyboard supporting record keystroke capabilities. The 6592D supports screen arrangements of 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters.

6592F Plug-Compatible Display: This display is the color equivalent of the 9592D. It includes a 14-inch, seven-color screen and a 122-key keyboard which provides record keystroke capabilities. The 6592D supports screen arrangements of 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters.

Printers and Printer Controllers

AT&T offers a 6500 system-compatible printer and printer controller as well as an IBM plug-compatible printer and printer controller. The 6500 System printer products are designed for communications with the 6544 controller alone; the plug-compatible printer products support connections to both the 6544 and 6542 controllers as well as IBM controllers.

6571 Color Matrix Printer: The 6571, a 6500 system-compatible matrix printer, provides color or monochrome text and graphics printing. The 6571 operates at speeds up to 400 cps in draft mode and 100 cps in near letter quality mode. The 6571 prints symbol graphics and supports one-, four-, and seven-color printing. The 6571 includes a full-function SNA control panel and LCD display, an operator-replaceable 18-wire printhead with half-dot shift, and a tractor- or friction-feed platen with rear or bottom feed. Paper feed/positioning controls are also included.

6572 Plug-Compatible Printer: The 6572 is a coax (plug-compatible) version of the 6571 printer, offering all the same features.

6561 Printer Controller: The 6561 is a printer controller that enables the use of older AT&T 4540 and E4540 printers as well as AT&T's newer asynchronous printers in a 6500 System cluster. The 6561 adds new functions and applications to the older printers and includes a full-function SNA control panel, LCD display, and the following interfaces: SSI (twisted pair) in, SSI out, RS-232-C out, and Centronics parallel out.

6562 Coax Printer Controller: The 6562 Printer Controller is a plug-compatible version of the 6561 that can connect to IBM 3274 or 3174 controllers. The 6562 supports both parallel and serial asynchronous printers.

Personal Computer Add-On Products

The 2-N-1 Adapter, which runs AT&T's Attachmate Control Program, provides multisession, multiwindowing capability to PCs connected to the 6500 controller via twisted pair wire. Up to seven concurrent windows are possible: four 3270 sessions, two notepads, and one PC session. While the PC cannot access multiple hosts simultaneously, it can access multiple concurrent sessions on a single host.

The Coax Attachmate (3-N-1) Card supports a connection from a PC to either the 6544 or 6542 controller via an RG62A/U coaxial cable, running AT&T's Attachmate Control Program and providing the same capabilities.

Pricing

The 6500 Multifunction Communication System components are available for purchase and lease through AT&T's direct sales force or by calling (800) 247-1212.

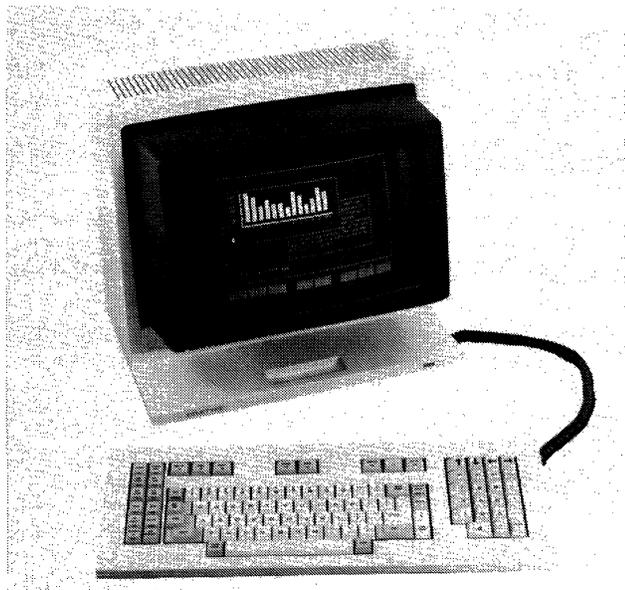
AT&T provides installation and maintenance service through 1,000 nationwide sites.

The 6500 Multifunction Communication System products carry a warranty from the date of purchase, guaranteeing that AT&T will replace any defective part or software free of charge during the warranty period. The company offers several Equipment Maintenance Agreement Plans, including per-occurrence and contract plans.

Equipment Prices

		Purchase Price (\$)
6544	Multifunction Communication Controller	1,418
6544	Options:	
	Synchronous Host Module	383
	Synchronous Device Interface Module	5,179
	Asynchronous Host/Protocol Conversion Module	2,425
	X.25 Interface Module	1,369
	Local Channel Expansion Module	3,668
	16-Port, Plug-Compatible Logic Module	5,179
	Nine-Port PCM Device Logic Module	4,672
	Processor/Memory Logic Module	1,600
	Hard Disk Drive	1,845
6542	Tabletop Communication Controller	3,597
6542	Options:	
	Synchronous Device Interface Module	821
	Asynchronous Host/Protocol Conversion Module	887
	Memory Expansion Module	1,281
Controller Software Release 3.3		27
Displays		
6518	Basic Function Display	1,100
6528	Standard Display	1,935
6529	Standard Display	2,085
6538	Multitasking Display	2,755
6539	Multitasking Display	2,880
6591D	Plug-Compatible Display	1,300
6592D	Plug-Compatible Display	1,600
6592F	Plug-Compatible Displays	1,750
Printers and Printer Controllers		
6571	Color Graphics Printer	5,037
6572	Plug-Compatible Printer	5,037
6561	Printer Controller	1,002
6562	Coax Printer Controller	1,643
Personal Computer Options		
	The 2-N-1 Adapter	1,144
	The Coax Attachmate (3-N-1) Adapter	1,144
	Attachmate Control Program	323

AT&T 4400 Series Display Terminals



The 4425 is AT&T's high-end asynchronous display terminal offering. The terminal is buffered and features horizontal split screen, windowing, 80-/132-column display capability, and compatibility with both the Unix operating system and the Digital VT102 display. An integral modem is optional.

MANAGEMENT SUMMARY

UPDATE: This report reflects the removal of the Teletype name from all AT&T display terminals. Teletype (based in Skokie, IL) has been absorbed into the Computer Systems Division of AT&T Information Systems; it remains the manufacturing arm of AT&T-IS.

Since 1930, Teletype Corporation was responsible for manufacturing and supplying the Bell System's teletypewriter equipment and, in recent times, computer display terminals and printers. The Bell System used Teletype products internally and resold them to end users on a tariffed basis. In addition, Teletype marketed its own products on a nontariffed basis directly to end users, and through a large network of dealers, distributors, leasing companies, and OEMs.

The AT&T divestiture and deregulation have changed most of that. Teletype has been absorbed into the Computer Systems Division of AT&T Information Systems, and its Teletype and Dataspeed labels have disappeared from view. The company was known for a while as "AT&T Teletype," but now products coming out of Skokie display only the AT&T logo. Some AT&T-IS terminal equipment is obtained from other OEMs, as well.

AT&T's family of display terminals encompasses the 4400 Series, the E4540 Series (an IBM 3270-compatible line), Model 5620 (a bit-mapped graphics display), and the 6500 Series (multifunctional replacements for the IBM 3270) ➤

The 4400 Series is AT&T's latest generation of ASCII display terminal products, replacing the older 4400 models. The 4400 Series was formerly marketed as the 5400 Series by AT&T Teletype. Models 4410 and 4425 are ANSI X3.64-compliant terminals. Model 4418 is an asynchronous terminal that is designed to function in an IBM 3270 environment when used with a protocol converter.

MODELS: 4410, 4418, and 4425.

DISPLAY: All models contain a 12-inch display with 80/132-column display capability; amber or white phosphor characters may be selected. All models have a tiltable display.

KEYBOARD: The 5410 and 5425 feature a typewriter-style keyboard with 8 function keys; the 5418 features an IBM 3278-style keyboard with 24 function keys. Keyboards are detachable, and contain a low-profile design with height adjustment.

COMPETITION: Wyse Technology, TeleVideo Systems, Applied Digital Data Systems (ADDS), Lear Siegler, Esprit Systems, and several others.

PRICE: Purchase prices for the 4400 Series terminals range from \$902 to \$1,720.

CHARACTERISTICS

VENDOR: AT&T Information Systems, 1 Speedwell Avenue, Morristown, NJ 07960. Telephone (201) 898-2000. In Canada: AT&T Canada, 1500 Don Mills Road, Don Mills, Ontario M3B 3K4. Telephone (416) 449-4300.

DATE OF ANNOUNCEMENT: 4410—April 1983; 4418—May 1984; 4425—September 1984.

DATE OF FIRST DELIVERY: 4410—Third quarter 1983; 4418—May 1984; 4425—October 1984.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: AT&T Information Systems.

MODELS

The 4400 Series currently consists of the following three models.

- **4410**—an asynchronous, conversational terminal. The 4410 conforms to the ANSI X3.64 standard. It provides 80/132-column display capability, horizontal split screen, editing capabilities, and five display attributes.
- **4418**—an asynchronous, conversational terminal that features IBM 3270 emulation when used in conjunction with a protocol converter. It provides 80-/132-column display capability, conforms to the ANSI X3.64 standard, and includes an IBM 3278-style keyboard. ➤

AT&T 4400 Series Display Terminals

▷ line) of products. The 4400 Series, E4540 Series, and 5620 are equivalent to the former Teletype 5000 Series; the 6500 Series are new products.

The 4400 Series currently consists of models 4410, 4418, and 4425. The 4410 is a conversational, asynchronous, ASCII display based on the ANSI X3.64 standard. It features a monochrome 80-/132-column display, full editing, horizontal split screen, eight programmable function keys, visual attributes, and business graphics. The 4418 is similar to the 4410 but has an IBM 3270 look-alike keyboard, and is designed to replace a more expensive IBM 3270 terminal when used with a protocol converter. The 4425 is a buffered terminal that provides up to 78 lines of display in memory (80 column mode), and is compatible with Digital Equipment Corporation VT102/VT52 display terminals as well as the ANSI X3.64 standard. The 4425 features 38 function keys and four fixed-program function keys.

The 4400 Series terminals are designed for general-purpose asynchronous applications, as well as for use with AT&T's 3B line of computers.

COMPETITIVE POSITION

Prior to AT&T's divestiture, Teletype Corporation possessed what was, essentially, a built-in market. The company's products were sold primarily to the Bell Operating Companies (BOCs) for their internal use or for resale to their customers. At that time, as much as 40 percent of Teletype's revenues were attributed to their business with the BOCs. As part of Computer Inquiry II, the BOCs were forbidden to sell new premises equipment to users during 1983. Also as part of Computer Inquiry II, Teletype was prohibited from selling its products directly to end users. With the AT&T divestiture, the BOCs were divested from AT&T, thus loosening, to some extent, Teletype's hold on them. Teletype remains a part of AT&T, while the BOCs are now free to purchase equipment from whatever source they prefer.

All of this forced Teletype (which soon became AT&T Teletype) to change its strategy in the new, deregulated marketplace. As a result, the company poured more money into research and development, beefed up marketing, cut manufacturing costs in order to reduce prices, and established new distribution channels.

In 1985, AT&T Teletype became a wholly owned subsidiary of the Computer Systems Division of AT&T Information Systems. All sales and marketing for Teletype terminals was relocated to AT&T-IS headquarters in Morristown, New Jersey. Teletype, based in Skokie, Illinois, will remain the manufacturing arm for the production of asynchronous and synchronous data terminals. However, the Teletype logo will no longer be found on the terminals.

The 4400 line of asynchronous terminals competes with terminal product lines from independent vendors such as Wyse Technology, TeleVideo Systems, Lear Siegler, Applied Digital Data Systems (ADDS), Esprit Systems, Visual Technology, and several others. For general-purpose appli- ▷

▶ • 4425—an asynchronous, buffered terminal. The 4425 contains all of the features of the 4420, plus Unix operating system compatibility and Digital VT102 terminal compatibility.

TRANSMISSION SPECIFICATIONS

For the 4400 terminals, transmission is asynchronous, in half or full duplex, at speeds up to 19,200 bits per second; isochronous transmission is selectable on the 4425. Multi-point operation is available on all models except the 4410. All models conform to both the ASCII and ANSI X3.64 communications protocols. Vertical parity generation and detection options are available. All models provide an EIA RS-232-C interface, as well as an auxiliary EIA RS-232-C printer interface. A self-test capability is standard. An integral modem/dialer is optionally available on all models. The integral modem is compatible with 212A-type modems for operation at 1200 or 300 bps.

DEVICE CONTROL

The 4410 and 4418 conversational display terminals transmit data a character at a time as it is keyed. The option menu is displayed on the screen in a "plain English" manner. Eight user- or host-programmable function keys are included on the 4410, each of which has up to a 50-character per key capacity in nonvolatile memory. Each function key has a corresponding screen label, with up to 16 characters displayable on each label. The 4418 contains 24 function keys. When used with a protocol converter, the 4418 emulates the IBM 3278 for both local and remote communications. The 4418 features single-key access to all 3278-like keystrokes.

Visual display attributes available on the 4410 and 4418 include normal, blank, half intensity, blink, underline, and reverse video. The display screen may be horizontally split into a maximum of two static regions and one scrolling region. Editing capabilities include character and line insert/delete, as well as clear functions. Line drawing and special symbol graphics are available. The 4410 and 4418 conform to the ANSI X3.64 standard.

The 4425 buffered display can transmit data a character at a time from the keyboard, or by line/page/block from the display. Up to 78 lines of display memory are available when using the 80-column display format, and up to 54 lines of memory are available when using the 132-column display format. The 4425 contains all of the basic operating features of the 4410 and 4418 (including visual attributes and editing), plus some additional features not found on the conversational models, including single or multiple character or line insert/delete. The 4425 is compatible with the Unix operating system and with the Digital VT102 display terminal.

The 4425 provides three separate methods to access and manipulate the display memory; scroll mode, horizontal split screen, and windowing. Scroll mode allows the operator to scroll through display memory. The horizontal split screen feature is the same as found on the 4410 and 4418, with one scrolling region and two static regions. With windowing, the 4425's memory can be divided into a maximum of four rectangles of varying lengths and widths, called workspaces. A window or viewport into each workspace can be created, and its position defined and located on the screen. One viewport can be overlapped or eclipsed with another.

The optional integral modem feature allows the 4410, 4418, and 4425 displays to plug directly into a telephone line for manual dialing of calls from the keyboard, automatic dialing of stored numbers, or automatic repeat dialing. A security feature hides all or part of the dial command log-on string. ▶

AT&T 4400 Series Display Terminals

► cations, AT&T will also go up against terminals from computer vendors like Digital Equipment Corporation and IBM. However, the chief market for the AT&T terminals will be for use with AT&T's 3B line of computers. It is this market that will assure AT&T of continuing to hold the large market share that Teletype managed to carve out.

ADVANTAGES AND RESTRICTIONS

Teletype's products have traditionally maintained a reputation for exceptionally good functionality and reliability, as well as for their rather high price tags. The AT&T 4400 Series terminals retained the high degree of functionality offered by their predecessors, but prices have fallen somewhat to reflect the current trends in the display terminal market. Still, the AT&T terminals are priced higher than many comparable terminals from the independent vendors. For the money, the AT&T terminals feature a variety of attractive features; these include 80-/132-column display capability, windowing (on the buffered models), and ANSI X3.64 compatibility. UNIX operating system compatibility and Digital VT102 compatibility have been implemented on the 5425. An optional integral modem/dialer has also been added to the line. All AT&T 4400 Series terminals include a tiltable display and a detachable, low-profile keyboard.

USER REACTION

In Datapro's 1985 Terminal Users Survey, conducted in conjunction with *Data Communications* magazine, a total of 32 users of the AT&T 4400 Series (then AT&T Teletype 5400 Series) display terminals responded. These users represented an installed base of approximately 1,500 units. The users were asked to rate their terminals with respect to seven specific categories. Their responses are summarized in the following table.

	Excellent	Good	Fair	Poor	WA*
Overall performance	26	5	1	0	3.8
Ease of operation	24	7	1	0	3.7
Display clarity	25	4	1	1	3.7
Keyboard feel & usability	13	15	3	0	3.3
Ergonomics	21	7	3	0	3.6
Hardware reliability	25	5	1	0	3.8
Mfr.'s maintenance service/technical support	24	5	2	0	3.7

*Weighted Average on a scale of 4.0 for Excellent.

When asked whether or not they would recommend the 4400 Series terminals to other users, 26 of the respondents answered that they would; the remaining six did not answer the question. When asked what factors *most* influenced

► Screen labels are available to simplify dialing, and call progress status and prompts are displayed on the screen's 25th display line.

COMPONENTS

4410/4418/4425 DISPLAY UNITS: Include a 12-inch (diagonal) display screen, capable of displaying 24 lines of 80 or 132 characters. One status line is available, plus 2 lines for screen labels. Characters are formed utilizing a 7-by-9 dot matrix with descenders in a 9-by-13 field (80-column format), or using a 5-by-7 dot matrix with descenders in a 7-by-13 field (132-column format). White or amber phosphor characters are available. Two character sets are selectable: 128 ASCII alphanumeric plus control characters, or 96 line drawing and special graphic characters. Other character sets available include United Kingdom, videotex mosaics, and securities industry. The screen features 7 tilt positions, a nonglare finish, and brightness control.

4410/4425 KEYBOARDS: Feature a typewriter-style layout with a separate numeric cluster and 8 programmable function keys. Function keys offer 16 functions: 8 defined by the host and 8 defined by the user. Each function key is capable of storing 80 characters per key. The 4425 provides 11 additional function keys, shiftable to provide 22 functions.

4418 KEYBOARD: Features a layout similar to that found on the IBM 3278, including 24 function keys. Otherwise, the 4418 keyboard contains the same features found on the 4410 and 4425 keyboards, including a low-profile design, tilt adjustments, and detachability.

PRICING

The AT&T 4400 Series display terminals are available for purchase only. Quantity discounts are available on the following schedule: 25 to 49 units—10 percent; 50 to 99 units—15 percent; 100 to 199 units—20 percent; 200+ units—25 percent.

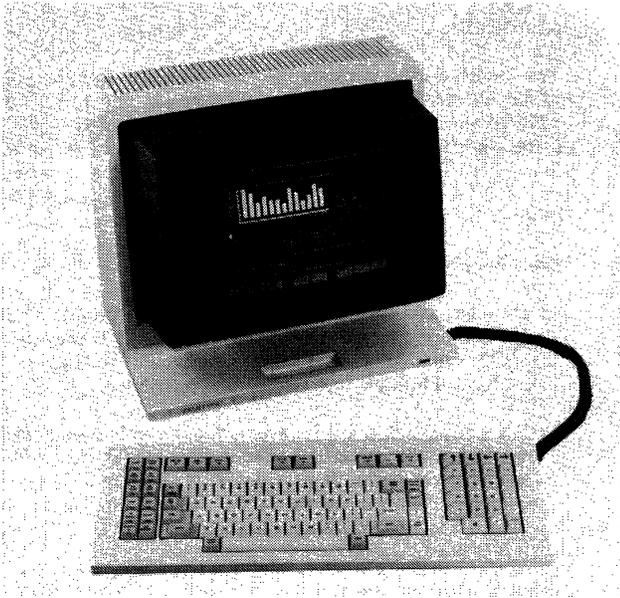
Maintenance service for the 4400 Series terminals is available from AT&T Information Systems field personnel. Maintenance contracts are available on a yearly basis.

EQUIPMENT PRICES

	Purchase Price (\$)
4410 Display Terminal	902
4418 Display Terminal	1,080
4425 Display Terminal	1,265-1,720 ■

their decision to purchase the AT&T terminals, nearly half (48 percent) cited the terminals' features and/or functionality. □

AT&T Teletype 5000 Series Display Terminals



The 5425 is AT&T Teletype's high-end asynchronous display terminal offering. The terminal is buffered and features horizontal split screen, windowing, 80/132-column display capability, and compatibility with both the UNIX operating system and the DEC VT102 display. An integral modem is optional.

MANAGEMENT SUMMARY

The 5000 Series products are AT&T Teletype's new generation of display terminals. (As a by-product of divestiture, Teletype Corporation recently changed its name to AT&T Teletype.) These new products cover a broad field, with new terminals for four different application areas: asynchronous conversational, asynchronous buffered, IBM 3270-compatible, and intelligent dot-mapped graphics. This report will cover AT&T Teletype's products in the first three application areas only.

The 5400 family is AT&T Teletype's asynchronous display terminal product line. It consists of two conversational terminals (5410 and 5418) and two buffered terminals (5420/2 and 5425). The 5410 Display is a low-priced, character mode asynchronous terminal. The 5410 conforms to the ANSI X3.64 standard, and contains several features not normally associated with conversational terminals. These include: 80/132-column display capability; horizontal split screen; eight programmable function keys with associated screen labels; full editing features and visual attributes; and graphics capabilities.

The 5420/2 is a buffered version of the 5420 (a production which is no longer offered). The 5420/2 provides up to 78 lines of display memory in 80-column mode (54 lines in 132-column mode). In addition to the horizontal split screen capability, a scroll mode and windowing capability are provided in order to access and manipulate the 5420/2's

The 5000 Series is AT&T Teletype's latest generation of display terminal products, replacing the 4400 and 4540 product lines. The 5000 Series consists of two separate families of products: the 5400 asynchronous terminals, and the 5540 synchronous (IBM 3270-compatible) terminals. All of the display terminal models contain a new design enclosure, and feature lower prices than previous Teletype display terminal products.

MODELS: 5400 Family—5410 and 5418 Conversational Displays, 5420/2 and 5425 Buffered Displays; 5540 Family—5544 and 5546 Controllers, 5548-12, 5548-22, 5548-25 Display Terminals, 5549 Color Display Terminal.

DISPLAY: The 5410, 5418, 5420/2, 5425, and 5548-12 contain a 12-inch display; the 5548-22, 5548-25, and 5549 feature a 13-inch screen. The 5410, 5418, 5420/2, 5425, and 5548-25 feature 80/132-column display capability; the 5548-12, 5548-22, and 5549 feature 80-column display capability only. All models have a tiltable display.

KEYBOARD: The 5410, 5420/2, and 5425 feature a typewriter-style keyboard with 8 function keys; the 5418 features an IBM 3278-style keyboard with 24 function keys. A variety of 3270-style keyboard layouts are available for the 5540 displays, including typewriter and data entry; all keyboard models feature 24 function keys. Keyboards for the 5400 and 5540 displays are detachable, and contain a low-profile design with height adjustment.

COMPETITION: 5400 Family—TeleVideo Systems, Applied Digital Data Systems, Lear Siegler, Esprit Systems, and several others; 5540 Family—IBM, ITT Courier, Telex, Lee Data, Memorex, and several others.

PRICE: Purchase prices for the 5000 Series terminals range from \$995 to \$2,817.

CHARACTERISTICS

VENDOR: AT&T Teletype Corporation, 5555 Touhy Avenue, Skokie, Illinois 60077. Telephone (312) 982-2000.

DATE OF ANNOUNCEMENT: 5410, 5420/2, 5544, 5546, and 5548—April 1983; 5418 and 5549—May 1984; 5425—September 1984.

DATE OF FIRST DELIVERY: 5410, 5420/2, 5544, 5546, and 5548—Third quarter 1983; 5418 and 5549—May 1984; 5425—October 1984.

AT&T Teletype 5000 Series Display Terminals

memory. The 5420/2 also provides all of the operational and design features of the 5410, and is compatible with the older Teletype 40/1 and 40/2 terminals.

The 5418 and 5425 are newcomers to the AT&T Teletype product line. The 5418 is a conversational terminal designed for both local and remote communications over IBM 3270 networks when used with a protocol converter. It features an IBM 3278-style keyboard layout, with single-key access to each 3278-like keystroke. Otherwise, all other features are the same as found on the 5410. The 5425 is an enhanced version of the 5420. The 5425 is compatible with the UNIX operating system, as well as with the DEC VT102 display terminal.

The 5540 is a family of IBM 3270-compatible products; the new products are also compatible with Teletype's existing 4540 series of 3270-compatible controllers and displays. The 5540 family consists of two controllers (5544 and 5546), three monochrome displays (5548-12, 5548-22, and 5548-25), a color display (5549), and a line of printers.

The 5544 is an IBM 3274-compatible control unit. Available in 16-port and 32-port versions, the 5544 is a floor-standing unit. The 5546 is an IBM 3276-compatible, table-top control unit available in 6-port and 12-port versions. Both controllers provide 5¼-inch dual floppy disks for software storage. Users can switch from BSC to SNA/SDLC line protocol by changing disks.

The 5548-22 Display Terminal is an IBM 3278 Model 2 compatible unit containing a 13-inch display and a 1920-character display capacity. The 5548-25 is compatible with the IBM 3278 Model 5; it also contains a 13-inch screen, while providing selectable display capacities of 1920 and 3564 (27 lines by 132 columns) characters. The 5548-12 is AT&T Teletype's version of the IBM 3178, with a smaller (12-inch) display screen and a 1920-character display capacity. The 5549 is a 4-color display that includes a 13-inch screen and selectable 1920- and 2560-character (32 lines by 80 columns) display capacities. All of the 5540 displays can be configured with a choice of available keyboards, including typewriter-style, typewriter with external numeric pad, and data entry styles.

COMPETITIVE POSITION

AT&T Teletype's 5000 Series covers three distinct market areas. The 5400 products are targeted at the low-priced ASCII terminal market, a segment in which Teletype has not traditionally been a major force. The 5400 terminals contain a high degree of functionality, and are priced at levels significantly below the older 40 and 4400 Series terminal that they are designed to replace.

The 5540 family is Teletype's new generation of IBM 3270 replacement products. The new components are also compatible with the existing Teletype 4540 products, a line which boasts a very large installed base and a high degree of user acceptance in the competitive 3270 replacement market. The new 5620 is an intelligent, dot-mapped graphics terminal which places AT&T Teletype in the intelligent terminal market for the first time.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: AT&T Teletype Corporation.

MODELS

The 5000 Series consists of two separate families of products: the 5400 asynchronous terminals and the 5540 3270-compatible terminals. (Another member of the 5000 series, the 5620, is an intelligent graphics terminal and thus beyond the scope of this report.) The following paragraphs describe the terminals that comprise the 5400 and 5540 product lines:

5400 Family—

- 5410—an asynchronous, conversational terminal. The 5410 conforms to the ANSI X3.64 standard. It provides 80/132-column display capability, horizontal split screen, editing capabilities, and five display attributes.
- 5418—an asynchronous, conversational terminal that features IBM 3270 emulation when used in conjunction with a protocol converter. It provides 80/132-column display capability, conforms to the ANSI X3.64 standard, and includes an IBM 3278-style keyboard.
- 5420/2—an asynchronous, buffered terminal. The 5420/2 provides all of the features of the 5410, plus 78 (80 columns) or 54 (132 columns) lines of display memory, scroll mode, page mode, and windowing. Emulates the older Teletype Models 40/1 and 40/2, and replaces the 5420.
- 5425—an asynchronous, buffered terminal. The 5425 contains all of the features of the 5420, plus UNIX operating system compatibility and DEC VT102 terminal compatibility.

5540 Family—

The 5540 is a family of IBM 3270-compatible display terminals, controllers, and printers. As with the older Teletype 4540 family, the 5540 products operate under both BSC and SDLC line protocols. Members of the 5540 line include:

- 5544—a control unit that is compatible with the IBM 3274 and is available in 16- and 32-port configurations;
- 5546—a control unit that is compatible with the IBM 3276 and is available in 6- and 12-port versions;
- 5548 Model 12—a monochrome display terminal that is compatible with the IBM 3178; includes a 12-inch display screen with a 1920-character capacity and a detachable keyboard;
- 5548 Model 22—a monochrome display terminal that is compatible with the IBM 3278 Model 2; includes a 13-inch display screen with a 1920-character capacity and a detachable keyboard;
- 5548 Model 25—a monochrome display terminal that is compatible with the IBM 3278 Model 5; includes a 13-inch display screen with selectable 1920- and 3564-character capacities and a detachable keyboard;
- 5549—a 4-color display terminal that is compatible with the IBM 3279 Model S2A; includes a 13-inch display screen with selectable 1920- and 2560-character capacities and a detachable keyboard.

AT&T Teletype also provides a variety of printers for use with the 5540 family, including serial and line printers.

AT&T Teletype 5000 Series Display Terminals

▷ Prior to AT&T's divestiture, Teletype Corporation possessed what was, essentially, a built-in market. The company's products were sold primarily to the Bell Operating Companies (BOCs) for their internal use or for resale to their customers. At that time, as much as 40 percent of Teletype's revenues were attributed to their business with the BOCs. As part of Computer Inquiry II, the BOCs were forbidden to sell new premise equipment to users during 1983. Also as part of Computer Inquiry II, Teletype was prohibited from selling its products directly to end users. With the AT&T divestiture, the BOCs were divested from AT&T, thus loosening, to some extent, Teletype's hold on them. Teletype remains a part of AT&T, while the BOCs are now free to purchase equipment from whatever source they prefer.

All of this has forced Teletype (now officially AT&T Teletype) to change its strategy in the new, deregulated marketplace. As a result, the company has poured more money into research and development, beefed up marketing, cut manufacturing costs in order to reduce prices, and established new distribution channels. The results to date have been encouraging—AT&T Teletype posted a significant jump in net profits during 1983. AT&T Teletype now sells its products through distributors, OEMs, AT&T Information Systems (under the Dataspeed name), and AT&T International. The company also supplies equipment to the BOCs for internal use; the BOCs, however, are still not permitted to resell third party data processing equipment to their customers.

In the deregulated market for terminals, AT&T Teletype now finds itself competing directly with a myriad of vendors. Its 5400 line of asynchronous terminals competes with product lines from vendors such as TeleVideo Systems, Lear Siegler, Applied Digital Data Systems, Esprit Systems, Visual Technology, and several others. The 5540 product line competes with the IBM 3270 family, as well as with 3270-compatible products from ITT Courier, Telex, Lee Data, Memorex, and a number of others.

ADVANTAGES AND RESTRICTIONS

Teletype's products have gained a reputation for functionality and reliability, as well as for their rather high price tags. The 5000 Series terminals retain the functionality offered by their predecessors, but prices have fallen to reflect the realities of competing in a deregulated market. The AT&T Teletype terminals feature a variety of attractive features. The 5400 asynchronous terminals have been imbued with 80/132-column display capability, windowing (on the buffered models), and ANSI X3.64 compatibility. UNIX operating system compatibility and DEC VT102 compatibility have been implemented on the new 5425. An optional integral modem/dialer has also been added to the line. The 5540 synchronous terminals are interchangeable with existing Teletype 4540 components. All AT&T Teletype terminals include a tiltable display and a detachable, low-profile keyboard.

AT&T Teletype has fallen somewhat behind in the competitive 3270 replacement market, however. Although the

▶ TRANSMISSION SPECIFICATIONS

For the 5400 terminals, transmission is asynchronous, in half- or full-duplex, at speeds up to 19,200 bits per second. Isochronous transmission is selectable on the 5420/2 and 5425. Multipoint operation is available on all models except the 5410. All models conform to both the ASCII and ANSI X3.64 communications protocols. Vertical parity generation and detection options are available. All models provide an EIA RS-232-C interface, as well as an auxiliary EIA RS-232-C printer interface. A self-test capability is standard. An integral modem/dialer is optionally available with the 5410, 5418, and 5425. The integral modem is compatible with 212A-type modems for operation at 1200 or 300 bps.

For the 5540 family, transmission is synchronous, in half- or full-duplex, at speeds up to 9600 bits per second. Both BSC and SNA/SDLC protocols are supported. The 5544 is compatible with the IBM 3274 "C" models, while the 5546 is compatible with the IBM 3276 remote controllers. The following SNA descriptors are supported: Physical Unit (PU) Type 2, Logical Units (LU) Types 1, 2, and 3, and Format Identification (FID) Type 2. Displays and printers connect to the control unit via twisted pair or coaxial cable, at distances up to 5,000 feet (up to 2,000 feet only for the line printer models). Over nonswitched transmission facilities, half-duplex terminal operation is supported. Two EIA RS-232-C interfaces are standard.

DEVICE CONTROL

The 5410 and 5418 conversational display terminals transmit data a character-at-a-time as it is keyed. The option menu is displayed on the screen in a "plain English" manner. Eight user- or host-programmable function keys are included on the 5410, each of which has up to a 50-character per key capacity in nonvolatile memory. Each function key has a corresponding screen label, with up to 16 characters displayable on each label. The 5418 contains 24 function keys. When used with a protocol converter, the 5418 emulates the IBM 3278 for both local and remote communications. The 5418 features single-key access to all 3278-like keystrokes.

Visual display attributes available on the 5410 and 5418 include normal, blank, half-intensity, blink, underline, and reverse video. The display screen may be horizontally split into a maximum of two static regions and one scrolling region. Editing capabilities include character and line insert/delete, as well as clear functions. Line drawing and special symbol graphics are available. The 5410 and 5418 conform to the ANSI X3.64 standard.

The 5420/2 and 5425 buffered displays can transmit data a character-at-a-time from the keyboard, or by line/page/block from the display. Up to 78 lines of display memory are available when using the 80-column display format, and up to 54 lines of memory are available when using the 132-column display format. The 5420/2 and 5425 contain all of the basic operating features of the 5410 and 5418 (including visual attributes and editing), plus some additional features not found on the conversational models, including single or multiple character or line insert/delete. The 5425 differs from the 5420/2 in that it is compatible with the UNIX operating system and with the DEC VT 102 display terminal. The 5420/2 is compatible with the older Teletype 40/1 and 40/2 display terminals.

The 5420/2 and 5425 provide 3 separate methods to access and manipulate the display memory; scroll mode, horizontal split screen, and windowing. Scroll mode allows the operator to scroll through display memory. The horizontal split screen feature is the same as found on the 5410 and 5418, with 1 scrolling region and 2 static regions. With windowing, the 5420/2 and 5425 memory can be divided into a maxi-

AT&T Teletype 5000 Series Display Terminals

▶ company has recently added a color display to the 5540 product line, it does not offer the wide range of product choices now available from such independent 3270-compatible vendors such as ITT Courier, Lee Data, Telex, and Memorex; nor does it possess the product choices offered by IBM itself. Look for AT&T Teletype to significantly enhance the 5540 family in the near future, possibly with attachment capability for the AT&T Personal Computer Model 6300. These enhancements are necessary to protect the company's installed base and possibly carve out a larger share of the lucrative 3270-replacement market. □

▶ mum of 4 rectangles of varying lengths and widths, called workspaces. A window or viewport into each workspace can be created, and its position defined and located on the screen. One viewport can be overlapped or eclipsed with another.

The optional integral modem feature allows the 5410, 5418, and 5425 displays to plug directly into a telephone line for manual dialing of calls from the keyboard, automatic dialing of stored numbers, or automatic repeat dialing. A security feature hides all or part of the dial command log-on string. Screen labels are available to simplify dialing, and call progress status and prompts are displayed on the screen's 25th display line.

The 5540 family of components are compatible with the corresponding members of the IBM 3270 Information Display System. The 5540 is also compatible with the Teletype 4540 family, the company's previous line of IBM 3270-compatible equipment.

The 5540 terminals feature a separate user information/status line, block or underline cursor with selectable blink, and self-test diagnostics. A selector light pen is optional. The displays connect to a cluster controller via twisted pair or coaxial cable at distances up to 5,000 feet.

All software for the 5540 controllers is stored on dual 5¼-inch floppy disks; a user can switch from BSC to SDLC protocol by switching disks. The first port on the controller is reserved for the controller console, for communicating with the host and for setting options such as station addresses, configurations, and printer authorization matrix.

COMPONENTS

5400 Family

5410/5418/5420/5425 DISPLAY UNITS: Include a 12-inch (diagonal) display screen, capable of displaying 24 lines of 80 or 132 characters. One status line is available, plus 2 lines for screen labels. Characters are formed utilizing a 7-by-9 dot matrix with descenders in a 9-by-13 field (80-column format), or using a 5-by-7 dot matrix with descenders in a 7-by-13 field (132-column format). Green, white, or amber phosphor characters are available. Two character sets are selectable: 128 ASCII alphanumeric plus control characters, or 96 line drawing and special graphic characters. Other character sets available include United Kingdom, videotex mosaics, and securities industry. The screen features 7 tilt positions, a nonglare finish, and brightness control.

5410/5420/5425 KEYBOARDS: Feature a typewriter-style layout with a separate numeric cluster and 8 programmable function keys. Function keys offer 16 functions: 8 defined by the host and 8 defined by the user. Each function key is

capable of storing 80 characters per key. The 5425 provides 11 additional function keys, shiftable to provide 22 functions.

5418 KEYBOARD: Features a layout similar to that found on the IBM 3278, including 24 function keys. Otherwise, the 5418 keyboard contains the same features found on the 5410, 5420/2, and 5425 keyboards, including a low-profile design, tilt adjustments, and detachability.

5540 Family

5544 CONTROLLER: A floor-standing control unit that is compatible with the IBM 3274 Control Unit. The 5544 is based on a 16-bit microprocessor; software is stored on 5¼-inch dual floppy disks. The 5544 is available in two models, featuring 16 and 32 device attachment ports. Both models support BSC and SNA/SDLC line protocols by changing diskettes. Built-in local and remote test features are included.

5546 CONTROLLER: A tabletop control unit that is compatible with the IBM 3276 Control Unit (it does not include an integral display like the 3276). The 5546 is based on a 16-bit microprocessor; software is stored on 5¼-inch dual floppy disks. The 5546 is available in two models, featuring 6 and 12 device attachment ports. Both models support BSC and SNA/SDLC line protocols by changing diskettes. Built-in local and remote test features are included.

5548-12 DISPLAY TERMINAL: Includes a 12-inch (diagonal) display screen with a 1920-character capacity arranged in a 24-line by 80-column format. A user status line is also available. The 5548 Model 12 is designed to replace the IBM 3178 Display Station. Characters are formed utilizing a 9-by-14 dot matrix, and are displayed in white on a dark background. The EBCDIC character set is displayable. The screen features a nonglare finish, brightness control, and is tiltable.

5548-22 DISPLAY TERMINAL: Includes a 13-inch (diagonal) screen with a display capacity of 1920 characters, arranged in 24 lines of 80 characters each. A user status line is also available. The 5548 Model 22 is compatible with the IBM 3278 Model 2 Display Station. Characters are formed via a 9-by-14 dot matrix, and are displayed in white on a dark background. The EBCDIC character set is displayable. The display screen features a nonglare finish, brightness control, and is tiltable.

5548-25 DISPLAY TERMINAL: Includes a 13-inch (diagonal) screen with selectable display capacities of 1920 (24 lines by 80 columns) or 3564 (27 lines by 132 columns) characters. A user status line is also available. The 5548 Model 25 is compatible with the IBM 3278 Model 5 Display Station. Display formats are operator- or program-selectable. Characters are formed via a 9-by-14 dot matrix, and are displayed in white on a dark background. The EBCDIC character set is displayable. The screen features a nonglare finish, brightness control, and is tiltable.

5549 COLOR DISPLAY TERMINAL: Includes a 13-inch (diagonal) screen with selectable display capacities of 1920 (24 lines by 80 columns) or 2560 (32 lines by 80 columns) characters. A user status line is also available. The 5549 is compatible with the IBM 3279 Model S2A, as well as the basic versions of the IBM 3279 Models 3X. Characters are formed using a 9-by-14 dot matrix. Four colors are displayable: blue, green, red, and white. The EBCDIC character set is displayable. The screen features a nonglare finish, brightness control, and is tiltable. ▶

AT&T Teletype 5000 Series Display Terminals

► **5540 KEYBOARDS:** Keyboards are available with the following layouts: typewriter-style, typewriter-style with external numeric pad, and data entry. All keyboards are detached, plug-compatible with each other, and feature a 3270-like layout. All keyboard styles feature 24 programmable function keys; up to 12 of the keys (PF1 through PF12) can be executed via a single keystroke. The keyboards are detached and feature a low-profile design that meets the 30mm DIN height standard, and feature tilt adjustments of 5, 8, or 12 degrees. All alphanumeric keys repeat, and audible key click is selectable; tactile feedback is standard. The keyboard is connected to the display monitor via a coiled cord. When not in use, the keyboard stores on a shelf underneath the display.

5540 PRINTERS: A variety of printers are available for use with the 5540 controllers. Three matrix character printers are offered, featuring maximum print speeds of 30 (dot matrix), 55 (full character), and 340 (dot matrix) cps. All three printer models provide 132-column print capability. Two line printers are offered, in either tabletop or floor-standing versions. Both line printers operate at 300 lpm and are available in an 80-column friction feed version, or in an 80/132-column tractor feed version. Also offered is an 80-column forms access printer. The printers use the AT&T Teletype Standard Serial Interface (SSI) signalling method for communications with the 5544 and 5546 controllers, and operate with data streams in the 3270 Data Stream Compatibility (DSC) format, Logical Unit Type 3, or the SNA Character String (SCS) format, Logical Unit Type 1.

PRICING

The AT&T Teletype 5000 Series components are available for purchase only. In accordance with Computer Inquiry II, AT&T Teletype is not permitted to sell new customer-premise equipment to end-users. AT&T Teletype products

are available to end-users only through third-party resellers (OEMs) and distributors, as well as through AT&T Information Systems and AT&T International.

Maintenance service for the 5000 Series terminals is available from AT&T Teletype's product service organization; there are over 100 service centers located throughout the United States.

<u>Models</u>	<u>Purchase Price (\$)</u>
5400 Family—	
5410 Conversational Display	902
5418 Conversational Display	1,080
5420/2 Buffered Display	1,492
5425 Buffered Display	1,265-1,720
5540 Family—	
5544 Controller (16-port)	6,176
5544 Controller (32-port)	8,038
5546 Controller (6-port)	3,518
5546 Controller (12-port)	3,727
5548-12 Display (w/Data Entry Keyboard)	1,411
5548-22 Display (w/Data Entry Keyboard)	1,785
5548-25 Display (w/Data Entry Keyboard)	2,095
5549 Color Display (w/Data Entry Keyboard)	2,573■

AT&T Dataspeed 40 Service

AT&T, through its Bell System operating companies and certain other concurring carriers, offers the Dataspeed 40 service, which is composed of special configurations of the Teletype 40 display terminal family. (See Report C25-830-101 for equipment details.) AT&T offers interstate Dataspeed 40 service for both Private Line Service under AT&T Long Lines Tariff 260 and

Dataphone Digital Service under Tariff 267. Full details of these services are presented in Reports C31-046-351 and C31-046-251 respectively. The available offerings and rates are presented below. (Contact your local telephone company for availability and cost of intrastate Dataspeed 40 service.)

USOC Number**		Monthly Charge	Installation Charge
Asynchronous Dataspeed 40 Terminal Equipment (Teletype Model 40/1, 40/2, or 40/3)			
4TC*	Keyboard Display unit (Teletype 4025 KD) with basic features; includes 24-line display buffer and pedestal mount	\$170	\$214
4D1*	Teletypewriter compatibility features for 40/2 operation; requires item 4T3, 4T4, or 4T5	13.45	—
4D2*	Key control for selection between two transmission modes	9.20	—
	Keyboard Display Printer unit (Teletype 4025 KDP) with basic features; includes 24-line display buffer and friction-feed printer:		
4TF*	Printer under display, pedestal mount	258	246
4TH*	Print adjacent to display, pedestal mount	258	246
	Additional display buffer storage for items 4TC, 4TF, and 4TH:		
4T1*	48-line display buffer	12.65	50.40
4T2*	72-line display buffer	25.20	50.40
	Additional editing features; includes protected format, tabulation, highlighting, substitute character, and message preparation alarm; for items 4TC, 4TF, and 4TH:		
4T3*	24-line display buffer	22.70	126
4T4*	48-line display buffer	26.50	126
4T5*	72-line display buffer	30.20	126
4TG*	Receive-Only Printer (Teletype 4011 ROP), friction feed	158	183
4T9*	Buffer for item 4TG, 1000 characters	12.65	126
4TJ*	KD to ROP or Wide Platen Printer (132-col. tractor feed) Connection Arrangement	8.80	190
	Selective Calling Station Arrangement:		
DJO*	For 1050/1200 bps transmission	75.60	—
DJW*	For 2400 bps transmission; requires item 4T3, 4T4, or 4T5	122	—
DJX*	Individual Receiver Selection; for DK or ROP	40.40	122
DJB*	Third Call Directing Code Recognition	3.80	50.40
DJ8*	Message Waiting Alarm and Parity Check on Roll Call	6.30	50.40
4TS*	ROP Item Selector; responds to two types of codes to permit an ROP to receive signals from the line at 1200 bps	133	441
	Each subsequent code change	—	478
Synchronous Dataspeed 40 Terminal Equipment (Teletype Model 40/4)			
	Keyboard Display Unit (Teletype 4026 KD):		
4TO	Display unit with attached keyboard	83.50	61.15
4TP	Display unit with detached keyboard	83.25	61.15
4TQ	Upper/lower case	3.65	48.95
4EC	Single Display Station; requires item 4ED	180	306
4ED	Binary Synchronous line protocol	29	—
4TR	Printer, 80-column friction feed	125	61.15
4ST	Printer, 132-column tractor feed	214	201
4OC	Printer, 80-column noise-reduced friction feed	151	184
	Station Cluster Controller (Teletype 4001 SCC); accommodates up to six Device Cluster Controllers (item 4TV); requires item 4TM:		
4TT	For Device Cluster Controllers one to four	220	122
4TU	For Device Cluster Controllers five and six	24.45	48.95
	Device Cluster Controller (Teletype 4002 DCC); accommodates up to four KD's (item 4TO or 4TP or five Printers (item 4TR) in any combination of six devices; requires item 4TM and at least one 4TO or 4TP:		
4TV	For one or two devices	192	122
4TW	For four additional devices	40.40	48.95
	Mini Cluster Controller (Teletype 4003 MCC); requires item 4TM and at least one 4TO or 4TP; accommodates up to three devices:		
4TX	For one KD and zero or one Printer	226	122
4TY	For one additional KD or one additional Printer	25.70	48.95
4EACM	Keyboard Display Amplifier (Teletype KDA); for use with item 4TO; supports a KD at up to 250 cable feet from a DCC or MCC; cabinet mounted	36.70	208
4EANM	Keyboard Display Amplifier (Teletype KDA); for use with 4TO or 4TP; supports a KD at up to 350 cable feet from a DCC or MCC; in-line mounted	41.60	208
4EB	Extension Arrangement; extends maximum distance supported by a KDA (item 4EACM or 4EANM) by 250 cable feet	10.40	48.95
4D3	Keyboard Display Lock; for item 4TO	4.30	30.60
4NC	External Numeric Cluster Keyboard; for item 4TO, 4TP, or 4EC	7.95	91.80

AT&T Dataspeed 40 Service

<u>USOC Number**</u>		<u>Monthly Charge</u>	<u>Installation Charge</u>
Dataspeed 40 Options			
4TL	Tractor Feed for an ROP or KDP printer	\$29	\$ —
4TM	Additional Pedestal	8.80	50.40
4TN	Paper Accumulating Rack	1.55	50.40
4T7	Paper Winder	8.20	50.40
4T8	Copy Holder	3.50	50.40
4PP	Printer arrangement for grade B 16-pound, 3-ply rolled paper with 8- or 10-pound carbon paper interleaved and single-copy fanfold paper	12.20	48.95
	Environmental Enclosures for use with:		
4EK	KD with detached keyboard (item 4TP)	61.15	122
4EP	Printer (item 4ST or 4TR) equipped with item 4TL	31.85	122

* For Tariff 260 only.

**USOC—Uniform Service Order Code. ■

AT&T E4540 Series Display Terminals



The E4549 is a four-color display terminal available in two models. The E4549-42 provides a 1,920-character display capacity; the E4549-43 provides selectable 1,920- and 2,560-character display capacities. Both models include a 13-inch screen and choice of detachable keyboards.

MANAGEMENT SUMMARY

UPDATE: This report reflects the removal of the Teletype name from all AT&T display terminals. Teletype (based in Skokie, IL) has been absorbed into the Computer Systems Division of AT&T Information Systems; it remains the manufacturing arm of AT&T-IS.

Since 1930, Teletype Corporation was responsible for manufacturing and supplying the Bell System's teletypewriter equipment and, in recent times, computer display terminals and printers. The Bell System used Teletype products internally and resold them to end users on a tariffed basis. In addition, Teletype marketed its own products on a nontariffed basis directly to end users, and through a large network of dealers, distributors, leasing companies, and OEMs.

The AT&T divestiture and deregulation have changed most of that. Teletype has been absorbed into the Computer Systems Division of AT&T Information Systems, and its Teletype and Dataspeed labels have disappeared from view. The company was known for a while as "AT&T Teletype," but now products coming out of Skokie display only the AT&T logo. (In January 1986, AT&T announced that it will phase out the manufacturing of data terminals and teleprinters at the Skokie plant over the next two years.) Some AT&T-IS terminal equipment is obtained from other OEMs, as well.

The E4540 Series (formerly known as the 5540) is a family of IBM 3270-compatible products. The E4540 components are not plug-compatible with IBM's products; in other

The E4540 Series is AT&T's third generation of IBM 3270-compatible display terminal products, replacing the AT&T Teletype 4540 product line. An enhanced version of the older 4540 family, the E4540 line features local and remote cluster controllers, monochrome and color display terminals, and printers. As part of the product line, AT&T also makes available an asynchronous host adapter and a personal computer attachment feature. E4540 displays and printers attach to E4540 controllers via twisted-pair wire or coaxial cable.

MODELS: E4544 and E4546 Controllers; E4548-12 and E4548-25 Display Terminals; E4549-42 and E4549-43 Color Display Terminals.

DISPLAY: The E4548-12 contains a 12-inch display screen; the E4548-25, E4549-42, and E4549-43 feature a 13-inch screen. The E4548-25 features 80/132-column display capability; the E4548-12, E4549-42, and E4549-43 feature 80-column display capability only. All models have a tiltable display.

KEYBOARD: A variety of IBM 3270-style keyboard layouts are available for the E4540 Series displays, including typewriter and data entry; all keyboard models feature 24 function keys. Keyboards for the E4540 displays are detachable, and are available in both high-profile and low-profile designs.

COMPETITION: IBM, ITT Courier, Telex, Lee Data, Memorex, and several others.

PRICE: Purchase prices for the E4540 Series terminals range from \$1,495 to \$2,265; E4540 Series controllers are priced from \$4,000 to \$16,300.

CHARACTERISTICS

VENDOR: AT&T Information Systems, 1 Speedwell Avenue, Morristown, NJ 07960. Telephone (201) 898-2000. In Canada: AT&T Canada, 1500 Don Mills Road, Ontario M3B 3K4. Telephone (416) 449-4300.

DATE OF ANNOUNCEMENT: E4544, E4546, and E4548—April 1983; E4549—May 1984.

DATE OF FIRST DELIVERY: E4544, E4546, and E4548—Third quarter 1983; E4549—May 1984.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: AT&T Information Systems.

MODELS

The E4540 Series is a family of IBM 3270-compatible display terminals, controllers, and printers. As with the

AT&T E4540 Series Display Terminals

► words, they cannot be mixed in with IBM devices in the same configuration.

The E4540 family consists of local and remote cluster controllers (E4544 and E4546), monochrome displays (E4548-12 and E4548-25), color displays (E4549-42 and E4549-43), and a line of printers. Printers and displays attach to the controllers via twisted-pair wire or coaxial cable. Recent additions to the E4540 line include the E4540 Asynchronous Adapter, that allows E4540 terminal users to access asynchronous hosts via the keyboard; and the SSI IRMA Emulator, that provides for PC attachment (AT&T PC 6300, IBM PC/PC XT/PC AT, and IBM-compatible PCs) to an E4540 controller.

The E4544 is an IBM 3274-compatible control unit. Available in 16-port and 32-port versions, the E4544 is a floor-standing unit. The E4546 is an IBM 3276-compatible, tabletop control unit available in 6-port and 12-port versions. Both controller models provide 5¼-inch dual diskettes for software storage. Users can switch from BSC to SNA/SDLC line protocol by changing disks.

The E4548-12 Display Terminal is an IBM 3278 Model 2 and 3178-compatible unit containing a 12-inch display and a 1,920-character (24 lines by 80 columns) display capacity. The E4548-25 is compatible with the IBM 3278 Model 5; it features a 13-inch screen while providing selectable display capacities of 1,920 and 3,564 (27 lines by 132 columns) characters. The E4549-42 is a 4-color display that includes a 13-inch screen and a display capacity of 1,920 characters; the E4549-43 also contains a 13-inch screen, but includes selectable 1,920- and 2,560-character (32 lines by 80 columns) display capacities. All of the E4540 displays can be configured with a choice of keyboards, including typewriter, typewriter with external numeric pad, and data entry styles (all of which contain 24 programmable function keys). The keyboards can be chosen with high- or low-profile designs.

AT&T also provides a variety of character matrix and full-character belt printers for use as part of an E4540 Series configuration.

COMPETITIVE POSITION

Prior to AT&T's divestiture, Teletype Corporation possessed what was, essentially, a built-in market. The company's products were sold primarily to the Bell Operating Companies (BOCs) for their internal use or for resale to their customers. At that time, as much as 40 percent of Teletype's revenues were attributed to their business with the BOCs. As part of Computer Inquiry II, Teletype was prohibited from selling new premises equipment to users during 1983. Also as part of Computer Inquiry II, Teletype was prohibited from selling its products directly to end users. With the AT&T divestiture, the BOCs were divested from AT&T, thus loosening, to some extent, Teletype's hold on them. Teletype remains a part of AT&T, while the

► older AT&T Teletype 4540 family, the E4540 products operate under both BSC and SDLC line protocols. Members of the E4540 line include:

- E4544—a control unit that is compatible with the IBM 3274 and is available in 16- and 32-port configurations, as well as in remote and local versions;
- E4546—a remote control unit that is compatible with the IBM 3276 and is available in 6- and 12-port versions;
- E4548-12—a monochrome display terminal that is compatible with the IBM 3178 and 3278 Model 2; includes a 12-inch display screen with a 1,920-character capacity and a detachable keyboard;
- E4548-25—a monochrome display terminal that is compatible with the IBM 3278 Model 5; includes a 13-inch display screen with selectable 1,920- and 3,564-character capacities and a detachable keyboard;
- 4549-42—a 4-color display terminal that is compatible with the IBM 3279 Model S2A; includes a 13-inch screen with a 1,920-character capacity and a detachable keyboard; and
- 4549-43—a 4-color display terminal that is compatible with the IBM 3279 Model 3X; includes a 13-inch display screen with selectable 1,920- and 2,560-character capacities and a detachable keyboard.

AT&T also provides a variety of printers for use with the E4540 family, including serial and line printers.

TRANSMISSION SPECIFICATIONS

For the E4540 Series terminals, transmission is synchronous, in half- or full-duplex, at speeds up to 9600 bits per second (except for the E4544 Local Cluster Controller, which supports speeds up to 1M bps). Both BSC and SNA/SDLC protocols are supported. The E4544 remote controllers are compatible with the IBM 3274 "C" models, while the E4546 controllers are compatible with the IBM 3276 remote controller. The following SNA descriptors are supported: Physical Unit (PU) Type 2, Logical Units (LU) Types 1, 2, and 3, and Format Identification (FID) Type 2. Displays and printers connect to the control unit via 4-pair twisted wire or coaxial cable, at distances up to 5,000 feet (up to 2,000 feet only for the line printer models). Over nonswitched transmission facilities, half-duplex terminal operation is supported.

The E4544 and E4546 remote controllers can attach to the following IBM host computers: S/360, S/370, 3030, 3081, and 4300 via a channel-attached 2701, 2703, 3704, or 3705 communication processor or front-end; S/370 Models 115, 125, 135, and 138 via integrated adapters. A single host processor can be attached. The E4544 local controller communicates with the IBM S/370, 43XX, 303X, or 308X hosts in SNA or Extended 3272 modes.

Communications with asynchronous host computers is enabled via the AT&T E4540 Asynchronous Adapter. The adapter provides for full-duplex asynchronous transmission at 300, 1200, or 2400 bps. The E4540 Asynchronous Adapter provides eight asynchronous modem ports.

When operating in asynchronous mode, the E4540 remote controllers use the SSI/EIA Multiplexer attachment. The multiplexer connects to any port on a remote controller and provides eight RS-232-C interfaces to asynchronous modems. The E4544-31 SB can accommodate two multiplexers; all others can accommodate one.

AT&T E4540 Series Display Terminals

▷ BOCs are now free to purchase equipment from whatever source they prefer.

All of this forced Teletype (which soon became AT&T Teletype) to change its strategy in the new, deregulated, marketplace. As a result, the company poured more money into research and development, beefed up marketing, cut manufacturing costs in order to reduce prices, and established new distribution channels.

In 1985, AT&T Teletype became a wholly owned subsidiary of the Computer Systems Division of AT&T Information Systems. All sales and marketing for Teletype terminals were relocated to AT&T-IS headquarters in Morristown, New Jersey. Teletype, based in Skokie, Illinois, remains (for the time being) the manufacturing arm for the production of data terminals; however, the Teletype logo will no longer be found on the terminals.

In January 1986, AT&T announced that it will phase out the manufacturing of printers and data terminals at the Teletype plant in Skokie. This move will result in the layoffs of approximately 800 of the 2,000 workers now employed at the former Teletype headquarters. The move comes as part of AT&T Information Systems' planned reduction of 24,000 jobs. The manufacturing of printers and data terminals will be transferred to AT&T's Little Rock, Arkansas facility, which was formerly also a Teletype facility. It would seem that Teletype, as a company, is slowly disappearing. The Teletype name remains a legal entity for trademark, product brand name, and other purposes.

The E4540 Series is AT&T's replacement for the older Teletype 4540 family of IBM 3270 replacement products. The new components are also compatible with the existing Teletype 4540 products, a line which boasts a very large installed base (approximately 300,000) and a high degree of user acceptance in the competitive 3270 replacement market.

Within this market, the E4540 Series competes against IBM, as well as with the 3270 product lines from independent vendors such as Telex, ITT Courier, Memorex, Lee Data, Harris, and several others.

ADVANTAGES AND RESTRICTIONS

Teletype's products have gained a reputation for functionality and reliability, as well as for their rather high price tags. The AT&T E4540 Series terminals retain the functionality offered by their predecessors, but prices have fallen to reflect the realities of competing in a deregulated market. In addition, a variety of enhancements (thus, the E in E4540) have been made in this new family of products. Color terminals, compact monochrome terminals, and a wider variety of printers are now a part of the E4540 product line. In addition, selectable synchronous and asynchronous operation from a single terminal is now possible through the addition of the E4540 Asynchronous Adapter. ▷

▶ DEVICE CONTROL

The E4540 family of components are compatible with the corresponding members of the IBM 3270 Information Display System. The E4540 Series is also compatible with the older AT&T Teletype 4540 family, the company's previous line of IBM 3270-compatible equipment.

The E4540 terminals feature a separate user information/status line, block or underline cursor with selectable blink, and self-test diagnostics. A selector light pen is optional. The displays connect to a cluster controller via twisted-pair wire or coaxial cable at distances up to 5,000 feet.

All software for the E4540 controllers is stored on dual 5¼-inch diskettes; a user can switch from BSC to SDLC protocol by switching disks. The first port on the controller is reserved for the controller console, for communicating with the host and for setting options such as station addresses, configurations, and printer authorization matrix.

The E4540 Asynchronous Adapter allows an E4540 display terminal to access both IBM 3270-compatible networks and asynchronous data bases. The Asynchronous Adapter consists of a small module and a program diskette. The module connects to an E4544 or E4546 remote controller; each module provides the E4540 display terminals connected to the controller with access to eight RS-232-C asynchronous modem ports with line speeds up to 2400 bps. Once the program is downloaded from the diskette, the user of an E4540 display can select synchronous or asynchronous operation by pressing a single key. When in asynchronous mode, the E4540 display is compatible with application programs based on the ANSI X3.64 protocol and Digital Equipment Corporation VT100 and VT52 terminal operation. A horizontal split screen mode is selectable for displaying and interacting with synchronous and asynchronous data simultaneously.

The SSI IRMA Emulator allows an AT&T 6300 personal computer, an IBM PC, PC XT, PC AT, or IBM-compatible PC to attach to an E4540 Series controller. The SSI IRMA Emulator consists of a plug-in circuit card and an emulator program on diskette. The emulation program allows the PC to emulate an E4540 display.

COMPONENTS

E4544-31 SA REMOTE CLUSTER CONTROLLER: A floor-standing control unit that is compatible with the IBM 3274 Control Unit. The E4544-31 SA is based on a 16-bit microprocessor; software is stored on 5¼-inch dual diskettes. The controller provides for the attachment of up to 16 devices (1 display minimum; 8 printers maximum) in a remote cluster. Support for both BSC and SNA/SDLC line protocols is provided by changing diskettes. Built-in local and remote test features are included.

The E4544-31 SA provides for the attachment of E4540 Series display terminals and printers; it does not support attachment of IBM devices.

E4544-31 SB REMOTE CLUSTER CONTROLLER: A floor-standing control unit that is compatible with the IBM 3274 Control Unit (C models). The E4544-31 SB is based on a 16-bit microprocessor; software is stored on 5¼-inch dual diskettes. The controller provides for the attachment of up to 32 (1 display minimum; 8 printers maximum) devices in a remote cluster. Support for both BSC and SNA/SDLC line protocols is provided by changing diskettes. Built-in local and remote test features are included.

The E4544-31 SB provides for the attachment of E4540 Series display terminals and printers; it does not support attachment of IBM devices. ▶

AT&T E4540 Series Display Terminals

➤ Another important trend in the 3270-replacement market is the addition of personal computers to a standard 3270 configuration. With the SSI IRMA Emulator (a version of the industry's most popular micro-mainframe link, the Irma board from DCA), E4540 Series users can connect an AT&T 6300 Personal Computer, an IBM PC, PC XT, or PC AT, or certain IBM-compatible PCs to an E4540 controller.

A disadvantage of the E4540 Series is the product line's lack of plug-compatibility with the IBM 3270 family of products. AT&T E4540 components cannot be mixed in with IBM 3270 components in the same configuration; thus, the product line must be sold as a complete package. AT&T has recently introduced the 6500 Multifunction Communication System, a new generation of 3270-compatible products. The question now would seem to be whether or not AT&T will phase out the E4540 Series in favor of the new 6500 product line. □

➤ **E4544 LOCAL CLUSTER CONTROLLER:** A floor-standing local control unit that can operate in SNA or Extended 3272 modes. The E4544 Local Cluster Controller is based on a 16-bit microprocessor; software is stored on 5¼-inch dual diskettes. It supports up to 32 devices (1 display minimum; 8 printers maximum) in a local cluster.

The E4544 local controller provides for the attachment of E4540 Series display terminals and printers; it does not support attachment of IBM devices.

E4546-31 SA REMOTE CLUSTER CONTROLLER: A tabletop control unit that is compatible with the IBM 3276 Control Unit (it does not include an integral display like the 3276). The E4546-31 SA is based on a 16-bit microprocessor; software is stored on 5¼-inch dual diskettes. The E4546-31 SA provides for the attachment of up to 6 devices (1 display minimum; 5 printers maximum) in a remote configuration. Support for both BSC and SNA/SDLC line protocols is provided by changing diskettes. Built-in local and remote test features are included.

The E4546-31 SA provides for the attachment of E4540 Series display terminals and printers; it does not support attachment of IBM devices.

E4546-31 SB REMOTE CLUSTER CONTROLLER: A tabletop control unit that is compatible with the IBM 3276 Control Unit (it does not include an integral display like the 3276). The E4546-31 SB is based on a 16-bit microprocessor; software is stored on 5¼-inch dual diskettes. The E4546-31 SB provides for the attachment of up to 12 devices (1 display minimum; 6 printers maximum) in a remote configuration. Support for both BSC and SNA/SDLC line protocols is provided by changing diskettes. Built-in local and remote test features are included.

The E4546-31 SB provides for the attachment of E4540 Series display terminals and printers; it does not support attachment of IBM devices.

E4548-12 DISPLAY TERMINAL: A monochrome display terminal that includes a 12-inch (diagonal) display screen with a 1,920-character capacity arranged in a 24-line by 80-column format. A user status line is also available. The E4548-12 is designed for compatibility with the IBM 3178 Display Station. Characters are formed utilizing a 7-by-9 dot matrix, and are displayed in white on a dark background. The 96 EBCDIC/ASCII character set is displayable. The screen features a nonglare finish, brightness control, and is tiltable.

The E4548-12 attaches to the E4540 Series controllers; it does not attach to IBM controllers.

E4548-25 DISPLAY TERMINAL: A monochrome display terminal that includes a 13-inch (diagonal) screen with selectable display capacities of 1,920 (24 lines by 80 columns) or 3,564 (27 lines by 132 columns) characters. A user status line is also available. The E4548-25 is compatible with the IBM 3278 Model 5 Display Station. Display formats are operator- or program-selectable. Characters are formed via a 7-by-9 dot matrix (5-by-7 dot matrix in 132-column mode), and are displayed in white on a dark background. The 96 EBCDIC/ASCII character set is displayable. The screen features a nonglare finish, brightness control, and is tiltable.

The E4548-25 attaches to the E4540 Series controllers; it does not attach to IBM controllers.

E4549-42 COLOR DISPLAY TERMINAL: A 4-color display terminal that includes a 13-inch (diagonal) screen with a 1,920-character (24 lines by 80 columns) display capacity. A user status line is also available. The E4549-42 is compatible with the IBM 3279 Model S2A. Characters are formed using a 7-by-9 dot matrix. Displayable colors are blue, green, red, and white. The 96 EBCDIC/ASCII character set is displayable. The screen features a nonglare finish, brightness control, and is tiltable.

The E4549-42 attaches to the E4540 Series controllers; it does not attach to IBM controllers.

E4549-43 COLOR DISPLAY TERMINAL: A 4-color display terminal that includes a 13-inch (diagonal) screen with selectable display capacities of 1,920 (24 lines by 80 columns) or 2,560 (32 lines by 80 columns) characters. A user status line is also available. The E4549-43 is compatible with the IBM 3279 Model S2A, as well as the basic versions of the IBM 3279 Models 3X. Characters are formed using a 7-by-9 dot matrix. Displayable colors are blue, green, red, and white. The 96 EBCDIC/ASCII character set is displayable. The screen features a nonglare finish, brightness control, and is tiltable.

The E4548-43 attaches to the E4540 Series controllers; it does not attach to IBM controllers.

E4540 KEYBOARDS: The E4548 display terminals are configured with the T5 keyboard as standard, which is a typewriter-style keyboard available in either high- or low-profile designs. Also available are two additional keyboards: a low-profile keyboard with a typewriter-style layout, and a low-profile keyboard with a data entry layout.

All keyboards are detached, plug-compatible with each other, and feature an IBM 3270-type layout. All keyboard styles feature 24 programmable function keys; up to 12 of the keys (PF1 through PF12) can be executed via a single keystroke. All alphanumeric keys repeat, and audible key click is selectable; tactile feedback is standard. The keyboard is connected to the display monitor via a coiled cord. When not in use, the keyboard stores on a shelf underneath the display (monochrome displays only). The low-profile keyboards feature a design that meets the 30 mm DIN height standard, and include tilt adjustments of 5, 8, or 12 degrees.

T5 High-Profile Keyboard—an 87-key keyboard with a typewriter-style key layout and a 12-degree (70 mm) stepped keyrow profile.

T5 Low-Profile Keyboard—an 87-key keyboard with a typewriter-style key layout and a 5-degree (30 mm) stepped keyrow profile. ➤

AT&T E4540 Series Display Terminals

► **Low-Profile Typewriter Keyboard**—an 87-key keyboard with a typewriter-style key layout, an external numeric pad, and a 5-degree (30 mm) stepped keyrow profile.

Low-Profile Data Entry Keyboard—an 87-key keyboard with a data entry-style key layout and a 5-degree (30 mm) stepped keyrow profile.

E4540 PRINTERS: A variety of character and line printers are available for attachment to the E4540 Series controllers. The printers use the AT&T Standard Serial Interface (SSI) signaling method for communications with the E4544 and E4546 controllers, and operate with data streams in the 3270 Data Stream Compatibility (DSC) format, Logical Unit Type 3, or the SNA Character String (SCS) format, Logical Unit Type 1.

The E4540 Series low-speed character matrix printer (E45AP102AAA) prints at 10 cpi and 6 lpi, handling forms 3 to 15 inches wide and 11 inches long. The high-speed character matrix printer (E45AP201AAA) prints at 5, 10, or 16.7 cpi and 6 or 8 lpi; forms can be 3 to 16 inches wide, and up to 14 inches long. The Letter Quality Printer prints at 10, 12, or 15 cpi and 3, 6, or 8 lpi.

E45AP102AAA Matrix Printer—a floorstanding character printer with a print speed of 30 cps. Printing is bidirectional, using a 4-by-7 dot matrix and a 132-column tractor feed mechanism. The upper-/lowercase EBCDIC character set is used.

E45AP201AAA Matrix Printer—a tabletop character printer with print speeds of 200 or 340 cps. Printing is bidirectional, using a 4-by-7 dot matrix and a 132-column tractor feed mechanism. The upper-/lowercase EBCDIC character set is used.

Letter Quality Printer—a tabletop daisywheel printer with a print speed of 55 cps. A form-length dial, top-of-form feed switch, reset switch, alarm/clear switch, and word proportional spacing switch are standard. The upper-/lowercase EBCDIC character set is used.

The E4540 Series line printers are full-character, impact belt printers which print at 10 cpi and 6 lpi. Forms can be from 4 to 9.5 or 15 inches wide, and 3.75, 5.5, or 11 inches long.

E4011-3BXO Belt Printer—a tabletop belt printer with print speeds of 220 or 300 lpm. An 80-column friction feed mechanism is standard; the monospace EBCDIC character set is used.

E4011-3EXO Belt Printer—a tabletop belt printer with print speeds of 220 or 300 lpm. An 80-column friction feed mechanism is standard; the upper-/lowercase EBCDIC character set is used.

E4011-4GXO Belt Printer—a tabletop belt printer with print speeds of 220 or 300 lpm. An 80-column tractor feed mechanism is standard; the monospace EBCDIC character set is used.

E4011-4JXO Belt Printer—a tabletop belt printer with print speeds of 220 or 300 lpm. An 80-column tractor feed mecha-

nism is standard; the upper-/lowercase EBCDIC character set is used.

E4011-4LXO Belt Printer—a tabletop belt printer with print speeds of 220 or 300 lpm. A 132-column tractor feed mechanism is standard; the monospace EBCDIC character set is used.

E4011-4MXO Belt Printer—a tabletop belt printer with print speeds of 220 or 300 lpm. A 132-column tractor feed mechanism is standard; the upper-/lowercase EBCDIC character set is used.

E4011-4AXN Belt Printer—a floorstanding belt printer with print speeds of 220 or 300 lpm. An 80-column tractor feed mechanism and forms access are standard; the monospace EBCDIC character set is used.

E4011-4DXN Belt Printer—a floorstanding belt printer with print speeds of 220 or 300 lpm. An 80-column tractor feed mechanism and forms access are standard; the upper-/lowercase EBCDIC character set is used.

E4504-1CEF Belt Printer—a floorstanding belt printer with print speeds of 220 or 300 lpm. A 132-column tractor feed mechanism is standard; the monospace EBCDIC character set is used.

E4504-1CFF Belt Printer—a floorstanding belt printer with print speeds of 220 or 300 lpm. A 132-column tractor feed mechanism is standard; the upper-/lowercase EBCDIC character set is used.

E4540 ASYNCHRONOUS ADAPTER: Diskette-resident emulation software that allows an E4540 Series display terminal to emulate Digital VT100 asynchronous terminal operation and normal synchronous operation. The E4540 Asynchronous Adapter consists of a small module (which connects to a BSC cluster controller) and a program diskette. The module provides the displays connected to the controller with access to eight asynchronous modem ports; two E4540 Asynchronous Adapter modules may be used with 32-port controllers.

SSI IRMA EMULATOR: Allows a personal computer to attach to an E4540 Series controller, emulating an E4540 Series display terminal. The AT&T 6300 Personal Computer, IBM PC, PC XT, and PC AT, or IBM-compatible PCs may be attached. The SSI IRMA Emulator consists of a plug-in circuit card (for the PC) and emulation software on a diskette. The SSI IRMA is an OEMed version of the Digital Communications Associates (DCA) Irma product.

PRICING

The AT&T E4540 Series components are available for purchase only; quantity discounts are available.

Maintenance service for the E4540 Series components is available from AT&T Information Systems field personnel. Maintenance charges are billed on a monthly basis; monthly rates vary depending on user location. The maintenance rates shown in this report are the maximum maintenance charges. ►

AT&T E4540 Series Display Terminals

EQUIPMENT PRICES

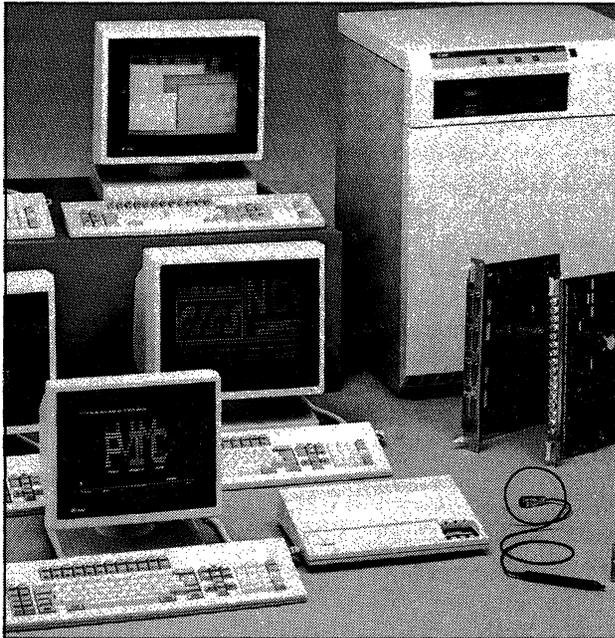
		Purchase Price (\$)	Monthly Maintenance (\$)
E4544-31 SA	Remote Cluster Controller	6,800	33
E4544-31 SB	Remote Cluster Controller	12,350	34
E4544	Local Cluster Controller	16,300	65
E4546-31 SA	Remote Cluster Controller	4,000	30
E4546-31 SB	Remote Cluster Controller	4,400	31
E4548-12TA	Display Terminal; w/low-profile T5 keyboard	1,495	12
E4548-12TF	Display Terminal; w/high-profile T5 keyboard	1,695	12
E4548-25TA	Display Terminal; w/low-profile T5 keyboard	2,065	12
E4548-25TF	Display Terminal; w/high-profile T5 keyboard	2,265	12
E4549-42	Color Display Terminal; requires keyboard	1,840	—
E4549-43	Color Display Terminal; requires keyboard	1,840	—
T5	High-Profile Keyboard	425	—
T5	Low-Profile Keyboard	225	—
	Low-Profile Typewriter Keyboard; w/external numeric pad	335	—
	Low-Profile Data Entry Keyboard	225	—
E45AP102AAA	Matrix Printer	2,498	17
E45AP201AAA	Matrix Printer	3,868	32
	Letter Quality Printer	4,950	—
E4011-3BXO	Belt Printer	3,973	28
E4011-3EXO	Belt Printer	3,973	28
E4011-4GXO	Belt Printer	4,208	28
E4011-4JXO	Belt Printer	4,208	28
E4011-4LXO	Belt Printer	5,170	30
E4011-4MXO	Belt Printer	5,170	30
E4011-4AXN	Belt Printer	4,785	28
E4011-4DXN	Belt Printer	4,785	28
E4504-1CEF	Belt Printer	5,595	30
E4504-1CFF	Belt Printer	5,595	30
E4540	Asynchronous Adapter	1,500	2
	SSI IRMA Emulator	1,045	11
	SSI/EIA Multiplexer	1,500	2 ■

AT&T 6500 Multifunction Communication System

datapro ANALYSIS

UPDATE: *The 6500 Multifunction Communication System is AT&T's newest IBM 3270 replacement product line. Based on the modular 6544 controller, the 6500 System provides access to both synchronous and asynchronous hosts. AT&T provides a variety of system-compatible and plug-compatible display terminals for use with the 6500 System in both monochrome and color versions; multitasking capability is also available. Personal computing capability can be added to the system via standard MS-DOS personal computers (PCs), including the AT&T 6300 and 6300 Plus.*

Two years ago, AT&T introduced the 6500 Multifunction Communication System, a family of products that provides compatibility with the synchronous IBM 3270 system, as well as asynchronous host computers and functions. In September 1987, AT&T announced several enhancements that expand the system's functionality and increase its capabilities. Included in the announcement



AT&T's 6500 Multifunction Communication System provides multiple host access, as well as asynchronous/synchronous operation. A variety of displays and printers are available for use with the 6500 System, which is based on the modular 6544 controller.

VENDOR: AT&T, 1 Speedwell Avenue, Morristown, New Jersey 07960. Telephone (201) 898-2000.

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

MODELS: 6544 Multifunction Communication Controller; 6518 Basic Function Display; 6528 and 6529 Standard Displays; 6538 and 6539 Multitasking Displays; 6578, 6579, 6580, and 6591 Plug-Compatible Displays; 6571 and 6581 Color Graphics Printer; and the 2-N-1 Adapter.

KEYBOARD: All models include a detachable 122-key keyboard featuring a low-profile design.

ADAPTER: The 2-N-1 Adapter is for use with AT&T 6300, 6310, or compatible personal computers.

COMPETITION: IBM, Telex, ITT Courier, Memorex, Lee Data, and several others.

PRICING: The basic 6544 controller is priced at \$7,880; various modules for the controller range in price from \$2,215 to \$3,920. Display terminals range in price from \$1,950 to \$2,895. The prices of the plug-compatible displays range from \$1,165 to \$1,705. The 2-N-1 Adapter costs \$1,045.

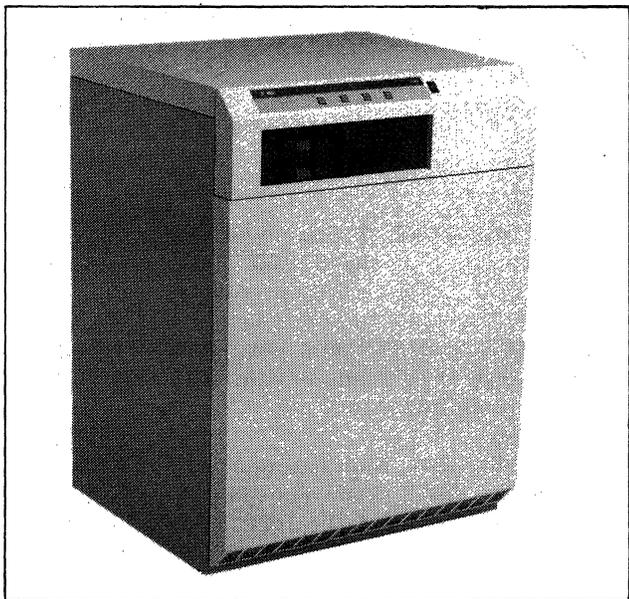
REPORT HIGHLIGHTS:	PAGE
Product Evaluation	502
Market Position	503
SPECIFICATIONS	504
PRICING	508

are five new plug-compatible displays, an optional plug-compatible controller module, and a local channel-connection option. The company also announced increased asynchronous access capabilities.

AT&T has long been a leader in the IBM 3270-compatible terminal market, with well over 300,000 terminals installed. The company's products include the 40 Series, the 4540 family, and the current E4540 line. Each product line provides basic, functional compatibility with corresponding IBM 3270 products.

The 6500 product line provides access to multiple hosts from the same display terminal. Components of the 6500 Multifunction Communication System include the 6544

AT&T 6500 Multifunction Communication System



Shown above is the outside view of the 6544 controller. The backplane of the controller contains 12 expansion slots for connecting as many as 3 synchronous hosts, 32 synchronous devices, and 32 asynchronous devices.

controller; 6518, 6528, 6538, 6578, 6580, and 6591 monochrome displays; 6529, 6539, and 6579 color displays; and the 6571 and 6572 color printers. The 6500 family also accommodates the older AT&T 4540 and E4540 displays; AT&T 4400 family asynchronous displays; and a variety of personal computers, including the AT&T 6300 and 6300 Plus PCs and the IBM PC/XT/AT. The 6500 components operate over standard twisted-pair telephone wire or previously installed coaxial cable.

The 6544 Multifunction Communication Controller is the central component of the 6500 System. It supports up to 32 synchronous devices, up to 32 asynchronous devices, and 12 module slots, which hold the following:

- Synchronous Host Module—provides synchronous ports for the access of 3270 hosts (Bisync or SNA). This module supports a 19.2K bps transmission speed and provides access to up to three host computers, depending upon their speed and protocol.
- Synchronous Device Interface Module—provides for the attachment of up to 16 synchronous displays, printers, or PCs via twisted-pair wire and supports up to four modules.
- Asynchronous Host/Protocol Conversion Module—provides for connection of up to eight asynchronous hosts or terminals; protocol conversion allows asynchronous terminals to access synchronous hosts and supports up to two modules.

- X.25 Interface Module—provides a connector for IBM-compatible hosts supporting packet switched protocols.
- Local Channel Interface Module—provides connection for IBM mainframe byte multiplexers, block multiplexers, or selector channel configurations in which the 6544 is within 200 cable feet of the host.
- Plug-Compatible Device Interface Module—provides connection of up to 16 synchronous devices to the 6544 controller.

The 6500 family includes five displays: the 6518, a basic synchronous display; the 6528 monochrome and 6529 color displays, which provide a split-screen capability so that the user can display one synchronous and one asynchronous session simultaneously; and the 6538 monochrome and 6539 color multitasking displays, which provide up to four multitasking windows in any combination of synchronous and asynchronous sessions. In asynchronous mode, the 6528/6529 and 6538/6539 displays emulate the Digital Equipment Corporation VT220 display terminal. The 6500 display keyboards are detached and feature a low-profile design.

AT&T also offers four display terminals that are plug-compatible with 3270 controllers. The coax displays offer all the ergonomic features of the units listed above and also support “hot-key” capabilities when attached to the 6500. Model 6578 is an alternative to the IBM 3278 and 3178 displays. Model 6579 is an alternative to the IBM 3279, 3179, and 3192C display terminals. Model 6580 can be used instead of IBM 3129D and 3180-1 displays, and Model 6591 is an alternative to the IBM 3191 display.

The Single Session Irma option adds personal computing to the 6500 System by providing support for the AT&T 6300 and 6300 Plus PCs, as well as the IBM PC/XT/AT and other IBM-compatible PCs. The Single Session Irma option is compatible with DCA’s Irma product and consists of a feature card (which plugs into an expansion slot on the PC) and software.

The 2-N-1 adapter, for use with AT&T 6300, 6310, or compatible PCs, is a PC-based software/hardware feature that provides seven concurrent windows: four multisession windows, two notepads, and one PC session.

The 6500 family components can communicate with a variety of host computers, including the IBM S/360, S/370, 303X, 308X, 43XX, and IBM plug-compatible mainframes (PCMs) from various vendors.

PRODUCT EVALUATION

The 6500 Multifunction Communication System’s key feature, reflected in its name, is multifunctionality. The 6500 System provides multihost access, both to asynchronous and synchronous computer systems. In addition, a

AT&T 6500 Multifunction Communication System

6500 configuration can include color and monochrome multitasking displays, plug-compatible displays, personal computers, printers, adapters, and older AT&T 4540 and E4540 displays. AT&T's 6500 display terminals offer a variety of features and capabilities not found on previous AT&T displays. Particularly interesting are the 6538 monochrome and 6539 color multitasking systems, which can offer up to four multitasking windows that provide simultaneous access to four distinct computer sessions in any combination of synchronous and asynchronous applications. Currently, IBM offers this capability only on its 3270-PC, which is roughly three times the cost of the 6539.

The key to the multifunctional capabilities of the 6500 System is the 6544 controller. The 6544 operates as a standard IBM 3274-type controller; it can also be upgraded, via add-on modules, to provide support for three synchronous host communications ports, one high-speed (64K bps) synchronous port, eight asynchronous hosts and terminals, and X.25 networks. The 6544 controller contains 12 module slots and can be expanded as a user's communications requirements grow. A major benefit of the 6500 System is its ability to access both synchronous and asynchronous hosts from a single terminal. This is a benefit currently found only on Lee Data's Series 400 products. Users have eagerly awaited IBM's introduction of a new-generation 3274 controller supporting many of the same capabilities found on the 6544; AT&T has beaten IBM to the punch this time.

The 6500 System puts AT&T on a strong competitive level in the 3270 market; however, since the market has been dominated for so long by IBM, AT&T is still in a position of scrambling for a market share.

MARKET POSITION

Over the years, AT&T's former subsidiary, Teletype, built up a large installed base of IBM 3270-compatible terminals; the company estimates that there are some 300,000 terminals now installed, including the 40, 4540, and E4540 families. Prior to AT&T's divestiture, Teletype had what amounted to a built-in market for its products, selling primarily to the Bell Operating Companies (BOCs) for their internal use or resale to their customers. As much as 40 percent of Teletype's business at that time was attributed to the company's relationship with the BOCs.

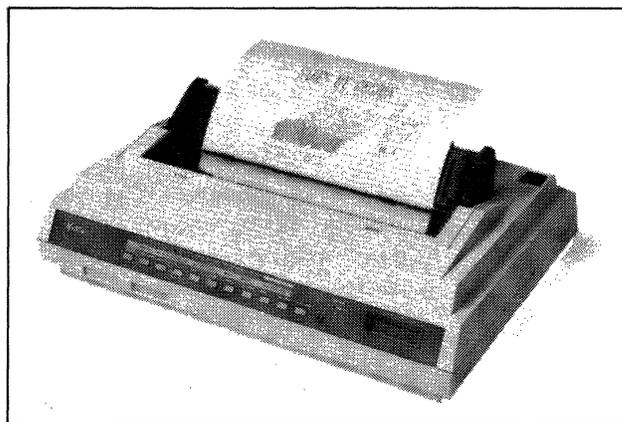
Divestiture has caused a number of changes, particularly to Teletype. First, the company lost its captive market. Then came changes to Teletype itself. The company's name was officially changed to AT&T Teletype Corporation. In 1985, AT&T Teletype became a wholly owned subsidiary of the Computer Systems Division of AT&T

Information Systems, with all sales for Teletype-manufactured products being moved to AT&T headquarters in New Jersey and product management folded into a DTE division of the Computer Systems Division. The Teletype name remains a legal entity for trademark, product brand name, and other purposes; as a company, however, Teletype Corporation has been swallowed up by AT&T.

The 6500 Multifunction Communication System is AT&T's most comprehensive (and ambitious) foray into the 3270 replacement market. The product line conforms to two important trends in the market:

- Integration of personal computing capabilities into the 3270 cluster; and
- Access to multiple hosts, including asynchronous computers.

The 6500 product line places AT&T in a strong position to compete with IBM, as well as other 3270-compatible vendors, including Telex, ITT Courier, Memorex, Lee Data, and Harris. At one time, it was enough to offer 3270-compatible controllers, terminals, and printers at a lower price than IBM. IBM, however, has moved to protect its huge and lucrative 3270 installed base by introducing a generation of products that provide a number of new and attractive features at considerably lower prices. The competitors, including AT&T, have countered by adding functionality to their own product lines and lowering prices even further. A number of vendors have withdrawn from this market, unable or unwilling to match IBM's moves. The remaining participants will vie with IBM for what continues to be a growing and profitable market segment.



The 6572 Printer is a serial, dot matrix color printer that prints at 100 cps in near letter quality or at 400 cps in draft quality. The unit's multicolor ribbons support four- or seven-color printing.

AT&T 6500 Multifunction Communication System

SPECIFICATIONS

MODELS: 6544 Multifunction Communication Controller; 6518 Basic Function Display; 6528 and 6529 Standard Displays; 6538 and 6539 Multitasking Displays; 6578, 6579, 6580, and 6591 plug-compatible displays; 6571 and 6581 Color Graphics Printer; and the 2-N-1 Adapter.

DATE OF ANNOUNCEMENT: November 1985; some components announced in September 1987.

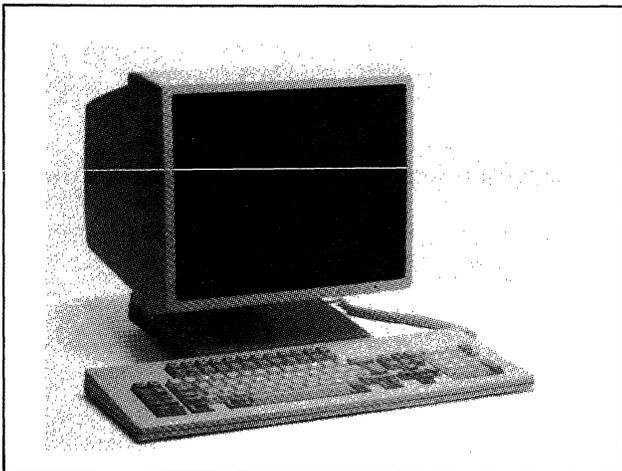
DATE OF FIRST DELIVERY: December 1985; the 2-N-1 Adapter and all plug-compatible displays were scheduled for availability in November 1987, with the exception of the 6591, which will be available in April 1988.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: AT&T.

SYSTEM COMPONENTS

6544 MULTIFUNCTION COMMUNICATION CONTROLLER: The 6544 controller supports up to 3 synchronous hosts, 32 synchronous devices, and 32 asynchronous devices or hosts, depending on how it is configured. Connection to the 6544 is through AT&T's Standard Serial Interface (SSI) unshielded twisted-pair wire that is compatible with the AT&T Premises Distribution System (PDS). Devices can be located up to 5,000 feet from the controller. For users with coaxial cable already installed, coaxial adapters are available to connect devices to the 6544 via coax. The basic 6544 contains a Main Processor Module, a dual diskette drive for loading software, and 14 module slots, 12 of which are available for add-on expansion modules. The basic 6544 configuration provides



The Model 6579 plug-compatible display station, announced in September 1987, is a \$1,705 unit featuring a 14-inch color monitor and a 122-key keyboard. The 6579 was designed to be a replacement for the IBM 3279, 3179, and 3192C displays.

access to a single synchronous host computer through a single 6500 System display. Add-on expansion modules are available to provide additional multifunctional features. The following expansion modules are available.

Synchronous Host Module—an add-on expansion module that provides simultaneous access to more than one synchronous host. The 6500 System supports up to three of these modules, operating at a maximum or aggregate speed of 38.4K bps, but only two of the three can support Bisync and/or SNA/SDLC protocols. For example, this allows two ports using the Bisync (or SDLC) protocol to operate at 19.2K bps, but if a third 19.2K bps Bisync (or SDLC) port is needed, two synchronous host modules are required. The Synchronous Host Module may also support one SNA port operating at either 56K or 64K bps. At either of these higher speeds, only one port is used per card. Two Synchronous Host modules are needed in situations when there are two SNA hosts operating at higher speeds.

Synchronous Device Interface Module—an add-on expansion module that provides for the attachment of up to 16 synchronous displays, printers, and personal computers via twisted-pair wire. The 6500 System accommodates two Synchronous Device Interface Modules, providing for a maximum configuration of 32 synchronous devices.

Asynchronous Host/Protocol Conversion Module—an add-on expansion module that provides port connections for up to eight asynchronous host computers or terminals. Protocol conversion allows asynchronous terminals to access synchronous hosts. The ports operate at speeds up to 19.2K bps. Four Asynchronous Host/Protocol Conversion Modules are accommodated, providing for a maximum configuration of 32 asynchronous connections.

X.25 Interface Module—an add-on expansion module that provides one connector for IBM-compatible hosts supporting the Network Control Program Packet Switched Interface (NPSI) protocols. The connector supports either of the following interfaces: RS-232-C at speeds up to 19.2K bps or CCITT V.35 at speeds of 48K, 56K, or 64K bps.

Local Channel Interface Module—an add-on expansion module that provides connections for an IBM mainframe byte multiplexer, block multiplexer, or selector channel in

AT&T 6500 Multifunction Communication System

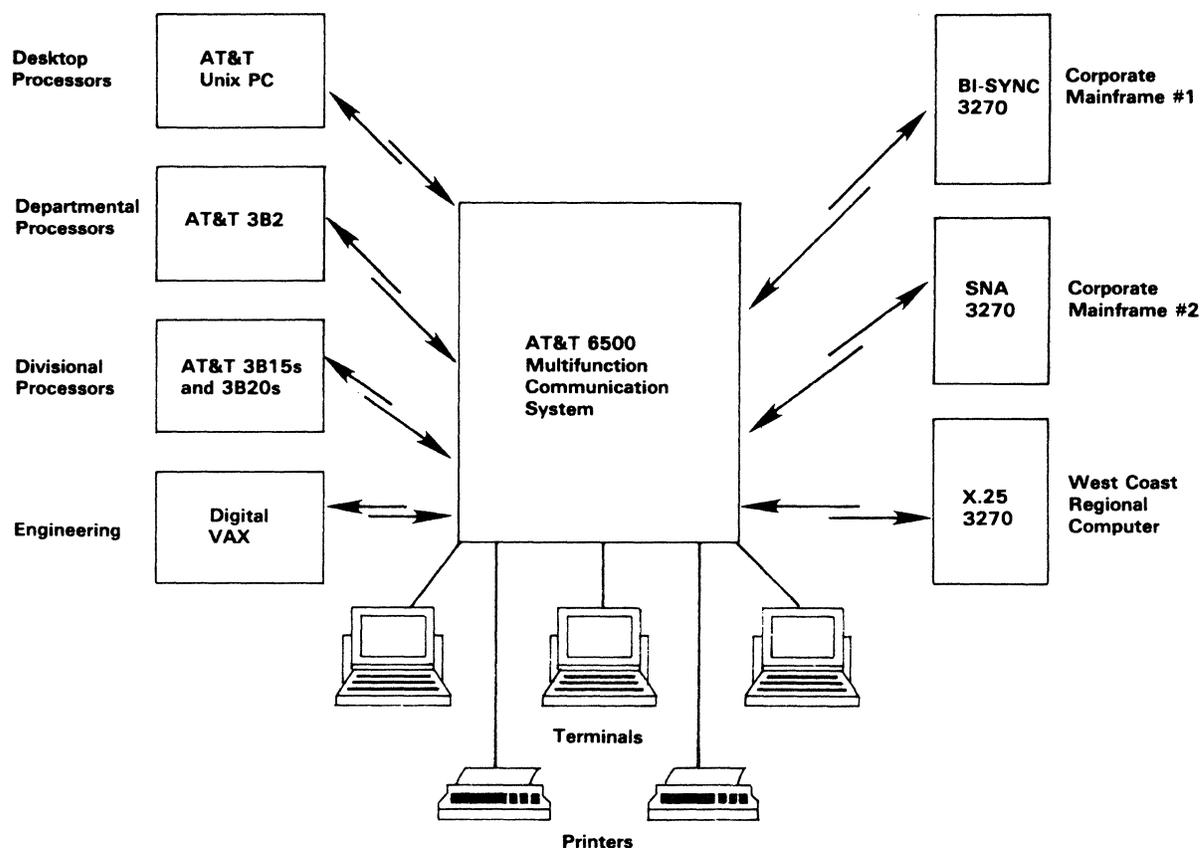


Figure 1. AT&T's 6500 Multifunction Communication System provides access to a variety of asynchronous and synchronous host computers.

configurations where the 6544 is located within 200 cable feet of the host. Users can equip each 6544 with one Local Channel module.

Plug-Compatible Device Interface Module—an add-on expansion module that allows users to establish plug compatibility for up to 16 synchronous devices; users can add a second module for a total of 32 ports.

The AT&T Multifunction Communication System supports a variety of host computers, including the IBM S/360, S/370, 3031, 3032, 3033, 3081, 3083, 3084, 4321, 4331, and 4341; with the appropriate software, the System can also support the IBM 8100, Series/1, System/36, and System/38. In addition to IBM synchronous hosts, the 6500 System supports connection to IBM plug-compatible mainframes (PCMs) from vendors such as Amdahl, Control Data, IPL, National Advanced Systems, and Magnuson. Asynchronous computers that may be accessed through the 6500 System include the AT&T 3B family and UNIX PC, the Digital VAX, and most other popular minicomputer families. AT&T 6500 System displays and printers are connected to the 6544 controller via twisted-

pair telephone wire (compatible with AT&T's Premises Distribution System). Communications over previously installed coaxial cable is possible with the addition of optional adapters.

The 6544 also supports the older AT&T 4540 and E4540 displays. For asynchronous applications, the 6544 supports the attachment of the AT&T 4400 family of displays and the AT&T 600 line, as well as other asynchronous displays like the Digital VT220 and VT100. Other printers, including AT&T 4540 and E4540 printer models, may be added to a 6500 System cluster using the 6561 Printer Controller; one printer controller is required for each printer.

Self-test diagnostics are standard on the 6544 controller. In addition, the 6544 supports two IBM network programs that reside on host computers: Network Problem Determination Application (NPDA) and Network Logical Data Manager (NLDM).

System Displays

The 6500 System supports five System display units and four IBM plug-compatible units. All models support a

AT&T 6500 Multifunction Communication System

tilt/swivel capability, and monochrome, amber, or green displays are available. Each display connects only to the 6544 controller. The units are described in more detail below.

6518 BASIC FUNCTION DISPLAY: This monochrome unit accesses only synchronous hosts. The 6518 includes a 12-inch display screen, with a display capacity of 1,920 characters arranged in 24 lines of 80 characters each. The 6518 is functionally compatible with the IBM 3178 display station.

6528 STANDARD DISPLAY: This monochrome display provides a split-screen function for the simultaneous viewing of one synchronous session and one asynchronous session with "hot-key" switching between sessions. The 6528 includes a 15-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6528 is functionally compatible with the IBM 3180 display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

6529 STANDARD DISPLAY: This unit is a color display that provides a split-screen function for the simultaneous viewing of one synchronous session and one asynchronous session with "hot-key" switching between sessions and "change-host" capability via command line. The 6529 includes a 14-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6529 features four- or seven-color display capability. It is functionally compatible with the IBM 3179 display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

6538 MULTITASKING DISPLAY: This monochrome display provides up to four multitasking windows in any combination of synchronous and asynchronous sessions. Window positioning/browsing/sizing speed is four inches per second horizontal and six inches per second vertical. The 6538 includes a 15-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6538 supports four screen formats, including 3270 operation, VT220 operation, full-extended attributing, and input and edit. An auxiliary I/O port and programmed symbol graphics are optionally available. The 6538 is functionally compatible with the IBM 3180 display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

6539 MULTITASKING DISPLAY: This color display provides up to four multitasking windows in any combination of synchronous and asynchronous sessions. Win-

ow positioning/browsing/sizing speed is four inches per second horizontal and six inches per second vertical. The 6539 includes a 14-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The 6539 features four- or seven-color display capability and supports four screen formats, including 3270 operation, VT220 operation, full-extended attributing, and input and edit. An auxiliary I/O port and programmed symbol graphics are optionally available. The 6539 is functionally compatible with the IBM 3279-S3G display station in synchronous mode and with the Digital VT220 display terminal in asynchronous mode.

The 6528, 6529, 6538, and 6539 displays are modularly designed and can be upgraded or downgraded by switching logic bases and display monitors.

Plug-Compatible Displays

All of the 6500 plug-compatible displays can operate with IBM 3270 controllers, as well as the AT&T 6544 controller. The units' display screens support tilt/swivel capabilities, and monochrome devices are available with amber or green phosphor characters.

6578 PLUG-COMPATIBLE DISPLAY: This unit is a monochrome display that has a 3178 screen format, a 14-inch monitor, and an 87-key keyboard. The 6578 is functionally compatible with IBM 3278 and 3178 displays.

6579 PLUG-COMPATIBLE DISPLAY: A color display available with four or seven colors, this unit measures 14 inches and has 3179 screen formats and a 122-key keyboard. It is functionally compatible with IBM 3279, 3179, and 3192C displays.

6580 PLUG-COMPATIBLE DISPLAY: This monochrome display has 3180 screen formats and a 122-key keyboard. The 6580 is functionally compatible with IBM 3192D and 3180-1 displays.

6591 PLUG-COMPATIBLE DISPLAY: This monochrome display has a 14-inch flat screen and an IBM-type 122-key keyboard. It is functionally compatible with IBM 3191 displays.

Options

In addition to the 6544 controller and a wide variety of displays, the 6500 also incorporates a number of options, described below.

2-N-1 ADAPTER: This adapter, recently introduced by AT&T, is for use with AT&T 6300, 6310, or compatible personal computers. The PC-based software/hardware

AT&T 6500 Multifunction Communication System

unit offers enhanced connectivity to the 6500 controller. It is available with a 3270-type keyboard. The 2-N-1 provides seven concurrent windows: four multisession windows, two notepads, and one PC session.

6518 KEYBOARDS: The 6518 display can be configured with either of two available keyboards. One keyboard contains 87 keys, an external numeric pad, and 12 function keys; the second keyboard contains 99 keys and 24 external program function (PF) keys. The keyboard has a typewriter-style layout and a low-profile design and is detachable. Security keylock is a standard feature. A three-year warranty is available with the 6518.

6528/6529/6538/6539/6500 PC KEYBOARD: The 6528/6529 Standard Displays, 6538/6539 Multitasking Displays, and 6500 PC are equipped with a 122-key keyboard that includes 24 program function (PF) keys and a VT220 template. The keyboard contains a typewriter-style layout and a low-profile design and is detachable. Security keylock is a standard feature.

SINGLE SESSION IRMA ADAPTER: This PC adapter allows the AT&T 6300 and 6300 Plus, IBM PC/XT/AT, and other PCs running the MS-DOS operating system to function as a workstation on the 6500 System. The Single Session Irma Adapter consists of a feature card that plugs into an expansion slot on the PC, as well as supporting software. It provides CMS, TSO, and IBM file transfer. The adapter is compatible with the Irma board from DCA.

6571 COLOR MATRIX PRINTER: The 6571 is a matrix printer that provides color or monochrome text and graphics printing. The 6571 operates at speeds up to 400 cps in draft mode and 100 cps in near letter quality mode. The 6571 prints symbol graphics and one-, four-, or seven-color printing is supported. The 6571 includes a full-function SNA control panel and LCD display, an operator-replaceable 18-wire printhead with half-dot shift, and a tractor- or friction-feed platen with rear or bottom feed. Paper feed/positioning controls are also included.

6572 PLUG-COMPATIBLE PRINTER: The 6572 is a coax version of the 6571 printer, offering all the same features.

6561 PRINTER CONTROLLER: The 6561 is a printer controller that enables the use of older AT&T 4540 and E4540 printers in a 6500 System cluster. The 6561 adds new functions and applications to the older printers and includes a full-function SNA control panel, LCD display, and the following interfaces: SSI (twisted pair) in, SSI out, RS-232-C out, and Centronics parallel out.

TRANSMISSION SPECIFICATIONS

When communicating with synchronous host computers, the 6500 System provides maximum data rates of 64K bps for hosts supporting SNA and X.25 protocols and 19.2K bps for hosts supporting Bisync protocols. The Synchronous Host Module supports access to as many as three synchronous hosts, two of which may be supporting SNA software. The 6500 System communicates with from 1 to 32 asynchronous hosts at a maximum 19.2K bps data transmission rate. Devices can be connected up to 5,000 feet from the 6544 controller.

PRICING

The 6500 Multifunction Communication System components are available for purchase and lease through AT&T's direct sales force or by calling (800) 247-1212. AT&T provides installation and maintenance service through 1,000 nationwide sites.

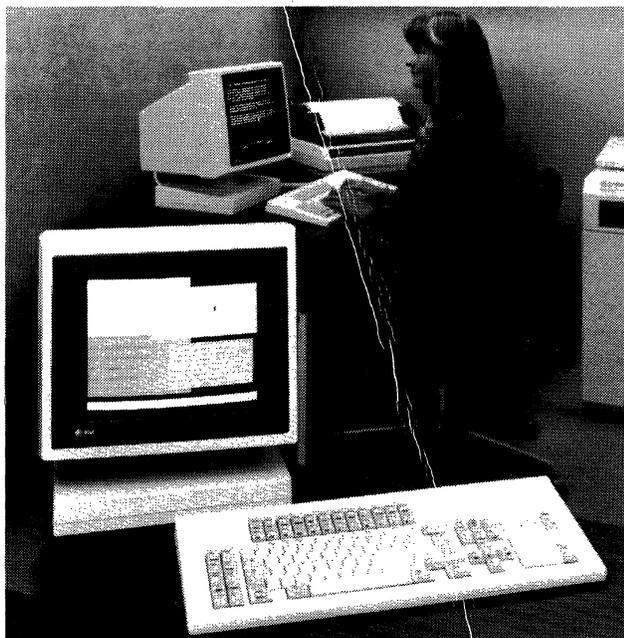
The 6500 Multifunction Communication System products carry a warranty from the date of purchase, guaranteeing that AT&T will replace any defective part or software free of charge during the warranty period. The company offers several Equipment Maintenance Agreement Plans, including per-occurrence and contract plans.

The following price list includes single-quantity purchase prices for various 6500 System products. As of press time, prices for some 6500 System products had not yet been set. For those prices, and for volume pricing, contact AT&T Information Systems.

EQUIPMENT PRICES

	Purchase Price (\$)
6544 Multifunction Communication Controller	7,880
Synchronous Host Module	2,400
Synchronous Device Interface Module	3,920
Asynchronous Host/Protocol Conversion Module	2,215
X.25 Interface Module	3,510
Local Channel Expansion Module	3,350
16-Port, Plug-Compatible Logic Module	4,730
6528 Standard Display	1,950
6529 Standard Display	2,195
6538 Multitasking Display	2,645
6539 Multitasking Display	2,895
6578 Plug-Compatible Display	1,165
6579 Plug-Compatible Display	1,705
6580 Plug-Compatible Display	1,615
6591 Plug-Compatible Display	1,165
6561 Printer Controller	915
6571 Printer	4,000
6572 Plug-Compatible Printer	4,000 □

AT&T Multifunction Communication System



The AT&T Multifunction Communication System provides multiple host access, and synchronous/asynchronous operation. A variety of displays are available for use with the 6500 system, including the 6539 Multitasking Display, shown here. The 6539 display provides 4- or 7-color display capability, and can display up to four multitasking windows, in any combination of synchronous or asynchronous sessions.

MANAGEMENT SUMMARY

AT&T, via its Teletype subsidiary, has long been a leader in the IBM 3270-compatible terminal market, with well over 300,000 terminals installed. The earlier generations of 3270-compatible products offered by AT&T and Teletype include the 40 Series, the 4540 family, and the current E4540 line. Each of these product lines provided basic functional compatibility with the corresponding IBM 3270 products.

In November 1985, AT&T introduced the 6500 Multifunction Communication System, a family of products that provides compatibility with the IBM 3270 system, plus access to asynchronous host computers and functions. The 6500 product line provides access to multiple hosts, both synchronous and asynchronous, from the same display terminal. Components of the 6500 Multifunction Communication System include the 6544 controller; 6518, 6528, and 6538 monochrome displays; 6529 and 6539 color displays; and 6571 color printer. Also introduced was the 6500 PC, an equivalent to the IBM 3270-PC. The 6500 family also accommodates the older AT&T 4540 and E4540 displays; AT&T 4400 family asynchronous displays; and a variety of personal computers including the AT&T 6300 and 6300 Plus PCs, and the IBM PC, PC XT, and PC AT. The 6500 components operate over standard

The 6500 Multifunction Communication System is AT&T's newest IBM 3270 replacement product line. Based on the modular 6544 controller, the 6500 system provides access to both synchronous and asynchronous hosts. AT&T provides a variety of display terminals for use with the 6500 system, in both monochrome and color; multitasking capability is also available. Personal computing capability can be added to the system with the new 6500 PC, or via standard MS-DOS PCs, including the AT&T 6300 and 6300 Plus.

MODELS: 6544 Multifunction Communication Controller, 6518 Basic Function Display, 6528 and 6529 Standard Displays, 6538 and 6539 Multitasking Displays, 6571 Color Graphics Printer, and 6500 PC.

DISPLAY: The 6518 includes a 12-inch display, the 6528 and 6538 a 15-inch display, and the 6529 and 6539 a 14-inch display. The 6518, 6528, and 6538 are monochrome displays, while the 6529 and 6539 are 4- or 7-color displays. The 6518 provides a 24-line by 80-column screen format; all other models feature four selectable display formats, including 27 lines by 132 columns.

KEYBOARD: A choice of 87- and 99-key keyboards is available for the 6518; all other models include a 122-key keyboard. All keyboard models feature a low-profile design and are detachable.

COMPETITION: IBM, Telex, ITT Courier, Memorex, Lee Data, and several others.

PRICE: The basic 6544 controller is priced at \$7,880; various modules for the controller range in price from \$2,215 to \$3,920. Display terminals range in price from \$1,950 to \$2,895 (the price for the 6518 has not been announced).

CHARACTERISTICS

VENDOR: AT&T Information Systems, 1 Speedwell Avenue, Morristown, NJ 07960. Telephone (201) 898-2000. In Canada: AT&T Canada, 1500 Don Mills Road, Ontario M3B 3K4. Telephone (416) 449-4300.

DATE OF ANNOUNCEMENT: November 1985.

DATE OF FIRST DELIVERY: December 1985; some components scheduled for availability in 1986.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: AT&T Information Systems.

AT&T Multifunction Communication System

▷ twisted-pair telephone wire; they can also operate over previously installed coaxial cable.

The multifunctionality of the 6500 family stems from the 6544 Multifunction Communications Controller. The 6544 supports up to 32 synchronous devices and up to 16 asynchronous devices. It provides 12 available module slots, into which the following expansion modules may be plugged:

- Synchronous Host Module—provides synchronous ports for the access of 3270 hosts (BSC or SNA). Speeds up to 19,200 bps are attainable. Depending on speed and protocol, up to three hosts can be accessed.
- Synchronous Device Interface Module—provides for the attachment of up to 16 synchronous displays, printers, or PCs via twisted-pair wire; up to two are supported;
- Asynchronous Host/Protocol Conversion Module—provides for connection of up to eight asynchronous hosts or terminals; protocol conversion allows asynchronous terminals to access synchronous hosts; up to two are supported; and
- X.25 Interface Module—provides a connector for IBM-compatible hosts supporting packet switched protocols.

Displays available as part of the 6500 family include the 6518, a basic synchronous display; the 6528 monochrome and 6529 color displays, that provide a split screen capability that allows the user to display one synchronous and one asynchronous session simultaneously; and the 6538 monochrome and 6539 color multitasking displays, that provide up to four multitasking windows in any combination of synchronous and asynchronous sessions. In asynchronous mode, the 6528/6529 and 6538/6539 displays emulate the Digital Equipment Corporation VT220 display terminal. Keyboards for the 6500 displays are detached and feature a low-profile design.

AT&T has introduced the 6500 PC, a functionally compatible version of IBM's 3270-PC, for use with the 6500 system. The 6500 PC offers four host sessions, two note pads, and one PC session, for a total of seven user-configurable windows. Personal computing can also be added to the 6500 system via the Single Session Attachmate option, which supports the attachment of the AT&T 6300 and 6300 Plus PCs, as well as the IBM PC, PC XT, PC AT, and other IBM-compatible PCs. The Single Session Attachmate option is compatible with DCA's Irma product, and consists of a feature card (which plugs into an expansion slot on the PC) and software.

The 6500 family components can communicate with a variety of host computers, including the IBM S/360, S/370, 303X, 308X, 43XX, and IBM plug-compatible mainframes (PCMs) from various vendors. Asynchronous hosts such as the AT&T 3B family and the Digital VAX can also be accessed. ▷

► CONFIGURATION

A variety of configurations are possible with the 6500 Multifunction Communication System, depending on how the 6544 Multifunction Communication Controller is configured. The 6544 contains 14 module slots, 12 of which are available for optional add-on expansion modules. The basic 6500 system configuration supports single-host, 3270 synchronous operation via one 6544 controller and one 6500 system display terminal. Four different expansion modules are available for integration in the 6544 controller.

- Synchronous Host Module—when simultaneous access to more than one synchronous host is required, the Synchronous Host Module is used. Up to three of these modules can be supported in the 6500 Multifunction Communication System. The Synchronous Host Module supports three communications ports at a maximum or aggregate speed of 38.4K bps operating with BSC, SNA (two maximum), or a combination thereof. For example, this would allow two ports using BSC protocol to operate at 19,200 bps. If a third BSC port operating at 19,200 bps was needed, two synchronous host modules are required. The Synchronous Host Module may also be used to support one SNA port operating at either 56K or 64K bps. When using either of these higher speeds, only one port per card may be used. If support for two SNA hosts operating at higher speeds is required, two Synchronous Host Modules are needed. A further example using these higher speeds would be the utilization of two Synchronous Host Modules, each supporting one SNA host at 65K bps and a third module supporting one BSC host at 19,200 bps.
- Synchronous Device Interface Module—an add-on expansion module that provides for the attachment of up to 16 synchronous display terminals, printers, and personal computers via twisted-pair telephone wire (compatible with the AT&T Premises Distribution System). Two modules may be added to the 6544, for a total of 32 synchronous devices supported.
- Asynchronous Host/Protocol Conversion Module—an add-on expansion module that provides for connection of up to eight asynchronous hosts or terminals. Protocol conversion allows asynchronous terminals to access synchronous hosts. The ports operate at speeds up to 19,200 bps, with an aggregate speed for the entire card of up to 48,000 bps. Two modules may be added to the 6544, for a total of 16 asynchronous connections.
- X.25 Interface Module—an add-on expansion module that provides one connector for IBM-compatible hosts supporting Network Control Program Packet Switched Interface (NPSI) protocols. The module can be configured in two ways: an EIA RS-232-C interface at 19,200 bps, or a CCITT V.35 interface at 48,000, 56,000, or 64,000 bps.

AT&T 6500 system displays available for use with the 6544 controller include the 6518 Basic Function Display; the 6528 (monochrome) and 6529 (color) Standard Displays; and the 6538 (monochrome) and 6539 (color) Multitasking Displays. The 6544 also supports the older AT&T 4540 and E4540 displays. For asynchronous applications, the 6544 supports the attachment of the AT&T 4400 family of displays, as well as other asynchronous displays like the Digital VT 220 and VT 100. AT&T has introduced the 6571 Color Graphics Printer for use in a 6500 system cluster. Other printers, including AT&T 4540 and E4540 printer models, may be added to a 6500 system cluster using the 6561 Printer Controller; one printer controller is required for each printer.

Personal computing capabilities can be added to the 6500 system in two ways. AT&T has introduced the 6500 PC, which is functionally equivalent to the IBM 3270-PC. The ►

AT&T Multifunction Communication System

► COMPETITIVE POSITION

Over the years, AT&T's Teletype subsidiary has built up a large installed base of IBM 3270-compatible terminals; the company estimates that there are some 300,000 terminals now installed, including the 40, 4540, and E4540 families. Prior to AT&T's divestiture, Teletype had what amounted to a built-in market for its products, selling primarily to the Bell Operating Companies (BOCs) for their internal use or resale to their customers. As much as 40 percent of Teletype's business at that time was attributed to their relationship with the BOCs.

Divestiture has caused a number of changes, particularly to Teletype. First, the company lost its captive market. Then came changes to Teletype itself. The company's name was officially changed to AT&T Teletype Corporation. In 1985, AT&T Teletype became a wholly owned subsidiary of the Computer Systems Division of AT&T Information Systems, with all sales for Teletype-manufactured products being moved to AT&T-IS headquarters in New Jersey, and product management folded into a DTE division of the Computer Systems Division. The Teletype name remains a legal entity for trademark, product brand name, and other purposes; it would appear, though, that as a company Teletype Corporation has been swallowed up by AT&T.

The 6500 Multifunction Communication System is AT&T's most comprehensive (and ambitious) foray into the 3270 replacement market. The product line conforms to two important trends in the market:

- Integration of personal computing capabilities into the 3270 cluster; and
- Access to multiple hosts, including asynchronous computers.

The 6500 product line places AT&T in a strong position to compete with IBM, as well as the other 3270-compatible vendors—a group that includes Telex, ITT Courier, Memorex, Lee Data, Harris, and a number of others. At one time, it was enough to offer 3270-compatible controllers, terminals, and printers at a lower price than IBM. However, IBM has moved to protect its huge (and lucrative) 3270 installed base by introducing a new generation of products that provide a number of new and attractive features at considerably lower prices. The competitors, including AT&T, have countered by adding additional functionality to their own product lines, and lowering prices even further. A number of vendors have withdrawn from this market, unable or unwilling to match IBM's moves. The remaining participants will vie with IBM for what continues to be a growing and profitable market segment.

ADVANTAGES AND RESTRICTIONS

The key feature offered by the 6500 Multifunction Communication System is found in the product line's name; that is, its multifunctional capabilities. The 6500 system ►

► 6500 PC includes built-in connectivity to the 6544 controller. The AT&T 6300 and 6300 Plus PCs, IBM PC, PC XT, and PC AT, and IBM-compatible PCs can be added to a 6500 cluster via the Single Session Attachmate Adapter. The adapter consists of a plug-in feature card and supporting software; one adapter is required for each PC on the system.

The AT&T Multifunction Communication System may be connected to a variety of host computers, including the IBM S/360, S/370, 3031, 3032, 3033, 3081, 3083, 3084, 4321, 4331, and 4341. The 6500 system is also supported, with the appropriate software, for use with the IBM 8100, Series/1, System/36, and System/38. In addition to the IBM synchronous hosts, the 6500 system is supported for connection to IBM plug-compatible mainframes (PCMs) from vendors such as Amdahl, Control Data, IPL, National Advanced Systems, and Magnuson. Asynchronous computers that may be accessed include the AT&T 3B family and Unix PC, the Digital VAX, and most other popular mini-computer families. AT&T 6500 system displays and printers are connected to the 6544 controller via twisted-pair telephone wire (compatible with AT&T's Premises Distribution System). Communication over previously installed coaxial cable is possible with the addition of optional adapters.

TRANSMISSION SPECIFICATIONS

When communicating with synchronous host computers, the 6500 system provides maximum data rates of 64K bps for hosts running under SNA and X.25 protocols, and 19,200 bps for hosts running under BSC protocols. Up to three synchronous hosts may be accessed via the Synchronous Host Module; a maximum of two of the hosts can be running under SNA. When communicating with asynchronous computers, the 6500 system provides for a maximum data rate of 19,200 bps; 1 to 16 asynchronous hosts may be accessed. Devices can be connected up to 5,000 feet from the 6544 controller.

DEVICE CONTROL

For synchronous operation, the 6544 Multifunction Communication Controller provides support for the 6518 Basic Function Display, 6528 and 6529 Standard Displays, and the 6538 and 6539 Multitasking Displays. The 6518 display provides support for a single synchronous session; it does not support asynchronous operation. The 6528 and 6529 displays feature a split screen capability that can display one synchronous and one asynchronous session simultaneously, with "hot key" switching between sessions. One session of each type is supported. The 6538 and 6539 displays provide up to four concurrent multitasking windows, in any combination of synchronous and asynchronous sessions. Data can be transferred from window to window. In asynchronous mode, the 6528, 6529, 6538, and 6539 emulate the Digital VT220 display terminal. In synchronous mode, the 6518 is compatible with the IBM 3178; the 6528 is compatible with the IBM 3178 and 3180; the 6529 is compatible with the IBM 3179; the 6538 is compatible with the IBM 3180; and the 6539 is compatible with the IBM 3279-S3G.

Peer-to-peer messaging is a standard feature on all 6500 system displays. Users can send messages to other selected users, or broadcast messages to all users via the 6544 controller. A keystroke record and playback feature is also standard. With this feature, users can store commonly used characters and commands, allowing them to execute complex operations with a single keystroke.

Personal computing capabilities can be added to a 6500 system cluster in either of two ways. First, AT&T has ►

AT&T Multifunction Communication System

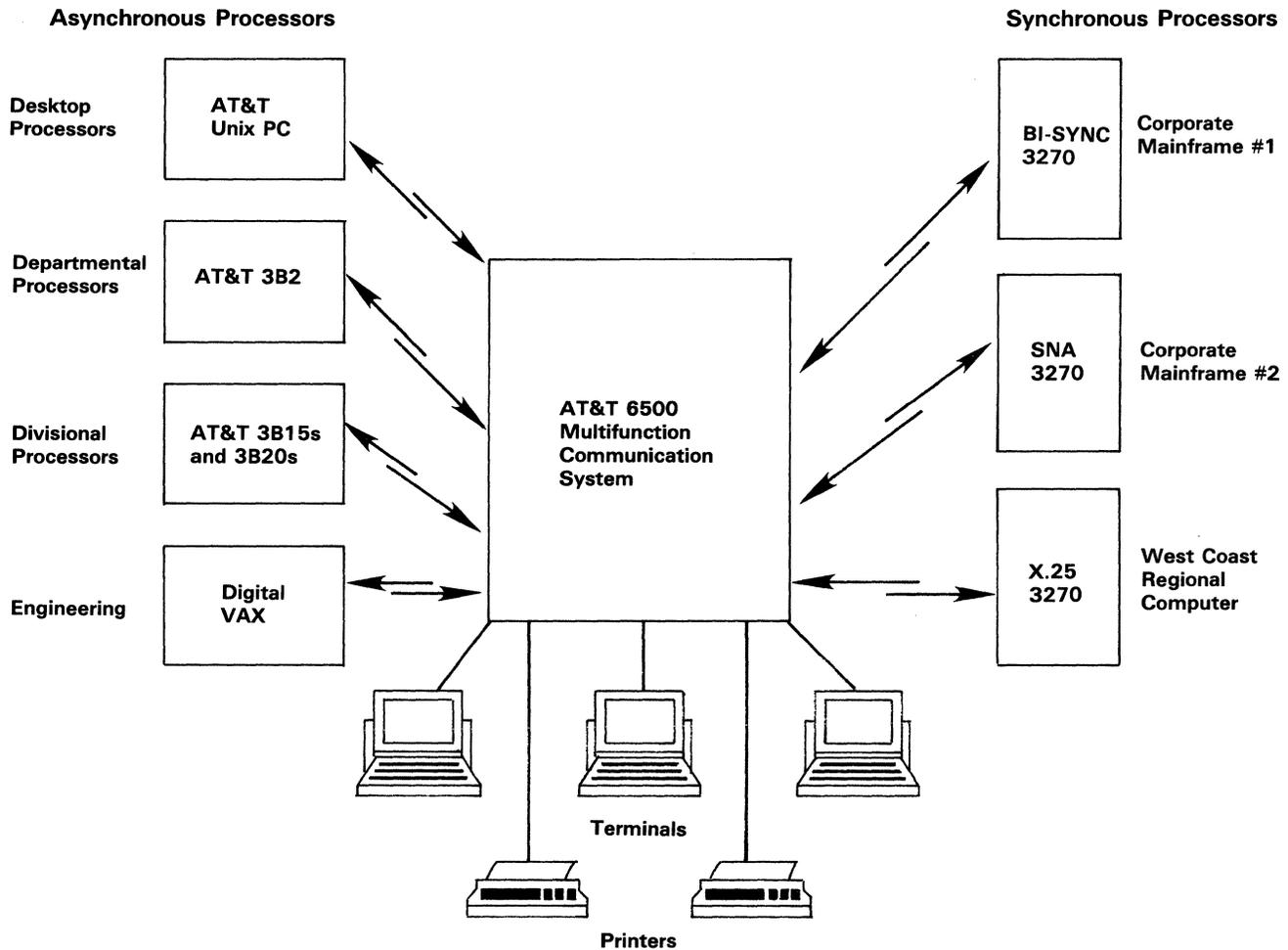


Figure 1. The AT&T Multifunction Communication System provides access to a variety of host computers, both synchronous and asynchronous.

➤ provides multi-host access, both to asynchronous and synchronous computer systems. In addition, a 6500 configuration can include color and monochrome multitasking displays, personal computers, printers, and older AT&T 4540 and E4540 displays. AT&T's 6500 display terminals offer a variety of features and capabilities not found on previous AT&T displays. Particularly interesting are the 6538 monochrome and 6539 color multitasking displays, which can offer up to four multitasking windows that provide simultaneous access to four distinct computer sessions, in any combination of synchronous and asynchronous applications. Currently, IBM offers this capability only on its 3270-PC, which is roughly three times the cost of the 6539. AT&T has also introduced its version of the 3270-PC, the 6500 PC; like the 3270-PC, the 6500 PC offers four host sessions, two note pads, and one PC session, for a total of seven user-configurable windows.

The key to the multifunctional capabilities of the 6500 system is the 6544 controller. The 6544 can operate as a standard IBM 3274-type controller; it can also be upgraded, via add-on modules, to provide support for three synchro-

➤ introduced the 6500 PC, which is functionally equivalent to the IBM 3270-PC. The 6500 PC provides four host sessions, two note pads, and one PC session, for a total of seven user-configurable windows. Personal computing can also be added to the 6500 system via the Single Session Attachmate option, which supports the attachment of the AT&T 6300 and 6300 Plus PCs, as well as the IBM PC, PC XT, PC AT, and other IBM-compatible PCs. The Single Session Attachmate option is compatible with DCA's Irma product, and consists of a feature card (which plugs into an expansion slot on the PC) and software.

COMPONENTS

6544 MULTIFUNCTION COMMUNICATION CONTROLLER: The 6544 controller supports up to three synchronous hosts, 32 synchronous devices, and 16 asynchronous devices or hosts, depending on how it is configured. Connection of devices to the 6544 is via SSI (AT&T Standard Serial Interface) unshielded twisted-pair wire, compatible with the AT&T Premises Distribution System (PDS). Devices can be located up to 5,000 feet from the controller. For users with coaxial cable already installed, coaxial adapters are available to connect devices to the 6544 via coax. The basic 6544 contains a Main Processor Module, a diskette drive for loading software, and 14 module slots, 12

AT&T Multifunction Communication System

➤ nous host communication ports, one high-speed (64,000 bps) synchronous port, eight asynchronous hosts and terminals, and X.25 networks. The 6544 controller contains 12 available module slots, and can be expanded as the user's communications requirements grow. A major benefit of the 6500 system, though, is its ability to access both synchronous and asynchronous hosts from a single terminal. This is a benefit currently found only with Lee Data's Series 400 product line. Users have eagerly awaited IBM's introduction of a new-generation 3274 controller, with many of the same capabilities found on the 6544; AT&T has beaten IBM to the punch this time.

The 6500 system puts AT&T on a strong competitive level in the 3270 market. However, in a market dominated so long by IBM, AT&T is still in a position of scrambling for market share. □

➤ of which are available for add-on expansion modules. The basic 6544 configuration provides access to a single synchronous host computer via a single 6500 system display. Add-on expansion modules are available to provide additional multifunctional features. The following expansion modules are available.

Synchronous Host Module—an add-on expansion module that provides simultaneous access to more than one synchronous host. Up to three Synchronous Host Modules are supported. The Synchronous Host Module supports three communications ports at a maximum or aggregate speed of 38.4K bps, operating with BSC, SNA (two maximum), or a combination of the two. The Synchronous Host Module can also be used to support one SNA port operating at 56K or 64K bps. When using these higher speeds, only one port card may be used. If support for two SNA hosts operating at higher speeds is required, two Synchronous Host Modules are needed.

Synchronous Device Interface Module—an add-on expansion module that provides for the attachment of up to 16 synchronous displays, printers, and personal computers via twisted-pair wire. Two Synchronous Device Interface Modules can be accommodated, providing for a maximum configuration of 32 synchronous devices.

Asynchronous Host/Protocol Conversion Module—an add-on expansion module that provides port connections for up to eight asynchronous host computers or terminals. Protocol conversion allows asynchronous terminals to access synchronous hosts. The ports operate at speeds up to 19,200 bps. Two Asynchronous Host/Protocol Conversion Modules can be accommodated, providing for a maximum configuration of 16 asynchronous connections.

X.25 Interface Module—an add-on expansion module that provides one connector for IBM-compatible hosts supporting the Network Control Program Packet Switched Interface (NPSI) protocols. The connector can be optioned for either of the following interfaces: RS-232-C at speeds up to 19,200 bps, or CCITT V.35 at speeds of 48,000, 56,000, or 64,000 bps.

Self-test diagnostics are standard on the 6544 controller. In addition, the 6544 supports two IBM network programs that reside on host computers: Network Problem Determination Application (NPDA) and Network Logical Data Manager (NLDM).

6518 BASIC FUNCTION DISPLAY: A display that can be used to access synchronous hosts only. The 6518 includes a 12-inch display screen, with a display capacity of 1,920

characters arranged in 24 lines of 80 characters each. The display screen contains tilt/swivel capability. Amber or green phosphor characters are available. The 6518 is functionally compatible with the IBM 3178 display station; it can connect only to the 6544 controller.

6528 STANDARD DISPLAY: A monochrome display that provides a split screen function, for the simultaneous viewing of one synchronous session and one asynchronous session. Only one session of each type is supported, with "hot key" switching between sessions. The 6528 includes a 15-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The display screen contains tilt/swivel capability. Amber or green phosphor characters are available. The 6528 is functionally compatible with the IBM 3180 display station in synchronous mode, and with the Digital VT220 display terminal in asynchronous mode. It can be connected only to the 6544 controller.

6529 STANDARD DISPLAY: A color display that provides a split screen function, for the simultaneous viewing of one synchronous session and one asynchronous session. Only one session of each type is supported, with "hot key" switching between sessions, and "change host" capability via command line. The 6529 includes a 14-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The display screen contains tilt/swivel capability. The 6529 features 4- or 7-color display capability. It is functionally compatible with the IBM 3179 display station in synchronous mode, and with the Digital VT220 display terminal in asynchronous mode. The 6529 can be connected only to the 6544 controller.

6538 MULTITASKING DISPLAY: A monochrome display that provides up to four multitasking windows, in any combination of synchronous and asynchronous sessions. Window positioning/browsing/sizing speed is 4 inches per second horizontal, and 6 inches per second vertical. The 6538 includes a 15-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The display screen contains tilt/swivel capability. Amber or green phosphor characters are available. Four screen formats are available, including 3270 operation, VT220 operation, full extended attributing, and input and edit. An auxiliary I/O port and programmed symbol graphics are optionally available. The 6538 is functionally compatible with the IBM 3180 display station in synchronous mode, and with the Digital VT220 display terminal in asynchronous mode. The 6538 can be connected only to the 6544 controller.

6539 MULTITASKING DISPLAY: A color display that provides up to four multitasking windows, in any combination of synchronous and asynchronous sessions. Window positioning/browsing/sizing speed is 4 inches per second horizontal, and 6 inches per second vertical. The 6539 includes a 14-inch display screen, with display capacities ranging from 1,920 to 3,564 characters; screen arrangements include 24 lines by 80 characters, 32 lines by 80 characters, 43 lines by 80 characters, and 27 lines by 132 characters. The display screen contains tilt/swivel capability. The 6539 features 4- or 7-color display capability. Four screen formats are available, including 3270 operation, VT220 operation, full extended attributing, and input and edit. An auxiliary I/O port and programmed symbol graphics are optionally available. The 6539 is functionally compatible with the IBM 3279-S3G display station in synchro-

AT&T Multifunction Communication System

➤ nous mode, and with the Digital VT220 display terminal in asynchronous mode. The 6539 can be connected only to the 6544 controller.

The 6528, 6529, 6538, and 6539 displays are modularly designed, and can be upgraded or downgraded by switching logic bases and display monitors.

6500 PC: The 6500 PC is a personal computer that is functionally equivalent to the IBM 3270-PC. The 6500 PC offers four host sessions, two note pads, and one PC session, for a total of seven user-configurable windows. The 6500 PC includes a high-resolution display screen, and connects to the 6544 controller.

6518 KEYBOARDS: The 6518 display can be configured with either of two available keyboards. One keyboard contains 87 keys, with an external numeric pad and 12 function keys; the second keyboard contains 99 keys, with 24 external program function (PF) keys. The keyboard has a typewriter-style key layout, a low-profile design, and is detachable. Security keylock is a standard feature.

6528/6529/6538/6539/6500 PC KEYBOARD: The 6528/6529 Standard Displays, 6538/6539 Multitasking Displays, and 6500 PC are equipped with a 122-key keyboard that includes 24 program function (PF) keys and a VT220 template. The keyboard contains a typewriter-style key layout, a low-profile design, and is detachable. Security keylock is a standard feature.

SINGLE SESSION ATTACHMATE ADAPTER: A PC adapter that allows the AT&T 6300 and 6300 Plus, IBM Personal Computer, PC XT, and PC AT, and other PCs running the MS-DOS operating system to function as a workstation on the 6500 system. The Single Session Attachmate Adapter consists of a feature card that plugs into an expansion slot on the PC, and supporting software. It provides CMS, TSO, and IBM file transfer as well as IBM API. The adapter is compatible with the Irma board from DCA, and is supplied via an OEM agreement with Attachmate Corporation (Bellevue, WA).

6571 COLOR MATRIX PRINTER: The 6571 is a matrix printer that provides color or monochrome text and graphics printing. The 6571 operates at speeds up to 400 cps in draft mode, and 100 cps in near letter-quality mode. Programmed symbol graphics can be printed; 1-, 4-, or 7-color printing is supported. The 6571 includes a full-function SNA control panel and LCD display. An operator-replaceable 18-wire printhead, with half-dot shift, is utilized. A tractor or fric-

tion feed platen, with rear or bottom feed, can be used. Paper feed/positioning controls are also included.

6561 PRINTER CONTROLLER: The 6561 is a printer controller that enables the use of older AT&T 4540 and E4540 printers in a 6500 system cluster. The 6561 adds new functions and applications to the older printers. The 6561 includes a full-function SNA control panel, LCD display, and the following interfaces: SSI (twisted pair) in, SSI out, RS-232-C out, and Centronics parallel out.

PRICING/SUPPORT

The 6500 Multifunction Communication System components are available for purchase and lease, via AT&T's direct sales force, or by calling (800) 247-1212. Installation and maintenance service is provided by the AT&T Information Systems Service Organization, located at 1,000 sites nationwide.

The 6500 Multifunction Communication System products carry a 90-day warranty from the date of purchase. AT&T Information Systems will replace any defective part or software free of charge during the warranty period. AT&T offers several Equipment Maintenance Agreement Plans, including per-occurrence and contract plans.

The following price list includes single-quantity purchase prices for various 6500 system products. As of press time, prices for some 6500 system products had not yet been set. For those prices, and for volume pricing, contact AT&T Information Systems.

EQUIPMENT PRICES

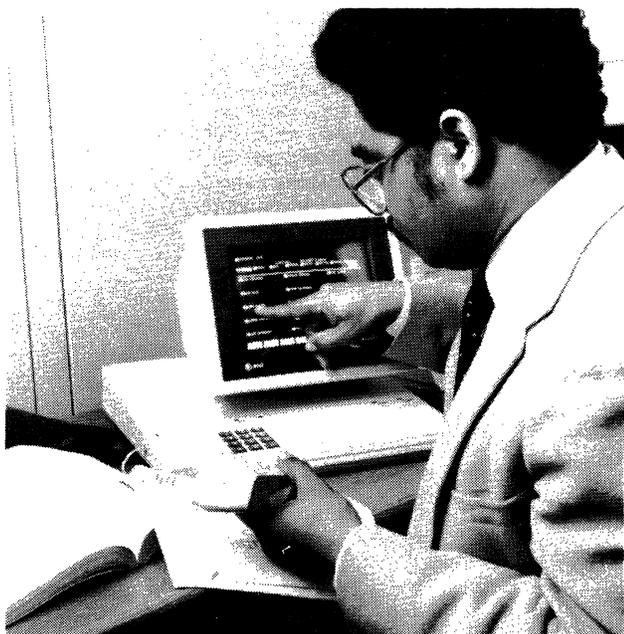
	Purchase Price (\$)
6544 Multifunction Communication Controller	7,880
Synchronous Host Module	2,400
Synchronous Device Interface Module	3,920
Asynchronous Host/Protocol Conversion Module	2,215
X.25 Interface Module	3,510
6528 Standard Display	1,950
6529 Standard Display	2,195
6538 Multitasking Display	2,645
6539 Multitasking Display	2,895
6561 Printer Controller	915 ■

AT&T Personal Terminal Model 510

MANAGEMENT SUMMARY

AT&T's entry in the integrated voice/data terminal (IVDT) market is the Personal Terminal Model 510, introduced in March 1985. Designed for use with the AT&T System 75 and System 85 PABXs, the Model 510 includes a 9-inch display, integral telephone handset, speakerphone for hands-free operation, autodialer, built-in calculator and calendar, and a telephone directory with 100 listings (up to 200 listings with the optional Directory Cartridge). Data capabilities, available via an integrated digital data module, include character and block mode transmission at speeds up to 19,200 bps, 2 pages of data memory, 40/80/132 column modes, and multiple screen windows. Simultaneous voice and data transmission is possible over one physical line to the PABX.

The features mentioned above can be found on most IVDTs on the market today; the Personal Terminal Model 510, however, is a unique product. With the Model 510, AT&T has introduced the first IVDT with touch-sensitive screen capabilities. The Workstation Design Group of AT&T Information Systems Laboratories has designed and patented a "soft" touch-sensitive screen for the Model 510. The soft screen utilizes a silicon gel, giving the screen a softer, more cushiony feel. The user is actually provided with tactile feedback when the screen is touched, unlike many other "hard" touch-sensitive screens. Targets on the screen, represented by circles, provide the user with a menu of choices or functions. When a target is touched, the circles ➤



The AT&T Personal Terminal Model 510 is an integrated voice/data terminal (IVDT) equipped with a touch-sensitive screen. Designed for use in conjunction with the AT&T System 75 and System 85 PABXs, the Model 510 provides one-touch access to voice and data functions.

AT&T Information Systems' Personal Terminal Model 510 is an integrated voice/data terminal designed for use with the AT&T System 75 and System 85 PABXs. The Model 510 includes a patented "soft" touch-sensitive display screen, for one-touch access to voice and data features; a retractable alphanumeric keyboard is optional. Standard features of the Model 510 include a 9-inch display, integral telephone handset, built-in speakerphone, and a telephone dial pad.

MODELS: Personal Terminal Model 510.
DISPLAY: The Model 510 features a 9-inch display screen with a 27-line by 80-column display format as standard; 40-, 80-, and 132-column display modes are selectable. The screen is touch-sensitive, using a patented "soft" touch technique that provides the user with tactile feedback.
KEYBOARD: Voice and data features are activated through the touch-sensitive screen. A 72-key alphanumeric keyboard is optionally available.
INTEGRATED HANDSET: An integrated telephone R-handset is located to the left of the display; a built-in speakerphone and telephone dial pad are also included.
COMPETITION: Northern Telecom Displayphone; Rolm Cypress; GTE XT300E ActionStation; InteCom/Wang Keystone; ITT Telecom InfoStation; Mitel SuperStation; Ambi AmbiSet; and others.
PRICE: The Personal Terminal Model 510 is priced at \$1,795; the optional keyboard is \$100.

CHARACTERISTICS

MANUFACTURER: AT&T Information Systems, 1 Speedwell Avenue, Morristown, NJ 07960. Telephone (201) 898-2000.

IN CANADA: AT&T Canada, 1500 Don Mills Road, Ontario M3B 3K4. Telephone (416) 449-4300.

MODELS: Personal Terminal Model 510.

DATE ANNOUNCED: March 1985.

DATE FIRST INSTALLED: May 1985.

NUMBER INSTALLED TO DATE: Contact vendor.

MODELS

The Personal Terminal Model 510 is available in digital (510D) and analog (510A) versions. Standard features in- ➤

AT&T Personal Terminal Model 510

▷ are transformed into squares, additionally providing the user with visual feedback. This visual and tactile feedback reduces the possibility of input errors on the Model 510's screen.

In phone mode, the targets on the screen allow the user to select lines (from among 4 line appearances), activate features such as conference calls, transfer, hold, and drop, retrieve phone messages, provide notification of other messages such as electronic mail, and dial a number from the 100-listing local directory. The Model 510 provides one-touch access to all System 75/85 PABX Unified Messaging services via an on-screen 40-character display. In data mode, the targets on the screen provide for one-touch auto log-in to data bases such as Dow Jones. A time manager and on-screen calculator are also included.

For extensive data applications, users may configure the Personal Terminal Model 510 with an optional alphanumeric keyboard. The keyboard includes 72 keys, including eight function keys, cursor control keys, and a "Dial It" key that provides the same one-touch telephone dialing as the touch screen. The keyboard has a low-profile design, and retracts into the terminal's base when not in use. The data capabilities of the Model 510 are stored in an asynchronous integrated digital data module within the terminal, and can be accessed through the touch screen or the keyboard. The Model 510 can transmit asynchronous data in character and block modes, at speeds up to 19,200 bps. Other standard data functions include horizontal/smooth scrolling, multiple display windows, 2 pages of data memory, and protected fields/forms support.

Each Personal Terminal Model 510 is equipped with a software cartridge that provides the user with an introduction to the Model 510 and training in its use. Two optional software cartridges are also available. The Directory Cartridge doubles the capacity of the local directory (from 100 listings to 200), or it can be used to back-up the local directory; the Security Cartridge performs the function of a software lock to prevent unauthorized access to the terminal.

COMPETITIVE POSITION

Despite predictions of rapid growth at its outset, the market for integrated voice/data terminals (IVDTs) remains slow-moving and only marginally successful. A number of reasons for the disappointing performance of this market have been proffered, including the lack of concrete applications for the devices and the targeting of the executive segment as the prime users of IVDTs. Whatever the reasons, many companies who founded their businesses on the premise that the IVDT market would be a lucrative one have run into financial difficulties.

The most successful of the IVDT vendors have been the PABX makers. Northern Telecom, which founded the IVDT market with the introduction of the Displayphone in 1981, has done reasonably well with the product, selling it in conjunction with their highly successful SL-1 PABX product. Likewise, telecommunications vendors such as ▷

▶ include a 9-inch touch-sensitive display screen; telephone handset with 7-foot connecting cord; built-in speakerphone with on/off button and volume control; telephone dialing pad, phone button, privacy button, and microphone on/off button; message waiting lamp; software cartridge port; and Centronics-compatible parallel printer port. A 72-key, low-profile alphanumeric keyboard is optionally available. The keyboard is retractable, and can be stowed in the terminal's housing when not in use. The Model 510 is a compact device, with dimensions of 11½ inches high, 13¾ inches wide, and 14¾ inches deep, and a weight of 18½ pounds (without the optional keyboard). Optional software cartridges for directory expansion and security functions are available. For data applications, the Model 510 conforms to the ANSI X3.64 standard for command codes.

TRANSMISSION SPECIFICATIONS

The AT&T Personal Terminal Model 510 provides four line appearances plus a dedicated data line. Voice and data may be simultaneously transmitted over a single line to the AT&T System 75 or System 85 PABX. An asynchronous integrated digital data module provides for asynchronous data transmission over the PABX, in character or block modes, half- or full-duplex, at speeds from 300 to 19,200 bps. Parity checking is provided, along with flow control and answerback. A Centronics-compatible parallel printer port is included.

The Personal Terminal Model 510D must be plugged into a 110-120 V outlet. The digital voice terminal is connected via a standard 8-position modular jack for connection to AT&T System 75 or System 85 Digital Communications Protocol. The telephone handset is connected via a standard 4-pin modular jack. The optional alphanumeric keyboard is connected via an 8-wire keyboard jack in the rear of the unit. The Personal Terminal Model 510A provides two modular jack connections for analog lines.

For more information on the AT&T Information Systems, System 85, see Report TC07-070NV-101. For more information on the AT&T Information Systems, System 75, see Report TC07-070NV-301.

DATA FEATURES

An integral digital data module provides the Personal Terminal Model 510 with data terminal capabilities. In data mode, the Model 510 conforms with the ANSI X3.64 standards for command code compatibility. The Model 510 is also compatible with the older AT&T 513 BCT. The Model 510 provides for both character and block mode transmission.

Using the touch screen, one- or two-touch access to the following data features is available: communications with System 75 or System 85 applications processors; access to resident services such as Message Center and Electronic Document Communication; and links to public data bases for access to stock prices, financial reports, and newswires. In data mode, an on-screen keyboard is provided, with touch targets for the simplification of data entry and retrieval. One-touch access to on-line data bases is also provided via the touch screen.

For more intensive data applications, users can optionally add an alphanumeric keyboard to the Model 510. Automatic log-in is provided to AT&T processors and other UNIX-based processors.

Standard data features include 2 pages of data memory; vertical/horizontal smooth scrolling; visual attributes including underline, blank, reverse video, and half-intensity; multiple screen windows; 40/80/132-column display modes; ▶

AT&T Personal Terminal Model 510

➤ AT&T, Rolm, InteCom (in a joint venture with Wang), Mitel, GTE, and ITT Telecom have all introduced IVDTs as an add-on device for their PABX lines. It is primarily these vendors who have found, at least for now, a viable market for these products.

AT&T has unveiled a number of IVDTs for use with their PABX systems, including the Dimension, System 85, and System 75. These include the 515 BCT, an intelligent IVDT that could be downloaded to emulate a number of different ASCII terminals. However, the Personal Terminal Model 510 is technologically superior to these earlier IVDT products. The Model 510's touch-screen capability makes it the first IVDT on the market to utilize this technology. With the number of features that most IVDTs are designed to access via a single keystroke, the implementation of a touch screen for this type of device is a logical and smart step. In fact, it would seem that touch-sensitive screens are ideal for the types of applications for which IVDTs are designed. We feel that the Personal Terminal Model 510 will carve itself a respectable niche in this marketplace, not only because of the strength of AT&T, but also due to its technological advantages.

ADVANTAGES AND RESTRICTIONS

As we have just mentioned, the most attractive feature of the Model 510 is its touch-sensitive screen. AT&T has patented the screen used on the Model 510; it is a "soft" touch screen, that provides improved tactile feedback over most conventional touch screens available today. The screen implements a silicon gel that gives the screen a soft, cushiony feeling. When a target is pressed, the screen actually gives, providing the user with positive tactile feedback. In addition, visual feedback is supplied; the targets, when they are touched, change from circles to squares. These 2 features virtually eliminate the chance for an input error using the touch screen. The screen is also designed so that it will not go out of alignment. Unlike other touch screens, that use a separate grid of light beams on top of the screen, the Model 510's screen uses the light from the gun that paints the screen.

For ease of use, the Model 510 is unmatched by any other comparable product. When the "Phone" button on the terminal console is depressed, the phone mode screen appears. The phone mode screen includes 4 line appearances, each of which is activated by touch. Status displays tell the user if a line is idle, active, or on hold. Also displayed are messaging functions, targets for programmable System 75/85 features, and 8 touch blocks that provide menus for additional functions. Three of these blocks provide access to the local directory, time manager, and calculator.

For data functions, the screen provides one-touch access to private and public data bases. For more intensive data applications, an optional keyboard is available. Additional software cartridges provide the Model 510 with training courses for new users, additional directory space, and security features.

▶ protected field/forms support; and separate user- and host-programmable screen labels.

VOICE FEATURES

The voice features on the Personal Terminal Model 510 may be used in the traditional manner, or via the touch screen. For traditional use, a telephone dial pad is provided on the terminal console. The integral handset may be used; for hands-free operation, the speakerphone button activates the built-in speakerphone. The microphone on/off button provides the caller with privacy.

For touch screen operation, the user presses the phone button on the console. The screen is then activated, providing the user with a menu of operations which are activated by touching a "target," or touchpoint, on the screen. The target appears as a circle; once pressed, the circle becomes a square, providing the user with visual confirmation that the target has been pressed and its associated function activated.

The activated touch screen has 4 distinct parts. The top part of the screen provides the 4 telephone line appearances; the state of the line (idle, active, or hold) is displayed by a status message next to the line display. Calls from and to individuals within the company are also identified. To the right of the line appearances, displays provide call notifications and preset time alarms. Below that are touch targets for Conferencing, Transfer, Drop, and Hold functions.

The second section of the screen provides the messaging functions. When the Message Waiting lamp on the terminal console lights, the user can retrieve the message by touching a target on the screen. With Unified Messaging (available on the System 75/85), this includes all items addressed to the user's electronic mailbox via Message Center Service, AUDIX, Electronic Document Communication, and Leave Word Calling.

Below the messaging section are 9 touch targets that may be programmed for any System 75 or System 85 application desired.

At the bottom of the screen are 8 menu blocks, that generate menus for additional Model 510 functions. These include 3 resident services:

- **Time Manager**—maintains a list of daily objectives and acts as a personal reminder system, with audible alarms;
- **Calculator**—converts the screen to a calculator for mathematical calculations; and
- **Local Directory**—maintains a personal list of up to 100 names, addresses, and telephone numbers, or automatic log-ins to data bases. Numbers from the local directory can be dialed via a single touch of the target beside the name displayed on the screen.

Two optional software cartridges are available to plug into the Model 510. The Directory Cartridge doubles the number of listings in the local directory from 100 to 200; it can also serve as a backup device, for the copying of an entire directory, specified directory group, or the Time Manager service. The Security Cartridge performs the function of a software lock to prevent unauthorized access to the terminal and its functions. An electronic serial number from the cartridge is stored in the terminal; to change the password, the user must insert the security cartridge with the same electronic serial number. On-screen privacy is provided by the privacy button; when it is depressed, the entire screen is blanked.

AT&T Personal Terminal Model 510

➤ As an IVDT product, the Personal Terminal Model 510 is a functional and easy-to-use addition to a System 75 or System 85 PABX. The only drawback of the device, or of AT&T's IVDT product line, is the lack of local processing capabilities (such as those found on the Rolm Cedar). Look for AT&T to introduce a PC-compatible IVDT (possibly based on the 6300 PC) in the near future. □

► COMPONENTS

CRT DISPLAY UNIT: The Personal Terminal Model 510 includes a 9-inch (diagonally measured) display screen. The display format is 27 lines of 80 characters each; separate user- and host-programmable screen labels are displayed at the bottom of the screen. Characters are displayed in green phosphor on a black background, and formed using a 6-by-10 dot matrix in an 8-by-12 dot cell. Visual attributes available include underline, blink, half-intensity, and reverse video. A 256-character set is displayable.

The Personal Terminal Model 510's display screen is touch-sensitive; both voice and data applications may be accessed via the touch screen. The screen provides a menu of functions in both phone and data modes. These functions are activated by touching a "target," which is represented by a circle on the screen. The Model 510 has a patented "soft" screen; a silicon gel is used to give the screen a cushiony feeling. Thus, the user is provided with tactile feedback when using the screen. In addition, when a target is touched, the circle is transformed into a square, verifying that the target has been touched and the associated function accessed.

HANDSET/SPEAKERPHONE: An integral telephone handset (R-handset) is located to the left of the display screen on the Model 510. A built-in speakerphone is located below the display screen, on the right-hand side of the display console. Speakerphone volume control is also included.

UPPER KEYBOARD: Various keys are available on the display console of the Model 510. A standard 12-key tele-

phone dial pad is located just to the right of the R-handset. Just above the dial pad are located the Phone button (which activates the phone mode screen display), Privacy button (that provides security by blanking the display), and Message lamp (which indicates that a message is waiting). Located above the built-in speakerphone are the Speakerphone On/Off button (which enables hands-free operation) and the Microphone On/Off button (mute). Lamps indicate the status of the speakerphone and microphone buttons.

ALPHANUMERIC KEYBOARD: An alphanumeric keyboard is optionally available for use with the Personal Terminal Model 510. The keyboard contains 72 keys in a typewriter-style layout, including cursor control keys, 8 function keys, and a Dial It key, which allows for one-key dialing of numbers from the keyboard. The keyboard has a low-profile design, is detachable, and stows under the terminal console when not in use.

PRICING

The Personal Terminal Model 510 is available for purchase, only, through AT&T Information Systems' direct sales; the customer has the option of installing the unit or contracting for installation with AT&T Information Systems. The Model 510 carries a one-year warranty from the date of purchase; during the warranty period, AT&T-IS will replace any defective part free of charge. After the warranty period, AT&T-IS offers several Equipment Maintenance Agreement Plans, including both per-occurrence and contract plans. For maintenance service, the AT&T Information Systems Service Organization can be contacted by calling 1 (800) 922-0354.

EQUIPMENT PRICES

	Purchase Price (\$)
Personal Terminal Model 510	1,795
Alphanumeric Keyboard	100
Directory Cartridge	70
Security Cartridge	50 ■