

IBM 3270 Series

Information Display System

■ PROFILE

Function • standalone and cluster display terminal system employed in inquiry/update, data entry, program development, graphics, and local personal computing • all processing and database services handled by host computer unless personal computer option is employed.



Architectures Supported • used with IBM S/360, S/370, 3030, 3081, 4300, 8100, and S/3 processors • 3790 Communications System supported by 3276 control unit • S/370, 4300, and 8100 function under SNA/SDLC architecture • S/360, S/370, 4300, and S/3 operate under BSC • 8100 loop local architecture supported by 3274-51C and 61C • local attach via I/O channels, integrated adapters, direct loop or communication channels at rates up to 650K cps • directly attached 8100 loops operate at 9600 or 38,400 bps under SDLC • remote attach by nonswitched private or switched dial-line communication facilities in BSC/SDLC half-duplex at rates up to 9600 bps for BSC and 56K bps for SDLC.

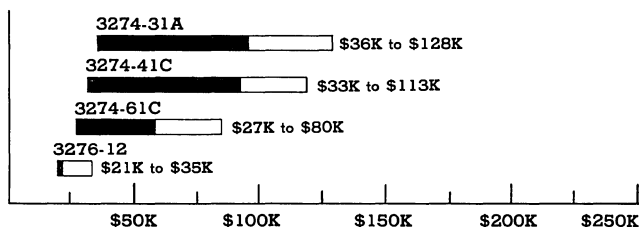
Communications • CICS/VS under ACF/VTAM/VTAME/TCAM for OS/VS and DOS/VS • IMS under BTAM and ACF/VTAM • single link, dedicated line at 1200/2000/2400/3600/4800/7200/9600 bps, half-duplex over half- or full-duplex facilities, BSC or SDLC • Models 51C and 61C operate half-duplex over switched facilities at 1200/2400/



The 3270 permits up to 32 users to simultaneously access host facilities. While designed primarily for inquiry/update applications, users may attach personal computers to off-load processing from the mainframe.

PURCHASE PRICE RANGE

hardware & software 
5-yr maint/serv fee 



IBM 3270 SERIES PURCHASE PRICING bar graphs cover price ranges between "small" and "large" configurations for hardware products (solid bars) and for associated 5-year period maintenance (open bars) • 3274-31A small system consists of a controller with 8 channel adapters, an integrated diskette, 4 Model 3178-C20 keyboard/displays, three 3180 Model 1 keyboard/displays, and a 3287 Model 12 printer; large configuration consists of basic controller with 16 additional channel adapters, integrated diskette, 8 Model 3178-C20 keyboard/displays, eight 3180 Model 1 keyboard/displays, 3 Model 3179 displays and associated keyboards, 2 Model 3287-12 printers, a Model 3287 Color Printer, and a Model 3262 Line Printer • 3274-41C small system consists of a controller with 8 channel adapters, integrated diskette, 4 Model 3178-C20 displays, two 3180 Model 1 displays, and a 3287 Model 12; large configuration consists of basic controller with 16 additional channel adapters, integrated diskette, 8 Model 3178-C20, eight 3180 Model 1 displays, 3 Model 3179 displays and keyboards, two 3287 Model 12, a 3287 Color Printer, and a Model 3262 • 3274-61C small system consists of a controller with 16 channel adapters, integrated diskette, 4 Model 3178-C20 displays, two 3180 Model 1 displays, and a 3287 Model 12; large configuration consists of basic controller plus integrated diskette, 8 Model 3178-C20 displays, 3 Model 3179 displays and keyboards, two 3180 Model 1 displays, two 3287 Model 12 displays, and 3287 Color Printer • 3276-12 small configuration consists of basic 3276-12 keyboard/display controller, 4 additional channel adapters, 2 Model 3178-C20 displays, two 3180 Model 1, and a 3287 Model 12; large configuration consists of basic unit plus 7 additional channel adapters, 4 Model 3178-C20, 2 3180 Model 1 displays, and a 3287 Model 12 • all prices shown in bar graphs reflect single-quantity purchase prices; the actual prices will be lower since the vendor offers quantity purchase price discounts.

4800/9600 bps • all operate at speeds up to 56K bps, point-to-point and multipoint where facilities exist • Models 51C and 61C operate in half-duplex mode at 9600 or 38,400 bps over direct attach loop, and 2400/4800/9600 bps over data link attached loop • X.21 supported by Models 41C, 51C, and 61C under SDLC at speeds of 2400/4800/9600 and 48K bps • X.25 supported by 31C, 41C, 51C, and 61C at 9600 bps • ASCII/EBCDIC codes • RS-232C interface; DDS and CCITT V.35 interface optional • integrated 1200-bps modem for dedicated line standard; higher speeds optional.

Operating System • service through host processor under DOS, DOS/VS, DOS/VSE, OS, OS/VS, VM/370.

Database Management • none; only in association with host IMS/VS and CICS/VS facilities.

Transaction Processing • primarily through CICS or IMS which acts as terminal-oriented transaction monitor with file processing facilities • supports send/receive batch and inquiry tasks.

Support Software • supported by and employs software and program facilities of host processor • no local independent (from host) off-line programming/processing capabilities • system diagnostics checks DTE and DCE.

Terminals/Workstations • up to 32 CRTs and printers per cluster.

First Delivery • 1971 to 1984 dependent on specific controller, display, printer model, or component.

Systems Delivered • over 1,000,000 (terminals).

Comparable Systems • emulated by large number of PCs; most prominent systems are Davox 100, 2000, and 5000, Lee Data 300/400, NCR 7950, Harris Challenger Series, ITT Courier 270 and 9000 Series, Memorex 2070, Telex 270, MDS 9000 Series, and Braegen Elan • other manufacturers offer replacement

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display or printer models compatible with 3270 control units.

Vendor • International Business Machines (IBM) Corporation, Information Systems Group • National Accounts Division; 1133 Westchester Avenue, White Plains, NY 10604; 914-696-1900 • National Marketing Division; 4111 Northside Parkway, Atlanta, GA 30327; 404-238-2000.

Canadian Headquarters • IBM Canadian Limited; 3500 Steeles Avenue East; Markham, ON L3R 2Z1 • 416-474-2111.

Distribution • worldwide via local IBM sales/service offices; also marketed in conjunction with IBM S/3 processors.

GSA Schedule • listed.

■ ANALYSIS

The 3270 is now in its 14th year of production, and remains one of the most widely used and emulated product lines on the market. And for good reason; it is an effective vehicle for sharing resources in a clustered terminal environment.

In the 3270 marketplace, IBM competes with 15 primary vendors offering some 78 products (see report 0722). For the most part, competitive offerings are replacements for the 3274/3276 controllers and/or the 3178, 3179, 3180, 3278, and 3279 terminals. In addition to these primary vendors, a new breed of competitor called protocol converters has surfaced in the past few years that offers a 3270 alternative in the form of product emulation and protocol conversion (see report 737). These emulators/converters are generally priced far below comparable IBM products, and permit low-cost ASCII terminals and printers to be used in lieu of the higher-priced 3270 products.

Another level of competition comes from the marriage of personal computers and device emulator. Here, a PC is fitted with firmware/software that allows the unit to "appear" to be a 3270 controller with an attached 3270 terminal. This combination allows users to access an IBM host to avail itself of its services, yet provides local autonomous processing services. For the most part, this PC/emulator combination is used for remote sites that cannot justify the cost of a 3270 system.

While the aforementioned protocol converters might eventually become strong 3270 competitors, the primary vendors still present the greatest challenge to IBM. Companies like ITT Courier, Telex, Lee Data, Harris, MDS, and Davox all offer strong—and in many cases—inventive products. One of the most innovative vendors is Lee Data. It was the first to offer a multihost communication facility; an "all-in-one" terminal emulating all of the display characteristics of the IBM 3278-2 through -5; plus the capability to switch from asynchronous to 3270 mode via a single terminal. While IBM now offers a comparable all-in-one product in the form of the 3180, it has yet to respond to Lee Data's other innovations.

While innovation might establish a reputation, it doesn't necessarily guarantee market domination or, for that matter, large market share. Price and compatibility do. ITT Courier, second only to IBM in market share, sells its products based on price plus a solid reputation for product reliability and service. Telex, Memorex, and Beehive also sell on these tenets, plus true **plug compatibility** with IBM. Any Telex 270 Series controller/terminal/printer, for example, will work with IBM products. For example, a Telex 278X terminal (a 3278 replacement) will plug into a 3274/3276 controller. Likewise, a Telex 274 controller will interface 3270 terminals.

The marketing strategy behind plug compatibility is two pronged. First, it provides the vendor with the opportunity to replace 3270 systems with absolutely no modification to the user's operations. Second, it expands marketing opportunities by replacing individual components of the 3270. With most IBM competitors, such piecemeal replacement is **not** permitted. ITT Courier and Harris, however, have modified their stance on this issue by announcing true plug compatibility. The Harris Challenger is allegedly plug compatible at every level, and the new ITT Courier 1778 will attach to a 3274/3276 as a 3178 replacement.

With several companies offering plug-compatible products, end users should prepare themselves for a round of "bare knuckles" marketing. Here, vendors increase market share by capturing

other vendors' customers through, among other things, price slashing. While end users will benefit from this coming war by paying less for products, many of the smaller or less financially stable companies will not survive. We all lose when that happens.

As for IBM's plans for the 3270, it would not be surprising if IBM furnished a multihost addressing controller, and a terminal that facilitated switching between asynchronous and 3270 modes. IBM recognized the importance of ASCII handling when it introduced the 7171 Control Unit late last year. The 7171 attaches to a local 43XX or 308X block multiplexer channel, and emulates 1 or 2 IBM 3274D control units to the host processor. Up to 64 ASCII devices operating at rates ranging from 300 to 19.2K bps can attach to a 7171.

The multihost addressing facility, first introduced by Lee Data and now available with Harris and Telex units, allows the user to access different hosts at the same or different locations. Undoubtedly, IBM would rather sell a separate controller for each host, but it realizes that the multihost feature will become inevitable as companies move towards distributed processing. IBM might even do the competition one better by allowing peer-to-peer addressing at the controller level.

□ Strengths

While the 3270 has long enjoyed a prominent position in the marketplace, IBM has had to significantly enhance the product over the past few years to retain its market position. For example, the 3274 C models can interconnect to X.25 public data networks; the protean 3180 was introduced to satisfy the needs for extended data formatting; and a response-time monitor was added to increase communication efficiency.

The 3180 is an extremely versatile terminal, allowing users to switch between 80-/132-column formats directly from the keyboard. This terminal incorporates all of the functionality of the current 3278 Models 2 through 5, yet is priced between Models 4 and 5. The ability to switch column formats makes the product very attractive to those needing both conventional 80-column display format, and the facility to handle 132-column applications like spreadsheets. It also allows users to view a typical 132-column printing line before the actual print operation.

Users of the 3180 will also benefit from its 7680-character scroll buffer. With it, vertical scrolling can be performed **without** intervention from the host processor. The 3180 also has a record/playback function that allows up to 96 keystrokes to be saved and recalled on command.

Another enhancement to the 3270, also implemented via the 3180, is a local print capability. Users can transfer data from the screen **directly** to a cluster-attached printer **without** host intervention. While local printing is a significant improvement, a 3180 printer interface for direct printer attachment, such as offered by the competition, would be an even greater improvement.

The X.25 allows Models 31C, 41C, 51C, and 61C cluster controllers to interface with the many X.25 data services now on the market. Transfer speeds are 9600 bps. IBM is no stranger to the X.25; it has been offering this service to Canadian customers and some U.S. Government agencies for about 5 years. If it follows the same conventions with this version, the SDLC message frame is wrapped in an X.25 envelope.

Another communication enhancement, offered with 3274 controllers, is a response-time monitor. Basically this facility measures and records the transaction time between an inbound host attention and user-defined transaction end. This facility should benefit users who need to be alerted to degrading or poor response time. Currently, Lee Data, Telex, and Davox have similar facilities.

The 3270 is one of the few products in its class to offer high-level data protection. Through an encryption/decryption facility, data transmitted between systems employing 3274/3276 controllers are encoded via a combination of hardware and software. The encryption technique itself is an IBM implementation of the Federal Data Encryption Standard (DES). Two additional security features are a keylock facility and user identification card reader. The latter can be used to establish an audit trail and/or billing.

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A personal computer option supports the 3270 as an intelligent workstation. This upgrade appeals to users that are now demanding facilities for local processing and file transfers. In addition, users can take advantage of the mountain of application packages now readily available for the 5150 personal computer and 3270 PC.

For distributed users, the 3270 offers 2 features which speed communication. The first is the ability to concurrently transmit and receive messages; the second is broadcast polling. With the latter, the local control unit may generate a poll instruction which interrogates all attached terminals. This greatly reduces polling overhead and optimizes the use of the communication line.

The ability to simultaneously send and receive messages optimizes the high-speed link through full-duplexing. Unfortunately, this facility can only be implemented when 2 or more SDLC devices are multidropped and attached to 3704 or 3705 front ends.

Another strong point of the 3270 is its diagnostic software. With it the user can check the operation of the local components (DTE) and to a degree the integrity of the high-speed link (DCE). The latter is accomplished via interface check (local and remote) test messages generated at the host, and the logging of line error statistics. Further DCE link tests, of course, can be initiated via the modem's diagnostics.

□ Limitations

While a multihost communication facility may be on the horizon, the 3270 does not offer it, while Lee Data and Harris do.

There are a few alternatives to IBM's single-host attachment restriction, however. The first is to attach IBM's relatively new X.25 interface to the 3274 controller. This allows the user to connect to the packet-switched networks like Telenet or Tymnet and, theoretically, to any computer attached to these networks.

The second alternative involves employing personal computers with an auxiliary EIA RS-232C interface that supports a dial-up modem. Users then can merely switch from 3270 mode to personal computer mode, dial the target computer, and begin communication. This approach is similar to that employed by Davox.

While IBM's personal computer support is a strong move (especially with the 3270 PC), no means exist for sharing the personal computer among many users. Sharing is attractive for a number of reasons. First, personal computers are expensive and the cost multiplies as additional users obtain them. Second, since the 3270 PC emulates 3278/3279 terminals, a fair amount of time the personal computer may not be used in its native mode. Davox's solution to this inefficiency is to attach a personal computer to a cluster controller port, and allow all attached terminals to share it. Obviously, this facility will prove unacceptable to users with heavy personal computer requirements. However, for those occasional users, it makes sense.

The facility for handling remote dial-up terminals surfaced a few years ago when it was introduced by one of the protocol converter vendors. It proved to be the right product at the right time, judging by its sales success. This facility allows users remotely located from the cluster controller to dial-in and obtain the same services as a locally attached terminal. As more and more remote terminals and personal computers come into play, dial-up support will become mandatory.

IBM supports remote dial-in with its Model 7171 controller, used to interface asynchronous terminals to the 43XX and 308X processors. It should also be added to the 3270.

Neither IBM nor its competitors permit peer-to-peer addressing on a local level. Thus all transactions must be handled by the host processor. IBM may be taking steps to eliminate this restriction via its recently announced SNA LU6.2 protocol. LU6.2 allows program-to-program communication between all network nodes, including host-to-host, peripheral-to-peripheral (such as Displaywriter-to-Displaywriter, and host-to-peripheral). Currently, LU6.2 is available in 5 SNA programs: CICS, System/38, Displaywriter, Scanmaster I, and the 5520. Hopefully, it will be extended.

When up to 32 devices are operating online, every bit of the available bandwidth must count. A data compression capability provides such a service by eliminating unnecessary data such as zeros, blanks, and redundant characters. The 3270 could certainly benefit from this capability.

A final limitation of the 3270 is its inability to store locally, frequently used screen formats. Each time a format must be changed, the user must invoke a request to the host. This wastes host resources and increases delays and communication costs. Telex provides a local format facility.

■ COMMUNICATIONS FACILITIES OVERVIEW

□ Distributed Communications

The S/360, S/370, 3030, 3081, and 4300 operate under BTAM, BTAM-ES, TCAM, ACF/TCAM, VTAM, ACF/VTAM, ACF/VTAME, EXTM.

BTAM and BTAM-ES (Basic Telecommunications Access Method and BTAM Extended Support) provides control for data transfer between processor storage and local/remote BSC 3270 terminals. It also provides the application program with macros assembled into routines, inline instruction and linkages, and control blocks and tables used in defining lines, terminals, and other options to be used.

BTAM & BTAM-ES • support facilities for generating channel programs; starting I/O operations; handling attentions; handling line interrupts; and performing error recovery, posting, and counting • allows user to route data into display/prINTER buffer; to erase buffer and write data; to erase all unprotected fields in buffer; to read data from buffer or specified buffer location; and to read modified field from buffer or specified buffer location • under DOS and OS, support only provided for 1920-character buffers under local 3274 terminals; full compliment of buffer sizes are supported under remote BSC 3274/3276 attachments, however • BTAM-ES accommodate all buffer sizes under DOS/VSE or on 4300 Series processor.

TCAM & ACF/TCAM • controls transfer of messages between TCAM and application programs, and provides high-level message control language • macros used to construct message control program that controls messages between local and remote stations and application • ACF/TCAM offers optional multisystem networking feature; TCAM runs under OS and OS/VS; ACF/TCAM operates under OS/VS • TCAM macros support 1920-character buffers • ACF/TCAM supports all buffer sizes (up to 3,564 characters), but will not support 3274 local SNA attachments.

VTAM • operates with 3704/3705 in local or BSC/SDLC environments • establishes, controls, and terminates access between application programs and devices, and permits applications to share lines, controllers, and devices • controls movement of data between application programs and devices, and provides facilities which allows communications network to be monitored and altered.

ACF/VTAM • extends VTAM support by altering size of buffer pools to meet traffic loads; buffer sizes ranging from 480 to 3,564 characters (except under DOS/VS) supported • paces flow of messages between application programs and logical units • permits flow of data between interconnected communications controllers without having to pass through host attached to intermediate controllers • provides tuning statistics function that permits dynamic accumulation of data about I/O interface to local communications controller or 3790.

ACF/VTAME • supports Communications Adapter of 4331 processor and for various channel-attached devices, and provides key ACF/VTAM/NCP/VS functions including multiple-domain networks • supports extensions to 3270 data stream, permitting extended color, extended highlighting, programmed symbols, and structured fields.

EXTM (Extended Telecommunications Modules) • feature of CICS/DOS/VS provides linkage between CICS/DOS/VS and communications network • establishes, controls, and terminates communications between CICS/DOS/VS application programs and terminals; transfers data between application program and

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terminals; and monitors/alters network • operates with SNA and some pre-SNA terminals, and supports BSC or SNA/SDLC • buffer sizes supported by EXTM range from 480 to 3,440 characters.

□ Distributed Configurations

The 3270 is made up to 3 components—control unit, associated display terminal(s), and associated terminal printer(s). Cluster configurations of the 3270 are built around 3274 Control Units or 3276 Control Unit Display Station. These controllers provide control, buffer, and multiplexing capabilities for a cluster of other directly attached 3270 family display terminals and printers, which include 3178, 3180, 3277, and 3278 Display Stations; 3179 and 3279 Color Display Stations; 3290 information panel; 3262, 3268, 3287, 3289, and 5210 printers.

Each 3270 controller or terminal has, in turn, a number of model options that allow display system to be tailored to specific requirements of user and host processor. Dependent on host system and 3270 controller option, local, remote, or loop attachment facilities are provided. BSC and SDLC remote communications protocols at rates of up to 56K bps are provided. The following outlines the display cluster maximums of the 3270 and the processors to which they may be attached.

3274-Based Clusters • clusters 8 to 32 terminals (3178/3180/3277/3278 displays, 3179/3279 color displays, 3287 printers, and 3289 line printers) • up to 31 3290s; each require 1 physical port and up to 5 logical addresses depending on screen partitioning (see 3290 description) • local/remote attachment to IBM S/360 Models 30, 40, 50, 65, 75, and 195; any S/370; any 3030 or 3081; and any 4300 • remote and direct loop attachment to any 8100 • remote and local communications channel attachment to S/3 Models 4, 8, 10, 12, 15, and 15D • BSC to 9600 bps; SDLC to 56K bps • up to 32 Model 6580 Displaywriter Systems with no associated printers may also be attached; supports up to 16 Displaywriters with printers • supports up to 32 3270 Personal Computers.

3276-Based Clusters • clusters of up to 8 terminals (integral 3276 display plus 3178/3280/3278 display, 3179/3279 color displays, 3262, 3268, 3287, and 3289 printers) • local/remote attachment to the IBM S/360 Models 30, 40, 50, 65, 75, and 195; any S/370; any 3030 or 3081; and any 4300 • remote and direct loop attachment to any 8100 • remote and local communications channel attachment to S/3 Models 4, 8, 10, 12, 15, and 15D • BSC/SDLC to 9600 bps • accommodates up to 7 Model 6580 Displaywriter Systems with no associated printers; up to 3 Displaywriters with printers; or up to seven 3270 Personal Computers.

□ Distributed Utilities

IBM S/360, S/370, 3030, 3081 & 4300 Processors

DEMF (Display Exception Monitoring Facility) • provides for network problem determination and isolation in BSC mode under OS/VS.

DIDOCS (Device Independent Display Operator Console Support) • provides uniform services for all displays on OS and OS/VS systems • DIDOCS establishes linkage between displays and systems allowing displays to function as operator consoles; provides for processing and routing of messages from operating system or application program to console in multiconsole environments; and extends such support to 3270 printers operating as output-only hardcopy consoles.

NPDA (Network Problem Determination Application) • provides for network problem definition and isolation in BSC/SDLC modes under VTAM or TCAM.

SDS (Status Display Support) • provides system status display services for both display and nondisplay consoles.

IIS (Interactive Instruction System) • provides interactive online training capabilities for 3270 database/communications systems users under IMS/CICS/TCAM.

SLR (Service Level Reporter) Version 2 • monitors and reports level of service provided users • reports system and subsystem availability • provides performance data such as processor

utilization, paging, channel load related to IMS/VS, CICS/VS or TSO response times or transaction load • provides data on utilization channels, DASD, tape and printers • operates on 3276 Models 2, 3, 4, 12, 13, or 14; 3277-2; 3178; 3278-2, -3, -4, or -5; 3279-2A or -3A.

IBM 8100 Processors

DSC (Data Stream Compatibility) • provides direct communications between displays or printers and 8100 via local/remote loops, direct-loop attachment, or remote links and host 370.

■ SOFTWARE

The 3270 operates under control of local/remote host processor software; the following briefly summarizes software support under such host controlled environments.

□ Operating System

IBM S/360, S/370, 3030, 3081 & 4300 Processors

The 3270 operates under OS, DOS, OS/VS1, OS/VS2(SVS), OS/VS2(MVS, MVS/SE, MVS/SP), DOS/VS, DOS/VSE, and VM/370(VM, VME, VM/BSE, VM/SP) in conjunction with other systems software and programs.

TSO (Time Sharing Option) • provides for local/remote 3270 timeshared operation under all OS/DOS or communications/OS/DOS facilities.

TSO/E (Time Sharing Option/Extended) • incorporates all functions of TSO • complements full-screen System Productivity Facility (SPF) • operates in MVS/370 or MVS/XA environment.

IBM 8100 Processors

The 3270 operates under DPPX (Distributed Processing Programming Executive) general-purpose operating system, and DPCX (Distributed Processing Control Executive) multitask interactive operating system.

IBM S/3 Processors

The 3270 operates under 570-SC (Systems Control) series software in conjunction with other program facilities.

□ Data Management

IBM S/360, S/370, 3030, 3081 & 4300 Processors

ATMS-II (Advanced Text Management System II) • provides conversational text processing capabilities, allowing the terminal to enter, edit, store, format, proof, and present textual material.

ACP (Airline Control Program) • special-purpose standalone combination operating system and database management system for airlines • provides for real-time (under 3 seconds) transaction processing in inquiry/update mode with large centralized database.

CICS/VS (Customer Information Control System/VS) • general-purpose communications/database system that provides an interface between operating system, access methods, and applications programs • has facilities for file inquiry, browsing, order entry and distribution, data entry and collection, and message switching/broadcasting in local/remote environments • usually operates in conjunction with DL/1, but IMS version also available.

IMS & IMS/VS (Information Management System) • IMS is program product supported by OS/BTAM allowing user to define message formats and associated screen image formats, and for message transmission between terminal and application program without regard for device characteristics • IMS/VS communications/database program product supports user-written batch processing and teleprocessing tasks; provides database and communications management for multiple applications employing common database.

DL/1 • stripped-down compatible version of IMS/VS designed to run under DOS/VS or DOS/VSE in conjunction with CICS/VS.

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SQL/Data System • limited function relational database system designed to complement DL/1 under DOS/VSE; includes extract feature which enables users to copy portions of DL/1 into an SQL/DS table.

STAIRS/VS (Storage & Information Retrieval System) • provides for terminal-oriented, multiuser storage/retrieval operations, and for batch processing under OS/VS; previous queries made under STAIRS/VS may be referred to or extended, and take the form of simple language statements to extended Boolean logic.

Personal Services/370 • allows preparation, storage, retrieval, and dissemination of messages and office correspondence both within a single DISOSS/370 environment and across multiple DISOSS/370 systems • used with Entry Assist RPQ#8K1147 available on 3274C model controllers • allows documents to be displayed on 3270 terminals with 80-column format; prints documents on 3270 and SCS printers (3268-2, 3286-2, 3287-2) under CICS/VS • works in conjunction with DISOSS/370 Version 3 Release 2, under MVS/SP or VSE and CICS/VS.

IBM 8100 Processors

DTMS (Data Base & Transaction Management) allows for database and transaction processing management.

□ Communications/Networks

IBM S/360, S/370, 3030, 3081 & 4300 Processors

BTAM & BTAM-ES (Basic Telecommunications Access Method & BTAM Extended Support) • provides control for data transfer between processor storage and local/remote BSC 3270 terminals • provides application/problem program with macros assembled into routines, inline instructions and linkages, and control blocks and table defining lines, terminals, and other devices to be used • support tended to 3270 includes generation of channel programs, starting I/O operations, handling attentions and line interruptions, and performing error recovery, counting and posting • allows display to write data into display/prINTER buffer; to erase buffer and write data; to erase all unprotected fields in buffer; to read data from buffer or specified buffer location; and to read modified fields from buffer or specified buffer location • supports 1920-character buffers for local 3274 attachment under real-memory versions of OS and DOS; all buffer sizes accommodated for remote BSC 3274/3276 attachment • BTAM-ES extends support to DOS/VSE environments, and to 4300 series processors; all buffer sizes are accommodated.

TCAM & ACF/TCAM (Telecommunications Access Method & Advanced Communications Function TCAM) • supports 3270 in either local or BSC/SDLC remote environments for data transfer between processor storage and display terminals • TCAM macros construct control program that governs messages between local/remote terminals and applications programs • ACF/TCAM add facilities for multisystem networking as well as expanding TCAM functions • TCAM macros define equipment configuration at facility and buffers necessary for message processing; functional macros select TCAM modules that route and edit messages, and check for message errors • support tended to 3270 by TCAM control systems includes auto insert/delete of line control characters; assignment, use and release of buffers during program execution; incoming/outgoing message edit; message error handling; and message traffic statistics maintenance • allows device scheduling under control program on general or specific polling basis • online test capability allows diagnostic testing on one control unit while other units continue processing • TCAM macros only support 1920-character buffers; ACF/TCAM supports all 3270 buffer sizes, but will not support 3274 for local SNA attachment • TCAM operates under the various real memory OS versions and the various virtual memory OS/VS operating systems; ACF/TCAM functions only with OS/VS.

VTAM, ACF/VTAM & ACF/VTAME (Virtual Telecommunications Access Method, Advanced Communications Function VTAM & VCF/VTAM Entry) • supports 3270 in local or BSC/SDLC remote environments for data transfer between terminals and applications programs • VTAM operates

with 3704/3705 communications controllers, eliminating considerations of communications lines and controllers in application program coding • services provided include access control between device and applications programs; data transfer between device and program; allowing programs to share lines, controllers and devices; and allowing network monitoring and alteration • ACF/VTAM extends support by allocating main storage for buffer pools according to message traffic loads and availability of storage facilities; accumulating and displaying data on network status and resources; allowing data flow through multicontroller network without recourse to host system; and providing program-to-program communications facilities • VTAM operates under OS/VS and DOS/VS, and supports 1920-character buffers; ACF/VTAM is supported by OS/VS, DOS/VS, and DOS/VSE, and accommodates all buffer sizes; ACF/VTAME works with DOS/VSE, and supports all buffer sizes and 4331 attachment.

6580 Displaywriter System 3270 Attached Workstation • allows Displaywriter to emulate 3278 display and 3287 printer • attaches to 3274 Control Unit or 3276 Control Unit Display System • Displaywriter attaches to 4321 and 4331 Processors and 4701 Finance Communications Controllers via integrated adapters supporting 3278-2 and 3287-1 and -2.

Video/VS • allows data entry from 3270 terminals while permitting concurrent use of computers for other applications • version available for DOS/VSE (5796-PYT) and OS/MVS (5796-PYX) under CICS • permits full use of color with 3279 terminals.

Remote Spooling Communications Subsystems (RSCS) • RSCS Networking Version 2 accepts spooled output from Graphical Data Display Manager (GDDM) Release 3 (or later releases) and prints it on a 3270 printer; terminal need not be attached to the terminal of the CMS user invoking GDDM • SNA printers must be via LU3 session, or an SNA-character string data stream when connected to LU1 session • requires VM/SP Release 4 for processor-dependent function; SNA support requires ACF/VTAM • requires 512K bytes of real storage in non-VTAM environment and 2M bytes in VTAM environment.

IBM 8100 Processors

DPPX/DPCX operating systems provide communications facilities to 8100-to-3270 operations on direct or data link loop attachments.

IBM S/3 Processors

3270 Display Control Feature of S/3 RPG II provide local/remote BSC communications facilities for up to 15 3270-type displays • program feature automatically linked into RPG II application program via SPECIAL file exit capability • features include RPG access to 3270 displays attached by Local Communications Adapter, Local Display Adapter, Integrated Communications Adapter, or BSC Adapter of S/3; auto buffering and queuing of terminal data; display formatting interface for 3270 RPG II coding; and line control.

□ Applications Development Aids

IBM S/360, S/370, 3030 & 4300 Processors

VM/CMS (Conversational Monitor System) • CMS is a VM/370 component that provides general-purpose conversational facility for program development and problem solving in remote timesharing modes.

DMS/VS (Display Management System) • under CICS/VS; will simplify establishment of online use of DMS/VS forms upon which users define data files, display images, and batch utility operations required.

GIS/VS (Generalized Information System) • allows non-EDP professionals to maintain and access information from database systems.

SPF (Structured Program Facility) • provides program development aid for VS2/TSO users equipped with 3270 24/32/43-line EBCDIC terminals configured with 12-user function keys.

IBM 3270 Series

Information Display System

ISPF (Interactive System Productivity Facility) Version 2 • provides a dialog manager for interactive applications, and supports interactive applications (dialogs) in different hosts • runs under MVS/TSO, VM/CMS.

ISPF/PDF MVS (Interactive System Productivity Facility/Program Development Facility for MVS Version 2) • aids in development of applications, including dialogs • uses display terminals in an interactive environment • runs under MVS.

VSPC (Virtual Storage Personal Computing) • operating under OS/VS and DOS/VS allows remote terminal users to perform problem-solving and personal computing tasks, or develop programs.

VS/APL • supported under VM/370 3270 Data Analysis and APL/Text features.

SCRIPT • supported under VM/370 3270 Text feature.

3277 APL Graphics Support • provides APL functions for curve plotting, curve fitting, contour plotting, 3-dimensional geometry • runs on 3277 with Graphics Attachment (RPQ 7H0284).

GDQF (Graphical Display & Query Facility) • allows viewing of CADAM models and APT geometry (PUNCH) files • outputs to 3287/4250 printers.

GDDM & PGF (Graphical Data Display Manager & Presentation Graphics Feature) • allows display of graphic or alphanumeric-graphic formats • PGF via GDDM generates business charts in conjunction with user application program or interactively with the user with no application program requirements • GDDM and PGF operate under CICS/VS, TSO with ACF/TCAM or ACF/VTAM, or VM/370 CMS.

IBM 8100 Processors

DMS (Development Management System) • provides for interactive development of applications via data selection from a file, map definition (display formatting), and application definition operations.

DPS (Distributed Processing Services) • formats displays for applications programs.

■ HARDWARE

□ Terms & Support

Terms • the 3270 is available for purchase, 30-day rental, or 2-year lease basis; 3274 controllers offered on **purchase-only basis** after April 24, 1982 • discounts offered on multiple purchases based on product category • Category A devices consist of 3274 Control Unit, 3276 Control Unit Display Station, and 3290 Information Panel; discounts range from 9 percent for 10 to 19 purchases, 15 percent for 20 to 29, 20 percent for 30 to 44, 25 percent for 45 to 69, 30 percent for 70 to 124, 35 percent for 125 to 174, and 40 percent for 175 or more; for 3274/3276, the 3290 discounts are 6 percent for 25 to 49 units, 9 percent for 50 to 74, 12 percent for 75 to 99, 15 percent for 100 to 224, 20 percent for 225 to 349, 25 percent for 350 to 499, and 30 percent for 500 or more • Category B devices are the 3178/3180/3278 Display Station and 3179/3279 Color Display Station; discounts are 9 percent for 50 to 99 units, 15 percent for 100 to 249, 20 percent for 250 to 499, 25 percent for 500 to 999, 30 percent for 1,000 to 1,999, 35 percent for 2,000 to 2,999, and 40 percent for 3,000 or more • Category D devices are 3287, 3268, 3289 printers; discounts are 9 percent for 10 to 24 units, 15 percent for 25 to 64, 20 percent for 65 to 124, 25 percent for 125 to 249, 30 percent for 250 to 499, 35 percent for 500 to 749, and 40 percent for 750 or more • Category F is the 3299 Terminal Multiplexer; discounts are 9 percent for 15 to 29 devices, 15 percent for 30 to 59, 20 percent for 60 to 99, 25 percent for 100 to 174, 30 percent for 175 to 349, 35 percent for 350 to 499, and 40 percent for 500 or more • price protection plan guarantees no more than a 7-percent increase during second year • lease-purchase plan offered; purchase price will not be less than 45 percent of purchase price used to determine the net purchase option price under the agreement for lease or rental.

Support • IBM markets and supports the 3270 through a nationwide network of local offices • maintenance is bundled into

rental or lease charges, and priced separately for purchased systems • basic monthly maintenance charge stated in following text provides for service availability on a Monday through Friday, 7:00 AM to 6:00 PM, 9 consecutive-hour basis; various extensions to such service for weekends and before/after standard hours are quoted at percentage premiums over the basic rate; full 7-day, 24-hour service adds a 47 percent premium to basic rate • certain modules of the 3270 have been designated as Customer Setup Units (CSU); these include 3274, 41C, 51C, and 61C; 3276 Control Unit Display Station; 3178/3180/3278 Display Stations; 3179/3279 Color Display Stations; 3290 Information Panel; 3299 Terminal Multiplexer; 3287, 3289, and 5210 Printers; once unpacked and in position, such CSUs can be setup and checked out by customer personnel, minimizing time required for going online with unit; remaining 3270 components are installed by IBM personnel • partially bundled; basic training is included in pricing with more extensive instruction at extra cost • the IIS program package also provides interactive online training for IMS/CICS/TCAM facilities • customer carry-in repair, carrier-in exchange, on-site exchange, and IBM on-site exchange maintenance programs offered for certain products; annual maintenance charge • time-and-material maintenance also offered • Display Station service offered in 5 different plans: IBM On-Site Exchange (#9830), Customer On-Site Exchange (#9824), Customer Carry-In Exchange (#9816), Customer Carry-In/Repair (#9821), and Time-and-Material Repair • IBM On-Site Exchange calls for an IBM representative to bring replacement product to customer site and install and test it • Customer On-Site Exchange calls for IBM to deliver product but customer installs and tests it • Customer Carry-In Exchange calls for the customer to deliver the failing product to an IBM service/exchange center and pick up replacement product • Customer Carry-In/Repair calls for the customer to deliver the failing product to an IBM service/exchange center for repair; IBM ships the product prepaid to the customer site • Time and Material calls for IBM to repair product at an IBM repair center.

□ Controllers

The IBM 3270 controllers consist of a family of locally attached (to the host processor) and remotely connected units with from 8 to 32 collocated workstations/printers in any combination. The only restriction is that at least 1 workstation must be included in each configuration.

The current controller lineup consists of the 3274 and 3276. The original 3270 controllers, consisting of the **3271/3272/3275**, are **no longer marketed**. The 3274 controllers are intended for local attachment and consist of Models 21A, 21B, 21D, 31A, 31D, 41A, and 41D. The remote units consist of the "C" Models and include the 21C, 31C, 41C, 51C, and 61C. The 3276 is a remote or local unit.

An examination of the specifications for 21, 31, and 41 models reveals substantial similarity and overlap. For example, the 21 series all have 64K bytes of RAM and accommodate 8 to 32 A/B category workstation/printers. The 31 series are very much the same as the 21, but have 128K bytes of RAM. The 41 series are greatly different. All have 192K bytes of RAM and support up to 32 workstation/printers, but category B devices are excluded. The protocols supported by the family are similar. Models 21A and 31A operate in SNA mode with extended datastream handling capabilities. Models 21D and 31D support 3272-like operations with extended data stream handling while Model 21B provides 3272-like operation only. Model 41A provides SNA operation with extended data stream handling, while 41D provides 3272-like operation with extended data stream handling. All models of the 3274, except the 41 series, contain 8 channels and are expandable to 32; the 41 includes 32 channels.

With the similarity among the products, it's obvious that IBM intends to replace the older 21 and 31 series with the newer 41 models. Unfortunately, IBM offers no upgrades to convert the 21 and 31 to 41 models.

Communication protocols supported by Models 21C, 31C, 41C, 51C, and 61C are the same. All support SDLC when communicating with the S/370 or 4300, and BSC when communicating with S/360. The 51C and 61C communicate with the 8100 Information System using SDLC. IBM also supports

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Models 31C, 41C, 51C, and 61C on X.25 PDNs. Again, given the overall similarities of these products, we expect the 21C, 31C, and 51C to be discontinued in the near future.

The 3276 is a control-unit display station combination that accommodates up to 8 slaved workstations/printers. The 3276 is composed of 8 separate models which differ primarily in the size of the display buffer and protocols supported. Models 1, 2, 3, and 4 offer 960/1920/2560/3440-character buffers, respectively, and support BSC (SDLC is optional). Models 11, 12, 13, and 14 offer identical buffers to the corresponding Models 1, 2, 3, and 4, but support only SDLC. In addition, Models 11 to 14 can operate over the switched public telephone network at speeds up to 4800 bps. IBM provides upgrades across the product line.

Users planning to contract for 3274 controllers based on lease/rental basis should note that all machines shipped after **August 24, 1984** will be available on a **purchase basis only**. In addition, effective **April 24, 1984**, orders will be accepted for **purchase only**. For those reasons, we have deleted rental prices on 3274 controllers.

While IBM does not offer an asynchronous terminal-handling facility as part of its 3270 line, it does offer a protocol converter that emulates the 3274D controllers. Called the Model 7171, it attaches to a local 43XX or 308X block multiplexer channel and interfaces up to 64 ASCII devices. These devices can be connected directly or remotely via switched or dedicated lines. Autobaud detection is also provided.

The user can define terminal types to the control unit through a terminal control table. Control tables are provided for the IBM 3101 Display Terminal, Datamedia 1520/1521/3045, Digital VT100, Lear Siegler ADM3A/ADM31, and Televideo 912/920/950 terminals. The 7171 also supports the IBM PC, System 9000, and other microcomputers running in a mode that emulates a supported ASCII device such as the IBM 3101.

The 7171 also provides 328X printer emulation for ASCII printers. A transparency option allows printers, plotters, and graphic devices to be attached and operate as native ASCII devices. An operator control option allows a password-protected terminal to access terminal status information and display it for diagnostic purposes.

Purchase price and monthly minimum maintenance charge (MMC) are \$12,420/\$229 for the basic 7171 Model 1 ASCII device attachment unit for 16 full-duplex devices; \$830/\$13 for an 8-line increment; \$1,325/\$13 for an 8-line addition; and \$5,705/NA for a spare parts kit.

3274 Control Units

3274 Control Unit Models 21A, 21B, 21C, 21D, 31A, 31C, 31D, 41A, 41C & 41D • floorstanding control unit supporting up to 32 Category A terminal clusters (except 3290 which is limited to 31); 16 Category B terminal clusters supported by 21A, 21B, 21C, 21D, 31A, 31C, and 31D • Type A adapters attach to Category A terminals; Type B adapters attach to Category B terminals on all control units except 21C and 31C • local and remote attach cluster controllers • Category A terminals consist of 3178 Models C1 and C2 display stations; 3180 Model 1 display stations; 3262, 3268, 3287, 3289, and 5210 printers; 3278 Models 2, 3, and 4 displays; 3278 Model 5 (Model 21B excluded); 3279 Models S2A, S2B, S3G, 2X, 3X, 2A, 2B, 3A, and 3B (base color models only on 21A, 21B, 21C, 21D, 31A, 31C, and 31D); 3179 Model 1 color display station (same as 3279 Models S2A and S2B); 3290 information panel (except 21A, 21B, 21C, and 21D); 4250 Model 1 printer; 5210 Models G1 and G2 printwheel printers • 24 Type A connectors standard on 21A, 21B, 21C, 21D, 31A, 31C, and 31D; 32 Type A connectors standard on 41A, 41C, and 41D • Category B terminal is the 3277 Model 2 • diskette program loading facilities on 3274 allows user to configure initial display system and then change hardware/functions to meet new needs as required • Model 21 series can be upgraded directly to 31 series; Model 41A can be upgraded to 41D and vice versa • Model 21 equipped with 64K-byte controller; Model 31 equipped with 128K-byte controller; Model 41 equipped with 192K-byte controller • basic models support up to 8 Category A terminals • Models 41A, 41C, and 41D support up to 32 Category A terminals.

Local host processor attachment is via processor channels • 3274 Models 21, 31A/B/D, and 41A/D controllers attach in SNA-mode S/360 Models 30, 40, 50, 65, 75, and 195 and to S/370 Models 115 to 165 MP, as well as to 3030 processors via byte multiplexer, selector, or block multiplexer channels; however, attachment to non-DCC (Disconnect Chain Command) block multiplexer subchannel or to selector channel is not recommended because of reduced throughput considerations; 3274 Models 21A, 31A/B/D, and 41A/D attach to S/370, 3080, and 3081 via selector, byte, or block multiplexer channels; attachment to 4300 via byte or block multiplexers • 3274 Models 21/31B controller attaches in non-SNA 3272-mode to same processors and channels as 3274 Models 21/31A • 3274 Models 21/31/41D attach in non-SNA 3272-mode to virtual storage versions of same processors and via same channels as Models 21/31A • remote host attachment via leased/dial-up facilities • Models 21C, 31C, and 41C attach to S/370 or 4300 processors via 2701, 2703, 3704, 3705, or 3725 or via communications adapter feature on 4321 or 4331; attaches to S/360 Models 115, 125, 135, and 138 via Integrated Communications Adapter (ICA); attaches to S/360 Models 30, 40, 50, 65, 75, and 195 via 2701, 2703, 3704, or 3705 • ASCII/EBCDIC transmission code; all attached terminals require same character set • at least 1 display terminal required with each controller.

3274 Model 21A • local SNA mode:	\$874/\$696 mo	\$14,200 prch	\$72.00 maint
3274 Model 21B • local mode:	874/696	14,200	72.00
3274 Model 21C • remote BSC/SDLC:	613/488	9,990	55.50
3274 Model 21D • local mode for virtual storage:	874/696	14,220	79.50
3274 Model 31A • local SNA mode:	1,026/816	16,650	90.00
3274 Model 31C • remote BSC/SDLC:	764/608	12,420	73.50
3274 Model 31D • local mode for virtual storage:	1,026/816	16,650	97.50
3274 Model 41A • local SNA mode:	1,083/862	18,230	58.00
3274 Model 41C • remote BSC/SDLC:	820/653	13,840	40.00
3274 Model 41D • local mode for virtual storage:	1,083/862	18,230	58.00

3274 Model 21, 31 & 41 Series Control Field Upgrades • field-installable model upgrader/changer.

3274 Upgrade • Model 21A to 21B:	\$1,225.
3274 Upgrade • Model 21A to 21D:	\$1,130.
3274 Upgrade • Model 21A to 31A:	\$2,430.
3274 Upgrade • Model 21A to 31D:	\$3,445.
3274 Upgrade • Model 21B to 21A:	\$776.
3274 Upgrade • Model 21B to 21D:	\$655.
3274 Upgrade • Model 21B to 31A:	\$3,130.
3274 Upgrade • Model 21B to 31D:	\$3,020.
3274 Upgrade • Model 21C to 31C:	\$2,430.

MO: monthly charge for monthly rental (first figure) and 2-year lease (second figure), including maintenance. **PRCH:** purchase price. **MAINT:** monthly maintenance charge for prime-shift maintenance. **NA:** not applicable/available. **NC:** no charge. **RPQ:** request price quotation. All prices are for single units and are not discounted. Prices current as of May 1985.

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3274 Upgrade • Model 21D to 21A: \$776.
 3274 Upgrade • Model 21D to 21B: \$748.
 3274 Upgrade • Model 21D to 31A: \$3,130.
 3274 Upgrade • Model 21D to 31D: \$2,430.
 3274 Upgrade • Model 31A to 31D: \$1,130.
 3274 Upgrade • Model 31D to 31A: \$776.
 3274 Upgrade • Model 41A to 41D: \$1,015.
 3274 Upgrade • Model 41D to 41A: \$695.

3274 Model 1, 21 & 31 Series • some terminal configurations and/or features and functions exceed the basic control storage capacity of 3274 controller configuration; IBM provides detailed tables equating memory requirements versus terminal types/categories and features/functions offered • requires 1 or more increments of Type C & D Extended Function Store (EFS) memory (features 3622, 3623, 3625, 3627, and 3628), and/or Type A terminal adapters (features 6901, 6902, and 6903).

6901 Type A1 Adapter • terminals 9 to 16:			
	52/42	918	2.00
6902 Type A2 Adapter • terminals 17 to 24:			
	52/42	918	2.00
6903 Type A3 Adapter • terminals 25 to 32:			
	52/42	918	2.00
7802 Type B1 Adapter • terminals 1 to 4:			
	60/48	986	4.00
7803 Type B2 Adapter • terminals 5 to 8:			
	52/42	831	2.50
7804 Type B3 Adapter • terminals 9 to 12:			
	52/42	831	2.50
7805 Type B4 Adapter • terminals 13 to 16:			
	52/42	831	2.50

3101 Integrated Diskette Drive Enhancement • installs enhanced file required to use configuration support D:

100/75	1,620	14.00
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3274 Control Unit—Models 51C & 61C • tabletop control unit supporting up to 12 Category A and up to 4 Category B terminals on the 51C; the 61C supports 16 Category A terminals • 51C is shipped with 8-Category A terminal capacity; 61C is shipped with 16-terminal capacity • 51C has 64K bytes of control storage; 61C has 192K bytes.

Remote host processor attachment is via communication facilities to channel-connected transmission control units/adapters • 3274 Model 51C controller communicates in BSC with S/360 Models 30, 40, 50, 65, 75, and 195, S/370 Models 115 to 195, 3030, 3081, and 4300 processors via (where applicable) 2701 Data Adapter Unit, 2703 Transmission Control, or 3704/3705/3725 Communications Controller; with S/370 Models 115, 125, 135, and 138 processors via Integrated Communications Adapter; and with 4331 processors via Communications Adapter • 3274 Model 51C controller communicates in SNA/SDLC with S/370 Models 115 to 168, 3030, 3081, and 4300 processors via 3704/3705/3725, or with 4321 or 4331 processor via Communications Adapter; and with 8100 processors via data-link, or direct attach or data-link attach loop (cannot support Category B terminal adapters) • the 61C controller communicates with S/370 or 4300 using SDLC via a 3704/3705, 3725, or communications adapter on 4321 or 4331; BSC communication and attachment same as 51C • both controllers operate at line speeds of 1200 to 9600 bps in half-duplex mode over full-duplex facilities; also operate in half-duplex mode at 9600/38.4K bps over direct attach loop or 2400/4800/9600 bps over data-link attached loop on 8100 • ASCII/EBCDIC transmission code; all terminals require same character set.

Direct local connection without communication facilities or modem is possible for 3274 Model 51C and 61C to 3704/3705/3725 Communications Controller or 4321 and 4331 Communications Adapter attachment • communication with

4331 also provided via direct- or data-link attached loop for 51C and 61C • operation is at 1200 bps in BSC or SDLC.

3274 Model 51C • remote BSC/SDLC 8-Category A terminal support:

282/225	4,885	37.50
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3274 Model 61C • remote BSC/SDLC 16-Category A terminal support • 192K bytes of control storage:

434/345	7,600	27.00
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5101 Integrated Diskette Drive Enhancement • installs enhanced file required for configuration support D:

87/74	1,530	13.00
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5550 Power Expansion Unit • required for supplying additional power for terminals attached via Type B adapters:

16/14	341	1.50
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7801 Type B Adapter • terminals 9 to 12 on 51C:

56/48	986	4.00
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3276 Control Unit Display Stations

Tabletop control unit with integral display terminal supporting up to 8-terminal clusters for remote processor attachment • 3276 Model 1 display-controller with 960-character buffer supports 3278 Model 1 displays, 3287 Models 1, 1C, 2, and 2C printers, 3289 Models 1 and 2 line printers and 3262 Model 13 line printers • 3276 Model 2 display-controller with 1920-character buffer supports 3178, 3180 Model 1, 3278 Models 1 and 2 displays, 3179, 3279 Models 2A and 2B color displays, 3268 Model 2 printer, 5210 Models G1 and G2 printers, 3287 Models 1, 1C, 2, and 2C printers, 3289 Models 1 and 2 line printers and 3262 Model 13 line printers • 3276 Model 2 display controller support for S/3 applications only; accommodates 3180 Model 1, 3278 Model 2, 3287 Model 2 displays, 3287 Models 1 and 2 printers, 3268 Model 2 printers, and 3289 Models 1 and 2 line printers • 3276 Model 3 display-controller with 2560-character buffer supports 3180 Model 1, 3278 Models 1, 2, and 3 displays, 3279 Models 2A, 2B, 3A, and 3B color displays, 3287 Models 1, 1C, 2, and 2C printers, 3289 Models 1 and 2 line printers, and 3262 Model 13 line printers • 3276 Models 4, 11, 12, 13, and 14 display controllers support 3180 Model 1, 3278 Models 1, 2, 3, and 4 displays, 3279 Models 2A, 2B, 3A, and 3B color displays, 3287 Models 1, 1C, 2, and 2C printers, 3268 Model 2 printer, 3289 Models 1 and 2 line printers, 3262 Model 13 line printers, 5210 Models G1 and G2 printers • basic display-controller configuration supports integral display and has port for 1 additional terminal • see Terminals section for display-oriented features.

Remote host processor attachment is via communication facilities to channel-connected transmission control units/adapters • 3276 Models 1, 2, 3, and 4 display controllers communicate in BSC with S/360, S/370, or 4300 processors via 2701 Data Adapter Unit, 2703 Transmission Control, or 3704/3705/3725 Communications Controller; with S/370 Models 115, 125, 135, or 138 via Integrated Communications Adapter; or with 4331 via Communications Adapter feature • 3276 Models 11, 12, 13, and 14, or Models 1, 2, 3, and 4 with BSC/SDLC switch display controllers communicate in SDLC with S/370 or 4300 processors via 3704/3705/3725, or with 4331 via Communications Adapter feature • 3276 Models 11, 12, 13, and 14 communicate in SDLC with 8100 processors via data-link, or direct or data-link attached loop; 3276 Models 1, 2, 3, and 4 with BSC/SDLC switch communicate in SDLC with 8100 processors via data link • 3276 Models 12, 13, and 14, or Models 2, 3, and 4 with BSC/SDLC switch communicate in SDLC with 3790 Communication System via SDLC data link in 1920-character modes • 3276 Model 2 display controller communicates in BSC with S/3 Models 4, 10, and 15 via BSC adapter, Models 8 and 12 via BSC or Integrated Communications adapters, and with Model 15D via BSC adapter or controller • 3276 operates in half-duplex mode over half-/full-duplex facilities at 1200 to 7200 bps using BSC, and 1200 to 9600 bps using SDLC • transmission code is EBCDIC or ASCII; however, all attached terminals must employ same character set.

Direct local connection without communication facilities or

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modem is possible for 3276 to 3704/3705/3725 Communications Controller on S/370, 3030, 3081, or 4300 processors, or 4331 Communications Adapter attachment • operation is at 1200 bps using BSC or SDLC protocol.

3276 Model 1 • remote BSC with 960-character display buffer (not in new production).

3276 Model 2 • remote BSC with 1920-character display buffer (not in new production).

3276 Model 3 • remote BSC with 2560-character display buffer:

\$306/\$243 mo	\$5,680 prch	\$36.00 maint
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3276 Model 4 • remote BSC with 3440-character display buffer:

318/254	5,830	36.50
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3276 Model 11 • remote SDLC with 960-character display buffer (not in new production).

3276 Model 12 • remote SDLC with 1920-character display buffer:

301/240	5,535	31.00
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3276 Model 13 • remote SDLC with 2560-character display buffer:

306/243	5,680	31.50
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3276 Model 14 • remote SDLC with 3440-character display buffer:

318/238	5,830	32.00
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3276 Control Unit Display Station Upgrades • field-installable model upgrades for 3276 display controllers are available on purchase-only basis with no additional installation charges.

3276 Upgrade • Model 1 to 2: \$1,005.

3276 Upgrade • Model 1 to 3: \$1,035.

3276 Upgrade • Model 1 to 4, 2 to 4, 3 to 4: \$1,060.

3276 Upgrade • Model 1 to 11, 2 to 12, 3 to 13, 4 to 14: \$823.

3276 Upgrade • Model 1 to 12, 2 to 13, 3 to 14: \$1,305.

3276 Upgrade • Model 1 to 13, 2 to 14: \$1,360.

3276 Upgrade • Model 1 to 14: \$1,420.

3276 Upgrade • Model 11 to 12: \$569.

3276 Upgrade • Model 11 to 13, 12 to 13: \$605.

3276 Upgrade • Model 11 to 14, 12 to 14, 13 to 14: \$660.

1067 APL/Text Control • provides for APL/Text or Text Print for terminals attached to 3276; field-installable option requires Extended Function Base (feature 1068) and APL/Text (feature 1120):

47/38	950	1.00
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1068 Extended Function Base • provides for addition of APL/Text Control (feature 1067), and for attachment of 3279 color displays to 3276:

6/5	190	1.00
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1950 Color Display Attachment • allows attachment of 3179 and 3279 color displays; field-installable option requires Extended Function Base (feature 1068) and APL/Text Control (feature 1067); cannot be employed with SDLC/BSC switch:

40/32	758	0.50
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Terminal Adapters • provide for attachment of 3270-type terminals to 3276 display controller.

3255 Adapter No 1 • for terminals 2 and 3:

23/19	530	1.50
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3256 Adapter No 2 • for terminals 4 and 5:

23/19	589	1.50
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3257 Adapter No 3 • for terminals 7 and 8:

23/19	530	1.50
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□ I/O Channels

3270-To-Processor Local Attachment

Local host-processor attachment is via selector, byte multiplexer, or block multiplexer channel on the S/370 models and via byte multiplexer or block multiplexer channels on 3030, 3081, and 4341 processors, with 3270 control unit attached to 1 of 8 positions on channel interface (note that IBM does not recommend non-DDC subchannel attachment to block multiplexer channel or to selector channel because of less than maximum throughput considerations) • the 3270 can locally attach to a display adapter or the byte multiplexer on the 4331 • channel provides 3270 control unit with display/print data, and with control instructions needed to operate attached terminal devices • terminal buffers store data forwarded via control unit for display/print or modification • local-attached 3270 control units may be positioned no more than 200 feet from processor channel • all 3274 Models control units except the "C" models are used for local attachment (see 3270 Controllers section for other particulars).

Local-type attachment via direct connection to 8100 data loop, or via S/3 communications channels is also employed for certain 3270 configurations employing remote-type control units or standalone displays. (See 3270 Communications section for other particulars.)

Remote host processor attachment is via communication facilities to channel-connected transmission control units/adapters; however, certain remote 3270 control units can communicate via communication controllers or adapters without recourse to modem or communication facilities in a direct-connect mode (see 3270 Controllers and Communications sections for other particulars).

3270-To-Terminal Device Attachment

The 3274 attaches Category B terminals via direct cable connection at distances up to 2,000 feet from terminal adapter • 3276 controllers also attach terminals at distances up to 2,000 feet; 3274 Category A terminals can be located up to 4,900 feet from controller • 3287 Models 1 and 2 printers can be positioned up to 2,000 feet from controller; 3287 Models 1C and 2C and 3289 printers allow distances up to 4,900 feet (see Controllers section for other details) • terminals connected to 3299 terminal multiplexer can be located up to 4,920 feet from the mux; the 3299 can be located up to 4,920 feet from the 3274 controller (see Terminal Multiplexer for details).

□ Communications

The 3270 display system communicates with a remote processor via half-duplex data transmission on a single point-to-point, half-/full-duplex or multipoint full-duplex facility in BSC and/or SDLC protocol • dedicated (leased) private line facilities can be employed with any 3270 control unit • switched (dial) public telephone facilities can also be employed with 3274-51C and 61C, and 3276-11, 12, 13, and 14 models • IBM or independent vendor-supplied modems can be employed. 3274-31C, -41C, -51C, and -61C available in customized versions permitting interface to X.25 networks.

All remote 3270 models communicate with S/360, S/370 (including 3030 and 3081), or 4300 processors by transmitting to a channel-attached 2701, 2703, 3704, 3705, or 3725 communication or front end; they can also transmit to integrated adapters on the S/370 Models 115, 125, 135, and 138 or on the 4331 (1601 ICA). Specific hosts are detailed in discussions describing each model (see 3270 Controllers section for other particulars); only 1 remote host processor may be attached to a 3270. 3270-type display, printer and line printer terminals cannot remotely attach to 3270 control units via transmission line facilities (see 3270 Controllers and I/O Channels sections for other particulars on terminal attachment).

3274 Control Unit Communications

Models 21C, 31C, and 41C communicate in BSC or SDLC protocol over dedicated lines at 2000/2400/4800/7200/9600-bps rates • Models 51C and 61C communicate in BSC or SDLC

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on dedicated lines at 1200/2000/2400/4800/7200/9600-bps rates, and on switched lines at 1200/2000/2400/4800 bps • remaining 3274 controller models local attach only (see 3270 Controllers section for other particulars).

Adapters & Interfaces • various communication adapters or interfaces are employed for data transmission applications on 3274 Model "C" controllers • 3701 External Modem Interface provides EIA cable and interface logic for attachment of IBM or equivalent modems • Digital Data Service (DDS) adapters support BSC/SDLC transmission at 2400/4800/9600 bps over AT&T Dataphone Data Service (DDS) facilities; 5650 DDS adapter supports point-to-point communication, and 5651 DDS supports multipoint communication • 1 Common Communications Adapter is required on 3274 Model 51C and 61C to handle BSC/SDLC transmission control protocols, and to support other communication adapters or interfaces; 6302 Common Communications Adapter supports communication of up to 9600 bps through IBM or equivalent modems that provide clocking, or through DDS adapters • CCITT V.35 interface adapter provides clocking up to 56K bps; BSC not supported at speeds above 9600 bps • offered with Models 21C, 31C, 41C, 51C, and 61C • X.21 adapter for SDLC data transmission at speeds of 2400/4800/9600 or 48K bps on dedicated facilities; offered with Models 21C, 31C, 41C, 51C, and 61C • **X.25 support** function selectable during customization of Models 31C, 41C, 51C, and 61C; allows attachment to X.25 PDN at speeds to 9600 bps.

1550 CCITT V.35 Interface:

\$22/\$18 mo	\$525 prch	\$1.50 maint
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3701 External Modem Interface • for EIA cabling and logic (included with Models 21C, 31C, and 41C):

16/14	337	3.00
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5650 DDS • point-to-point adapter:

36/29	840	1.50
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5651 DDS • multipoint adapter:

36/29	840	1.50
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5655 X.21 Adapter • nonswitched networks:

33/27	800	1.50
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5656 X.21 Adapter • switched networks:

41/33	800	2.00
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X.25 Interface Support • customized function for 3274 Models 31C, 41C, 51C, and 61C • requires Configuration Support D Release 62, 256K bytes of control storage (features 3660), and one of the following interfaces: 3701, 5655, or 1550:

NA/NA	NA	NA
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6302 Common Communications • BSC/SDLC 9600-bps adapter (included with Models 21C, 31C, and 41C):

14/12	365	2.00
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6303 High Performance Communications Adapter • required on 41C and 61C for attaching to communications facilities at speeds up to 9600 bps; BSC/SDLC operation:

58/46	1,010	8.50
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4850 Loop Adapter • for 8100 system operations:

42/34	797	3.00
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3680 Encrypt/Decrypt Communications Security • provides Federal Data Encryption Standard 56-bit key variable algorithm capability for 3274 21C, 31C, 41C, 51C, and 61C transmission over unprotected lines to processors employing ACF/VTAM Encrypt/Decrypt Program 5735-RC2 and Programmed Cryptographic Facility Program Product 5740-XY5:

85/68	1,780	2.00
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6101 Response Time Monitor • measures and records transaction time between an inbound host attention (AID) and user-defined transaction end:

NA/NA	595	NA
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Particulars on external IBM modems that may be employed with 3274 controllers are discussed at the end of this section.

3276 Control Unit Display Station Communications

Models 1, 2, 3, and 4 communicate in BSC over dedicated lines at 1200/2000/2400/4800/7200 bps; with 6315 SDLC/BSC switch installed, the Models 1, 2, 3, and 4 can also communicate over dedicated lines in SDLC at 1200/2000/2400/4800/7200/9600 bps • Models 11, 12, 13, and 14 communicate in SDLC over dedicated lines at 1200/2000/2400/4800/7200/9600 bps, and on switched public lines at 1200/2000/2400/4800 bps • 3276 must be equipped with Common Communications feature, and either External Modem Interface, DDS Adapter or Integrated Modem for remote communication interfacing • 4850 Loop Adapter is employed for data link or direct attachment to 8100.

3701 External Modem Interface • for EIA cabling and logic:

\$16/\$14 mo	\$337 prch	\$3.00 maint
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5650 DDS • point-to-point adapter:

36/29	840	1.50
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5651 DDS • multipoint adapter:

36/29	840	1.50
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5655 X.21 Adapter/Dedicated Networks • provides interface and cable for attaching Models 11, 12, 13, and 14 to X.21 dedicated DCE • SDLC at 2400/4800/9600 bps:

32/26	800	1.50
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5656 X.21 Adapter/Switched Networks • provides interface and cable for attaching Models 11, 12, 13, and 14 to switched networks at speeds of 2400/4800/9600 bps:

40/33	884	2.00
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6301 Common Communications • 1200-bps adapter:

24/20	489	2.50
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6302 Common Communications • BSC/SDLC 9600-bps adapter:

23/11	543	2.50
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6315 SDLC/BSC Switch • for Models 1, 2, 3, and 4; mutually exclusive with 1068 Extended Function Base:

32/26	682	3.00
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5500 1200-bps Integrated Modem • dedicated:

29/24	535	5.50
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5501 1200-bps Integrated Modem • switched; auto-answer:

39/32	714	2.50
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5502 1200-bps Integrated Modem • switched; manual answer:

29/24	535	3.00
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5507 1200-bps Integrated Modem • dedicated; manual-answer dial backup:

43/35	766	5.50
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5508 1200-bps Integrated Modem • dedicated with auto-answer dial backup:

47/38	855	3.00
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4850 Loop Adapter • for 8100 system operations with Models 11, 12, 13, and 14:

42/34	797	3.00
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3680 Encrypt/Decrypt Communications Security • provides Federal Data Encryption Standard 56-bit key variable algorithm capability for 3276 Models 11, 12, 13, and 14 transmissions over unprotected lines to processors employing ACF/VTAM Encrypt/Decrypt Program 5735-RC2 and Programmed Cryptographic Facility Program Product 5740-XY5:

85/68	1,600	2.00
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External Modems

External IBM or equivalent modem can be employed for 3270-to-processor remote communication over transmission facilities • external modem attaches to 3270 via 3701 External Modem Interface and 6301 clocked 1200-bps or 6302/6303 nonclocked 9600-bps Common Communications Adapter on 3274 and 3276 control units.

3701 External Modem Interface • for EIA cabling and logic:

\$16/\$14 mo	\$337 prch	\$3.00 maint
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6301 Common Communications • 1200 bps clocked:

23/20	543	2.50
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6302 Common Communications • 9600 bps nonclocked:

14/12	365	2.00
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6303 Common Communications • 9600 bps nonclocked for Type B terminal adapter on 3274 Model 51C:

58/46	1,010	8.50
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3863 Modem • 2400 bps with 1200-bps half-speed backup and automatic remote speed selection • Model 1 operates in half-/full-duplex mode over unconditioned 4-wire, dedicated full-duplex point-to-point or multipoint lines • Model 2 operates in half-duplex mode over 2-wire switched facilities • auto-answer is standard on Model 2 and available on Model 1 via 4-wire SNBU option • Model 1 can be equipped with Fan Out feature that allows modem attachment to up to 3 terminals or controllers (only 1 may transmit at a given time), and with 4-Wire Switched Network Backup (SNBU) feature for auto-answer dial backup.

3863 Model 1 • 2400-/1200-bps dedicated modem:

102/87	2,685	13.00
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3863 Model 2 • 2400-/1200-bps switched modem:

110/94	2,935	15.50
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3901 Fan Out • 3-terminal attachment for Model 1:

34/29	804	2.00
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7953 SNBU • auto-answer dial backup for Model 1:

54/46	1,180	10.00
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3863 Model 1 modem can be employed with any 3274 or 3276 remote controller • 3863 Model 2 may only be applied in primary switched line environments with 3274 Model 51C and 3276 Models 11, 12, 13, and 14 controllers.

3864 Modem • 4800 bps with 2400-bps half-speed backup and automatic remote speed selection • Model 1 operates in half-/full-duplex mode over unconditioned 4-wire, dedicated full-duplex point-to-point or multipoint lines • Model 2 operates in half-duplex mode over 2-wire switched facilities • auto-answer is standard on Model 2 and available on Model 1 via 4-wire SNBU option • Model 1 can be equipped with Fan Out feature that allows modem attachment to up to 3 terminals or controllers (only 1 can transmit at a given time), and with 4-wire Switched Network Backup (SNBU) feature for auto-answer switched backup capabilities.

3864 Model 1 • 4800-/2400-bps dedicated modem:

176/150	3,715	21.00
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3864 Model 2 • 4800-/2400-bps switched modem:

188/160	3,925	22.00
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3901 Fan Out • 3-terminal attachment for Model 1:

34/29	804	2.00
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7953 SNBU • auto-answer dial backup for Model 1:

54/46	1,180	10.00
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3864 Model 1 modem can be employed with any 3274 or 3276 remote controller • 3864 Model 2 can only be applied in primary switched line environments with 3274 Model 51C and 3276 Models 11, 12, 13, and 14 controllers.

3865 Modem • 9600 bps with 4800-bps half-speed backup and automatic remote speed selection • Model 1 operates in point-to-point mode and Model 2 in multipoint mode in half-/full-duplex over full-duplex unconditioned 4-wire dedicated lines • both models can be equipped with Fan Out for attachment to up to 3 terminals or controllers (only 1 may transmit at a given time), and with 4-wire Switched Network Backup (SNBU) for auto-answer switched backup capabilities • Model 1 may also be equipped with Data Multiplexer feature for subchannel operation at 9600, 4800/4800, 4800/2400/2400, or 2400/2400/2400/2400 bps at full-speed, or 4800 or 2400/2400 at half-speed operation.

3865 Model 1 • 9600-/4800-bps point-to-point modem:

282/240	5,885	30.50
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3865 Model 2 • 9600-/4800-bps multipoint modem:

282/240	5,885	30.50
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3901 Fan Out • 3-terminal attachment:

34/29	804	2.00
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7953 SNBU • auto-answer dial backup:

54/46	1,180	10.00
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3260 Data Multiplexer • subchannels for Model 1:

47/40	1,075	4.00
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3865 modem may be employed with 3274 and 3276 remote controllers.

3868 Modem • rackmounted versions of the 3863, 3864, and 3865 modem family inserted in a 3866 multimodem enclosure • 9600/4800/2400-bps half- or full-duplex modems with half-speed backup and automatic remote-speed selection • Model 1 (equivalent to 3863-1) operates over a 4-wire dedicated facility in a point-to-point or multipoint arrangement at speeds of 2400/1200 bps • Model 2 (equivalent to 3864-1) operates over a 4-wire dedicated facility in a point-to-point or multipoint arrangement at speeds of 4800/2400 bps • Model 3 (equivalent to 3865-1) operates over a 4-wire dedicated facility in a point-to-point arrangement only at speeds of 9600/4800 bps • Model 4 (equivalent to 3865-2) is identical to Model 3, except operates in multipoint arrangement.

3868 Model 1 • 2400-/1200-bps point-to-point or multipoint modem:

102/NA	2,550	12.00
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3868 Model 2 • 4800-/2400-bps point-to-point or multipoint modem:

165/NA	3,340	12.50
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3868 Model 3 • 9600-/4800-bps point-to-point modem:

263/NA	5,000	13.50
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3868 Model 4 • 9800-/4800-bps multipoint modem:

263/NA	5,000	13.50
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3872 Modem • 2400 bps with 1200-bps half-speed backup for operation in half-duplex mode over 2-/4-wire multipoint lines • point-to-point, multipoint tributary, switched network, switched network backup, 3-terminal Fan Out attachment, auto-call originate and alternate voice features are available as field-installable options • separate modem add-on sharing the same power supply and cabinet is also possible, but precludes Fan Out, auto-call, and dial backup.

3872 • 2400-/1200-bps multipoint modem:

153/NA	2,975	19.00
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1051/1052 • first/second modem; alternate voice:

25/NA	525	0.50
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1091 Auto-Call Originate • for auto-call terminals:

56/NA	1,050	7.50
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3901 Fan Out • 3-terminal attachment:

36/NA	701	1.00
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5101/5102 • first/second modem; multipoint tributary:

23/NA	490	3.00
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6101/6102 • first/second modem; point-to-point:

9/NA	244	1.50
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6302 • second modem:

134/NA	2,445	13.00
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7941/7942 • first/second modem; switched network:

25/NA	525	7.00
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7951 • switched network backup:

14/NA	349	3.00
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7952 • switched network backup with auto-answer:

25/NA	525	3.00
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3872 modem can be employed in dedicated mode with 3274 and

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3276 remote controllers and in primary switched line environments with 3274 Model 51C and 3276 Models 11, 12, 13, and 14 controllers.

Terminal Multiplexer

The 3299 Terminal Multiplexer connects Category A terminals to any 3274 Control Unit, except a 51C. The multiplexer reduces coaxial cable requirements by combining up to 8 terminals on a single coaxial cable connected to a 3274 Control Unit. Up to four 3299s can be attached to any controller except the 61C, which is limited to 2. The 3299 can be located up to 4,920 feet from 3274; each terminal can be located up to 4,920 feet from the multiplexer. Terminals connected in this fashion can be located up to 9,840 feet from the 3274 Control Unit.

3299 Terminal Multiplexer • time-division multiplexer (TDM) accommodates 8 Category A terminals and connects to 3274 controller:

NA/NA mo	\$1,175 prch	NA maint
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□ Workstations/Terminals

IBM supports the 3270 with an extensive line of monochromatic and color terminals plus a gas plasma information panel. In addition, IBM offers personal computer attachment either via a standalone 3270 Personal Computer or a personal computer retrofitted to a 3278-2 workstation. Customers with Model 6580 Displaywriters can also attach these units to the 3274 controller (see Distributed Configurations).

The monochromatic products consist of Models 3178, 3180, 3277, 3278 workstations; Models 3179 and 3279 are color terminals. The 3290 Information Panel is a gas plasma terminal, somewhat of a misnomer since it does have a keyboard and allows host-processor interaction.

As with the controllers, there is a considerable duplication among the terminal lines. For example, the 3178, 3277, and 3278-2 duplicate each other in number of characters displayed and editing/formatting facilities. The 3180 Model 1 provides the base functions of the 3278 Models 2 through 5. In addition, the 3179 color terminal is functionally equivalent to the 3279 Models S2A and S2B. We expect the older models to be discontinued in the near future. The only exception might be the 3277. That product is one of the few Category B devices still available and needed to support the older 3271/3272/3274 controllers.

The 3179 and 3180 offer facilities not available on the products they replace. For example, the 3180 Model 1 has a 7680-character buffer which allows the operator to vertically scroll data. Both also support a keyboard definition utility whereby the internal keyboard tables can be modified to conform with modifications made to the keyboards to accommodate user-specific applications. Any combination of 4 standard and modified keyboard layouts can be defined in this manner for each 3274 control unit. For those planning to use these unique functions, IBM requires the 3274 to have Configuration Support D Release Level 63 Microcode. There is **no charge** for this upgrade.

The 3180 contains a number of unique features itself. For example, by invoking the **record/playback** function, a series of up to 96 keystrokes can be saved via the record key, and recalled and displayed on command. This saved data is retained when power is switched off. The 3180 also allows the operator to select **dual or monospace** characters from the keyboard, providing the capability to display uppercase alphanumeric characters only for 3277 compatibility. A notable feature of the 3180 Model 1 is the local print facility. With it the operator can initiate a local display-to-printer copy without host intervention when the terminal is attached to a 3274/3276 controller.

The 3180 Model 1 is unique to anything in the 3270 line in that it allows users to **select** the number of **displayable characters** and their formats. Essentially, Model 1 provides the base functions of the 3278-2 through 5 and undoubtedly replaces those terminals.

For its 3179 and 3180 terminals, IBM's maintenance plans include Customer Carry-In Repair, Customer Carry-In Exchange, Customer On-Site Exchange, and IBM On-Site Exchange. This report uses the IBM On-Site Exchange (see Terms & Support for details).

Display images on 3270 may be unformatted with no defined fields, or formatted with program-defined fields and field attributes. Formatted fields may be protected from operator modification, or may be unprotected and allow operator data input or modification via keyboard. 3270 field attribute capabilities include alphanumeric or numeric-only input; character display/nondisplay; blink, intensity, reverse video or underscore highlighting; color highlighting and display (3179 and 3279 only); selector light pen field detect/nondetect; tab to next unprotected field; and program-tab write to successive unprotected fields. 3270 functional controls include Write, Write Structured, Erase All (clear), Erase Unprotected (clear input), Read and Read Modified commands; host or operator-initiated Local Copy (print); and host-initiated Copy (data transfer) between terminals on same cluster.

The 3278 terminal can be field upgraded to connect an IBM 5150 personal computer via a personal computer adapter (feature 5315 or 5316). The upgraded terminal supports most DOS1.1-based personal computer programs, including APA (All Points Addressable) graphics; 16 levels of color intensity when used with the personal computer color graphics adapter; user-definable character sets; character attributes; and business graphics.

The personal computer (feature 8501206) attaches to a 3278 via a 5-foot cable; connections are made to the display adapter and cable distribution box; the keyboard attaches to the cable distribution box using existing keyboard cable. After installation, the 3278 operates in switch-selectable host compute and personal compute modes. In host compute mode, the 3278 operates as it did prior to the upgrade, except that data transfer is now supported if a 3274 controller is used. Data is transferred bidirectionally between the 3274 via 3278 to the program running in the personal computer. Data flow between the host and 3274 employs a new structured field type of 3270 data stream. Typical data transfers are screen capture and file transfer. Screen capture transfers data displayed on a 3278 screen to the personal computer's printer or diskette in ASCII code. File transfer requires both personal computer and host sample applications; VM/SP (CMS) or TSO controls the operation.

In personal computer mode, the image displayed on the 3278 screen is received from the personal computer adapter. Keystrokes are directed to the personal computer program. Users can write BASIC programs, run VisiCalc, or process any data in personal computer storage.

In addition to the personal computer attachment, IBM offers a standalone 3270 PC which can be used with 3274 controllers. The 3270 PC handles up to 4 concurrent sessions, and also emulates the IBM 3178, 3278 (except 2 or 5) or the 3279 (except Model 2C). For details, see report 950-I048-3271.

3178 Display Station

Configuration • cluster display employed with 3274/3276 control unit • modular (detached) typewriter-/data entry-style keyboards.

Display • 12-inch diagonal • 7x14 dot matrix • 1920-character, 24-line x 80-character format • 94 EBCDIC or ASCII character set • blink and nonblink underscore and block cursor.

Edit & Format Features • auto-repeat keyboard • 10 programmable function keys on data entry keyboard; 24 on typewriter-style keyboard • cursor up, down, left, right pad; home, new line, tab, backtab, backspace key functions • cursor address write • erase to EOF; clear input, clear • character insert and delete • protected and numeric-only fields • selector light pen field select • blink, intensity, reverse video, underscore, nondisplay attributes.

Communications • via controller—see 3270 Communications for details.

Peripherals • mag card slot reader or mag hand scanner • cluster printers via controller.

Model C10 • 1920-character display; 75-key, data entry keyboard:

NA/NA mo	\$1,660 prch	\$14.00 maint
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Model C20 • 1920-character display; 87-key, typewriter-style keyboard:

NA/NA	1,720	14.00
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Model C3 • 1920-character display; 87-key typewriter keyboard with numeric keypad • cannot attach to 4321 processor:

NA/NA	1,720	14.00
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Model C4 • 1920-character display; 87-key typewriter keyboard with 49 alphanumeric keys, 26 control keys, and a block 12 numeric key (0 to 9 plus decimal and tab) in lower and upper shifts, and program function keys 13 through 24 shiftable:

NA/NA	1,720	14.00
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3179 Color Display Station

Configuration • cluster display employed with 3274/3276 control units • modular (detached) 87- or 122-key, typewriter-style keyboard standard; typewriter/APL, typewriter/text, data entry, and data entry keypunch keyboards optional.

Display • 14-inch diagonal tilt and swivel screen • 7x9 matrix • 1920-character 24-line x 80-character format, plus 25th status line • 96 EBCDIC or ASCII; 222 EBCDIC/APL • custom character sets • 7-color presentation (white, red, blue, green, pink, yellow, and turquoise) • blink and nonblink block and underscore cursor.

Edit & Format Features • auto-repeat keyboard • 10, 12, or 24 user-function keys • cursor up, down, left, right, home, new line, tab, backtab, backspace key functions • cursor address write • erase to EOF; clear input, clear • character insert and delete • protected and numeric-only fields • light pen field select • 7-color blink, intensity, reverse video, underscore, nondisplay attributes • vertical scrolling.

Communications • via controller—see 3270 Communications section for particulars.

Peripherals • cluster printers via controller.

Keyboards • 87- or 122-key, typewriter-type EBCDIC/ASCII • 24 program function keys • low profile, 6, 12, or 18 degrees of inclination • standard on 3179.

Model 1 • 7-color, 1920-character display station:

NA/NA mo	\$2,295 prch	\$11.25 maint
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3180 Display Stations

Configuration • cluster display utilized with 3274 or 3276 control units • 75-key, data entry-style keyboard (Model 120); 87-key, typewriter-style keyboard with 81 specific APL characters and 24 program function keys (Model 130) • 7680-character screen buffer.

Display • 15-inch diagonal tilt and swivel • 7x9 matrix • 3564-character 27-line x 80-character format; 3440-character, 43-line x 80-character format; 2560-character, 32-line x 80-character format; 1920-character, 24-line x 80-character format • extra status indicator line • 96 EBCDIC or ASCII; 222 EBCDIC/APL; custom character sets • blink and non-blink underscore and block cursor.

Edit & Format Features • auto-repeat keyboard • 10, 12, or 24 user-function keys • cursor up, down, left, right pad; home, new line, tab, backtab, backspace, key functions • cursor address write • erase to EOF; clear input, clear • character insert and delete • protected and numeric-only fields • selector light pen field select • blink, intensity, reverse video, underscore, nondisplay attributes • vertical scrolling of 4 pages via 7680-character screen buffer.

Communications • via controller—see 3270 Communications section for particulars.

Peripherals • mag card slot reader or mag hand scanner • cluster printers via controller.

Keyboards • 75-key, data entry-style keyboard standard on Models 120; 87-key typewriter-style keyboard with 81 APL characters and 24 program function keys standard on Model 130.

3180-120 • 3564/3440/2560/1920-character display formats • data entry-style keyboard:

NA/NA mo	\$2,295 prch	\$12.33 maint
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3180-130 • 3564/3440/2560/1920-character display format • typewriter-style keyboard with 81 specific APL characters:

NA/NA	2,295	12.33
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3276 Control Unit Display Stations

Configuration • (not in new production) • standalone display with cluster control capability for 7 additional terminals (see 3270 Controllers section for other particulars on terminal attachments) • Models 1, 2, 3, and 4 are BSC or switch-selectable SDLC/BSC with optional features; Models 11, 12, 13, and 14 are SDLC • attaches to S/360, S/370, 4300, 8100, 3790, and S/3 (see 3270 Controllers section for other particulars) • modular (detached) typewriter, typewriter/APL, typewriter/text, or data entry keyboards.

Display • 14-inch diagonal • 7x9 matrix; 7x8 for Models 4 and 14 • 3440-character, 43-line x 80-character format (Models 4 and 14); 2560-character, 32-line x 80-character format (Models 3 and 13); 1920-character, 24-line x 80-character format (Models 2 and 12); 960-character, 12-line x 80-character format (Models 1 and 11); all have extra status indicator line • 96 EBCDIC or ASCII; 222 APL/EBCDIC character sets • blink or nonblink underscore or block cursor modes.

Edit & Format Features • auto-repeat keyboards • 10, 12, or 24 (12 + 12 shift) user-function keys • cursor up, down, left, right pad; home, new line, tab, backtab, backspace key functions • cursor address write • erase to EOF; clear input, clear • character insert and delete • protected and numeric-only fields • light pen field select • intensity, nondisplay attributes.

Communications • see 3270 Communications section for particulars.

Peripherals • mag card slot reader • up to 7 additional display/printer terminals (see 3270 Controllers Workstation/Terminals and Printers sections for other particulars).

Keyboards • 4621, 4622, 4623, 4624, 4626, 4627, 4628, and 4629.

3276 Model 1 • remote BSC with 960-character display (not in new production).

3276 Model 2 • remote BSC with 1920-character display (not in new production).

3276 Model 3 • remote BSC with 2560-character display:

\$306/\$243 mo	\$5,680 prch	\$36.00 maint
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3276 Model 4 • remote BSC with 3440-character display:

318/254	5,830	36.50
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3276 Model 11 • remote SDLC with 960-character display:

294/234	5,380	30.50
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3276 Model 12 • remote SDLC with 1920-character display:

301/240	5,535	31.00
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3276 Model 13 • remote SDLC with 2560-character display:

306/243	5,680	31.50
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3276 Model 14 • remote SDLC with 3440-character display:

318/254	5,830	32.00
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1067 APL/Text • for display of 222-character APL/text set:

45/38	950	1.00
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3620 Extended Character Set Adapter • for APL/text feature:

24/21	644	3.00
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4999 Mag Reader Control • mag slot card reader for sign-on and credit card-type, numeric input applications:

15/13	379	3.50
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1009 Address Keylock • for limiting access to setup and transmission control switches:

NA/NA	56	NC
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6360 Selector Light Pen Field Select • for Models 3, 4, 13, and 14 and for Models 1, 2, 11, and 12:

21/17	548	0.50
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3277 Display Stations

Configuration • cluster display employed with 3274 control units • modular (detached) typewriter, typewriter/APL, typewriter/text, console, data entry, and data entry keypunch keyboards.

Display • 14-inch diagonal • 7x9 matrix • 1920-character, 24-line x 80-character format • 64 EBCDIC or ASCII; 204 EBCDIC/APL (Model 2) character sets • underscore cursor.

Edit & Format Features • 12 user-function keys • cursor up, down, left, right pad; new line, tab/skip, backtab, backspace key functions • cursor address write • erase to EOF; clear input, clear • character insert and delete • protected and numeric-only fields • light pen field select • intensity, nondisplay attributes.

Communications • via controller—see 3270 Communications section for features.

Peripherals • mag slot ID card reader • cluster printers via controller.

Keyboards • 4630, 4631, 4632, 4633, 4634, 4635, 4636, 4637, 4638, and 4639.

3277 Model 2 • 1920-character display station:

\$177/\$142 mo	\$1,905 prch	\$23.00 maint
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1066 Data Analysis-APL • for dual-case EBCDIC and APL sets, TN print train character (Model 2 on 3271/3272 controllers):

42/34	300	1.50
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4600 Operator ID Mag Card Reader • for sign-on and credit card-type, numeric input applications:

20/16	260	4.00
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6340 Security Keylock • for locking terminal and preventing unauthorized system access:

NA/NA	35	NC
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1090 Audible Alarm • for program-controlled operator alert or for EOS next-to-last character condition alert:

5/4	87	1.50
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6350 Selector Light Pen field select:

40/33	434	2.00
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3278 Display Stations

Configuration • (not in new production as of November 1984) • cluster display employed with 3274 and 3276 control units • modular (detached) typewriter, typewriter/APL, typewriter/text, data entry, and data entry keypunch keyboards • intelligent upgrade.

Display • 14-inch diagonal • 7x9 matrix; 7x9 matrix for Models 4 and 5 • 3564-character, 27-line x 132-character format (Model 5); 3440-character, 43-line x 80-character format (Model 4); 2560-character, 32-line x 80-character format (Model 3); 1920-character, 24-line x 80-character format (Model 2); 960-character, 12-line x 80-character format (Model 1); all have extra status indicator line • 96 EBCDIC or ASCII; 222 EBCDIC/APL; up to 6 190-character custom character sets • blink and nonblink underscore and block cursor.

Edit & Format Features • auto-repeat keyboard • 10, 12, or 24 (12 + 12 shift) user-function keys • cursor up, down, left, right pad; home, new line, tab, backtab, backspace key functions • cursor address write • erase to EOF; clear input, clear • character insert and delete • protected and numeric-only fields • selector light pen field select • blink, intensity, reverse video, underscore, nondisplay attributes.

Communications • via controller—see 3270 Communications section for particulars.

Peripherals • mag card slot reader or mag hand scanner • cluster printers via controller.

Keyboards • 4621, 4622, 4623, 4624, 4626, 4627, 4628, 4629, 4640, 4651, and 4652.

3278 Model 2 • 1920-character display station:

\$102/\$82 mo	\$1,965 prch	\$10.00 maint
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3278 Model 3 • 2560-character display station:

123/99	2,145	10.50
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3278 Model 4 • 3440-character display station:

126/101	2,255	12.50
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3278 Model 5 • 3564-character display station:

148/118	2,575	12.50
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3278 Display Station Upgrades • field-installable model upgrades/changes are available for 3278 Models 1, 2, 3, and 4 on a purchase only basis with no additional installation charge.

3278 Upgrade • Model 1 to 2: \$513.

3278 Upgrade • Model 1 to 3, 2 to 3: \$517.

3278 Upgrade • Model 1 to 4, 2 to 4, 3 to 4: \$564.

3278 Upgrade • Model 1 to 5, 2 to 5, 3 to 5: \$982.

5315/5316 Personal Computer Adapter • attaches IBM personal computer to 3278 Models 2, 3, 4, and 5:

RPQ/RPQ	RPQ	NC
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5150 Personal Computer • color/graphics monitor adapter or monochrome display and printer adapter • 5.25-inch diskette drive and adapter • 64K-byte memory • DOS1.1 operating system:

NA/NA	1,355	NA
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3620 Character Set Extension:

26/22	580	2.50
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5790 Programmed Symbols • provides storage for accessing six 190-symbol sets with customer-definable shapes and codes • symbol sets loaded under program control • available for 3278-2 through -4 attached to 3274 having PS Control and Structured Field and Attribute Processing options • requires 3620:

34/29	853	3.50
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4999 Mag Card Reader Control • required for interfacing mag scanner or slot reader:

15/13	341	3.50
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6340 Security Keylock • for locking terminal and preventing unauthorized system access:

NA/NA	35	NC
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6360 Selector Light Pen Field Select • for Models 3, 4, and 5, and Models 1 and 2:

21/18	493	0.50
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3279 Color Display Stations

Configuration • color cluster display station employed with 3274 and 3276 control units • modular (detached) typewriter, typewriter/APL, typewriter/text, data entry, and data entry keypunch keyboards.

Display • 14-inch diagonal • 7x9 matrix • 2560-character, 32-line x 80-character format (Model S3G); 1920-character, 24-line x 80-character format (Models S2A and B); all have extra status indicator line • 96 EBCDIC or ASCII; 222 EBCDIC/APL; up to six 190-character custom character sets • 4-color presentation (white, red, blue, and green—Model S2A); 7-color presentation (white, red, blue, green, pink, yellow, and turquoise—Models S2B and S3G) • blink and nonblink block and underscore cursor.

Edit & Format Features • auto-repeat keyboard • 10, 12, or 24 (12 + 12 shift) user-function keys • cursor up, down, left, right pad; home, new line, tab, backtab, backspace key functions • cursor address write • erase to EOF; clear input, clear • character insert and delete • protected and numeric-only fields • light pen field select • 4-color, intensity, nondisplay attributes; 7-color, blink, intensity, reverse video, underscore, nondisplay attributes.

Communications • via controller—see 3270 Communications section for particulars.

Peripherals • mag card slot reader or mag hand scanner • cluster printers via controller.

Keyboards • 4621, 4622, 4623, 4624, 4626, 4627, 4628, 4629, 4640, 4651, and 4652.

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3279 Model S2A • 4-color, 1920-character display station:
\$170/\$136 mo \$3,160 prch \$18.00 maint

3279 Model S2B • 7-color, 1920-character display station:
172/148 3,490 18.00

3279 Model S3G • 7-color, 2560-character display station:
262/209 5,190 22.00

4999 Mag Reader Control • required for interfacing mag scanner or slot reader:

15/13 341 3.50

5322, 5325, 5327 Personal Computer Adapter • provides capability for attaching 5150 Personal Computer • requires 3279-S2A, S3A, S2B, S3B:

RPO/RPO RPO NC

3290 Information Panel

Configuration • cluster display employed with 3274 Models 31/41/51/61 control units • detached data/typewriter and APL keyboards; optional numeric and program function key keypads.

Display • flat plasma panel unit • 9920-character, 62-line x 160-character format using 5x8 dot matrix; 5300-character, 50-line x 106-character format using 7x9 dot matrix • multiple display screen can simultaneously display 3178/3179/3180/3278/3279 Model 2 screens; two 3178/3179/3180/3278/3279 Model 3 screens; two 3180/3278 Model 4 screens; or two 3180/3278 Model 5 screens.

Edit & Format Features • no data editing • panel can be organized into 16 separately managed partitions via application program control with vertical scrolling • 24K-character scrolling buffer • up to 4 separate logical regions can be established and interact with host applications or can be designated as a copy area • character size or partition can be enlarged to occupy entire screen • cursor moves between interactive screen partitions to change a displayed partition with 1 off-screen • uses Graphical Data Display Manager for graphs and charts.

Communications • via controller—see 3270 Communications section for details.

Peripherals • cluster printers via controller • BSC copy command not supported.

Keyboards • 4730, 4731, 4830, 4831:

\$337/NA mo \$7,100 prch \$30.00 maint

1503 Keyboard Cable • 3 feet long; for 4730 or 4731 keyboard:
3/NA 60 NC

1506 Keyboard Cable • 6 feet long; for 4730 or 4731 keyboard:
4/NA 75 NC

3210 Display Panel • flat plasma panel display medium for 3290 • connects to power-logic unit and keyboard:

171/NA 3,600 10.00

Keyboards

3276, 3277, 3278 & 3279 Keyboards

4621 Keyboard • 75-key, typewriter-type EBCDIC; 11 shift-activated user-program function keys:

\$20/\$16 mo \$417 prch \$2.00 maint

4622 Keyboard • 75-key, data entry-type EBCDIC; 10 user-program function keys:
20/16 417 3.00

4623 Keyboard • 75-key, data entry keypunch-type EBCDIC; 11 user-program function keys:
20/16 417 3.00

4624 Keyboard • 75-key, typewriter-type ASCII; 12 shift-activated user-program function keys:
20/16 417 2.00

4626 Keyboard • 87-key, typewriter-/APL-type EBCDIC; 12

user-program function keys:

24/18 569 2.50

4627 Keyboard • 87-key, typewriter-type EBCDIC; 24 user-program function keys (12 shift-activated):

24/20 569 2.50

4628 Keyboard • 87-key, typewriter-type ASCII; 24 user-program function keys (12 shift-activated):

24/20 569 2.50

4629 Keyboard • 87-key, typewriter-/text-type EBCDIC; 12 user-program function keys:

24/20 569 2.50

4630 Keyboard • 66-key, typewriter-type EBCDIC:

20/16 309 6.00

4631 Keyboard • 66-key, data entry-type EBCDIC:

20/16 309 7.00

4631 Keyboard • 75-key, typewriter-type EBCDIC • for 3278/3279 operator console with channel-to-channel; used with 4341 only:

54/43 977 5.50

4632 Keyboard • 78-key, console-type EBCDIC; 12 user-program function keys • used with 3277:

52/42 601 17.50

4632 Keyboard • 75-key, typewriter-type EBCDIC • for 3278/3279 operator console without channel-to-channel • used with 4341 only:

52/42 909 5.50

4633 Keyboard • 78-key, typewriter-type EBCDIC; 12 user-program function keys • used with 3277:

47/38 518 9.50

4633 Keyboard • 75-key, typewriter-type EBCDIC • operator console for 3278/3279 • used with 4341 only:

23/19 472 5.00

4634 Keyboard • 66-key, typewriter-type ASCII • for 3277:

20/16 309 6.00

4634 Keyboard • 75-key, typewriter-type ASCII • for 3278/3279 operator console without channel-to-channel; used with 4341 only:

52/42 909 6.00

4635 Keyboard • 78-key, typewriter-type ASCII; 12 user-program function keys • for 3277 only:

47/38 518 9.50

4636 Keyboard • 66-key, data entry keypunch-type EBCDIC; for 3277 only:

22/18 311 7.00

4637 Keyboard • 66-key, typewriter-/APL-type EBCDIC; for 3277 only:

43/35 480 6.50

4638 Keyboard • 78-key, typewriter-/APL-type EBCDIC; 12 user-program function keys; for 3277 only:

68/55 744 9.50

4639 Keyboard • 78-key, typewriter-/text-type EBCDIC; fast cursor and 12 user-program function keys; for 3277 only:

68/55 744 9.50

4640 Keyboard • 87-key, typewriter-type EBCDIC with narrow keytops allowing programmed symbol overlays:

24/20 569 2.50

4651 Keyboard • 87-key, typewriter-type EBCDIC with attribute select, color, and programmed symbol overlays:

25/20 569 2.50

4652 Keyboard • 87-key, typewriter-/APL-type EBCDIC with attribute select, color, and programmed symbol overlays:

25/20 569 2.50

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4690 Keyboard Numeric Lock • for numeric-only input

NC/NC	NC	NC
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3290 Keyboards

4730 Data/Typewriter Keyboard • EBCDIC typewriter-style keyboard with 24 programmable function keys; requires 1503 or 1506 cable:

\$23/NA mo	\$440 prch	\$6.50 maint
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4731 APL Keyboard • same as 4730 but with modified keycaps for entry of 81 APL specific characters; requires 1503 or 1506 cable:

23/NA	440	6.50
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4830 Numeric Keypad • key layout in calculator format • attaches to 4730 or 4731 via 2.5-foot cable:

NA/12	250	4.50
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4831 Program Function Keypad • provides 24 program function keys for 4730 or 4731; the 24 keys correspond to 24 program function keys on associated keyboard • attaches via 2.5-foot cable:

12/NA	250	4.50
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Printers

Serial and line printers employed on 3270 are configured within terminal clusters, or are attached to printer adapter on standalone display models. In addition, certain printer models may also be employed as output-only hardcopy consoles on 8100, 3790, or S/3 processors in non-3270 mode without terminal control units.

The Model 4250 high-resolution, nonimpact printer is an all-points-addressable unit with an addressable resolution of 600 dots per inch in both horizontal and vertical directions. It can print a wide variety of text in various sizes and styles, and produce graphic images. A blackness ratio of 50 percent per page should not be exceeded. According to IBM, the Model 4250 produces typeset quality, camera-ready master pages; it attaches to 3274-31A, -31D, -41A, and -41D controllers only, and runs under VM/CMS(VM/SP), MVS(MVS/SP), and VSE/Advanced Functions.

3287 Printers

Configuration • tabletop serial matrix impact printer • 480/960/1920-character buffer; 2560/3440/3564-character buffer (cost option) • cluster printer terminal for 3274 control units and 3276 displaycontroller (see 3270 Controllers section for other particulars).

Printer • 80-cps (Models 1 and 11) or 120-cps (Models 2 and 12) bidirectional 7x8 matrix impact • 64/96 EBCDIC or ASCII; 222 EBCDIC/APL; up to six 190-character customer character sets • 132 columns • 6/8 lpi • 3- to 15-inch forms tractor; 5- to 6-part forms; 3- to 14-inch form length • 8- to 15-inch form friction feed; single-part forms • page length control.

3287 Model 1 • 80-cps 480/960/1920-character buffer:

NA/NA mo	\$4,830 prch	\$37.50 maint
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3287 Model 2 • 120-cps 480/960/1920-character buffer:

NA/NA	5,150	46.50
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3287-11 Printer • 80-cps printer attached to local or remote loops; requires loop adapter and loop locally or data link adapter and 3842 (remote) loop control unit at 3287-11 site; otherwise same as 3287-1:

NA/NA	4,995	41.50
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3287-12 Printer • 120 cps; otherwise same as 3287-11:

NA/NA	5,315	50.00
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Upgrade • 3287-1 to 3287-2, or 3287-11 to 3287-12: \$355.

1066 Data Analysis/APL • dual-case EBCDIC plus APL character set; precludes Page Length Control:

16/14	297	NC
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1120 APL/Text • full 222-character EBCDIC/APL character set; requires 3610 ECS feature:

6/5	165	0.50
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5781 PS-2 Programmed Symbol • storage for two 190-character symbol sets; requires 3610 ECS and 3880 EPB features:

48/39	826	4.00
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5782 PS-4 Programmed Symbol • storage for additional four 190-character symbol sets; requires 3610 ECS, 3880 EPB, and 5781 PS-2 features:

39/32	662	2.50
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3610 Extended Character Set • adapter for 1120, 5781, and 5782 features:

22/18	429	3.00
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3880 Extended Print Buffer • for accommodating 2560-, 3440-, or 3564-character buffer sizes:

7/6	198	0.50
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4110 Friction Feed Platen • for feeding single-part continuous or fan-fold forms:

6/5	151	0.50
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8700 Variable-Width Forms Tractor • for feeding 5- to 6-part margin-punched forms:

6/5	151	0.50
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8330 3271/3272 Attachment • printer-controller interface:

52/42	860	2.50
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8331 3274/3276 Attachment • printer-controller interface:

6/5	165	0.50
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4250 Printers

Configuration • nonimpact dot-matrix printer • cluster printer attaches to 3274-31A, -31D, -41A, and -41D.

Printer • 600 dots per inch in both horizontal and vertical directions • all-points-addressable from host processor • print head moves at 40 ips • print time for average A4-size page ranges between 1.5 and 2.5 minutes:

\$1,285/\$1,205	\$21,000 prch	\$170.00 maint
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5210 Printers

Configuration • tabletop serial printwheel printer • letter-quality printer attaches to 3274 control units and 3276 display controller (see 3270 Controllers section).

Printer • 40-cps (Model G1) or 60-cps (Model G2) bidirectional printwheel • 96 EBCDIC or ASCII character set • up to 48-lpi vertical spacing; 10/12/15 cpi • 132 characters at 10 cpi; 158 characters at 12 cpi; 198 characters at 15 cpi • pinfeed continuous forms up to 15.4 inches wide; maximum print line 13.2 inches • cut sheet feeding optional.

5210 Model G1 • 40 cps:

NA/NA mo	\$5,420 prch	\$59.00 maint
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5210 Model G2 • 60 cps:

NA/NA	5,835	64.00
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7850 Continuous Forms Feed Device:

NA/NA	325	8.00
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7860 Cut Sheet Feed Device:

85/NA	1,850	22.00
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3287 Color Printers

Configuration • tabletop 4-color serial matrix impact printer • 960-/1920-character buffer; 2560/3440/3564-character buffer (cost option) • cluster printer terminal for 3274 control unit and 3276 display controller (see 3270 Controllers section for other particulars) • black, red, blue, and green multicolor ribbon generates display-attribute (protected/unprotected, intensity, etc) related printout, or extended attribute, and/or color display-related printout.

Printer • 80 cps (Model 1C) or 120 cps (Model 2C) bidirectional 7x8 matrix impact; rate reduced in proportion to colors printed for multicolor printout applications • 64/96 EBCDIC or ASCII; 222 EBCDIC/APL; up to six 190-character custom character sets • 132-column for black printout; 120-column, 4-color plus

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remaining 12-column base color printout • 6/8 lpi • 3- to 15-inch forms tractor; 5- or 6-part forms; 3- to 14-inch form length • 8- to 15-inch friction feed; single-part forms • page length control • replaceable 4-color ribbon cartridge.

3287 Model 1C • 80-cps, 960-/1920-character buffer color:
\$364/\$290 mo \$5,210 prch \$42.50 maint

3287 Model 2C • 120-cps, 960-/1920-character buffer color:
427/340 5,530 51.50

3287 Upgrade • Model 1C to Model 2C: \$355.

1120 APL/Text • full 222-character EBCDIC/APL character set; requires 3610 ECS feature:

6/5	165	0.50
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5781 PS-2 Programmed Symbol • storage for two 190-character symbol sets; selected single-color printout within character location; precludes use of 5783 PS-4A set, and requires 3610 ECS and 3880 EPB features:

48/39	826	4.00
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5782 PS-4 Programmed Symbol • storage for additional four 190-character symbol sets; selected single-color printout within character location; precludes use of 5783 PS-4A set, and requires 5781 PS-2, 3610 ECS, and 3880 EPB features:

39/32	662	2.50
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5783 PS-4A Programmed Symbol • storage for four 190-character symbol sets; 3 sets allow printout of any color within character location; remaining set allows selected single-color printout within character location; precludes use of 5781/5782 PS-2/4 sets; requires 3610 ECS and 3880 EPB features:

87/70	1,485	11.50
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3610 Extended Character Set • adapter for 1120, 5781, 5782, and 5783 features:

22/18	429	3.00
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3880 Extended Print Buffer • for accommodating 2560-, 3440-, or 3564-character buffer sizes:

7/6	198	0.50
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4110 Friction Feed Platen • for feeding single-part continuous or fan-fold forms:

6/5	151	0.50
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8700 Variable-Width Forms Tractor • for feeding 5- to 6-part margin-punched forms:

6/5	151	0.50
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3268 Character Printer

Configuration • tabletop, serial wire matrix impact printer • 960/1920/2560/3440/3564-character buffer • cluster printer for 3274 control units and 3276 display-controller (see 3270 Controllers section for additional details).

Printer • 340-cps bidirectional matrix impact • 64/96 EBCDIC or ASCII; 222 EBCDIC/APL • 132 columns • 3/4/6/8 lpi • 10 cpi • up to 16-inch forms tractor • 5- or 6-part continuous forms.

3268 Model 2 • 340 cps • 1920-character buffer:
NA/NA mo \$7,500 prch \$69.00 maint

3268 Color Printer

Configuration • tabletop, 4-color serial matrix impact printer • 960/1920/2560/3440/3564-character buffer • cluster printer for 3274 control unit and 3276 display controller; BSC or SNA LU3 or SCS SNA LU1 • black, red, blue, and green multicolor ribbon generates display-attribute (protected/unprotected, intensity, etc), related printout, or extended attribute, and/or color display-related printout.

Printer • 340-cps bidirectional matrix impact • 64/96 EBCDIC or ASCII; 222 EBCDIC/APL • 132 columns • 3/4/6/8 lpi • 15-inch forms tractor; 6-part forms • vertical spacing under manual, operator panel, or program control • changeable print belts.

3268 Model 2C • 340 cps • 1920-character buffer:

NA/NA mo	\$8,990 prch	\$92.00 maint
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3289 Line Printers

Configuration • product withdrawn from marketing March 1984 • floorstanding character-belt line printer with integral forms stacker • 4016-character buffer • cluster line-printer terminal for 3274 control unit and 3276 display controller (see 3270 Controllers section for other particulars).

Printer • 155-lpm 48-character belt, 120-lpm, 64-character belt, 80-lpm, 94-character belt, or 40-lpm 125-character belt impact (Model 1); 400-lpm, 48-character belt, 300-lpm 64-character belt, 230-lpm, 94-character belt, or 160-lpm, 125-character belt impact (Model 2) • 48/64/96 EBCDIC or ASCII; 125 EBCDIC/text character sets • 132 columns at 10 cpi • 6/8 lpi • 15-inch forms tractor; 6-part forms • vertical forms control • changeable print belts.

3289 Model 1 • 155/120/80/40-lpm belt printer:

\$631/\$488 mo	\$8,830 prch	\$104.00 maint
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3289 Models 2 & 3 • 160/230/300/400-lpm belt printer:

928/739	13,140	177.00
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1130 Text Print • 125-character EBCDIC logic:

7/6	231	NC
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1090 Audible Alarm • alert for manual intervention conditions:

6/5	192	NC
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3262 Line Printers

Configuration • floorstanding character band line printer • 288-character buffer • cluster line printer terminal for 3274/3276 (Model 13) (see 3270 Controllers section for other particulars).

Printer • 650-lpm, 48-character band, 467-lpm 64-character band, 364-lpm, 96-character band, or 253-lpm, 128-character band impact (Model 3); 325-lpm, 48-character band, 230-lpm 64-character band, 180-lpm, 96-character band, or 125-lpm, 128-character band impact • 48/64/96/128 EBCDIC character sets • 132 columns at 10 cpi • 3/4/6/8 lpi • 16-inch forms tractor • programmed controlled forms skip and advance; 20-ips slew rate • changeable print bands.

3262 Model 13 • 325/230/180/125-lpm band printer:

\$499/\$398 mo	\$12,620 prch	\$148.00 maint
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□ Plotters

IBM offers 2 color plotters for use with the 3277 Model 2 workstation. Both interface with the cluster controller via an RS-232C or IEEE 4888 adapter.

7374 Color Plotter

Configuration • tabletop plotter for use with 3277-2; RS-232C/IEEE 4888 interface to 3274 cluster controller.

Plotter • 8-pen plotter • automatic pen capping; fiber tip, roller ball, liquid ink pen types • handles drawings up to 24.5x48.5 inches • paper, vellum, and double-matte polyester media:

\$963/NA mo	\$15,000 prch	\$102.00 maint
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7375 Color Plotter

Configuration • tabletop plotter for use with 3277-2; RS-232C/IEEE 4888 interface to 3274 cluster controllers.

Plotter • 8-pen plotter • automatic pen speed, force, and acceleration settings; auto-pen capping; fiber tip, roller ball, liquid ink pen types • handles E/AO size drawings up to 34x44 inches • paper, vellum, double-matte polyester, and foils media:

\$1,070/NA mo	\$17,500 prch	\$107.00 maint
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