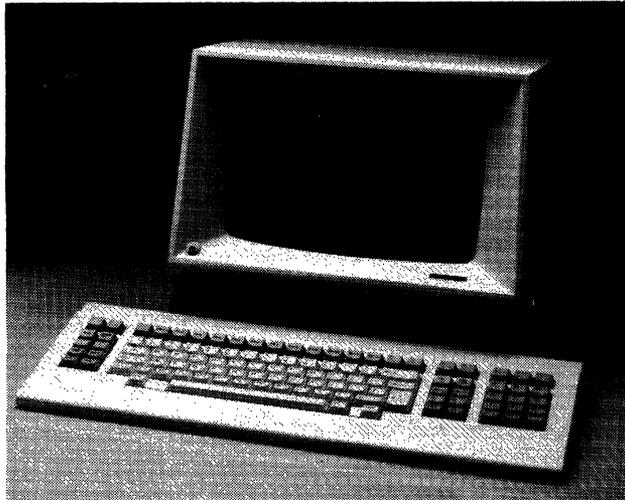


# Harris 9100/9200 Information Processing Systems



*The Harris 9178 Display Terminal can be configured with both the 9100 and 9200 Information Processing Systems. The 9178 features a 12-inch display screen with amber or green phosphor characters, and a 109-key, low-profile keyboard.*

## MANAGEMENT SUMMARY

**UPDATE:** Harris has made several additions to its 3270-compatible product line since we last published this report. Most significant is a small cluster (16 devices) remote display system, made possible with the introduction of the 9116 Controller. Other new components introduced include the 9279-3G Extended Color/Graphics Display Terminal, 9280 Display Terminal, 9168, 9187, and 9288 Printers, and the 9299 Terminal Multiplexer. Harris has also introduced the Challenger Series, a family of IBM plug-compatible products, which is covered in a separate report.

The 9100/9200 Information Processing Systems are Harris' second-generation IBM 3270-compatible product family. The 9200 was Harris' second entry into this market, the 8000 system being the first. The 8000 provided replacements for IBM's first generation of components (e.g., the 3271 Control Unit and 3277 Display Station). The 9200 (and the newer 9100) provide replacements for IBM's current 3270 offerings. Recent additions to the 9100/9200 product lines include the 9116 Controller, 9279-3G Extended (7-color) Color Display Terminal, 9280 Display Terminal, 9299 Terminal Multiplexer, and three new printers. Harris has recently expanded its entry in the 3270 market with the introduction of the Challenger Series, a family of products that are plug-compatible with the IBM 3270 family at the device level.

The 9200 can support up to 32 devices per controller (9210 or 9220), with both local and remote host communications capabilities at speeds up to 19,200 bps. Two system modes exist: the 9210 provides for attachment to a single host, while the 9220 has the ability to support multiple hosts concurrently. Both models support BSC or SNA/SDLC

The 9100 and 9200 Information Processing Systems are IBM 3270-compatible display systems. The 9200 system supports up to 32 devices per controller, with both local and remote communications capabilities. The newer 9100 system provides support for up to 16 devices in a remote environment. Both BSC and SNA/SDLC protocols are supported by both families. Monochrome and color display terminals, as well as a variety of printers, are available for use with both the 9100 and 9200 systems.

**MODELS:** 9116, 9210, and 9220 Controllers; 9178, 9278, and 9280 Display Terminals; 9279-2A and 9279-3G Color Display Terminals; 9168, 9187, 9287, 9288, and 9289 Printers.

**DISPLAY:** The 9278 and 9280 provide a 15-inch display; the 9279-2A and 9279-3G include a 14-inch display, while the 9178 features a 12-inch display. The 9178, 9279-2A, and 9280 contain the standard display capacity of 1920 characters. The 9279-3G provides selectable capacities of 1920 and 2560 characters. The 9278 provides selectable display capacities of 960, 1920, 2560, 3440, and 3564 characters. The 9279-2A contains 4-color display capability, and the 9279-3G provides 7-color support. All other models display characters in green or amber.

**KEYBOARD:** A variety of keyboards are available, with 75, 87, or 109 keys. The 109-key keyboards feature a low-profile design. All keyboards are detached.

**COMPETITION:** IBM, Telex, ITT Courier, Memorex, Lee Data, AT&T Teletype, and several others.

**PRICE:** A local 9200 system including eight 9278 displays, one 9289 band printer, and SNA/SDLC protocol compatibility, is priced at \$1,161 per month on a two-year lease, including maintenance.

## CHARACTERISTICS

**VENDOR:** Harris Corporation, Information Terminals Group, 16001 Dallas Parkway, P.O. Box 809022, Dallas, TX 75380-9022. Telephone (214) 386-2000. In Canada: Harris Systems Ltd., 19 Lesmill Road, Don Mills, Ontario M3B 2T3. Telephone (416) 441-2400.

**DATE OF ANNOUNCEMENT:** May 1980.

**DATE OF FIRST DELIVERY:** June 1980.

**NUMBER DELIVERED TO DATE:** Approximately 25,000 terminals (9200 Series).

## Harris 9100/9200 Information Processing Systems

► communications (the 9220 can support both simultaneously). Local attachment is achieved via a byte multiplexer, block multiplexer, or selector channel in 3272 or SNA modes; remote attachment is accomplished via modems utilizing either BSC or SNA/SDLC protocols.

The 9200 allows users to tailor the system to their individual needs by loading diskettes into the processor. A system diskette, feature diskette, and language diskette are supplied with each 9200 system, enabling the user to define such parameters as screen configuration, printer authorization, and number of devices. The system is reconfigured by entering new parameters.

The 9100 system is a small cluster system based on the 9116 Controller. Up to 16 remote devices are supported by the 9116, utilizing either BSC or SNA/SDLC protocols. Line speeds up to 56K bps are supported by the 9116.

Harris provides a variety of display stations for attachment to the 9100 and 9200 systems. The 9278 Display Terminal is compatible with the IBM 3278 Display Station, and offers screen sizes of 1920, 2560, 3440, and 3564 characters. Characters are displayed in green or amber phosphor on a 15-inch screen. The 9178 is a small-screen (12-inch), ergonomic version of the IBM 3278 Model 2, and is Harris' answer to the IBM 3178. The 9178 features a screen capacity of 1,920 characters. The third monochrome display offered by Harris is the new 9280, a 15-inch display that is compatible with the IBM 3180 Model 1. Harris also provides two color terminals for use with the 9100/9200 systems. The 9279-2A is a replacement for the IBM 3279-S2A Color Display Station, and provides the four base colors: red, white, green, and blue. The 9279-2A features a 1920-character screen capacity and a 14-inch display area. The newer 9279-3G is a replacement for the IBM 3279-S3G; it offers seven-color (red, blue, green, white, pink, yellow, turquoise) display capability, graphics, and two screen capacities (1920 and 2560 characters). All of the Harris displays can be configured with one of a variety of detached keyboards, featuring typewriter, data entry, or keypunch layouts.

The 9299 Terminal Multiplexer allows the user to double the distance between a controller and a display or printer, from 5,000 to 10,000 feet. Each terminal multiplexer supports the attachment of up to eight devices, and can attach to any of the Harris controllers. Each controller can support up to four 9299 Terminal Multiplexers. The 9299 provides for more efficient use of coaxial cable, by connecting up to eight devices to a controller using a single cable.

Harris provides matrix, letter quality, and band printers for use with both the 9100 and 9200 systems. In addition, a variety of diagnostic tools are provided on the 9100/9200 systems; these include a line trace facility, which allows a user to monitor the communications line while activity is occurring, and a complete set of confidence tests to provide system integrity for all components. ►

► **SERVICED BY:** Harris Corporation.

### CONFIGURATION

The 9100 Information Processing System is based on the 9116 Controller. The 9116 provides support for up to 4 devices alone, or for up to 16 devices using the 9299 Terminal Multiplexer. The 9116 supports any mix of 9178, 9278, 9279, or 9280 displays, and 9168, 9187, 9287, 9288, or 9289 printers. The 9116 operates in a remote environment, and supports both the BSC and SNA/SDLC protocols.

The 9200 Information Processing System includes two controller models: the 9210 and 9220. The 9210 supports remote or local communications with a single host, utilizing either BSC or SNA/SDLC protocols. The 9220 will support concurrent communications with multiple hosts, operating in either BSC or SNA/SDLC protocols, or both. Both models support attachment of up to 32 devices per controller, in any combination of 9178, 9278, 9279, or 9280 displays, and 9168, 9187, 9287, 9288, or 9289 printers. Displays and printers may be located up to 5,000 feet from the processor, and are connected via coaxial cable.

The 9299 Terminal Multiplexer can be used with both the 9100 and 9200 systems. The 9299 allows the distance between the controller and a terminal or printer to be doubled to 10,000 feet. The 9299 can be attached up to 5,000 feet from a controller, via a single coaxial cable; up to eight devices can be attached to a 9299, each at a maximum distance of 5,000 feet. (The 9299 Terminal Multiplexer does not increase the number of devices supported by the 9210 and 9220 controllers alone; it increases the number of devices supported by the 9116 from 4 to 16.) The 9116, 9210, and 9220 controllers each support up to four 9299 Terminal Multiplexers.

### TRANSMISSION SPECIFICATIONS

The 9116 provides for remote communications, in half-duplex mode, at speeds up to 19,200 bps, using both BSC and SNA/SDLC protocols. Optional support for 19,200 bps and 56K bps communications speeds is available.

When utilizing BSC protocols, the 9210 and 9220 controllers will communicate in half- or full-duplex, at speeds up to 9600 bps. When communicating in the SNA/SDLC environment, the 9210 and 9220 are capable of local channel attachment or remote communications in half-duplex mode. The 9210 and 9220 will support local attachment at channel speed, and remote host communications at up to 9600 bps. Optional support for 19,200 bps and 56K bps communications speeds is available.

Local attachment of the 9210 or 9220 is via byte multiplexer, block multiplexer, or selector channel in 3272 or SNA modes. Remote attachment is via modems in BSC or SNA/SDLC protocols.

### DEVICE CONTROL

A system diskette, feature diskette, and language diskette are supplied with each 9200 system. Through the use of these diskettes, the user can configure the system to meet individual requirements.

The first step in configuring the system is the loading of the system diskette into the controller. The system diskette determines the model of the system, either 9210 or 9220. Also determined by the system diskette is the connection (local or remote), and the operating environment (BSC or SNA/SDLC). The user then loads the feature diskette. This diskette provides the operating parameters, such as printer authorization, screen configuration, and number of devices to be supported. The system can be reconfigured by entering ►

## Harris 9100/9200 Information Processing Systems

### ▷ COMPETITIVE POSITION

The 9100/9200 Information Processing Systems, along with the new Challenger Series, represent Harris' commitment to the highly competitive IBM 3270-compatible marketplace. In this market, Harris not only competes with IBM but with other independent vendors such as Telex, ITT Courier, Memorex, Lee Data, Racal-Milgo, and a number of others. IBM has put pressure on this group with a number of new products (3178, 3179, 3180 displays) that are available at prices far below the level of the older IBM components. The independent vendors have been forced to respond by cutting prices (and margins) and introducing new generations of products. Some vendors, including Raytheon and MDS Trivex, have made the decision to exit the market rather than make these moves. Harris, Telex, ITT Courier, Memorex, and Lee Data have responded by introducing new generations of IBM-compatible equipment.

Unlike most of the independent vendors mentioned above, Harris' 3270 terminal systems represent only a part of their overall clustered terminal product lines. The 9100, 9200, and Challenger lines represent the low-end offerings in Harris' current clustered terminal product line, which also includes the 1600, 9300, and MIND Series DDP systems.

### ADVANTAGES AND RESTRICTIONS

Harris has been fairly quick to respond to IBM's enhancements to the 3270 family, thus keeping the 9100/9200 systems competitive. The Challenger Series, Harris' first family of plug-compatible IBM replacement products, should help the company by providing Harris with the capability of penetrating IBM shops. As we mentioned above, one advantage that Harris has over some other 3270-compatible vendors is that their product line also includes other offerings (the 1600, 9300, and MIND DDP systems). Users have the option of field-upgrading their 9100/9200 system to a MIND distributed processing system. Generally, however, Harris will continue to encounter the same problems that other independent vendors encounter in competing with the 3270 family, one of IBM's top money-makers.

Datapro received an insufficient number of responses on the Harris 9200 system, during the 1985 Terminal Users Survey, to provide an accurate sampling of user satisfaction. As a result, we regret that no User Reaction can be included in this report. □

- ▶ new system parameters. The language diskette, loaded third, determines whether data will be sent using ASCII or EBCDIC codes. It also determines whether the terminal will transmit in English or other languages which are available with the 9200.

A number of diagnostic tools are resident in the 9116, 9210, and 9220 controllers; these include a line trace facility and a set of automatic system confidence tests. The system confidence tests are executed each time the processor is powered on. A series of LEDs located on the processor identifies each processor component as it is tested. A lighted LED indicates a failing component.

The line trace facility gives the user the ability to display the communications traffic when the lines are active. Inbound and outbound message traffic is monitored and displayed as these events occur. In addition, a hard copy of the data can then be produced on a local printer, for detailed analysis.

Another series of diagnostic tests is available by initiating the command mode at the display station. These tests are resident in the processor. They provide such capabilities as functional testing for the display station, statistics for specific subsystems, and device status tables.

A Response Time Monitor feature is also resident in all controller models. This feature provides statistical information as to the response level of the devices attached to the controller.

### COMPONENTS

**9116 CONTROLLER:** Controller memory consists of 256K bytes of RAM. The 9116 supports the attachment of up to four devices; support is expandable to 16 devices using the 9299 Terminal Multiplexer. Devices supported can be in any mix of Harris displays and/or printers. A 320K-byte diskette is provided for user-customization of the controller. The 9116 operates in both BSC and SNA/SDLC environments.

**9210/9220 CONTROLLER:** Controller memory consists of 160K bytes of RAM. Each controller supports up to 32 devices, in any mix of Harris displays and/or printers. A system diskette, feature diskette, and language diskette are included with each system, and are loaded into the controller to configure the system. Local or remote attachment is accommodated. The 9210 and 9220 operate in both BSC and SNA/SDLC environments.

**9299 TERMINAL MULTIPLEXER:** Can be used with the 9116, 9210, and 9220 controllers. The 9299 supports attachment of up to eight devices (terminals and/or printers), and can be attached up to 5,000 feet from the controller, effectively doubling the distance between the controller and a display or printer to 10,000 feet. The 9299 Terminal Multiplexer increases the attachable devices on a 9116 controller from 4 to a maximum of 16; it does not increase the number of connectable devices on a 9210 or 9220 controller.

**9178 DISPLAY TERMINAL:** An IBM 3178-compatible display station. The 9178 features a 12-inch diagonal screen with a 1920-character capacity arranged in 24 lines of 80 characters each. A 25th status line is also available. Characters are displayed in green (P39/P42) or amber (PC166) phosphor, and are formed via a 9-by-14 dot matrix. The 9178 also features a low-profile design with a smaller footprint than that of the 9278. A 128-character set, either ASCII or EBCDIC, can be displayed. The 9178 connects only to Harris controllers.

**9278 DISPLAY TERMINAL:** An IBM 3278-compatible display station. A 15-inch diagonal, nonglare display screen is standard, capable of displaying up to 3564 characters. Four display formats are available: 24 lines of 80 characters (1920), 32 lines of 80 characters (2560), 43 lines of 80 characters (3440), and 27 lines of 132 characters (3564). A status line, displayed on the bottom of the screen, is also standard. Characters are formed via a 7-by-13 dot matrix, and are displayed in green (P39/P42) or amber (PC166) phosphor on a dark background. Three intensity levels are featured. A 128-character set, either ASCII or EBCDIC, can be displayed. The 9278 connects only to Harris controllers.

**9279-2A COLOR DISPLAY TERMINAL:** A base color display station compatible with the IBM 3279-S2A. The 9279-2A can display up to four colors: red, white, green, and

## Harris 9100/9200 Information Processing Systems

blue. A 14-inch diagonal screen, capable of displaying 1920 characters arranged in 24 lines of 80 characters each, is standard. A status line appears in blue as a 25th line at the bottom of the screen. A 128-character set, both ASCII and EBCDIC, can be displayed. An audible alarm, security lock, and line trace facility are standard; a tilt and swivel feature for the display is optional. The 9279-2A connects only to Harris controllers.

**9279-3G COLOR DISPLAY TERMINAL:** An extended color display station compatible with the IBM 3279-S3G. The 9279-3G can display up to seven colors: red, white, green, blue, yellow, and turquoise. A 14-inch diagonal screen, capable of displaying 1920 characters in a 24-line by 80-character format, or 2560 characters in a 32-line by 80-character format, is standard. A status line appears at the bottom of each screen size. Programmed symbols provide the 9279-3G with graphics capabilities. APL is also supported. Extended highlighting, reverse video, blink, and underscore are also standard. A 128-character set, both ASCII and EBCDIC, can be displayed. An audible alarm and numeric keylock are standard; a tilt/swivel display feature is optional. The 9279-3G connects only to Harris controllers.

**9280 DISPLAY TERMINAL:** An IBM 3180-compatible display station. The 9280 features a 15-inch diagonal screen, and selectable display formats of 24 lines by 80 characters (1920 characters total), 32 lines by 80 characters (2560), 43 lines by 80 characters (3440), and 27 lines by 132 characters (3564). A status line is also standard. Characters are displayed in green (P39/P42) or amber (PC166) phosphor. The 9280 connects only to Harris controllers.

**KEYBOARDS:** A variety of keyboards are available for use with the 9100/9200 Information Processing System display stations, all of which are detached. Keyboards are available in 75-, 87-, and 109-key versions, with typewriter-style, typewriter with 10-key numeric pad, data entry, and key-punch layouts. All keyboards include a Home key, ALTer-nate key, and Local Print key.

The 109-key keyboard is an ergonomic model available in typewriter and data entry styles. The newer display models (9178, 9279-3G, and 9280) support only the 109-key keyboard models. The keyboard features sculptured keys with a low-glare matte finish. The keyboard can be adjusted to three angles of elevation, and has a low-profile design. Adjustable key click and tactile feedback are standard. A variety of international character sets are also available.

**9168 MATRIX PRINTER:** A bidirectional character printer, with switch-selectable speeds of 400 cps (draft quality) or 100 cps (near letter quality). Line lengths of up to 132 characters are accommodated. The 96-character ASCII set is printable. Characters are formed using a 9-by-18 dot matrix for near letter quality, or a 7-by-9 dot matrix for draft quality. Horizontal spacing is selectable at 10, 12, or 13.1 cpi; vertical spacing is selectable at 3, 4, 6, or 8 lpi. Forms are advanced via a tractor feed mechanism; up to six-part forms may be used. The 9168 supports DSC or SCS datastreams; it can be connected to Harris controllers only.

**9187 MATRIX PRINTER:** A bidirectional character printer, with switch-selectable speeds of 200 cps (draft quality) or 45 cps (near letter quality). Line lengths of up to 132 columns are accommodated. The 96-character ASCII set is printable. Characters are formed via a 9-by-18 dot matrix for near letter quality, or via a 5-by-9 dot matrix for draft quality. Horizontal spacing is selectable at 10, 12, or 13.1

cpi; vertical spacing is selectable at 6 or 8 lpi. Forms are advanced via a tractor feed mechanism; up to six-part forms are accommodated. The 9187 supports DSC or SCS datastreams; it can be connected to Harris controllers only.

**9287 MATRIX PRINTER:** A bidirectional character printer, field upgradable from 80 characters per second print speed to 130 or 180 cps. Line lengths up to 132 characters are accommodated. Character sets include 64 printable ASCII or EBCDIC uppercase characters; 96 uppercase and lowercase characters. Both upper- and lowercase characters are formed using a 7-by-8 dot matrix. Horizontal spacing is 10 characters per inch; vertical spacing is adjustable to 6 or 8 lines per inch, with a paper slew rate of 15 inches per second. Paper is advanced via a tractor feed mechanism. Single or up to six-part forms may be used. The 9287 connects only to Harris controllers.

**9288 LETTER QUALITY PRINTER:** A bidirectional, letter quality printer that processes 3270 SCS and DSC datastreams and provides local copy capability. The 9288 prints at 55 cps (maximum rated burst print speed). Line lengths up to 132 columns are accommodated. Horizontal spacing is selectable at 10 or 12 cpi; vertical spacing is selectable at 6 or 8 lpi. A friction feed mechanism feeds single sheets, while a forms tractor advances up to five-part forms. The 9288 connects only to Harris controllers.

**9289 BAND PRINTER:** A band printer capable of printing 300 lines per minute with a 64-character set, or 240 lines per minute with a 96-character set. Line lengths up to 132 characters are accommodated (136 columns optional). Character sets include 64 printable ASCII or EBCDIC uppercase characters; 96 upper- and lowercase characters. Print method is an operator changeable etched steel band carrying 208 characters. A 50-yard continuous loop ribbon cartridge is utilized. Horizontal spacing is 10 characters per inch; vertical spacing is adjustable to 6 or 8 lines per inch. Paper is advanced via a pinfeed mechanism. Single or up to six-part forms may be used. The 9289 connects only to Harris controllers.

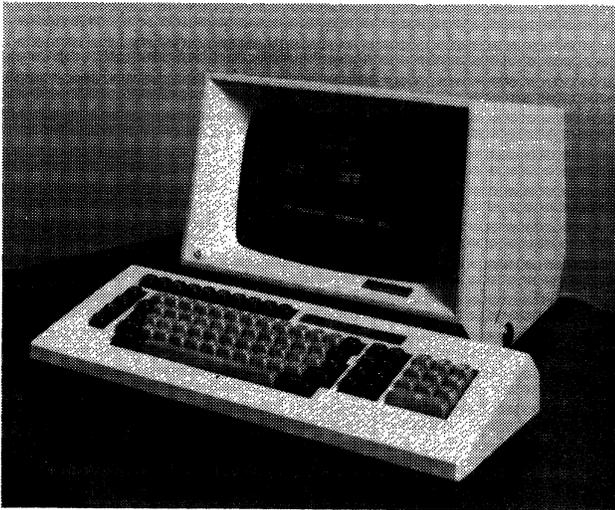
### PRICING

The Harris 9100/9200 Information Processing System components are available for purchase, or on a one-, two-, three-, four-, or five-year lease, including maintenance. A separate maintenance contract is available for purchased units. Harris has supplied the following single unit prices for selected 9100/9200 components. For more detailed pricing, or for lease pricing, contact Harris.

### EQUIPMENT PRICES

	Purchase Price (\$)
9116	4,250
9210	8,000
9220	12,500
9178	1,412
9278	1,562
9279-2A	2,088
9168	6,600
9287	3,200
9289	8,720 ■

# Harris 8000 Series Terminal Systems



*The Harris 8180 System offers IBM 3270 emulation. The display offers screen capacities from 480 to 1920 characters, on a 12-inch (diagonal) screen. The keyboard is detachable.*

## MANAGEMENT SUMMARY

The Harris 8000 Series is a family of clustered terminal systems designed for information entry and retrieval. Various models provide "basic" or "enhanced" emulation of the IBM 3271 and 3272, Univac Uniscope 100 and 200, Burroughs TD 800 Series, and Honeywell VIP 7760 and 7700 terminal systems. With the first components of the 8000 Series (8170) having been introduced in 1975, the 8000 Series is the older of two families in Harris' clustered terminal product line. The newer family, the Harris 9200 Series, is described in Report C25-468-201.

The 9200 family of terminals are not intended as replacements for the 8000 Series, but rather as an upgrade path to IBM SNA-type networks. Another Harris terminal product line is the MIND Series multifunctional distributed data processing system. The MIND Series provides both DDP and interactive (IBM 3270) processing.

Family components consist of a free-standing processing unit, in which the control programs required for emulation of the appropriate mainframer's equipment reside; an especially compact, lightweight display station with a 12-inch (diagonal measurement) screen, which displays various line arrangements and character sets in accordance with the emulation software; a choice of detachable typewriter, data entry, or operator console keyboards, equipped with appropriate keycap sets for the various emulators; five printer models, including a 40 cps correspondence-quality printer, 60-, 120-, and 165-cps impact matrix printers and a 200-lpm belt printer; a 5-megabyte cartridge disk unit; and a 500K-byte dual-drive diskette unit. ▶

**Harris' first generation of clustered terminal systems.**

Features include a software-driven control unit, support of up to 32 keyboard/displays plus 32 printers, local printing independent of mainframe control, and local diagnostics via self-test routines and line and event monitoring. Display screen capacities range from 480 to 1920 characters; printer speeds, from 40 cps to 200 lpm. Optional diskette or cartridge disk storage supports enhanced functions such as local format storage, queued transaction handling, and spooled printing.

A typical 8171 configuration, which provides emulation of a remote IBM 3271-1/-12 and includes a processor and eight 1920-character displays, is priced at \$23,009, or \$666 per month on a two-year lease including maintenance.

## CHARACTERISTICS

**VENDOR:** Harris Corporation, Data Communications Division, 16001 Dallas Parkway, P.O. Box 400010, Dallas, Texas 75240. Telephone (214) 386-2000.

**DATE OF ANNOUNCEMENT:** See System Characteristics table.

**DATE OF FIRST DELIVERY:** See System Characteristics table.

**NUMBER DELIVERED TO DATE:** Over 4,000 systems.

**SERVICED BY:** Harris Corporation.

## MODELS

The Harris 8000 Series consists of the following models:

- **8170**—A clustered terminal that comes in two versions: one emulates the IBM 3271 Models 1, 2, 11, and 12 for remote BSC or SDLC operation (Harris Model 8171); the other emulates the IBM 3272 Models 1 and 2 for local operation (Harris Model 8172). Display stations emulate IBM 3277 Models 1 and 2.
- **8180**—A clustered terminal that emulates the IBM 3271 Models 1 and 2 for remote BSC (but not SDLC) operation (Harris Model 8181) or the IBM 3272 Models 1 and 2 for local operation (Harris Model 8182). The 8180 is an enhanced version of the 8170 that supports local format storage, queued transaction handling, and spooled printing concurrently with 3270 operations.
- **8210**—A clustered terminal for local or remote operation that emulates the Univac Uniscope 100 and 200 display terminals.
- **8212**—A clustered terminal for local or remote operation that emulates the Univac Uniscope 100 and 200 display terminals. The 8212 is an enhanced version of the 8210 that ▶

## Harris 8000 Series Terminal Systems

➤ The processor, displays, and keyboards are components common to all configurations; support for the remaining peripherals depends on which emulation program is used. In general, up to 32 display stations plus 32 printers may be configured per cluster. One emulator is provided per system, and is stored on a cassette that is housed within the processor cabinet. The cassette is reprogrammed by Harris and reloaded by the user whenever changes need to be implemented. Harris is willing to program some custom features requested by users on an RPQ basis. Processor memory expansion and other additional systems support required for larger clusters and/or enhanced features is bundled with the configuration and generally inaccessible to the user.

Harris' "basic" emulation programs provide standard line protocols, polling characteristics, and device handling techniques equivalent to the functions of the four mainframer equipment families, as well as several features not available with the mainframers' systems. For example, the Univac emulator provides fully buffered printing, a self-test, typamatic keyboards, and synchronous transmission up to 9600 bps, none of which are available with the Uniscope terminals. Harris' Burroughs emulator, unlike the Burroughs' TD line itself, provides a local-controlled printing function, a self-test, and typamatic keyboards, utilizes parallel rather than serial clustering, and permits displays and printers to be located at up to 2000 feet from the controller. The Honeywell emulator supports clusters of up to 32 displays plus 32 printers, more than is permitted in VIP Series clusters.

An "enhanced" version of each of the four basic emulators is also available. The enhancements require additional processor memory and diskette or cartridge disk storage, and include support for local storage of formats that would normally reside at the host site, a queued transaction handling function that permits data to be entered off-line and stored locally for later transmission to the host, and (for the enhanced 3270 emulator only) a spooled print capability that permits data received by the terminal controller to be stored for later printing under local control. These enhanced functions run concurrently with emulator operations and are completely transparent to the host computer. They are designed to reduce line traffic and improve line usage, increase operator efficiency, and provide backup for terminal/host operations.

For systems originally equipped with the basic emulator version, the enhanced function software and related hardware requirements are field-installable. Certain Harris 8000 systems (for example, the IBM-compatible Harris Model 8171 and the Univac-compatible Harris Model 8210) are also upgradeable to Harris' 1600 Series Terminals, which provide a full range of user-programmable capabilities (see Report C21-468-101).

### USER REACTION

The 1982 Datapro survey of alphanumeric display terminal users yielded responses from four users of Harris ➤

➤ supports local format storage and queued transaction handling concurrently with Uniscope 100/200 operations.

- 8220—A clustered terminal that emulates the Burroughs TD 801, 802, and 820 display terminals.
- 8222—A clustered terminal that emulates the Burroughs TD 801, 802, and 820 display terminals. The 8222 is an enhanced version of the 8220 that supports local format storage and queued transaction handling concurrently with Burroughs TD 800 operations.
- 8760—A clustered terminal that emulates the Honeywell VIP 7760 and VIP 7700 display terminals.
- 8762—A clustered terminal that emulates the Honeywell VIP 7760 and 7700 display terminals. The 8762 is an enhanced version of the 8760 that supports local format storage and queued transaction handling concurrently with Honeywell VIP operations.

### CONFIGURATION

The 8000 Series systems are a family of clustered terminals built around a common processor and peripheral group. Various processor models and memory sizes are used in the different systems to accommodate particular configurations and functions.

In general, 8000 Series systems can support up to 32 display stations plus 32 printers connected via coax cable to the processor. Up to eight displays and eight printers are directly attachable to the basic processor. Additional displays and printers are accommodated via Device Adapters and may require processor memory expansion. Printers may be any combination of the Harris Model 3105 45-cps daisy wheel printer, 60-, 120-, or 165-cps dot matrix impact printers (Harris Models 3155, 3165, and 3120, respectively), or the Harris Model 3135 200 lpm belt printer. A photopen (light pen) and an ID card reader are available for use with IBM 3270-compatible configurations.

The four "enhanced" versions, Models 8180 (IBM), 8212 (Univac), 8222 (Burroughs), and 8762 (Honeywell) support additional capabilities not available in basic versions. These functions run concurrently with emulation operations and may require processor memory expansion. They include Local Format Storage, which enables the user to store formats locally that otherwise would reside at the host site; Queued Transaction Handling, which permits the user to enter data offline onto a diskette or disk and store it for later transmission to the host; and (for Model 8180 only) Spooled Print, which enables data received from the host to be stored for later printing.

Mass storage for these enhanced features can be provided via diskette or cartridge disk. Harris offers a 500K-byte dual-drive diskette unit and a 5MB cartridge disk unit containing 2.5MB of fixed disk storage plus 2.5MB of removable storage. Up to two diskette units may be added to the system for each increment of 8 displays, for a total system maximum of 4MB. Alternatively, up to two cartridge disk units may be added for each 8 displays, for a total system maximum of 40MB.

A summary of the major characteristics of each model are presented in the Systems Characteristics chart.

### TRANSMISSION SPECIFICATIONS

A wide range of communications capabilities is provided for the Series 8000, including half- or full-duplex operation using line disciplines of asynchronous, synchronous, bisynchronous or SDLC (Model 8170 only). Transmission rates include 110, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200 and ➤

Harris 8000 Series Terminal Systems

SERIES 8000 SYSTEM CHARACTERISTICS

MODEL	8170	8180	8210	8212	8220	8222	8760	8762
CRT Displays, maximum number/cluster	32	32	32	32	32	32	32	32
Memory capacity, min./max. (bytes)	16K/64K	32K/96K	24K/64K	32K/64K	24K/64K	32K/64K	32K/64K	32K/64K
Display size—								
480 char. (12 lines; 40 char./line)	●	●	—	—	—	—	—	—
960 char. (12 lines; 80 char./line)	●	●	●	●	●	●	●	●
1024 char. (16 lines; 64 char./line)	—	—	●	—	—	—	—	—
1920 char. (24 lines; 80 char./line)	●	●	●	●	●	●	●	●
Storage options—								
Dual diskette (500K)	—	Opt.	—	Opt.	—	Opt.	—	Opt.
Cartridge disk (5MB)	—	Opt.	—	Opt.	—	Opt.	—	Opt.
Compatibility (emulation)	IBM 3270 local & remote	IBM 3270 local & remote (enhanced)	Univac Uniscope 100/200	Univac Uniscope 100/200 (enhanced)	Burroughs TD 800 Series	Burroughs TD 800 Series (enhanced)	Honeywell VIP 7760 & 7700	Honeywell VIP 7760 & 7700 (enhanced)
Options—								
Printers (any model)	●	●	●	●	●	●	●	●
Photopen (light pen)	●	●	—	—	—	—	—	—
ID card reader	●	●	—	—	—	—	—	—
Keyboards:								
Typewriter	●	●	●	●	●	●	●	●
Data entry	●	●	—	—	●	●	—	—
Operator console	●	—	—	—	—	—	—	—
Communications—								
Asynchronous	—	—	—	—	●	●	—	—
Bisynchronous (EBCDIC & ASCII)	●	●	—	—	—	—	—	—
Synchronous	—	—	●	●	●	●	●	●
SDLC	●	—	—	—	—	—	—	—
Transmission speeds, min./max. (bps)	600/4800 (BSC); 600/9600(SDLC)	600/4800	300/9600	300/9600	300/9600	300/9600	300/4800	300/4800
Date of Announcement	9/74	4/76	4/76	12/79	4/76	12/79	4/76	12/79
Date of First Delivery	6/75	9/76	5/76	—	6/76	—	6/76	7/80

➤ 8000 Series terminals. These users represented an installed base of 414 terminals, with the largest of them having 300 displays in the system. Three of the users reported on Model 8170 clusters; the fourth user did not specify model. The ratings given to the Harris terminals by these users are presented in the following table.

	Excellent	Good	Fair	Poor	WA*
Overall performance	3	0	1	0	3.5
Ease of operation	2	2	0	0	3.5
Display clarity	1	2	1	0	3.0
Keyboard feel & usability	2	1	1	0	3.3
Hardware reliability	2	1	1	0	3.3
Maintenance service	1	1	1	0	3.0
Technical support	0	2	1	0	2.7

\*Weighted Average based on a scale of 4.0 for Excellent.

Principal applications for the Harris terminals included: data entry and interactive inquiry (four users); program development (three users); as a system console (three users); and for text editing, business graphics, and program development (one user each). Three of the users said that they would recommend the Harris terminals to other users with similar applications; the fourth user did not respond to that question. In addition, one user commented that his principal reason for choosing Harris terminals over competitive products was their price—he stated that both the terminals and controllers were comparatively inexpensive. □

➤ 9600 bps. Other speeds can be achieved through external clocking. Transmission code can be either ASCII or EBCDIC in 8 level (synchronous) or 10/11-level (asynchronous) format. The communications adapter can be configured with an EIA RS-232-C interface for connection to an external modem. Bell System or independent modems can be used with automatic answer (available on all terminals).

In general, the communications capabilities that can be implemented for each model within the family of terminals depend on the line discipline used and are summarized in the accompanying chart of System Characteristics.

DEVICE CONTROL

All operations are software-controlled by standard operating software and by parameterized programs residing on a cassette housed within the processor itself, or (in enhanced models only) in local disk or diskette storage. Program loading is controlled by a ROM (Read Only Memory) program loader.

One operating system per terminal emulated is offered. Emulated terminals include the IBM 3270, Univac Uniscope 100/200, Burroughs TD 800, and Honeywell VIP 7760 and 7700; see the accompanying System Characteristics table for the emulation capabilities of each system. The emulation packages offered are oriented toward specific functions such as on-line interactive communications, remote job entry, off-line source data entry, and local printing operations.

➤ **DIAGNOSTICS:** Complementary software and hardware diagnostic aids are available for the Series 8000 systems. These allow for isolation of hardware and/or software problems present in the terminal, host computer system, or data communications links. Two basic packages are provided. The Selftest System (software) isolates hardware fail-

## Harris 8000 Series Terminal Systems

► ures to a particular field-replaceable module. The Line and Event Monitor (hardware) provides analysis of line traffic and I/O events taking place between the terminal and the host computer.

**8180/8212/8222/8762 FUNCTIONS:** The software supplied with these enhanced systems provides a number of attractive features not available with the basic versions. These sub-routines include Local Format Storage, Queued Transaction Handling, and (for Model 8180 only) Spooled Print. Use of the software routines requires the additional memory supplied with each enhanced model and diskette or disk storage.

Local Format Storage allows data entry formats to be retrieved from the host computer and stored on diskette or disk for immediate access by the keystation operator. This program is beneficial to applications that require a number of data entry formats; a high rate of format retrievals from the host computer would burden the host and the communications facility.

Queued Transaction Handling allows keyed data (transactions) to be stored on diskette or disk for later transmission to the host. The program consists of three operating modes: Normal, Off-Line Data Entry, and On-Line Recovery mode. In Normal mode, keyed data is transmitted directly to the host. In the Off-Line Data Entry mode, keyed data is stored on disk to be later transmitted to the host. The On-Line Recovery mode transmits data from disk storage to the host. Individual terminal operators can selectively enter any mode. The program is beneficial to high volume data entry applications and to conditions such as interruption of communications between host and terminal and to periods of peak communications activity.

Spooled Print (Model 8180 only) allows received printer data files to be stored on diskette or disk for later printing. Typically, the data is received during unattended periods, such as after hours. A printer address accompanies each print file. One display station in the cluster functions as the print transmission control during host print transmission, and is used for error recovery and operator intervention. The assignment of printer number is typically determined by forms type. The spooled print operation is executed by command from any of the display stations. The operator selects a printer and print file and initiates the command.

### COMPONENTS

The following components are common to the members of the Harris 8000 family. The specific configuration details are provided by the accompanying Systems Characteristics table.

**PROCESSOR:** An integral, byte-oriented, serial minicomputer with an instruction execution time of 6.4 microseconds. Of its 16 basic instructions, 14 are logical instructions, expandable to 80 with the use of modifiers. Instructions are 16 bits long and are accessed during one memory cycle.

Read/write program memory is random access with a cycle time of 6.4 microseconds. Available storage capacity is 16K bytes, expandable to 64K bytes in 8K increments. Total memory, including program memory and buffer memory, can be expanded to 96K bytes, depending on the system.

Memory organization is on a page basis; each page contains 256 16-bit words (512 bytes). The first one or two pages are reserved for the ROM program loader. Internal processor architecture includes three general-purpose registers; each with a single-level stack, an instruction address register with combined page reference register and four-level stack, and a memory access register. The processor also includes up to 256 general-purpose (scratchpad) registers. All stacks use the push-down/pop-up technique for manipulating data and

addresses, which is a last-in/last-out arrangement for inter-connecting registers. I/O device interrupt is provided.

A cassette tape drive resides within the processor cabinet and stores the emulation program and other basic systems routines. The programs are developed by Harris personnel and are generally not accessible to the user.

**CRT DISPLAY UNIT:** A 12-inch (diagonal measurement) CRT with a viewing area 9.5 inches wide by 7.5 inches high. A character set of up to 128 ASCII characters, including upper and lower case alphabets, numerics, and special symbols, is displayed in white against a dark background. Characters are generated via a 9-by-7 dot matrix. The CRT screen is viewed through an etched non-glare screen.

The standard display arrangements are:

Characters/display:	480	960	1024	1920
Lines/display:	12	12	16	24
Characters/line:	40	80	64	80

Display character sets available include IBM 3270-compatible upper and lower case and IBM 3270-compatible upper case only. A number of International sets are also available. The display arrangement and character set must be identical for all display units associated with a common terminal processor.

Display attributes include dual intensity, blanking, strike-through, underscore, and blinking. An audible alarm is available for all models.

**KEYBOARDS:** Three keyboard arrangements are available: typewriter, data entry, and operator console. All keyboards are equipped with a 10-key numeric pad, cursor control cluster, 20 program function keys, seven indicator lamps, adjustable keyclick, typamatic function (automatic repeat), and selectable keylock.

**3105 PRINTER:** A desktop bidirectional, impact, "daisy-wheel" printer rated at 40 characters/second and equipped with 132 print positions at 10 characters/inch or 158 print positions at 12 characters/inch. Vertical spacing is selectable at 6 or 8 lines/inch. The standard character set includes 96 ASCII print symbols. The Diablo-produced printer is equipped with a pin feed, available in seven platen widths, or with a tractor feed that accommodates 6-part continuous pin-fed forms up to 14 $\frac{1}{8}$  inches wide. Options include nine print wheel styles and a printer stand.

**3155 PRINTER:** A desktop unidirectional, impact, matrix printer that prints up to 132 characters per line at a speed of 60 characters/second. Horizontal and vertical spacing are set at 10 characters per inch and 6 lines per inch, respectively. A 64-character ASCII or EBCDIC set is provided. Characters are formed within a 5-by-7 dot matrix. An adjustable tractor feed mechanism is standard and accepts 6-part continuous pin-fed forms of up to 17.3 inches in width. A printer stand is optional. The printer is a Centronics Model 700.

**3165 PRINTER:** A desktop, bidirectional, impact, matrix printer that prints up to 132 characters per line at a speed of 120 characters/second. Horizontal and vertical spacing are set at 10 characters per inch and 6 lines per inch, respectively. A choice of 64- or 96-character ASCII or EBCDIC sets is available. Characters are formed by a 7-by-7 or 7-by-9 dot matrix. An adjustable tractor feed mechanism is standard and accepts 6-part continuous pin-fed forms of 4 to 17.3 inches in width. A printer stand is optional. The printer is a Centronics Model 702.

**3120 PRINTER:** A 165-character/second matrix printer that prints up to 132-characters/line. Any of 64 ASCII symbols ►

## Harris 8000 Series Terminal Systems

are normally formed within a 5-by-7 dot matrix; a character elongation function prints double-width characters. The printer's tractor feed mechanism accommodates six-part, continuously sprocketed forms up to 14<sup>7</sup>/<sub>8</sub> inches wide. Horizontal and vertical spacing are 10 characters/inch and 6 lines/inch, respectively. The printer is a Centronics Model 101.

**3135 PRINTER:** A belt printer with a rated speed of 200 lines/minute. It has a 64 ASCII character set and 132 print positions. It accommodates six-part continuously sprocketed forms from 2 to 16 inches wide and features programmable (tape) vertical format control.

**DISK STORAGE:** The disk drive is similar, except for data format, to the IBM 5444 drives used with IBM's System/3 computers. Storage capacity is 5.0 million bytes. It features a 2.5M-byte removable disk cartridge and 2.5M-byte fixed disk. Data access is provided by four vertically aligned heads, one per disk surface. Average rotational delay and data

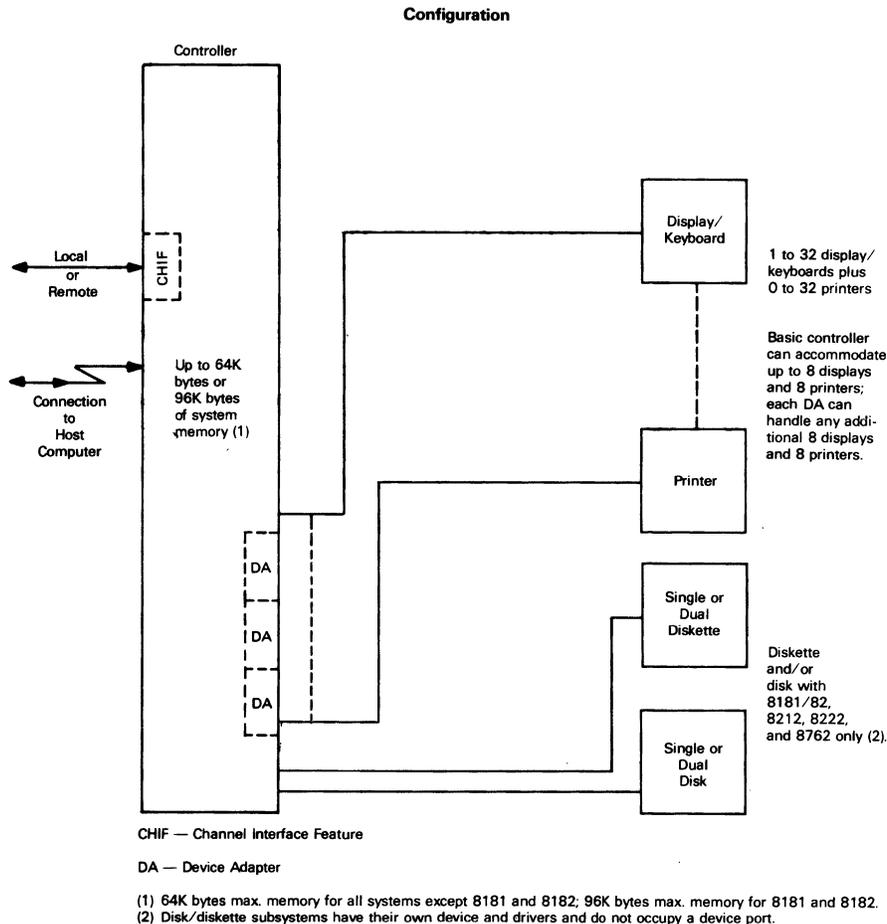
transfer rate are 20 milliseconds and 158,000 bytes/second, respectively. Average head positioning time is 85 milliseconds.

**DISKETTE STORAGE:** The Model 3450 diskette features a dual drive capability with maximum storage of 500K bytes. Track density is 48 tracks per inch, and bit density is 3268 bits per inch. Rotational time is 166.67 milliseconds per revolution with a transfer rate of 250K bits per second. Average access time is 302 milliseconds, while maximum access time is 711 milliseconds.

### PRICING

The Harris 8000 Series terminals are available for purchase or on a one-, two-, three-, four-, or five-year lease including maintenance. The terminals are also available on a four- or five-year full-payout lease including maintenance. A separate maintenance contract is available for purchased units.

Harris declined to provide detailed component pricing; they did, however, provide pricing for several sample configurations, which is listed below.



		Monthly Charge* (2-Year Lease)	Purchase	Monthly Maint.
8171	IBM 3270 Remote Emulation; 8 1920-character displays	\$ 666	\$23,009	\$193
8172	IBM 3270 Local Emulation; 6 1920-character displays and 1 60-cps printer	877	29,090	212
8181	Enhanced IBM 3270 Remote Emulation; 5 1920-character displays, 1 40-cps printer, 1 120-cps printer, and Dual Diskette (500K bytes)	1,112	33,879	301
8210	Univac Uniscope 100/200 Emulation; 4 1920-character displays	430	14,037	109
8220	Burroughs TD 800 Emulation; 7 1920-character displays	708	21,694	174
8762	Enhanced Honeywell VIP 7760/7700 Emulation; 8 1920-character displays, 1 60-cps printer, 1 200-lpm printer, and 10MB cartridge disk	2,148	67,900	531

\*Includes monthly maintenance. ■



# Harris 8000 Series Terminals

## MANAGEMENT SUMMARY

The Harris 8000 Series is a family of clustered terminal systems designed for information entry and retrieval. Various models provide "basic" or "enhanced" emulation of the IBM 3271 and 3272, Univac Uniscope 100 and 200, Burroughs TD 800 Series, and Honeywell VIP 7760 and 7700 terminal systems.

Family components consist of a free-standing processing unit, in which the control programs required for emulation of the appropriate mainframe's equipment reside; an especially compact, lightweight display station with a 12-inch (diagonal measurement) screen, which displays various line arrangements and character sets in accordance with the emulation software; a choice of detachable typewriter, data entry, or operator console keyboards, equipped with appropriate keycap sets for the various emulators; five printer models, including a 40 cps correspondence-quality printer, 60-, 120-, and 165-cps impact matrix printers (Centronics Models 700, 702, and 101, respectively), and a 200-lpm belt printer; a 5-megabyte cartridge disk unit; and a 500K-byte dual-drive diskette unit.

The processor, displays, and keyboards are components common to all configurations; support for the remaining peripherals depends on which emulation program is used. In general, up to 32 display stations plus 32 printers may be configured per cluster. One emulator is provided per system, and is stored on a cassette that is housed within the processor cabinet. The cassette is reprogrammed by Harris and reloaded by the user whenever changes need to be implemented. Harris is willing to program some custom features requested by users on an RPQ basis. Processor memory expansion and other additional systems support required for larger clusters and/or en- ➤

**A family of clustered terminal systems that emulate IBM 3270, Univac Uniscope 100/200, Burroughs TD 800, and Honeywell VIP 7760/7700 terminals.**

**Features include a software-driven control unit, support of up to 32 keyboard/displays plus 32 printers, local printing independent of mainframe control, and local diagnostics via self-test routines and line and event monitoring. Display screen capacities range from 480 to 1920 characters; printer speeds, from 40 cps to 200 lpm. Optional diskette or cartridge disk storage supports enhanced functions such as local format storage, queued transaction handling, and spooled printing.**

**A typical 8171 configuration, which provides emulation of a remote IBM 3271-1/-12 and includes a processor and eight 1920-character displays, is priced at \$23,009, or \$666 per month on a two-year lease including maintenance.**

## CHARACTERISTICS

**VENDOR:** Harris Corporation, Data Communications Division, 16001 Dallas Parkway, P.O. Box 400010, Dallas, Texas 75240. Telephone (214) 386-2000.

**DATE OF ANNOUNCEMENT:** See System Characteristics table.

**DATE OF FIRST DELIVERY:** See System Characteristics table. ➤



The 8180 Interactive Terminal System pictured above operates in IBM 3270 emulation mode while concurrently performing such enhanced functions as queued transaction handling, spooled printing, and local format storage.

## Harris 8000 Series Terminals

➤ hanced features is bundled with the configuration and generally inaccessible to the user.

Harris' "basic" emulation programs provide standard line protocols, polling characteristics, and device handling techniques equivalent to the functions of the four mainframer equipment families, as well as several features not available with the mainframers' systems. For example, the self-test and a locally-controlled print capability included in Harris' IBM emulation software are not available with the IBM 3270. The Univac emulator provides fully buffered printing, a self-test, typamatic keyboards, and synchronous transmission up to 9600 bps, none of which are available with the Uniscope terminals. Harris' Burroughs emulator, unlike the Burroughs' TD line itself, provides a local-controlled printing function, a self-test, and typamatic keyboards, utilizes parallel rather than serial clustering, and permits displays and printers to be located at up to 2000 feet from the controller. The Honeywell emulator supports clusters of up to 32 displays plus 32 printers, more than is permitted in VIP Series clusters; Harris' line monitoring function and typamatic keyboards are also not available through Honeywell.

An "enhanced" version of each of the four basic emulators is also available. The enhancements require additional processor memory and diskette or cartridge disk storage, and include support for local storage of formats that would normally reside at the host site, a queued transaction handling function that permits data to be entered off-line and stored locally for later transmission to the host, and (for the enhanced 3270 emulator only) a spooled print capability that permits data received by the terminal controller to be stored for later printing under local control. These enhanced functions run concurrently with emulator operations and are completely transparent to the host computer. They are designed to reduce line traffic and improve line usage, increase operator efficiency, and provide backup for terminal/host operations.

For systems originally equipped with the basic emulator version, the enhanced function software and related hardware requirements are field-installable. Certain Harris 8000 systems (for example, the IBM-compatible Harris Model 8171 and the Univac-compatible Harris Model 8210) are also upgradeable to Harris' 1600 Series Terminals, which provide a full range of user-programmable capabilities (see Report #C21-468-101).

The vast majority of Harris users have selected their 8000 Series equipment as a cost effective and/or enhanced replacement for their mainframer's terminal offerings. However, because the processor of the 8000 Series terminals is in essence a minicomputer, and because the system is almost completely software-driven, there is some potential for the sophisticated customer to implement user-developed assembly language programs on the system. Although Harris does not currently support this user programming capability, a small number of users ➤

➤ **NUMBER DELIVERED TO DATE:** Over 3,000 systems.

**SERVICED BY:** Harris Corporation.

### MODELS

The Harris 8000 Series consists of the following models:

- **8170**—A clustered terminal that comes in two versions: one emulates the IBM 3271 Models 1, 2, 11, and 12 for remote BSC or SDLC operation (Harris Model 8171); the other emulates the IBM 3272 Models 1 and 2 for local operation (Harris Model 8172). Display stations emulate IBM 3277 Models 1 and 2.
- **8180**—A clustered terminal that emulates the IBM 3271 Models 1 and 2 for remote BSC (but not SDLC) operation (Harris Model 8181) or the IBM 3272 Models 1 and 2 for local operation (Harris Model 8182). The 8180 is an enhanced version of the 8170 that supports local format storage, queued transaction handling, and spooled printing concurrently with 3270 operations.
- **8210**—A clustered terminal for local or remote operation that emulates the Univac Uniscope 100 and 200 display terminals.
- **8212**—A clustered terminal for local or remote operation that emulates the Univac Uniscope 100 and 200 display terminals. The 8212 is an enhanced version of the 8210 that supports local format storage and queued transaction handling concurrently with Uniscope 100/200 operations.
- **8220**—A clustered terminal that emulates the Burroughs TD 801, 802, and 820 display terminals.
- **8222**—A clustered terminal that emulates the Burroughs TD 801, 802, and 820 display terminals. The 8222 is an enhanced version of the 8220 that supports local format storage and queued transaction handling concurrently with Burroughs TD 800 operations.
- **8760**—A clustered terminal that emulates the Honeywell VIP 7760 and VIP 7700 display terminals.
- **8762**—A clustered terminal that emulates the Honeywell VIP 7760 and 7700 display terminals. The 8762 is an enhanced version of the 8760 that supports local format storage and queued transaction handling concurrently with Honeywell VIP operations.

### CONFIGURATION

The 8000 Series systems are a family of clustered terminals built around a common processor and peripheral group. Various processor models and memory sizes are used in the different systems to accommodate particular configurations and functions.

In general, 8000 Series systems can support up to 32 display stations plus 32 printers connected via coax cable to the processor. Up to eight displays and eight printers are directly attachable to the basic processor. Additional displays and printers are accommodated via Device Adapters and may require processor memory expansion. Printers may be any combination of the Harris Model 3105 45-cps daisy wheel printer, 60-, 120-, or 165-cps dot matrix impact printers (Harris Models 3155, 3165, and 3120, respectively), or the Harris Model 3135 200 lpm belt printer. A photopen (light pen) and an ID card reader are available for use with IBM 3270-compatible configurations.

The four "enhanced" versions, Models 8180 (IBM), 8212 (Univac), 8222 (Burroughs), and 8762 (Honeywell) support ➤

## Harris 8000 Series Terminals

### SERIES 8000 SYSTEM CHARACTERISTICS

MODEL	8170	8180	8210	8212	8220	8222	8760	8762
CRT Displays, maximum number/cluster	32	32	32	32	32	32	32	32
Memory capacity, min./max. (bytes)	16K/64K	32K/96K	24K/64K	32K/64K	24K/64K	32K/64K	32K/64K	32K/64K
Display size—								
480 char. (12 lines; 40 char./line)	●	●	—	—	—	—	—	—
960 char. (12 lines; 80 char./line)	●	●	●	●	●	●	●	●
1024 char. (16 lines; 64 char./line)	—	—	●	●	—	—	—	—
1920 char. (24 lines; 80 char./line)	●	●	●	●	●	●	●	●
Storage options—								
Dual diskette (500K)	—	Opt.	—	Opt.	—	Opt.	—	Opt.
Cartridge disk (5MB)	—	Opt.	—	Opt.	—	Opt.	—	Opt.
Compatibility (emulation)	IBM 3270 local & remote	IBM 3270 local & remote (enhanced)	Univac Uniscope 100/200	Univac Uniscope 100/200 (enhanced)	Burroughs TD 800 Series	Burroughs TD 800 Series (enhanced)	Honeywell VIP 7760 & 7700	Honeywell VIP 7760 & 7700 (enhanced)
Options—								
Printers (any model)	●	●	●	●	●	●	●	●
Photopen (light pen)	●	●	—	—	—	—	—	—
ID card reader	●	●	—	—	—	—	—	—
Keyboards:								
Typewriter	●	●	●	●	●	●	●	●
Data entry	●	●	—	—	●	●	—	—
Operator console	●	—	—	—	—	—	—	—
Communications—								
Asynchronous	—	—	—	—	●	●	—	—
Bisynchronous (EBCDIC & ASCII)	●	●	—	—	—	—	—	—
Synchronous	—	—	●	●	●	●	●	●
SDLC	●	—	—	—	—	—	—	—
Transmission speeds, min./max. (bps)	600/4800 (BSC); 600/9600(SDLC)	600/4800	300/9600	300/9600	300/9600	300/9600	300/4800	300/4800
Date of Announcement	9/74	4/76	4/76	12/79	4/76	12/79	4/76	12/79
Date of First Delivery	6/75	9/76	5/76	—	6/76	—	6/76	7/80

➤ have taken the initiative to tap this potential on their own. Certain software development tools are unsupported but available through Harris, for those users who ask about them. These include a cross assembler, debugging aids, utilities, test programs, and a library of user-developed assembly language application programs. And although, under normal circumstances, main memory expansion is bundled with support for additional peripherals and/or the enhanced function capabilities, memory can also be expanded on an unbundled basis to support user programming.

Just as we were going to press, Harris announced a new family of IBM-compatible terminals, the 9200 Information Processing System. Not intended as a replacement for the 8000 Series, the 9200 System is designed as an upgrade path to IBM SNA-type networks.

#### USER REACTION

In Datapro's 1980 survey of alphanumeric display terminal users, 5 Harris users reported on their experience on 130 8000 Series terminal systems containing 498 display stations. Four of the five users were also interviewed by telephone in early June and were asked to elaborate upon the information they provided on their survey forms.

Of the 130 clusters reported, 125 are remotely connected to the host and support an average of 4 display stations per cluster; the other 5 are locally connected and average 6 display stations each. Three of the five users have in-

➤ additional capabilities not available in basic versions. These functions run concurrently with emulation operations and may require processor memory expansion. They include Local Format Storage, which enables the user to store formats locally that otherwise would reside at the host site; Queued Transaction Handling, which permits the user to enter data offline onto a diskette or disk and store it for later transmission to the host; and (for Model 8180 only) Spooled Print, which enables data received from the host to be stored for later printing.

Mass storage for these enhanced features can be provided via diskette or cartridge disk. Harris offers a 500K-byte dual-drive diskette unit and a 5MB cartridge disk unit containing 2.5MB of fixed disk storage plus 2.5MB of removable storage. Up to two diskette units may be added to the system for each increment of 8 displays, for a total system maximum of 4MB. Alternatively, up to two cartridge disk units may be added for each 8 displays, for a total system maximum of 40MB.

A summary of the major characteristics of each model are presented in the Systems Characteristics chart.

#### TRANSMISSION SPECIFICATIONS

A wide range of communications capabilities is provided for the Series 8000, including half- or full-duplex operation using line disciplines of asynchronous, synchronous, bisynchronous or SDLC (Model 8170 only). Transmission rates include 110, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200 and 9600 bps. Other speeds can be achieved through external clocking. Transmission code can be either ASCII or EBCDIC in 8 level (synchronous) or 10/11-level (asynchronous) format. The communications adapter can be configured with an EIA RS-232-C interface for connection to an external modem. Bell System or independent modems can be used with automatic answer (available on all terminals).

## Harris 8000 Series Terminals

➤ cluded at least one printer in their configurations; only one of the users utilizes mass storage (diskette). All five users are operating in IBM 3270 emulation mode. In all cases, maintenance is performed by Harris Corporation.

Applications for which these terminals are being utilized include interactive inquiry/response (all 5 users), program development (all 5 users), text editing (2 users), intra-company message traffic (2 users), and systems console (2 users).

These users' ratings are presented below.

	Excellent	Good	Fair	Poor	WA*
Overall performance	0	5	0	0	3.0
Ease of operation	1	4	0	0	3.2
Display clarity	2	3	0	0	3.4
Keyboard feel and usability	0	5	0	0	3.0
Hardware reliability	0	4	1	0	2.8
Maintenance service	0	4	1	0	2.8
Technical support	0	4	1	0	2.8

\*Weighted Average on a scale of 4.0 for Excellent.

These users' ratings are remarkably similar to those provided in our September 1978 report on the Harris 8000 System, indicating not only a high degree of user satisfaction with the equipment, but a consistently acceptable pattern of support over several years by Harris.

All four interviewed users were highly satisfied with their systems. The most frequently mentioned advantage was Harris' maintenance service and technical support, which was cited by each of the four users as very good in terms of both quality of personnel and response time. Other features considered strengths by more than one of these users included the light weight and compactness of the display stations, the ease with which the cluster is reconfigured, and the quality of the Centronics printers utilized with their systems. The ability to control printing locally, the line monitor function, the quality of the software, and the ready availability of units for delivery (30 to 60 days) were also mentioned as advantages by these users.

No significant weaknesses were consistently reported. One user mentioned that the light pens sometimes break when dropped and that Harris does not stock an adequate supply of replacements locally. Another mentioned that the character generator chips on a few of his displays have had to be replaced. Another felt that the requested changes to the cassette program took a longer time than acceptable for Harris to make. And one user stated that the large size of the control unit is inconvenient for users with limited floor space.

Overall, one user's statement seemed to reflect the opinion of all: "We feel that the system is basically very good, and we are very satisfied with Harris. Price/performance-wise and service-wise, we would be happy to recommend it." □

➤ In general, the communications capabilities that can be implemented for each model within the family of terminals depend on the line discipline used and are summarized in the accompanying chart of System Characteristics.

### DEVICE CONTROL

All operations are software-controlled by standard operating software and by parameterized programs residing on a cassette housed within the processor itself, or (in enhanced models only) in local disk or diskette storage. Program loading is controlled by a ROM (Read Only Memory) program loader.

One operating system per terminal emulated is offered. Emulated terminals include the IBM 3270, Univac Uniscope 100/200, Burroughs TD 800, and Honeywell VIP 7760 and 7700; see the accompanying System Characteristics table for the emulation capabilities of each system. The emulation packages offered are oriented toward specific functions such as on-line interactive communications, remote job entry, off-line source data entry, and local printing operations.

**DIAGNOSTICS:** Complementary software and hardware diagnostic aids are available for the Series 8000 systems. These allow for isolation of hardware and/or software problems present in the terminal, host computer system, or data communications links. Two basic packages are provided. The Selftest System (software) isolates hardware failures to a particular field-replaceable module. The Line and Event Monitor (hardware) provides analysis of line traffic and I/O events taking place between the terminal and the host computer.

**8180/8212/8222/8762 FUNCTIONS:** The software supplied with these enhanced systems provides a number of attractive features not available with the basic versions. These sub-routines include Local Format Storage, Queued Transaction Handling, and (for Model 8180 only) Spooled Print. Use of the software routines requires the additional memory supplied with each enhanced model and diskette or disk storage.

**Local Format Storage** allows data entry formats to be retrieved from the host computer and stored on diskette or disk for immediate access by the keystation operator. This program is beneficial to applications that require a number of data entry formats; a high rate of format retrievals from the host computer would burden the host and the communications facility.

**Queued Transaction Handling** allows keyed data (transactions) to be stored on diskette or disk for later transmission to the host. The program consists of three operating modes: Normal, Off-Line Data Entry, and On-Line Recovery mode. In Normal mode, keyed data is transmitted directly to the host. In the Off-Line Data Entry mode, keyed data is stored on disk to be later transmitted to the host. The On-Line Recovery mode transmits data from disk storage to the host. Individual terminal operators can selectively enter any mode. The program is beneficial to high volume data entry applications and to conditions such as interruption of communications between host and terminal and to periods of peak communications activity.

**Spooled Print (Model 8180 only)** allows received printer data files to be stored on diskette or disk for later printing. Typically, the data is received during unattended periods, such as after hours. A printer address accompanies each print file. One display station in the cluster functions as the print transmission control during host print transmission, and is used for error recovery and operator intervention. The assignment of printer number is typically determined by forms type. The spooled print operation is executed by command from any of the display stations. The operator selects a printer and print file and initiates the command. ➤

## Harris 8000 Series Terminals

### ► COMPONENTS

The following components are common to the members of the Harris 8000 family. The specific configuration details are provided by the accompanying Systems Characteristics table.

**PROCESSOR:** An integral, byte-oriented, serial minicomputer with an instruction execution time of 6.4 microseconds. Of its 16 basic instructions, 14 are logical instructions, expandable to 80 with the use of modifiers. Instructions are 16 bits long and are accessed during one memory cycle.

Read/write program memory is random access with a cycle time of 6.4 microseconds. Available storage capacity is 16K bytes, expandable to 64K bytes in 8K increments. Total memory, including program memory and buffer memory, can be expanded to 96K bytes, depending on the system.

Memory organization is on a page basis; each page contains 256 16-bit words (512 bytes). The first one or two pages are reserved for the ROM program loader. Internal processor architecture includes three general-purpose registers; each with a single-level stack, an instruction address register with combined page reference register and four-level stack, and a memory access register. The processor also includes up to 256 general-purpose (scratchpad) registers. All stacks use the push-down/pop-up technique for manipulating data and addresses, which is a last-in/last-out arrangement for interconnecting registers. I/O device interrupt is provided.

A cassette tape drive resides within the processor cabinet and stores the emulation program and other basic systems routines. The programs are developed by Harris personnel and are generally not accessible to the user.

**DISPLAY UNIT:** A 12-inch (diagonal measurement) CRT with a viewing area 9.5 inches wide by 7.5 inches high. A character set of up to 128 ASCII characters, including upper and lower case alphabets, numerics, and special symbols, is displayed in white against a dark background. Characters are generated via a 9-by-7 dot matrix. The CRT screen is viewed through an etched non-glare screen.

The standard display arrangements are:

Characters/display:	480	960	1024	1920
Lines/display:	12	12	16	24
Characters/line:	40	80	64	80

Display character sets available include IBM 3270-compatible upper and lower case and IBM 3270-compatible upper case only. A number of International sets are also available. The display arrangement and character set must be identical for all display units associated with a common terminal processor.

Display attributes include dual intensity, blanking, strike-through, underscore, and blinking. An audible alarm is available for all models.

Three keyboard arrangements are available: typewriter, data entry, and operator console. All keyboards are equipped with a 10-key numeric pad, cursor control cluster, 20 program function keys, seven indicator lamps, adjustable keyclick, typamatic function (automatic repeat), and selectable key-lock.

**3105 PRINTER:** A desktop bidirectional, impact, "daisy-wheel" printer rated at 40 characters/second and equipped with 132 print positions at 10 characters/inch or 158 print

positions at 12 characters/inch. Vertical spacing is selectable at 6 or 8 lines/inch. The standard character set includes 96 ASCII print symbols. The Diablo-produced printer is equipped with a pin feed, available in seven platen widths, or with a tractor feed that accommodates 6-part continuous pin-fed forms up to 14 $\frac{1}{8}$  inches wide. Options include nine print wheel styles and a printer stand.

**3155 PRINTER:** A desktop unidirectional, impact, matrix printer that prints up to 132 characters per line at a speed of 60 characters/second. Horizontal and vertical spacing are set at 10 characters per inch and 6 lines per inch, respectively. A 64-character ASCII or EBCDIC set is provided. Characters are formed within a 5-by-7 dot matrix. An adjustable tractor feed mechanism is standard and accepts 6-part continuous pin-fed forms of up to 17.3 inches in width. A printer stand is optional. The printer is a Centronics Model 700.

**3165 PRINTER:** A desktop, bidirectional, impact, matrix printer that prints up to 132 characters per line at a speed of 120 characters/second. Horizontal and vertical spacing are set at 10 characters per inch and 6 lines per inch, respectively. A choice of 64- or 96-character ASCII or EBCDIC sets is available. Characters are formed by a 7-by-7 or 7-by-9 dot matrix. An adjustable tractor feed mechanism is standard and accepts 6-part continuous pin-fed forms of 4 to 17.3 inches in width. A printer stand is optional. The printer is a Centronics Model 702.

**3120 PRINTER:** A 165-character/second matrix printer that prints up to 132-characters/line. Any of 64 ASCII symbols are normally formed within a 5-by-7 dot matrix; a character elongation function prints double-width characters. The printer's tractor feed mechanism accommodates six-part, continuously sprocketed forms up to 14 $\frac{1}{8}$  inches wide. Horizontal and vertical spacing are 10 characters/inch and 6 lines/inch, respectively. The printer is a Centronics Model 101.

**3135 PRINTER:** A belt printer with a rated speed of 200 lines/minute. It has a 64 ASCII character set and 132 print positions. It accommodates six-part continuously sprocketed forms from 2 to 16 inches wide and features programmable (tape) vertical format control.

**DISK STORAGE:** The disk drive is similar, except for data format, to the IBM 5444 drives used with IBM's System/3 computers. Storage capacity is 5.0 million bytes. It features a 2.5M-byte removable disk cartridge and 2.5M-byte fixed disk. Data access is provided by four vertically aligned heads, one per disk surface. Average rotational delay and data transfer rate are 20 milliseconds and 158,000 bytes/second, respectively. Average head positioning time is 85 milliseconds.

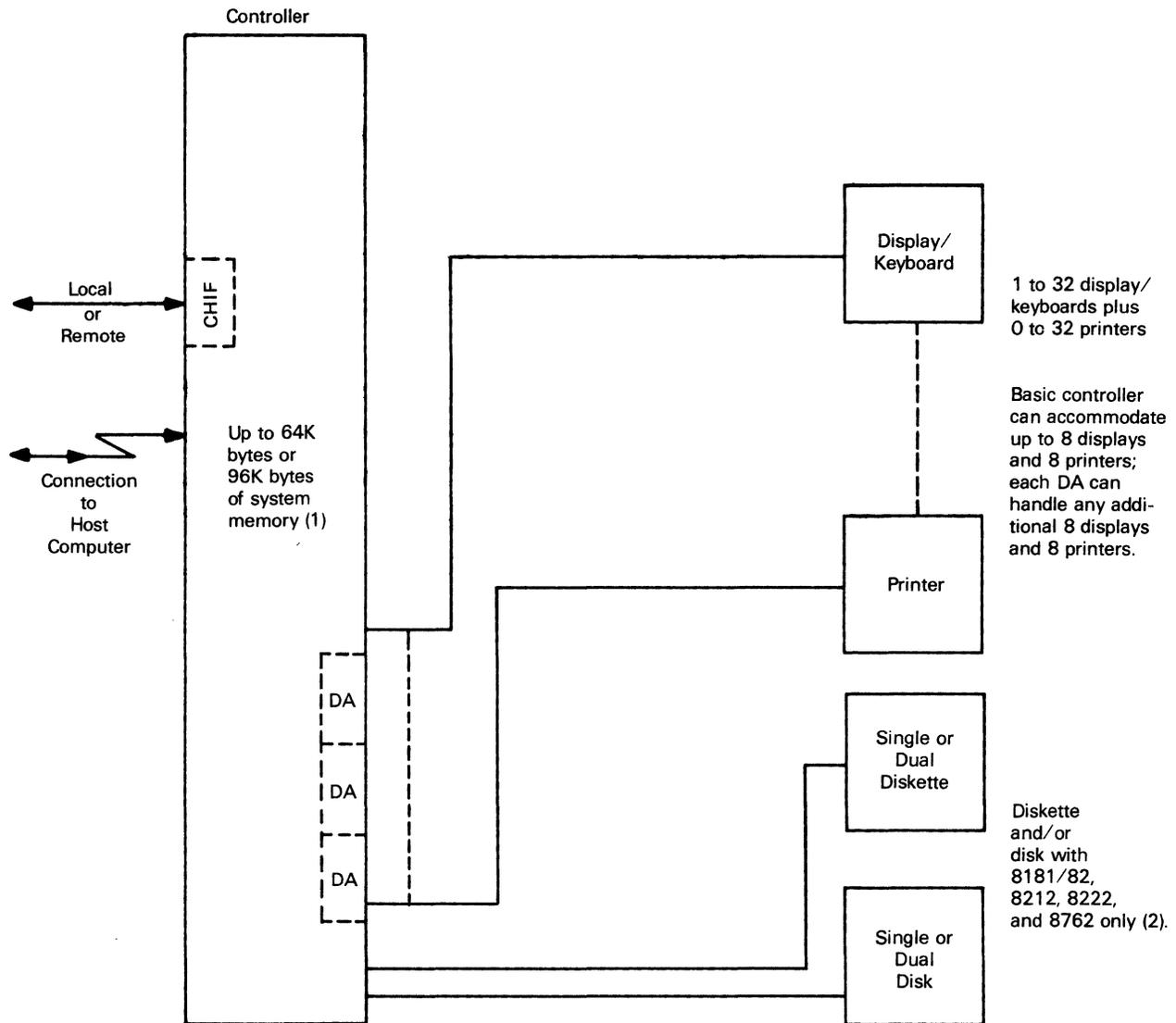
**DISKETTE STORAGE:** The Model 3450 diskette features a dual drive capability with maximum storage of 500K bytes. Track density is 48 tracks per inch, and bit density is 3268 bits per inch. Rotational time is 166.67 milliseconds per revolution with a transfer rate of 250K bits per second. Average access time is 302 milliseconds, while maximum access time is 711 milliseconds.

### PRICING

The Harris 8000 Series terminals are available for purchase or on a one-, two-, three-, four-, or five-year lease including maintenance. The terminals are also available on a four- or five-year full-payout lease including maintenance. A separate maintenance contract is available for purchased units. ►

## Harris 8000 Series Terminals

### Configuration



CHIF — Channel Interface Feature

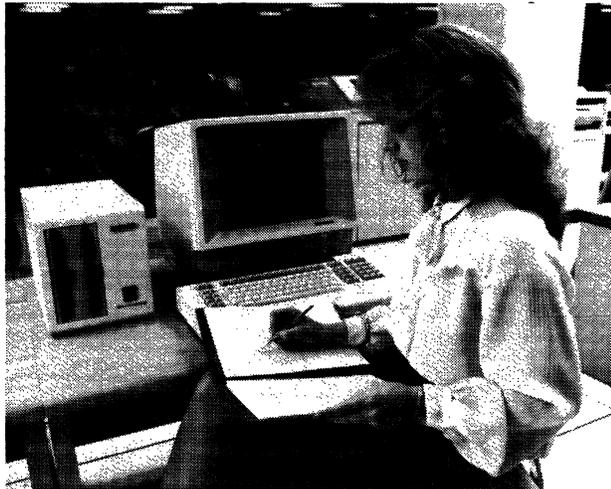
DA — Device Adapter

- (1) 64K bytes max. memory for all systems except 8181 and 8182; 96K bytes max. memory for 8181 and 8182.  
 (2) Disk/diskette subsystems have their own device and drivers and do not occupy a device port.

		Monthly Charge* (2-Year Lease)	Purchase	Monthly Maint.
▶ 8171	IBM 3270 Remote Emulation; 8 1920-character displays	\$ 666	\$23,009	\$193
8172	IBM 3270 Local Emulation; 6 1920-character displays and 1 60-cps printer	877	29,090	212
8181	Enhanced IBM 3270 Remote Emulation; 5 1920-character displays, 1 40-cps printer, 1 120-cps printer, and Dual Diskette (500K bytes)	1,112	33,879	301
8210	Univac Uniscopre 100/200 Emulation; 4 1920-character displays	430	14,037	109
8220	Burroughs TD 800 Emulation; 7 1920-character displays	708	21,694	174
8762	Enhanced Honeywell VIP 7760/7700 Emulation; 8 1920-character displays, 1 60-cps printer, 1 200-lpm printer, and 10MB cartridge disk	2,148	67,900	531

\*Includes monthly maintenance. ■

# Harris 9200 Information Processing System



*Users of the Harris 9200 Information Processing System can now add personal computing capabilities to the system as an option. Harris' Integrated Personal Computing option consists of a multi-functional terminal with 64K bytes of memory, two 8-inch, 1MB diskette drives, and the CP/M operating system.*

## MANAGEMENT SUMMARY

The 9200 Information Processing System is Harris' IBM 3270-compatible product family. The 9200 was Harris' second entry into this market, the 8000 system (which is still available) being the first. The 8000 provided replacements for IBM's first generation of components (e.g., the 3271 Control Unit and 3277 Display Station). The 9200 provides replacements for IBM's current 3270 offerings. Recent additions to the 9200 family include the 9279 Base Color Terminal, 9178 Display Station, and an integrated personal computing option.

The 9200 can support up to 32 devices per processor, with both local and remote host communications capabilities at speeds up to 9600 bps. Two system modes exist: the 9210 provides for attachment to a single host, while the 9220 has the ability to support multiple hosts concurrently. Both models support BSC or SNA/SDLC communications (the 9220 can support both simultaneously). Local attachment is achieved via a byte multiplexer, block multiplexer, or selector channel in 3272 or SNA modes; remote attachment is accomplished via modems utilizing either BSC or SNA/SDLC protocols.

The 9200 allows users to tailor the system to their individual needs by loading diskettes into the processor. A system diskette, feature diskette, and language diskette are supplied with each 9200 system, enabling the user to define such parameters as screen configuration, printer authorization, and number of devices. The system is reconfigured by entering new parameters.

Harris provides three models of display stations for attachment to the 9200 system. The 9278 is compatible with the ▶

Harris' entry in the IBM 3270-compatible terminal system marketplace.

The 9200 system supports up to 32 devices per processor, with both local and remote communications capabilities. Both BSC and SNA/SDLC protocols are supported. Display stations available for the 9200 include the 9278 and 9178 monochrome terminals, and the 9279 color display. A variety of keyboards are offered for use with the displays, as well as dot matrix and band printers. Harris also features an integrated personal computing option for the 9200.

A local 9200 system including eight 9278 displays, one 9289 band printer, and SNA/SDLC protocol compatibility, is priced at \$1,302 per month on a two-year lease, including maintenance.

## CHARACTERISTICS

**VENDOR:** Harris Corporation, Information Terminals Group, 16001 Dallas Parkway, P.O. Box 400010, Dallas, TX 75240. Telephone (214) 386-2000.

**DATE OF ANNOUNCEMENT:** May 1980.

**DATE OF FIRST DELIVERY:** June 1980.

**NUMBER DELIVERED TO DATE:** Information not available.

**SERVICED BY:** Harris Corporation.

## CONFIGURATION

The 9200 family is currently available in two system models: the 9210 and 9220. Both models offer IBM 3270 compatibility. The 9210 supports remote or local communications with a single host, utilizing either BSC or SNA/SDLC protocols. The 9220 will support concurrent communications with multiple hosts, operating in either BSC or SNA/SDLC protocols, or both. Both system models support attachment of up to 32 devices per processor, in any combination of 9278, 9279, or 9178 displays, 9287 matrix printers, or 9289 band printers. The 9200 systems will also provide support for existing IBM 3277 display stations, Models 1 and 2. Displays and printers may be located up to 5,000 feet from the processor, and are connected via coaxial cable. Optional peripherals include a light pen and a magnetic slot reader.

## TRANSMISSION SPECIFICATIONS

When utilizing BSC protocols, the 9200 will communicate in half-or full-duplex, in ASCII or EBCDIC. When communicating in the SNA/SDLC environment, the 9200 is capable of local channel attachment or remote communications in half-duplex mode. The 9200 will support local attachment at ▶

## Harris 9200 Information Processing System

▷ IBM 3278 Display Station, and offers screen sizes of 960, 1920, 2560, 3440, and 3565 characters. Characters are displayed in green or (recently introduced) amber phosphor on a 15-inch screen. The 9279 is a replacement for the IBM 3279 Color Display Station, and provides the four base colors: red, white, green, and blue. The 9279 features a 1920-character screen capacity and a 14-inch display area. The newest addition to the 9200 family is the 9178 Display Station, Harris' response to IBM's recent introduction of the 3178. Like the 3178, the 9178 is a small-screen (12-inch), ergonomic version of the IBM 3278 Model 2. All of the Harris displays can be configured with one of a variety of detached keyboards, featuring typewriter, data entry, or keypunch layouts.

Two types of printers are provided for the 9200 system: the 9287 matrix printer and the 9289 band printer. The 9287 offers bidirectional character printing at speeds of 80, 130, or 180 cps. The 9289 prints 300 lines per minute using a 64-character set (240 lpm with a 96-character set). Both models feature 132 print positions.

Another new addition to the 9200 product line is the optional Integrated Personal Computing. This option gives the 9200 user the ability to perform stand-alone personal computing or to combine personal computing with interactive functions. It eliminates the need for the user to purchase a dedicated personal computer in order to obtain personal computing capabilities.

A variety of diagnostic tools are provided on the 9200 system; these include a line trace facility, which allows a user to monitor the communications line while activity is occurring, and a complete set of confidence tests to provide system integrity for all components.

### COMPETITIVE POSITION

The 9200 Information Processing System is Harris' entry into the highly competitive IBM 3270-compatible marketplace. In this market, Harris not only competes with IBM but with other independent vendors such as Telex, Raytheon, ITT Courier, Lee Data, Racal-Milgo, and a number of others. IBM has put pressure on this group with their recent new product introductions (including the 3178) and accompanying price cuts. Harris has responded by cutting prices on the 9200 by 15 percent (with 40 percent reductions on quantity purchases), and by introducing the 3178-compatible 9178. Harris was also one of the first independents (along with Lee Data) to offer personal computing as an option on a 3270-compatible terminal system; IBM also added IBM Personal Computer attachment support for the 3270 system as part of their recent announcements.

Harris has an established product line, and is certain to remain a viable competitor in this market. The 9200 is the low-end family in Harris' current clustered terminal product line, which also includes the 1600 and MIND Series DDP systems.

▶ channel speed, and remote host communications at up to 9600 bps.

Local attachment of the 9200 is via byte multiplexer, block multiplexer, or selector channel in 3272 or SNA modes. Remote attachment is via modems in BSC or SNA/SDLC protocols.

### DEVICE CONTROL

A system diskette, feature diskette, and language diskette are supplied with each 9200 system. Through the use of these diskettes, the user can configure the system to meet his individual requirements.

The first step in configuring the system is the loading of the system diskette into the processor. The system diskette determines the model of the system, either 9210 or 9220. Also determined by the system diskette is the connection (local or remote), and the operating environment (BSC or SNA/SDLC). The user then loads the feature diskette. This diskette provides the operating parameters, such as printer authorization, screen configuration, and number of devices to be supported. The system can be reconfigured by entering new system parameters. The language diskette, loaded third, determines whether data will be sent using ASCII or EBCDIC codes. It also determines whether the terminal will transmit in English or other languages which are available with the 9200.

Personal computing capabilities are optionally available on the 9200. The option consists of a Harris Multifunctional Terminal with 64K bytes of memory, two 8-inch 1MB diskette drives, and the CP/M operating system. A keyboard overlay is supplied to indicate the ASCII teletype keys used in CP/M operations. A letter quality printer is also available for use with this option. When not in personal computing mode, the multifunctional terminal operates as a 3270-compatible display.

A number of diagnostic tools are resident in the processor; these include a line trace facility and a set of automatic system confidence tests. The system confidence tests are executed each time the processor is powered on. A series of LEDs located on the processor identifies each processor component as it is tested. A lighted LED indicates a failing component.

The line trace facility gives the user the ability to display the communications traffic when the lines are active. Inbound and outbound message traffic is monitored and displayed as these events occur. In addition, a hard copy of the data can then be produced on a local printer, for detailed analysis.

Another series of diagnostic tests is available by initiating the command mode at the display station. These tests are resident in the processor. They provide such capabilities as functional testing for the display station, statistics for specific subsystems, and device status tables.

### COMPONENTS

**9200 PROCESSOR:** Processor memory consists of 160K bytes of RAM. The processor supports up to 32 devices, in any mix of display stations and printers, in a cluster configuration. A system diskette, feature diskette, and language diskette are included with each system, and are loaded into the processor to configure the system. Local or remote attachment is accommodated. The 9200 operates in both BSC and SNA/SDLC environments.

**9278 DISPLAY STATION:** An IBM 3278-compatible display station. A 15-inch diagonal, non-glare display screen is ▶

## Harris 9200 Information Processing System

### ➤ ADVANTAGES AND RESTRICTIONS

As was mentioned previously, Harris has been quick to respond to IBM's enhancements to the 3270 family, thus keeping the 9200 system competitive. An advantage that Harris has over some other 3270-compatible vendors is that their product line also includes other offerings (the 1600 and MIND DDP systems). Users have the option of field-upgrading their 9200 system to a MIND distributed processing system. Generally, Harris will continue to encounter the same problems that other independent vendors encounter in competing with the 3270 family, one of IBM's top money-makers.

Datapro received an insufficient number of responses on the Harris 9200 system, during the 1982 Terminal Users Survey, to provide an accurate sampling of user satisfaction. As a result, we regret that no User Reaction can be included in this report.□

➤ standard, capable of displaying up to 3564 characters. Five display formats are available: 12 lines of 80 characters (960 characters total), 24 lines of 80 characters (1920), 32 lines of 80 characters (2560), 43 lines of 80 characters (3440), and 27 lines of 132 characters (3564). A status line, displayed on the bottom of the screen, is also standard. Characters are formed utilizing a 7 x 13 dot matrix, and are displayed in green (P39/P42) or amber (PC166) phosphor on a dark background. Three intensity levels are featured. A 128-character set, either ASCII or EBCDIC, can be displayed.

Options supported by the 9278 display unit include the Photopen Light Sensor (light pen), Magnetic Slot Reader, audible alarm, and security keylock.

**9279 DISPLAY STATION:** A base color display station compatible with the IBM 3279. The 9279 can display up to four colors: red, white, green, and blue. A 14-inch diagonal screen, capable of displaying 1920 characters arranged in 24 lines of 80 characters each, is standard. A status line appears in blue as a 25th line at the bottom of the screen. A 128-character set, both ASCII and EBCDIC, can be displayed. An audible alarm, security lock, and line trace facility are standard; a tilt and swivel feature for the display is optional.

**9178 DISPLAY STATION:** An IBM 3178-compatible display station. The 9178 features a 12-inch diagonal screen with a 1920-character capacity arranged in 24 lines of 80 characters each. A 25th status line is also available. Characters are displayed in green (P39/P42) or amber (PC166) phosphor, and are formed via a 9-by-14 dot matrix. The 9178 also features a low-profile design with a smaller footprint than that of the 9278. A 128-character set, either ASCII or EBCDIC, can be displayed.

**KEYBOARDS:** A variety of keyboards are available for use with the 9200 Information Processing System display sta-

tions, all of which are detached. Keyboards are available in 75-, 87-, and 109-key versions, with typewriter-style, typewriter with 10-key numeric pad, data entry, and keypunch layouts. All keyboards include a Home key, ALternate key, and Local Print key.

The 109-key keyboard is an ergonomic model available in typewriter and data entry styles. A personal computing model overlay is also available. The keyboard features sculptured keys with a low-glare matte finish. The keyboard can be adjusted to three angles of elevation, and has a low-profile design. Adjustable key click and tactile feedback are standard. A variety of international character sets are also available.

**9287 MATRIX PRINTER:** A bidirectional character printer, field upgradeable from 80 characters per second print speed to 130 or 180 cps. Line lengths up to 132 characters are accommodated. Character sets include 64 printable ASCII or EBCDIC upper case characters; 96 upper case and lower case characters. Both upper and lower case characters are formed utilizing a 7 x 8 dot matrix. Horizontal spacing is 10 characters per inch; vertical spacing is adjustable to 6 or 8 lines per inch, with a paper slew rate of 15 inches per second. Paper is advanced via a tractor feed mechanism. Single or up to six-part forms may be used.

**9289 BAND PRINTER:** A band printer capable of printing 300 lines per minute with a 64-character set, or 240 lines per minute with a 96-character set. Line lengths up to 132 characters are accommodated (136 columns optional). Character sets include 64 printable ASCII or EBCDIC upper case characters; 96 upper and lower case characters. Print method is an operator changeable etched steel band carrying 208 characters. A 50-yard continuous loop ribbon cartridge is utilized. Horizontal spacing is 10 characters per inch; vertical spacing is adjustable to 6 or 8 lines per inch. Paper is advanced via a pin feed mechanism. Single or up to six-part forms may be used.

### PRICING

The Harris 9200 system terminals are available for purchase, or on a one-, two-, three-, four-, or five-year lease, including maintenance. A separate maintenance contract is available for purchased units. Harris has supplied the following sample configuration prices:

#### Configuration

9210 BSC Remote Controller, 8 9278 (1920-character) displays, 1 9287 (130 cps) printer—2-year lease with maintenance:

\$828 per month

9210 SNA Local Controller, 8 9278 (3440-character) displays, 1 9289 (300 lpm) band printer—2-year lease with maintenance:

\$1,302 per month

9210 SNA Remote Controller, 6 9278 (2560-character) displays, 1 9287 (180 cps) printer, 1 magnetic slot reader:

Purchase Price \$22,914■



# Harris 9210 and 9220 Information Processing Systems

## MANAGEMENT SUMMARY

Harris Corporation's Data Communications Division introduced the 9200 Information Processing System at the National Computer Conference (NCC), held in Anaheim, California, in May 1980. The initial model in the family is the 9210, a system offering compatibility with the IBM 3270 Information Display System products, including the 3274 control unit and the 3278 display station. The second model in the family, the 9220, offers all of the features and functions of the 9210 as well as the ability to support multiple hosts in either BSC or SNA/SDLC environments. Additional high-end models in the 9200 family are expected to be announced within the coming year.

The 9210 and 9220 systems can support up to 32 devices per processor, with both local and remote host communications capabilities at speeds up to 9600 bps. The 9210 provides for attachment to a single host, while the 9220 has the ability to support multiple hosts concurrently. Both models support BSC or SNA/SDLC communications (The 9220 can support both simultaneously). Local attachment is achieved via a byte multiplexer, block multiplexer, or selector channel in 3272 or SNA modes; remote attachment is accomplished via modems utilizing either BSC or SNA/SDLC protocols.

The 9200 allows users to tailor the system to their individual needs by loading diskettes into the processor. A system diskette, feature diskette, and language diskette are supplied with each 9200 system, enabling the user to define such parameters as screen configuration, printer authorization, and number of devices. The system is reconfigured by entering new parameters.

**IBM 3270-compatible members of the Harris 9200 family.**

**The 9200 system supports up to 32 devices per processor, with both local and remote host communications capabilities. Model 9210 provides for attachment to a single host; Model 9220 can access multiple hosts. Either model can support BSC or SDLC operation; additionally, the 9220 can switch between the two protocols to communicate with one host utilizing BSC communications and another host operating in an SNA/SDLC environment.**

**The system's display station features a 15" diagonal display screen, screen sizes of 960, 1920, 2560, and 3440 characters, and a variety of detached keyboards. Harris also offers a choice of two printer types.**

**A typical system including a 9210 SNA Remote Controller, six 2560 character displays, one 180 cps printer, and an optional magnetic slot reader sells for \$28,155.**

## CHARACTERISTICS

**VENDOR: Harris Corporation, Data Communications Division, 16001 Dallas Parkway, P.O. Box 400010, Dallas, TX 75240. Telephone (214) 386-2000.**



Harris' 9200 system is a family of IBM 3270-compatible components. Two system models are currently available: the 9210 and 9220. Both models can support up to 32 devices per processor, with both local and remote communications capabilities. Shown here are the 9200 processor (left), 9287 matrix printer, and 9278 CRT displays.

## Harris 9210 and 9220 Information Processing Systems

➤ Harris supplies its 9278 CRT display with the 9200 system. The 9278 features a 15" diagonal, non-glare display screen. Characters are displayed in green phosphor, and screen sizes of 960, 1920, 2560, and 3440 characters are available. A status line, displayed on the bottom of the screen, provides operating and status messages. A variety of detached keyboards are offered, featuring either 75- or 87-key configurations, and available in data entry, typewriter, or keypunch formats. International keyboards are available, and options include an audible alarm and security keylock.

Two types of printers are provided for the 9200 system: the 9287 matrix printer and the 9289 band printer. The 9287 offers bidirectional character printing at speeds of 80, 130, or 180 cps. The 9289 prints 300 lines per minute using a 64-character set (240 lpm with a 96-character set). Both models feature 132 print positions, and are available with either ASCII or EBCDIC character sets.

Displays and printers are connected to the system with coaxial cable, and may be located up to 5,000 feet from the processor. In addition to supporting the 9278 display, the 9200 system also provides support for the IBM 3277 display stations, Models 1 and 2, for customers already using these displays in their network.

A variety of diagnostic tools are provided on the 9200 system; these include a line trace facility, which allows a user to monitor the communications line while activity is occurring, and a complete set of confidence tests to provide system integrity for all components.

Options supported by the 9278 display include the Photopen Light Sensor, a light pen for use with menu selection applications, and Magnetic Slot Reader, for reading encoded magnetic stripe cards. □

➤ **DATE OF ANNOUNCEMENT:** May 1980.

**DATE OF FIRST DELIVERY:** June 1980.

**NUMBER DELIVERED TO DATE:** Information not available.

**SERVICED BY:** Harris Corporation.

### CONFIGURATION

The 9200 family is currently available in two system models: the 9210 and 9220. Both models offer IBM 3270 compatibility. The 9210 supports remote or local communications with a single host, utilizing either BSC or SNA/SDLC protocols. The 9220 will support concurrent communications with multiple hosts, operating in either BSC or SNA/SDLC protocols, or both. Both system models support attachment of up to 32 devices per processor, in any combination of 9278 CRT displays, 9287 matrix printers, or 9289 band printers. The 9200 systems will also provide support for existing IBM 3277 display stations, Models 1 and 2. Displays and printers may be located up to 5,000 feet from the processor, and are connected via coaxial cable. Optional peripherals include a light pen and a magnetic slot reader.

### TRANSMISSION SPECIFICATIONS

When utilizing BSC protocols, the 9200 will communicate in half- or full-duplex, in ASCII or EBCDIC. When communicating in the SNA/SDLC environment, the 9200 is capable of local channel attachment or remote communications in half-duplex mode. The 9200 will support local attachment at channel speed, and remote host communications at up to 9600 bps.

Local attachment of the 9200 is via byte multiplexer, block multiplexer, or selector channel in 3272 or SNA modes. Remote attachment is via modems in BSC or SNA/SDLC protocols.

### DEVICE CONTROL

A system diskette, feature diskette, and language diskette are supplied with each 9200 system. Through the use of these diskettes, the user can configure the system to meet his individual requirements.

The first step in configuring the system is the loading of the system diskette into the processor. The system diskette determines the model of the system, either 9210 or 9220. Also determined by the system diskette is the connection (local or remote), and the operating environment (BSC or SNA/SDLC). The user then loads the feature diskette. This diskette provides the operating parameters, such as printer authorization, screen configuration, and number of devices to be supported. The system can be reconfigured by entering new system parameters. The language diskette, loaded third, determines whether data will be sent using ASCII or EBCDIC codes. It also determines whether the terminal will transmit in English or other languages which are available with the 9200.

### DIAGNOSTICS

A number of diagnostic tools are resident in the processor; these include a line trace facility and a set of automatic system confidence tests. The system confidence tests are executed each time the processor is powered on. A series of LEDs located on the processor identifies each processor component as it is tested. A lighted LED indicates a failing component.

The line trace facility gives the user the ability to display the communications traffic when the lines are active. Inbound and outbound message traffic is monitored and displayed as these events occur. In addition, a hard copy of the data can then be produced on a local printer, for detailed analysis.

Another series of diagnostic tests is available by initiating the command mode at the display station. These tests are resident in the processor. They provide such capabilities as functional testing for the 9278 display, statistics for specific subsystems, and device status tables.

### COMPONENTS

**9200 PROCESSOR:** Processor memory consists of 160K bytes of Random Access Memory (RAM). The processor supports up to 32 devices, in any mix of display stations and printers, in a cluster configuration. A system diskette, feature diskette, and language diskette are included with each system, and are loaded into the processor to configure the system. Local or remote attachment is accommodated. The 9200 operates in both BSC and SNA/SDLC environments.

**9278 CRT DISPLAY:** A 15" diagonal, non-glare display screen is standard, capable of displaying up to 3440 char-

## Harris 9210 and 9220 Information Processing Systems

► characters. Four display formats are available: 12 lines of 80 characters (960 characters total), 24 lines of 80 characters (1920), 32 lines of 80 characters (2560), and 43 lines of 80 characters (3440). A status line, displayed on the bottom of the screen, is also standard. Characters are formed utilizing a 7 x 13 dot matrix, and are displayed in green phosphor on a dark background. Three intensity levels are featured. A 128-character set, either ASCII or EBCDIC, can be displayed.

Options supported by the 9278 display unit include the Photopen Light Sensor (light pen), and Magnetic Slot Reader.

A variety of detached keyboards are available for the 9278. The keyboards feature either 75- or 87-key configurations, and are available in data entry, typewriter, and keypunch formats. All keyboards include a HOME key, Alternate key, and local print key. An audible alarm and security keylock are optionally available, and international keyboards may also be obtained.

**9287 MATRIX PRINTER:** A bidirectional character printer, field upgradeable from 80 characters per second print speed to 130 or 180 cps. Line lengths up to 132 characters are accommodated. Character sets include 64 printable ASCII or EBCDIC upper case characters; 96 upper case and lower case characters. Both upper and lower case characters are formed utilizing a 7 x 8 dot matrix. Horizontal spacing is 10 characters per inch; vertical spacing is adjustable to 6 or 8 lines per inch, with a paper slew rate of 15 inches per second. Paper is advanced via a tractor feed mechanism. Single or up to six-part forms may be used.

**9289 BAND PRINTER:** A band printer capable of printing

300 lines per minute with a 64-character set, or 240 lines per minute with a 96-character set. Line lengths up to 132 characters are accommodated (136 columns optional). Character sets include 64 printable ASCII or EBCDIC upper case characters; 96 upper and lower case characters. Print method is an operator changeable etched steel band carrying 208 characters. A 50-yard continuous loop ribbon cartridge is utilized. Horizontal spacing is 10 characters per inch; vertical spacing is adjustable to 6 or 8 lines per inch. Paper is advanced via a pin feed mechanism. Single or up to six-part forms may be used.

### PRICING

The Harris 9200 system terminals are available for purchase, or on a one-, two-, three-, four-, or five-year lease, including maintenance. A separate maintenance contract is available for purchased units. Harris has supplied the following sample configuration prices:

#### Configuration

9210 BSC Remote Controller, 8 1920 character displays, 1 130 cps printer — 2-year lease with maintenance:

\$829 per month

9210 SNA Local Controller, 8 3440 character displays, 1,300 lpm band printer — 2-year lease with maintenance:

\$1,230 per month

9210 SNA Remote Controller, 6 2560 character displays, 1 180 cps printer, 1 magnetic slot reader:

Purchase Price - \$28,155.■



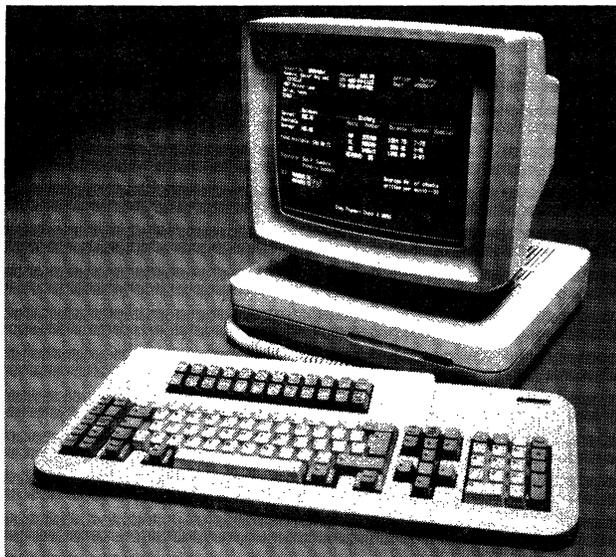
# Harris Challenger Information Display System

## MANAGEMENT SUMMARY

**UPDATE:** Since its introduction in March 1985, the Challenger Information Display System has been enhanced by the addition of five new products. New are the H274-08C/-16C Remote Control Units, H162 Shuttle Matrix Line Printer, and H165 Desktop Printer. Also added is a Coax Line Converter for 3270-type devices. One of Harris' most significant announcements, however, is the incorporation of IBM Token-Ring Network support, ASCII host support, and IPDS support for existing control units. The only product deleted from the original system is the H270 PC.

The Challenger Information Display System is Harris' newest product line intended to compete in the IBM 3270-compatible arena. It is a full-function 3270 communications system which supports both local and remote configurations under either SNA/SDLC or BSC protocols. IBM 3270 compatibility is implemented at both the host and device levels. The Challenger system is based on state-of-the-art microprocessor technology with a multiple processor design which enhances system performance and allows for future expansion and device support. Challenger combines the capabilities of the 9116/9200 Information Processing Systems, the MIND DDP System, and the 8000 Series to satisfy a number of user requirements for the office environment.

Of the original components in the Challenger Series two have been deleted; the H178 Display Terminal and the H270 PC. Still offered as part of the system are the H274-



The Harris H179 Display Terminal is an IBM 3179 alternative, featuring complete 3270 plug compatibility. The high-resolution, 14-inch monitor displays 1,920 characters in seven colors. A full range of tilt and swivel capabilities and a low-profile, detachable keyboard are standard. The optional display message printer provides individual users with desktop, hard-copy output and optional lightpen.

The Challenger Information Display System is a full-function 3270 communications system designed to compete directly with the IBM 3270 Information Display System. Challenger supports both local and remote configurations under either SNA/SDLC or BSC protocols. The Harris controllers can support the attachment of both Harris and IBM displays and printers. Likewise, the Challenger Series' displays and printers attach to both Harris and IBM controllers. A Challenger Series configuration can also support Harris 9116/9200 system components.

**MODELS:** H274-61C/-41C Remote Control Units, H274-08C/-16C Remote Control Units, H274-41A Local Control Unit, H178-02, H179, H180 and H181 terminals, H162 Shuttle Matrix Line Printer, H165 Desktop Laser Printer, H168 and H187 Multipurpose Printers, and H188 Letter Quality Printer.

**DISPLAY:** The H178-02 Display Terminal features a 12-inch diagonal display screen with a 1,920-character capacity. Amber or green phosphor characters are available on this model. The H179 Display Terminal features a 14-inch diagonal color display screen with a 1,920-character capacity. Seven colors are available. The H180 Display Terminal is available in 14- or 15-inch (diagonal) screen sizes. User-selectable screen formats of 1,920, 2,560, 3,440, and 3,564 amber or green phosphor characters are available for the H180. The H181 Display Terminal features four selectable screen formats that range from 1,920 characters to 3,564 characters. Characters are displayed in seven colors. All models feature a tilt/swivel capability as standard.

**KEYBOARD:** A choice of four keyboards is available for the H178-02, with typewriter or data entry layouts. The H178-02 offers as standard a 92-key keyboard. The H179, H180, and H181 are equipped with a 122-key, low-profile, detachable keyboard.

**COMPETITION:** IBM, Telex, Memorex, ITT Courier, Lee Data, AT&T, and several others.

## CHARACTERISTICS

**VENDOR:** Harris Corporation, National Accounts Division, 16001 Dallas Parkway, P.O. Box 809022, Dallas, TX 75380-9022. Telephone (214) 386-2000. In Canada: Harris Systems Ltd., 19 Lesmill Road, Don Mills, Ontario M3B 2T3. Telephone (416) 441-2400.

## Harris Challenger Information Display System

➤ 61C/-41C Remote Control Units, the H274-41A Local Control Unit, the H180 Display Terminal, the H168 and H187 Multipurpose Printers, and the H188 Letter Quality Printer. The new components include the H274-08C/-16C Remote Control Units, the H178-02 and H179 Display Terminals, the H162 Shuttle Matrix Line Printer, and the H165 Desktop Laser Printer. All Challenger Series components are plug compatible with corresponding members of the IBM 3270 family. A Challenger configuration can include Challenger Series and IBM 3270 controllers, displays, and printers, and Harris 9116/9200 displays and printers. Optionally offered with the Challenger Series controllers is ASCII device support and support for the IBM 3270 Personal Computer.

Of Harris' enhancements to the Challenger Information Display System, the incorporation of IBM Token-Ring Network support is by far the most significant. Token-Ring support, along with ASCII host support, and Intelligent Printer Data Stream (IPDS) support, allows existing customers to upgrade their current control units, thus offering a greater return on their investment through extended system use. Token-Ring Network support and ASCII host support will be available for the H274 control units in 1987.

The H274-08C Remote Control Unit supports the attachment of up to 8 coax A devices, while the H274-16C supports the attachment of up to 16 coax A devices. The H274-08C can be field upgraded to support 16 devices. The H274-61C Remote Control Unit supports the attachment of up to 16 devices, while the H274-41C supports the attachment of up to 32 devices. The H274-61C can be field upgraded to support 32 devices. These devices can be any mix of Harris or IBM displays and printers in a remote environment. Both BSC and SNA/SDLC protocols are supported. The H274-41A Local Control Unit supports the attachment of up to 32 devices, in any combination of Harris or IBM displays and printers, in a local environment. Both SNA and non-SNA (extended 3272) operations are supported.

The H178-02, H179, H180, and H181 Display Terminals are plug compatible replacements for the IBM 3178, 3179, and 3180 displays, respectively. The H178-02 features a compact design, including a 12-inch display screen with a 1,920-character display format. The H179 offers a 14-inch screen which displays 1,920 characters in seven colors. The H180 is modularly designed, and is available in 14- or 15-inch display screen sizes. This terminal features user selectable screen formats ranging from 1,920 to 3,564 characters. The H181 offers a 14-inch color monitor which displays in seven colors. Four user-selectable screen formats are available, which range from 1,920 characters to 3,564 characters. All Challenger Series displays feature a tilt/swivel mechanism. A low-profile, detachable keyboard is also standard. All models except the H179 and H181 may be selected with green or amber phosphor characters. All can attach to Harris Challenger controllers, as well as to IBM 3174, 3274, and 3276 controllers.

The H162 Shuttle Matrix Line Printer is compatible with the IBM 3262 Models 3 and 13. It offers 400 or 800 lpm in

➤ **DATE OF ANNOUNCEMENT:** March 1985.

**DATE OF FIRST DELIVERY:** March 1985.

**NUMBER DELIVERED TO DATE:** Information not available.

**SERVICED BY:** Harris Corporation.

### CONFIGURATION

The various configurations provided for the Harris Challenger Information Display System support up to 32 devices, in both local and remote environments. BSC and SNA/SDLC protocols are supported on the Challenger Series. Also available is an ASCII device support feature. The Challenger Series components are plug compatible with corresponding IBM devices.

The H274-08C Remote Control Unit supports the attachment of 8 coax A devices; it can be field upgraded to an H274-16C, which supports 16 coax A devices. The H274-61C Remote Control Unit supports the attachment of up to 16 devices; it can be field upgraded to an H274-41C Remote Control Unit, which supports the attachment of up to 32 devices. Attachable devices include the Harris H178-02, H179, and H180 Display Terminals; H168 and H187 Multipurpose Printers, the H188 Letter Quality Printer, H162 Shuttle Matrix Line Printer, and H165 Desktop Laser Printer. The Challenger control units also provide support for IBM monochrome and color display terminals, printers, the 3299 Terminal Multiplexer, the 3270 Personal Computer, and the 3179-G and 3290 displays. The H274-61C/-41C Control Units also support attachment of Harris 9116/9200 Information Processing System components.

The H274-41A Local Control Unit provides for the attachment of up to 32 devices, including the Harris H178-02, H179, H180, and H181 Display Terminals; H168 and H187 Multipurpose Printers, H188 Letter Quality Printer, H162 Shuttle Matrix Line Printer, and H165 Desktop Laser Printer. The H274-41A also supports the attachment of IBM monochrome and color displays, printers, the 3299 Terminal Multiplexer, the 3270 Personal Computer, and the 3179-G and 3290 displays. Also supported are components of the Harris 9116/9200 Information Processing Systems.

The H178-02, H179, H180, and H181 Display Terminals, H168 and H187 Multipurpose Printers, H188 Letter Quality Printer, H162 Shuttle Matrix Line Printer, and H165 Desktop Laser Printer can likewise be attached to IBM control units with screen printer and lightpen options.

ASCII device support is optionally available for the Harris Challenger Series control units. This option allows ASCII devices such as Digital VT100 terminals and desktop printers to be attached to Harris Challenger Series control units; the option performs ASCII-to-3270 and 3270-to-ASCII protocol conversion. IBM Personal Computers are also supported via RS-232-C asynchronous communication with full 3270 file transfer capabilities.

Other optional features being offered by Harris for the Challenger Series are IBM Token-Ring Network support and ASCII host support. This support will be available in 1987 for the H274 control units.

### TRANSMISSION SPECIFICATIONS

The H274-08C/-16C Remote Control Units provide maximum transmission rates of 19.2K bps while the H274-61C/-41C Remote Control Units provide maximum transmission rates of 56K bps. All units support SNA/SDLC and BSC protocols. The H274-41A Local Con-

## Harris Challenger Information Display System

▷ draft mode, 300 or 600 lpm in data processing mode, and 90 or 180 lpm in near letter quality mode. The H165 Desktop Laser Printer is a 3270 plug-compatible, high-speed printer offering letter-quality performance. With 300 by 300 dots per inch resolution, the H165 prints up to 5,000 pages per month at a maximum of 8 pages per minute. The H168 Multipurpose Printer is an IBM 3268 alternative, offering draft mode printing at 400 cps and near letter quality printing at 100 cps. The H187 Multipurpose Printer is an IBM 3287 alternative offering draft mode printing at 200 cps and near letter quality printing at 45 cps. The H188 Letter Quality Printer is an IBM 5120 alternative, with a maximum print speed of 55 cps. Like the H178-02 and H180 displays, the H188 can attach to Harris Challenger Series or IBM 3274/3276 controllers.

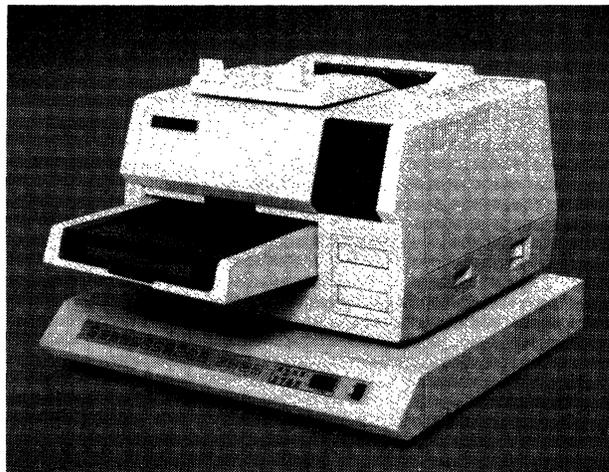
### COMPETITIVE POSITION

The addition of IBM Token-Ring Network support on the H274 controllers will allow Harris Challenger components to be connected directly to IBM's primary LAN. The addition of ASCII host support, along with the already available ASCII device support, will allow the Challenger Series to be easily integrated into a multivendor environment. Harris' plug compatibility with IBM 3270 components allows an entry-point into IBM-dominated offices. To date, Harris has been unable to carve out a significant share of the highly competitive (and still lucrative) 3270 market. With the new enhancements to the Challenger line, the company has positioned itself to do so.

### ADVANTAGES AND RESTRICTIONS

Harris, with the 1600 Series of batch terminals and the MIND DDP System, has a strong history of experience in the distributed data processing area. The company has also been a successful player in the minicomputer arena. It has had a more difficult time penetrating the IBM 3270 market. Its first terminal product line, the 8000, provided IBM 3270 emulation along with Honeywell, Sperry (Univac), and Burroughs emulation. Its 9200 system was the company's first pure 3270-compatible product line. Later joined by the small cluster 9116 system, this family was compatible with IBM only on the device level; it did not offer plug compatibility. An advantage of the 9200 family is that it can be field upgraded to a MIND DDP system.

The Challenger product line is fully plug-compatible with the IBM 3270 product family. The Challenger products can be mixed with IBM products, coexisting with them on the same system. Personal computing on the system can come in the form of the IBM 3270-PC. In addition, the Challenger control units provide ASCII device support as an option which supports IBM PC, PC XT, and PC AT with RS-232-C connectivity. The ability of the Challenger System to now support the IBM Token-Ring Network, an ASCII host, and IPDS is a definite advantage in that current investments in Challenger Series components, IBM, or ASCII devices will not be lost to obsolescence, but rather, saved by upgrading. □



*The Harris H165 Desktop Laser Printer is a 3270 plug compatible, nonimpact printer which features high-speed, letter-quality printing and heavy-duty cycle performance. The H165 prints up to 5,000 pages a month at eight pages per minute maximum print speed. The H165 is customer installable and customer friendly.*

▶ trol Unit supports SNA and non-SNA (extended 3272) channel-attached operation, with no hardware changes. All Challenger Series control units provide IBM Category coax A device support; Harris coax H device support is optional.

### DEVICE CONTROL

The Harris Challenger Information Display System provides full IBM host software compatibility. The following IBM features are also supported: NPDA compatibility; extended highlighting; extended color; structured field and attribute processing; decompression of programmed symbols load data; 3270 operation information area support; 3179-G and 3290 support; expanded operator information area support; Distributed Function Terminal support; entry assist; APL/Text control; response time monitor; host notification of terminal power status; automatic session recovery; pacing of inbound message traffic; keystroke record and playback; copy (print key function); SCS printer support; and 3289 text print control.

The ASCII device support feature provides the optional capability of connecting ASCII devices, such as the Digital VT100 terminal or a desktop printer, to a Challenger Series controller. An IBM Personal Computer or Harris personal computer may also be attached using this feature, either directly or via dial-up capability. The ASCII device support feature provides 3270-to-ASCII and ASCII-to-3270 protocol conversion with complete 3270 file transfer capabilities.

### COMPONENTS

**H274-08C/-16C REMOTE CONTROL UNITS:** Coax A remote control units for use as part of a Challenger system. The H274-08C provides support for up to 8 coax A devices; the H274-16C provides support for up to 16 coax A devices. BSC and SNA/SDLC protocols are supported. Line speeds up to 19.2K bps are supported on the SNA controllers and up to 9600 bps on BSC versions. Local and remote maintenance diagnostics and a complete Response Time Monitor are standard features. These units support the attachment of the H178-02, H179, H180, and H181 Display Terminals; H162 Shuttle Matrix Line Printer, H165 Desktop Laser Printer, H168 and H187 Multipurpose Printers, and H188 Letter Quality Printer. In addition, the controllers provide support for Harris 9116/9200 system displays and printers, ▶

## Harris Challenger Information Display System

► IBM 3270 family displays and printers (monochrome and color), the IBM 3270 Personal Computer, and the 3179-G and 3290 displays.

**H274-61C/-41C REMOTE CONTROL UNITS:** Remote control units for use as part of a Challenger system. The H274-61C provides support for up to 16 devices; the H274-41C provides support for up to 32 devices. The H274-61C can be field upgraded to support 32 devices. The controllers support both the BSC and SNA/SDLC protocols. Remote maintenance diagnostics and a Response Time Monitor are standard features. The H274-61C/-41C Remote Control Units support attachment of the H178-02, H179, H180, and H181 Display Terminals; H162 Shuttle Matrix Line Printer, H165 Desktop Laser Printer, H168 and H187 Multipurpose Printers, and the H188 Letter Quality Printer. In addition, the controllers provide support for Harris 9116/9200 system displays and printers, IBM 3270 family displays and printers (monochrome and color), and the IBM 3270 Personal Computer. ASCII device support is optional. IBM Token-Ring Network support, ASCII host support, and Intelligent Printer Data Stream (IPDS) support will be optionally available in 1987.

**H274-41A LOCAL CONTROL UNIT:** A local control unit for use as part of a Challenger system. The H274-41A provides support for up to 32 devices in a local configuration. Support for SNA or non-SNA (extended 3272) operation, with no hardware changes, is provided. Maintenance diagnostics and a Response Time Monitor are standard features. The H274-41A Local Control Unit provides attachment support for the H178-02, H179, H180, and H181 Display Terminals; H162 Shuttle Matrix Line Printer, H165 Desktop Laser Printer, H168 and H187 Multipurpose Printers, and the H188 Letter Quality Printer. In addition, the H274-41A provides support for the Harris 9116/9200 system displays and printers, IBM 3270 family displays and printers (monochrome and color), and the IBM 3270 Personal Computer. ASCII device support is optional. IBM Token-Ring Network support, ASCII host support, and IPDS will be optionally available in 1987. The local control unit can function as a remote controller without hardware changes.

**H178-02 DISPLAY TERMINAL:** An IBM 3178 alternative featuring complete 3270 plug compatibility. The H178-02 offers a 12-inch (diagonal) screen, and features a format of 1,920 characters (24 lines by 80 characters). A 25th status line is provided. Available with amber or green phosphor, the characters are formed in a 9-by-14 dot matrix. Standard features include a 92-key keyboard with security key lock and keyboard numeric lock, tilt/swivel monitor with anti-glare, high-resolution screen, adjustable audible alarm, brightness control, automatic screen dim, and row and column indicator. The H178-02 attaches to the H274-61C/-41C, H274-41A, and H274-08C/-16C control units. In addition, the H178-02 can attach to the IBM 3174, 3274, and 3276 control units. Options include a display attached printer and/or lightpen.

**H179 DISPLAY TERMINAL:** An alternative to the IBM 3179, the H179 features 3270 plug compatibility. It offers a 14-inch (diagonal) screen which displays 1,920 characters (24 lines by 80 characters) in seven colors. A 25th status line is also provided. Characters are formed in a 9-by-14 dot matrix. Standard features include a 122-key, user-modifiable keyboard with adjustable keyboard lock, keyboard brightness control, and keyboard adjustable alarm. Also standard is an antiglare, high-resolution screen, tilt/swivel monitor with automatic screen dim, and row and column indicator. The H179 attaches to the H274-61C/-41C, H274-41A, and H274-08C/-16C control units. In addition, the H179 can attach to the IBM 3174, 3274, and 3276 control units.

**H180 DISPLAY TERMINAL:** A plug-compatible replacement for the IBM 3180 Model 1 display. The H180 is available in 14- and 15-inch (diagonal) screen sizes, and features user-selectable screen formats of 1,920 characters (24 lines by 80 characters), 2,560 characters (32 by 80), 3,440 characters (43 by 80), and 3,564 characters (27 by 132). A status line is available for all screen sizes. Character formation is as follows: 1,920 characters (12-by-16 dot matrix); 2,560 characters (12-by-13 dot matrix); 3,440 characters (12-by-10 dot matrix); and 3,564 characters (9-by-12 dot matrix). Green or amber phosphor characters are available. Standard features include extended highlighting, row and column indicator, automatic screen dim, and a security keylock. A low-profile, detachable keyboard is also standard with the H180. The keyboard contains 122 keys, including separate numeric and cursor control pads. An adjustable alarm and numeric lock are standard, as is APL/Text support. Brightness for the display is also controlled from the keyboard.

The H180 features a modular design, with a tilt/swivel capability as standard. A display-attached printer is optional. The H180 attaches to the H274-61C/-41C and H274-41A control units. In addition, the H180 can attach to the IBM 3174, 3274, and 3276 control units.

**The H181 DISPLAY TERMINAL:** Features complete 3270 plug compatibility. It offers a 14-inch, tilt/swivel monitor which displays seven colors. The H181 also offers four user-selectable screen formats that include 1,920 characters (24 lines of 80 characters in a 12-by-15 dot matrix); 2,560 characters (32 lines of 80 characters in a 12-by-13 dot matrix); 3,440 characters (43 lines of 80 characters in a 12-by-10 dot matrix); and 3,564 characters (27 lines of 132 characters in a 10-by-14 dot matrix). Standard features include an antiglare, high-resolution screen, extended highlighting, automatic screen blank, and adjustable, audible alarm. The detachable keyboard contains 122 keys, offers a numeric lock and numeric keypad, and is height adjustable. The H181 attaches to the IBM 3174, 3274, and 3276 control units.

**H162 SHUTTLE MATRIX LINE PRINTER:** Compatible with the IBM 3262 Models 3 and 13, the H162 is a coax A line printer which provides SCS and DSC datastream compatibility. Also provided is speed-of-band printing with the flexibility of shuttle matrix printing. Data processing speeds of 300 and 600 lpm are supported, as well as near letter quality speeds of 90 and 180 lpm. Characters are formed using a 9-by-5 line matrix for draft mode, a 9-by-7 line matrix for data processing mode, and a 9-by-13 line matrix for near letter quality mode. Operator-selectable fonts are available. Horizontal spacing is available at 10, 12, 13, 15, or 17 cpi, and vertical spacing is selectable at 3, 4, 6, or 8 lpi. Up to six-part forms are accommodated and quiet operation (55 dBA) is standard. The H162 prints the 96-character ASCII set and attaches to the H274-61C/-41C, H274-41A, and H274-08C/-16C Control Units, as well as the IBM 3174, 3274, and 3276 Control Units.

**H165 DESKTOP LASER PRINTER:** The H165 is a non-impact, semiconductor laser printer, which is IBM 3270 plug compatible. Featuring high-speed, letter-quality printing, the H165 prints up to 5,000 pages a month at eight pages per minute maximum print speed. Resolution is 300 by 300 dots per inch. Also featured is a coax A interface, automatic cut-sheet paper feeding, multiple fonts, and portrait and landscape printing. This laser printer attaches to the H274-61C/-41C, H274-41A, and H274-08C/-16C control units, as well as the IBM 3174, 3274, and 3276 control units.

**H168 MULTIPURPOSE PRINTER:** An IBM 3268 alternative, providing 3270 SCS and DSC datastream compatibility. ►

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► **bility.** The H168 is a bidirectional dot matrix printer with two switch-selectable print speeds: 400 cps for draft quality, and 100 cps for near letter quality. Characters are formed using a 9-by-18 dot matrix for draft mode, and a 7-by-9 dot matrix for near letter quality mode. Operator-selectable fonts are available. Line lengths are up to 132 columns. Horizontal spacing is selectable at 10, 12, or 13.1 cpi, and vertical spacing is selectable at 3, 4, 6, or 8 lpi. Up to six-part forms are accommodated via a tractor feed mechanism. Quiet operation (55 dBA) is featured. The H168 can print the 96-character ASCII set; international character sets are available. The H168 attaches to the H274-61C/-41C and H274-41A control units. In addition, the H168 can attach to the IBM 3174, 3274, and 3276 control units.

**H187 MULTIPURPOSE PRINTER:** An IBM 3187 alternative, providing 3270 SCS and DSC datastream compatibility. The H187 is a bidirectional dot matrix printer with two switch-selectable print speeds: 200 cps for draft quality, and 45 cps for near letter quality. Characters are formed using a 9-by-18 dot matrix for draft mode, and a 7-by-9 dot matrix for near letter quality mode. Operator-selectable fonts are available. Line lengths are up to 132 columns. Horizontal spacing is selectable at 10, 12, or 13.1 cpi, and vertical spacing is selectable at 3, 4, 6, or 8 lpi. Up to six-part forms are accommodated via a tractor feed mechanism. Quiet operation (52 dBA) is featured. The H187 can print the 96-character ASCII set; international character sets are available. The H187 attaches to the H274-61C/-41C and H274-41A control units. In addition, the H187 can attach to the IBM 3174, 3274, and 3276 control units.

**H188 LETTER QUALITY PRINTER:** An IBM 5210 alternative, providing 3270 SCS and DSC datastream compatibility. The H188 uses a daisy printwheel with logic-seeking bidirectional printing. Print speed is 55 cps, and line lengths are up to 132 columns. Horizontal spacing is selectable at 10 or 12 cpi, and vertical spacing is selectable at 6 or 8 lpi. Up to five-part forms are accommodated via a tractor mechanism; friction feed is used for single sheets. Automatic test and high-speed electronic tab are standard features. A 3564-byte buffer is included. The H188 attaches to the H274-61C/-41C and H274-41A control units. In addition, the H188 can attach to the IBM 3174, 3274, and 3276 control units.

**TWISTED PAIR ADAPTERS:** Harris' Coax Line Converter allows Challenger displays, printers, and other 3270-type devices to connect to Challenger controllers or multiplexers over unshielded twisted pair telephone wires. The Coax Line Converter provides a full performance, point-to-point alternative to coax cable without requiring host computer or system changes.

### PRICING

Harris Challenger Information Display System components are available for purchase or lease. The Challenger Series components are designed for customer installation; site planning and installation instructions are provided ahead of product shipments. Customer service is available from over 150 cities throughout the United States.

All Challenger control units have a one-year extended warranty. The H178-02, H179, H180, and H181 Display Terminals have a standard one-year warranty, while all printer components have a 90-day standard warranty. Quantity discounts are available for all product line components. All warranties are for purchased equipment.

### EQUIPMENT PRICES

	Purchase Price (\$)
H274-08C/-16C Remote Control Unit	4,750
H274-61C/-41C Remote Control Unit	7,200
H274-41A Local Control Unit	13,450
H178-02 Display Terminal	1,075
H179 Display Terminal	1,895
H180 Display Terminal	1,795
H181 Display Terminal	2,095
H162 Shuttle Matrix Line Printer	11,500
H165 Desktop Laser Printer	6,600
H168 Multipurpose Printer	5,600
H187 Multipurpose Printer	3,985
H188 Letter Quality Printer	4,995
Coax Line Converter	100-300 ■



# Harris Challenger Information Display System



*The Harris Challenger Information Display System is fully plug-compatible with members of the IBM 3270 Information Display System. A Challenger configuration may include Harris Challenger controllers, displays, and printers, as well as similar devices from IBM. Pictured in this photo are: (clockwise, from left to right) a Harris H187 Multipurpose Printer, a Harris H178 Display Terminal, an IBM 3180 Model 1 Display Station, a Harris H274-61C/-41C Remote Control Unit, a Harris H270 PC, a Harris H188 Letter Quality Printer, and a Harris H180 Display Terminal. Also supported are members of the Harris 9100/9200 Information Processing Systems, ASCII devices (optionally), and the IBM 3270 Personal Computer.*

## MANAGEMENT SUMMARY

With the introduction of the Challenger Information Display System, Harris has reaffirmed their intention to remain a major player in the IBM 3270-compatible product market. The intense competition forced by IBM with their recent new product introductions and resultant price cuts has convinced a number of companies to leave this market (e.g., Raytheon, MDS Trivex). Others, like ITT Courier, Telex, and Lee Data, responded by introducing new products of their own. Now, Harris has introduced their first line of products that offer IBM 3270 compatibility on the device level. The Challenger Series joins with the 9100/9200 Information Processing Systems, the MIND DDP System, and the older 8000 Series to meet a broad range of user requirements in the interactive terminal area.

The Challenger Series consists of the following new components: the H274-61C/-41C Remote Control Units, the H274-41A Local Control Unit, the H178 and H180 Display Terminals, the H168 and H187 Multipurpose Printers, the H188 Letter Quality Printer, and the H270 PC. All Challenger Series components are plug-compatible with mem-

The Challenger Information Display System is Harris' first display family that is plug-compatible with the IBM 3270 Information Display System product line. The new Harris controllers can support the attachment of both Harris and IBM displays and printers. Likewise, the Challenger Series displays and printers attach to both Harris and IBM controllers. A Challenger Series configuration can also support Harris 9100/9200 system components.

**MODELS:** H274-61C/-41C Remote Control Units, H274-41A Local Control Unit, H178 and H180 Display Terminals, H168 and H187 Multipurpose Printers, H188 Letter Quality Printer, and H270 PC.

**DISPLAY:** The H178 Display Terminal features a 12-inch diagonal display screen with a 1920-character capacity. The H180 Display Terminal is available in 14- or 15-inch (diagonal) screen sizes. User selectable screen formats of 1920, 2560, 3440, and 3564 characters are available for the H180. Amber or green phosphor characters are available for both models. The H180 features a tilt/swivel capability as standard; that capability is optional for the H178. The H270 PC is available with monochrome or color displays.

**KEYBOARD:** A choice of two keyboards is available for the H178 and H270 PC, with typewriter or data entry layouts. Both layouts feature 109 keys, a low-profile design, adjustable slope, and are detachable. The H180 is equipped with a 122-key, low-profile, detachable keyboard.

**COMPETITION:** IBM, Telex, ITT Courier, Memorex, Lee Data, AT&T Teletype, and several others.

**PRICE:** A Challenger system configuration consisting of one remote control unit, 12 displays, and two printers is priced at \$35,700.

## CHARACTERISTICS

**VENDOR:** Harris Corporation, Information Terminals Group, 16001 Dallas Parkway, P.O. Box 809022, Dallas, TX 75380-9022. Telephone (214) 386-2000. In Canada: Harris Systems Ltd., 19 Lesmill Road, Don Mills, Ontario M3B 2T3. Telephone (416) 441-2400.

**DATE OF ANNOUNCEMENT:** March 1985.

**DATE OF FIRST DELIVERY:** March 1985.

## Harris Challenger Information Display System

bers of the IBM 3270 family. A Challenger configuration can include Challenger Series controllers, displays, and printers, Harris 9100/9200 displays and printers, and IBM 3270 controllers, displays, and printers. The Challenger Series controllers also offer, as an option, ASCII device support, as well as support for the H270 PC and the IBM 3270 Personal Computer.

The H274-61C Remote Control Unit supports the attachment of up to 16 devices, while the H274-41C supports the attachment of up to 32 devices. The H274-61C can be field-upgraded to support 32 devices. These devices can be any mix of Harris or IBM displays and printers, in a remote environment. Both BSC and SNA/SDLC protocols are supported. The H274-41A Local Control Unit supports the attachment of up to 32 devices, in any combination of Harris or IBM displays and printers, in a local environment. Both SNA and non-SNA (extended 3272) operation is supported.

The H178 and H180 Display Terminals are plug-compatible replacements for the IBM 3178 and 3180 (Model 1) displays, respectively. The H178 features a compact design, including a 12-inch display screen, 1920-character display format, and low-profile, detachable keyboard. The H180 is modularly designed, and is available in 14- or 15-inch display screen sizes. The display tilts and swivels, and features user-selectable screen sizes ranging from 1920 to 3564 characters. A low-profile, detachable keyboard is also standard. Both models may be selected with green or amber phosphor characters, and can attach to Harris Challenger controllers, as well as to IBM 3274 and 3276 controllers.

The H270 PC is an alternative to the IBM 3270 Personal Computer. Available with monochrome or color display screens, the H270 PC operates under the MS-DOS operating system, contains 512K of memory, and includes dual-diskette drives.

The H168 Multipurpose Printer is an IBM 3268 alternative offering draft mode printing at 400 cps and near letter quality printing at 100 cps. The H187 Multipurpose Printer is an IBM 3287 alternative offering draft mode printing at 200 cps and near letter quality printing at 45 cps. The H188 Letter Quality Printer is an IBM 5120 alternative, with a maximum print speed of 55 cps. Like the H178 and H180 displays, the H188 can attach to a Harris Challenger Series or IBM 3274/3276 controllers.

### COMPETITIVE POSITION

As mentioned previously, the introduction of the Challenger Information Display System has reaffirmed the company's commitment to remain a major supplier of IBM 3270-compatible products. The company now offers products compatible with IBM at the system level (9100/9200, 8000) and the device level (Challenger). With the increased competition in the 3270 arena, plug compatibility (and resultant coexistence) with IBM has become an increasingly attractive alternative for the independent ven-

NUMBER DELIVERED TO DATE: New product.

SERVICED BY: Harris Corporation.

### CONFIGURATION

Harris Challenger Information Display System configurations provide support for up to 32 devices, in both local and remote environments. The Challenger Series supports both BSC and SNA/SDLC protocols; an ASCII device support feature is also available. The Challenger Series components are plug-compatible with corresponding IBM devices.

The H274-61C Remote Control Unit supports the attachment of up to 16 devices; it can be field upgraded to an H274-41C Remote Control Unit, which supports the attachment of up to 32 devices. Attachable devices include the Harris H178 and H180 Display Terminals, H270 PC, H168 and H187 Multipurpose Printers, and the H188 Letter Quality Printer; the Challenger control units also provide support for IBM monochrome and color display terminals, printers, the 3299 Terminal Multiplexer, and the 3270 Personal Computer. The H274-61C/-41C Control Units also support attachment of Harris 9100/9200 Information Processing System components.

The H274-41A Local Control Unit provides for the attachment of up to 32 devices, including the Harris H178 and H180 Display Terminals, H168 and H187 Multipurpose Printers, and the H188 Letter Quality Printer. The H274-41A also supports the attachment of IBM monochrome and color displays, printers, the 3299 Terminal Multiplexer, and the 3270 Personal Computer. Also supported are components of the Harris 9100/9200 Information Processing Systems.

The H178 and H180 Display Terminals, H270 PC, H168 and H187 Multipurpose Printers, and the H188 Letter Quality Printer, can likewise be attached to IBM control units.

ASCII device support is optionally available for the Harris Challenger Series control units. This option allows ASCII devices such as DEC VT100 terminals and desktop printers to be attached to Harris Challenger Series control units; the option performs ASCII-to-3270 and 3270-to-ASCII protocol conversion.

### TRANSMISSION SPECIFICATIONS

The H274-61C/-41C Remote Control Units provide maximum transmission rates of 56K bps using SNA/SDLC protocol, and 9600 bps using BSC protocol. The H274-41A Local Control Unit supports SNA and non-SNA (extended 3272) channel-attached operation, with no hardware changes. All Challenger Series control units provide IBM Category coax A device support; Harris coax H device support is optional.

### DEVICE CONTROL

The Harris Challenger Information Display System provides full IBM host software compatibility. The following IBM features are also supported: NPDA compatibility; extended highlighting; extended color; structured field and attribute processing; decompression of programmed symbols load data; 3270 operation information area support; expanded operator information area support; Distributed Function Terminal support; entry assist; APL/Text control; response time monitor; host notification of terminal power status; automatic session recovery; pacing of inbound mes-

## Harris Challenger Information Display System

dors of 3270-compatible products. Telex and Memorex, historically, have been plug-compatible with IBM across their entire product lines. ITT Courier has recently announced a new display terminal that offers plug compatibility, its only current product that provides this capability. Harris' move to plug compatibility with IBM is a logical one, and could result in a larger share of this lucrative market.

### ADVANTAGES AND RESTRICTIONS

Harris, with the 1600 Series of batch terminals, and the newer MIND DDP System, has a strong history of experience in the distributed data processing area. The company has also been a successful player in the minicomputer arena. It has had a more difficult time penetrating the IBM 3270 market. Its first terminal product line, the 8000, provided IBM 3270 emulation along with Honeywell, Sperry (Univac), and Burroughs emulation. Its 9200 system was the company's first pure 3270-compatible product line. Later joined by the small cluster 9100 system, this family was compatible with IBM only on the device level; it did not offer plug compatibility. One advantage of the 9200 family is that it can be field-upgraded to a MIND DDP system.

The Challenger product line is fully plug-compatible with the IBM 3270 product family. The Challenger products can be mixed with IBM products, coexisting with them on the same system. Personal computing on the system can come in the form of the Harris H270 PC or the IBM 3270 PC. In addition, the Challenger control units provide ASCII device support as an option. Thus, the purchase of Challenger Series components will not obsolete a company's investment in either IBM or ASCII devices. □

► sage traffic; keystroke record and playback; copy (print key function); SCS printer support; and 3289 text print control.

The ASCII device support feature provides the optional capability of connecting ASCII devices, such as the DEC VT100 terminal or a desktop printer, to a Challenger Series controller. An IBM Personal Computer or Harris personal computer may also be attached using this feature, either directly or via dial-up capability. The ASCII device support feature provides 3270-to ASCII and ASCII-to-3270 protocol conversion.

### COMPONENTS

**H274-61C/-41C REMOTE CONTROL UNITS:** Remote control units for use as part of a Challenger system. The H274-61C provides support for up to 16 devices; the H274-41C provides support for up to 32 devices. The H274-61C can be field-upgraded to support 32 devices. The controllers support both the BSC and SNA/SDLC protocols. Remote maintenance diagnostics and a Response Time Monitor are standard features. The H274-61C/-41C remote control units support attachment of the new H178 and H180 Display Terminals, H270 PC, H168 and H187 Multipurpose Printers, and the H188 Letter Quality Printer. In addition, the controllers provide support for Harris 9100/9200 system displays and printers, IBM 3270 family displays and printers (monochrome and color), and the IBM 3270 Personal Computer. ASCII device support is optional.

**H274-41A LOCAL CONTROL UNIT:** A local control unit for use as part of a Challenger system. The H274-41A provides support for up to 32 devices in a local configuration. Support for SNA or non-SNA (extended 3272) operation, with no hardware changes, is provided. Maintenance diagnostics and a Response Time Monitor are standard features. The H274-41A local control unit provides attachment support for the new H178 and H180 Display Terminals, H270 PC, H168 and H187 Multipurpose Printers, and the H188 Letter Quality Printer. In addition, the H274-41A provides support for the Harris 9100/9200 system displays and printers, IBM 3270 family displays and printers (monochrome and color), and the IBM 3270 Personal Computer. ASCII device support is optional.

**H178 DISPLAY TERMINAL:** A plug-compatible replacement for the IBM 3178 display. The H178 features a 12-inch (diagonal) display screen with a 1920-character capacity, arranged in 24 lines of 80 characters each. A 25th line displays terminal status information. Characters are formed using a 9-by-14 dot matrix, and displayed in green or amber phosphor. The cursor can be chosen as a blinking or nonblinking underline or reverse video. Standard features of the H178 include automatic screen dim, adjustable audible alarm, and brightness control. A security keylock and tilt/swivel capability are optional. The H178 attaches to the H274-61C/-41C and H274-41A control units. In addition, the H178 can attach to the IBM 3274 and 3276 control units.

**H178 KEYBOARDS:** A choice of keyboards is available for the H178 Display Terminal. The keyboards contain 109 keys in a low-profile design, and are detachable. Available in both typewriter and data entry styles, the keyboards contain sculptured keys, are adjustable to three heights of elevation, and have adjustable key click, and home key indicators. The data entry style keyboard also includes a 10-key numeric pad.

**H180 DISPLAY TERMINAL:** A plug-compatible replacement for the IBM 3180 Model 1 display. The H180 is available in 14- and 15-inch (diagonal) screen sizes, and features user-selectable screen formats of 1,920 characters (24 lines by 80 characters), 2,560 characters (32 by 80), 3,440 characters (43 by 80), and 3,564 characters (27 by 132). A status line is available for all screen sizes. Character formation is as follows: 1920 characters (12-by-16 dot matrix); 2,560 characters (12-by-13 dot matrix); 3,440 characters (12-by-10 dot matrix); 3,564 characters (9-by-12 dot matrix). Green or amber phosphor characters are available. Standard features include extended highlighting, row and column indicator, automatic screen dim, and a security keylock. The H180 features a modular design, with a tilt/swivel capability as standard. A display-attached printer is optional. The H180 attaches to the H274-61C/-41C and H274-41A control units. In addition, the H180 can attach to the IBM 3274 and 3276 control units.

**H180 KEYBOARD:** A low-profile, detachable keyboard is standard with the H180. The keyboard contains 122 keys, including separate numeric and cursor control pads. An adjustable alarm and numeric lock are standard, as is APL/Text support. Brightness control for the H180 display is also controlled from the keyboard.

**H270 PC:** An IBM 3270 Personal Computer alternative. The H270 PC is available with monochrome or color displays, and operates under the MS-DOS operating system. Standard memory is 512K bytes, and dual-diskette drives are also included. The H270 PC attaches to the H274-61C/-41C and H274-41A control units. In addition, the H270 PC can attach to the IBM 3274 and 3276 control units. ►

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► **H270 PC KEYBOARD:** The H270 PC keyboard contains 122 keys and is detachable. The keyboard contains sculptured keys, has adjustable key click, and home key indicators; it also includes a 10-key numeric pad.

**H168 MULTIPURPOSE PRINTER:** An IBM 3268 alternative, providing 3270 SCS and DSC datastream compatibility. The H168 is a bidirectional dot matrix printer with two switch-selectable print speeds: 400 cps for draft quality, and 100 cps for near letter quality. Characters are formed using a 9-by-18 dot matrix for draft mode, and with a 7-by-9 dot matrix for near letter quality mode. Operator-selectable fonts are available. Line lengths are up to 132 columns. Horizontal spacing is selectable at 10, 12, or 13.1 cpi, and vertical spacing is selectable at 3, 4, 6, or 8 lpi. Up to six-part forms are accommodated via a tractor feed mechanism. Quiet operation (55 dBA) is featured. The H168 can print the 96-character ASCII set; international character sets are available. The H168 attaches to the H274-61C/-41C and H274-41A control units. In addition, the H168 can attach to the IBM 3274 and 3276 control units.

**H187 MULTIPURPOSE PRINTER:** An IBM 3187 alternative, providing 3270 SCS and DSC datastream compatibility. The H187 is a bidirectional dot matrix printer with two switch-selectable print speeds: 200 cps for draft quality, and 45 cps for near letter quality. Characters are formed using a 9-by-18 dot matrix for draft mode, and with a 7-by-9 dot matrix for near letter quality mode. Operator-selectable fonts are available. Line lengths are up to 132 columns. Horizontal spacing is selectable at 10, 12, or 13.1 cpi, and vertical spacing is selectable at 3, 4, 6, or 8 lpi. Up to six-part forms are accommodated via a tractor feed mechanism. Quiet operation (52 dBA) is featured. The H187 can print the 96-character ASCII set; international character sets are available. The H187 attaches to the H274-61C/-41C and

H274-41A control units. In addition, the H168 can attach to the IBM 3274 and 3276 control units.

**H188 LETTER QUALITY PRINTER:** An IBM 5210 alternative, providing 3270 SCS and DSC datastream compatibility. The H188 uses a daisy printwheel with logic-seeking bidirectional printing. Print speed is 55 cps, and line lengths are up to 132 columns. Horizontal spacing is selectable at 10 or 12 cpi, and vertical spacing is selectable at 6 or 8 lpi. Up to five-part forms are accommodated via a forms tractor mechanism; friction feed is used for single sheets. Automatic test and high-speed electronic tab are standard features. A 3564-byte buffer is included. The H188 attaches to the H274-61C/-41C and H274-41A control units. In addition, the H188 can attach to the IBM 3274 and 3276 control units.

### PRICING

Harris Challenger Information Display System components are available for purchase or lease. The Challenger Series components are designed for customer installation; site planning and installation instructions are provided ahead of product shipments. Customer service is available from over 150 cities throughout the United States.

Harris declined to provide detailed component pricing for the Challenger Series; the company did, however, provide the following sample configuration prices.

- One H274-61C Remote Control Unit, 12 H178 Display Terminals, and two H187 Multipurpose Printers are priced at \$35,700.
- One H274-41A Local Control Unit, 24 H178 Display Terminals, two H187 Multipurpose Printers, and two H188 Letter Quality Printers are priced at \$75,400. ■