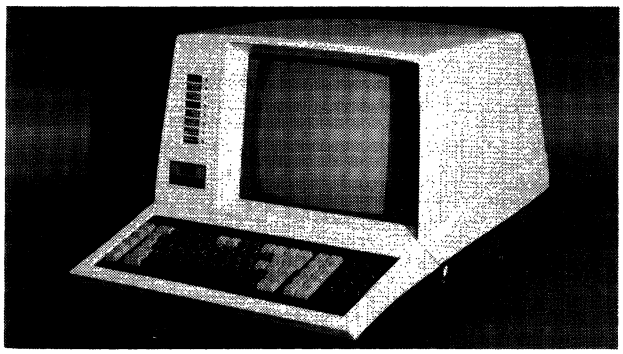
Raytheon PTS-100 Display Terminal System

MANAGEMENT SUMMARY

Unveiled by Raytheon in 1971, the PTS-100 Display Terminal System remains an extremely active member of the company's clustered terminal system family, which includes the PTS-1200 Intelligent Terminal System, as well as the newer PTS-2000 System. Raytheon reports that there are currently 60,000 PTS-100 terminal systems currently installed, representing a base of approximately 175,000 display stations, and that the system is expected to continue to produce about 35% of Raytheon Data Systems' revenues in 1983.

Raytheon offers the PTS-100 as a replacement for first-generation equipment in IBM's 3270 Information Display System (BSC and SDLC versions of both the 3271 and the 3274 controllers are supported) and for the IBM 2260 Display Station in both local and remote environments, for the Honeywell VIP 7700, and for Univac Uniscope 100 and 200 display terminals. A leading supplier of reservation and departure control systems to major airlines, Raytheon also offers the PTS-100 as an add-on or replacement terminal (also via software emulation) for IBM's 2948/2915 display terminals used in its PARS/IPARS airline reservation system.

The PTS-100 is available in clustered versions that accommodate up to 32 display units. Screen capacities include 480-, 960-, and 1920-character displays. Users can specify either of two display arrangements for the 960-, and 1920-character screen capacities when ordering the PTS-100. System peripherals include serial and line printers and card readers. The terminal's peripheral-handling capability is determined by the number of multiplexer subchannels included. The basic terminal provides 4 or 7, while an expanded terminal provides as many as 23. Each subchannel can operate in either simplex or half-duplex mode and can handle one data stream at a time. Communications and low-speed I/O devices interface the multiplexer subchannels; the minicomputer's high-speed I/O bus can interface a host computer via a channel interface.



The PTS-100 Display Terminal System consists of four controller models, offering support for up to 32 display stations, as well as a variety of other peripherals. The PTS-100 display, shown here, is available in 9-inch as well as 15-inch screen versions. Display capacities range from 480 to 1920 characters, with the following display arrangements: 12 lines by 40 characters; 15 lines by 64 characters; 12 lines by 80 characters; 24 lines by 80 characters; and 30 lines by 64 characters.

The senior member of Raytheon's family of clustered terminal systems.

The PTS-100 system provides IBM 3270 compatibility, as well as compatibility with the IBM 2260 Display Station, Honeywell VIP7700, and Sperry Univac Uniscope 100 and 200. The PTS-100 display is available in 9- and 15-inch screen sizes, with display capacities of 480, 960, and 1920 characters. Peripherals available for use with the system include serial and line printers, and an 80-column card reader.

A typical mid-range PTS-100 system, featuring 3270 remote emulation, 48K bytes of memory, and sixteen 1920-character displays sells for $42,146, and is available on a three-year lease at a monthly charge of $989, including maintenance.

CHARACTERISTICS

VENDOR: Raytheon Data Systems Company, Division of Raytheon Company, 1415 Boston-Providence Turnpike, Norwood, Massachusetts 02062. Telephone (617) 762-6700.

DATE OF ANNOUNCEMENT: May 1971.

DATE OF FIRST DELIVERY: October 1972.

NUMBER DELIVERED TO DATE: 60,000 systems with over 175,000 display stations.

SERVICED BY: Raytheon Data Systems Company.

CONFIGURATION

The basic PTS-100 System (all models) is built around a 16-bit minicomputer with 16K or 32K bytes of MOS semiconductor memory, expandable to 64K or 128K bytes in 16K- or 32K-byte increments. Memory size selected is a function of the emulator to be used and the number and type of peripherals to be configured. In addition to its complement of CRT display units, the system can include serial and line printers and card readers as peripheral devices. A magnetic tape cassette recorder is included with each controller for program loading.

The minicomputer features a bidirectional I/O bus with a maximum transfer rate of 1 million bytes/second. The I/O bus can support up to eight high-speed host processor channel interfaces and special user interfaces.

Low-speed I/O devices are attached via a multiplexer channel with a maximum transfer rate of 9600 bits/second. By means of an adapter, each of eight multiplexer subchannels can accommodate one peripheral device or communications interface operating in the half-duplex or simplex mode; full-duplex operation requires two subchannels. One multiplexer subchannel is dedicated to input from all keyboards associated with the attached display units, while a second is used for communications; therefore, six subchannels are available for external device usage. Model 1025 can accommodate 1 or 2 additional multiplexer channels to provide a total of 14 or 23 usable subchannels.

Raytheon PTS-100
Display Terminal System

The PTS-100 was originally marketed as a user-programmable terminal system. Although some software is still available from Raytheon that can support user programming of the PTS-100, including two macro assemblers, an operating system, and a set of utility programs, Raytheon has stated that these tools are rarely used by their customers. The PTS-100 is currently marketed strictly as a replacement for the non-programmable display terminals it emulates; if non-standard programs are required, Raytheon provides them on an RPQ basis. Users who need a programmable terminal system capability should inquire about Raytheon's PTS-1200 system, which utilizes many of the same components as the PTS-100 and provides full distributed processing support. Users who may need a programmable capability in the future should consider the PTS-100 Model 1025 cluster controller, which is field-upgradeable to a PTS-1200 configuration.

Although Raytheon's newer PTS-2000 System, which was announced in April 1980, provides many of the same functions as the PTS-100 (except for the PARS/IPARS capability, which is available exclusively on the PTS-100), Raytheon plans to continue to support and upgrade the PTS-100 for at least another two years. The PTS-2000 provides compatibility with IBM's second generation 3270 equipment.

Service is provided by Raytheon Data Systems, with more than 140 service locations in the U.S. and abroad.

USER REACTION

Datapro, in conjunction with *Data Communications* magazine, conducted an extensive terminal users' survey during June, July, and August of 1982. A questionnaire, designed by Datapro, was mailed to approximately 10,000 addresses selected at random from a cross-section of *Data Communications'* U.S. end-user subscriber base. Datapro received a total of 447 valid responses, covering batch terminals, teleprinters, clustered display systems, and stand-alone displays.

In the alphanumeric display terminals section of the survey form, users were asked to rate their clustered terminal systems in six different categories of usage. A total of seven users responded with ratings for the Raytheon PTS-100 Display Terminal System. These seven users reported on a total of 112 displays, for an average of 16 display stations per PTS-100 system. The ratings given to the PTS-100 by these users are summarized in the following table:

	Excellent	Good	Fair	Poor	WA*
Overall performance	1	4	2	0	2.9
Ease of operation	3	3	1	0	3.3
Reliability of controller	1	4	1	1	2.7
Reliability of peripherals	1	3	2	1	2.6
Maintenance service	1	3	2	1	2.6
Technical support	0	2	5	0	2.3

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

When asked whether or not they would recommend the PTS-100 system to other users with similar applications, four of the respondents answered that they would; two said that they would not; and the remaining user stated that he was undecided.□

The PTS-100 System is designed for remote operation in a communications environment or for local operations as a computer peripheral subsystem for an IBM System/370 or System/360 via the computer's byte or block multiplexer or selector channel. The data transfer rate in this mode is 200,000 bytes/second.

The parameters of each of the models of the PTS-100 System are listed below:

Model	Memory Size, bytes	Multiplexer Subchannels	Maximum Display Units 1920 Char.	960 Char.	480 Char.
1001A	16K	4	—	4	—
1009	32K or 64K	4	4	8	16
1018	16K to 128K	7/11	32	32	32
1025*	16K to 128K	7/15/23	32	32	32

***Can accommodate one or two additional multiplexer channels up to a maximum of 23 subchannels.**

Display arrangements can be mixed on the same controller for Models 1018 and 1025.

TRANSMISSION SPECIFICATIONS

Synchronous or asynchronous in the half- or full-duplex mode. Four modem adapters are each designed to accommodate specific transmission codes and code levels, including 6-level, 6-unit code; 8-level, 8-unit code; and 10-level, 8-unit code. Each adapter provides an EIA Standard RS-232-C or CCITT V.24 modem interface and can operate at speeds up to 9600 bits/second. The adapter designed for 10-level, 8-unit code supplies its own clocking; however, clocking derived from an external modem must be applied to the other adapters.

DEVICE CONTROL

The nucleus of the PTS-100 is a display-oriented minicomputer that executes all terminal operations under program control. Keyboards are not connected to their corresponding display monitors; data keyed and data displayed are entirely controlled by the stored program. All peripheral devices are interrupt-driven, and, except for the displays, transfer data through the arithmetic-logic unit of the processor. Programs can be loaded locally from cassette tape, or remotely via the communications facility.

Communications compatibility is a function of the program loaded. Under Raytheon-supplied emulator programs, the PTS-100 can operate as a local or remote IBM 2260 Display Station, as a local or remote IBM 3270 Information Display System (BSC and SDLC versions of both the 3271 and 3274 controllers are supported), a Honeywell VIP 7700, a Univac Uniscope 100 or 200, or as an IBM PARS/IPARS airlines reservation terminal.

The 2260 and 3270 Remote Emulators operate at speeds up to 9600 bps in a point-to-point or multipoint arrangement. The 3270 emulator will not operate in the Transparent Text mode, although it can be used in a multipoint arrangement with IBM BSC terminals operating in the Transparency mode. The 3270 Emulator operates with either ASCII or EBCDIC transmission code. The PARS/IPARS Emulator transforms the PTS-100 into a replacement for the IBM 2946 or 2948 and is compatible with the IBM 1006 line control discipline.

COMPONENTS

CONTROLLER: Four controller models are available, including one small, one medium, and two large cluster controllers.

- **Model 1001A—A small cluster controller with up to 16K bytes of memory that accommodates one to four keyboard/display stations and one or two printers. The 1001A is dedicated to the PARS/IPARS environment.**

Raytheon PTS-100
Display Terminal System

- Model 1009—A medium cluster controller with up to 64K bytes of memory that accommodates up to 16 keyboard/display stations and up to four printers.
- Model 1018—A large cluster controller with up to 128K bytes of memory that accommodates up to 32 keyboard/display stations and up to 11 I/O subsystems.
- Model 1025—A large cluster controller with up to 128K bytes of memory that accommodates up to 32 keyboard/display stations and up to 23 I/O subsystems. The 1025 can be directly attached to an IBM System/360 or 370 computer system.

CRT DISPLAY: Both 9-inch and 15-inch (diagonal measurement) CRTs are available in the following standard display arrangements:

Characters/Display:	480	960	960	1920	1920
Lines/Display:	12	15	12	24	30
Characters/Line:	40	64	80	80	64

A character set of 64 ASCII symbols, including upper-case alphabetics, numerics, and special characters, is displayed in green against a dark background. An optional 96-character set of displayable symbols includes lower-case alphabetics. Characters are generated by a 7-by-7 dot matrix (for 64-character screens) or 7-by-9 dot matrix (for 80-character screens).

KEYBOARD: Two typewriter-style keyboards (both ASCII), one without and one with a numeric keyset, are available with the 2260 Emulator. A 69-key data entry and a 69- or 81-key typewriter keyboard are available with the 3270 Emulator. EBCDIC-only keyboards are provided with the Local 3270 Emulator; while EBCDIC or ASCII keyboards are available with the Remote 3270 Emulator. The 69-key format includes 2 Program Attention keys, and the 81-key format adds 12 Program Function keys. Appropriate keyboards are provided with the PARS/IPARS, Honeywell, and Univac emulators. A magnetic stripe reader may be added to the keyboard for security.

PRINTERS: Available serial printers are rated at 30, 50, 100, and 120 cps. Available line printers include the Dataproducts Model 2230, rated at 300 lpm, and Model 2260, rated at 600 lpm. Boarding pass and ticket printers are available for airline applications.

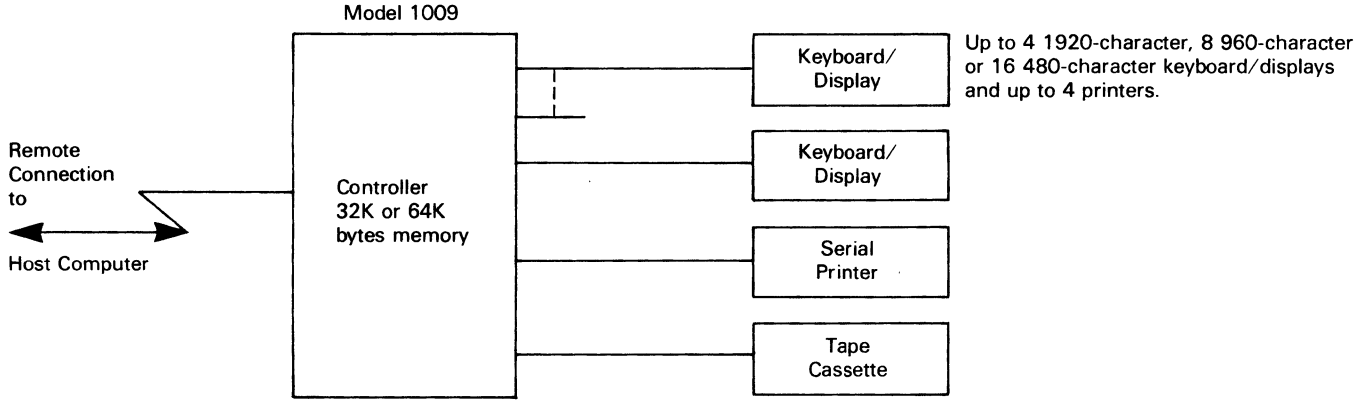
CARD READER: Reads 80-column cards punched in Hollerith or binary code at a rated speed of 300 cards/minute. Input hopper and output stacker capacities are 600 cards each.

CASSETTE TAPE RECORDER: Included with each PTS-100 for program loading. Records data on a "Philips-type" cassette, which contains 300 feet of 0.15-inch magnetic tape recorded at 800 bits/inch. Record length is variable, with 60 bytes/record minimum. Total cassette capacity is rated at 120,000 bytes for 80-byte records or 307,000 bytes for 960-byte records. Read/write and rewind tape speeds are 10 and 40 inches/second, respectively. Maximum rewind time is about 90 seconds.

PRICING

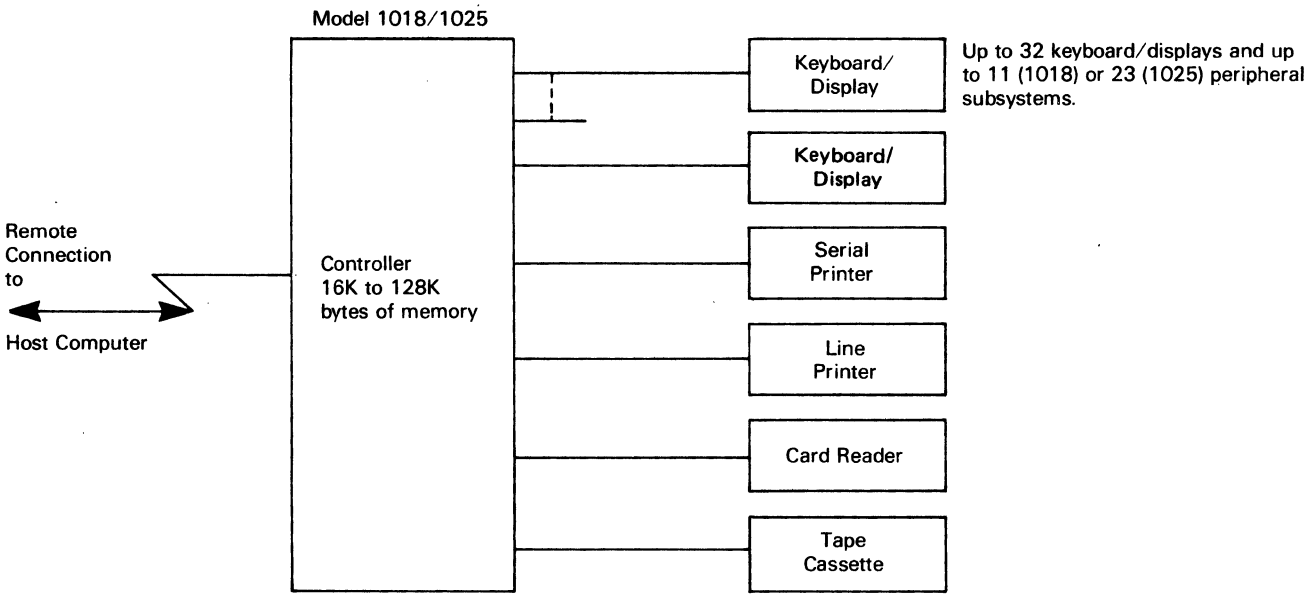
The Raytheon PTS-100 is available for purchase on a three- to five-year lease. Raytheon declined to supply complete pricing information, but furnished prices for several representative systems and auxiliary devices. All processor configurations include a cassette drive for program loading and system interfacing. Purchase prices include installation. Maintenance prices are for a one-year contract covering eight hours per day, five days per week.

Configuration



Raytheon PTS-100
Display Terminal System

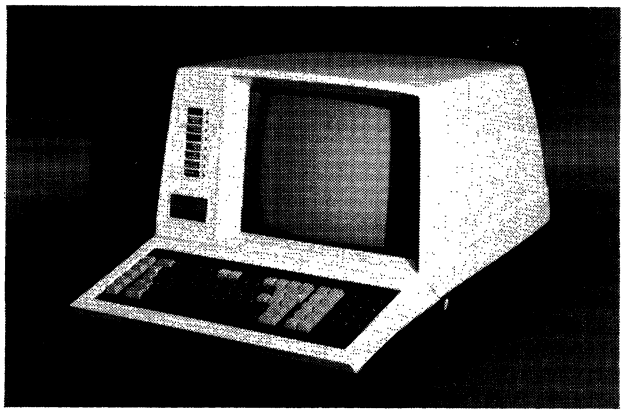
Configuration



			Monthly Charge* 3-Year Lease	Purchase	Monthly Maint.
➤	1001A	PARS/IPARS; 16K bytes, one display station	$ 188	$ 6,296	$ 47
	1009R	3270 Remote Emulation; 64K bytes, four 1920-character display stations	399	16,864	90
	1018R	3270 Remote Emulation; 48K bytes, 16 1920-character display stations	989	42,146	238
	1018R	3270 Remote Emulation; 96K bytes, 32 1920-character display stations	1,722	73,326	431
	1025L	3270 Local Emulation; 32K bytes, eight 1920-character display stations	749	33,524	195
	1025L	3270 Local Emulation; 96K bytes, 32 1920-character display stations	1,854	77,276	459
	3472	Printer; 150 cps	146	4,312	56
	3313-01	Printer; 300 lpm	286	11,155	130
	3316-01	Printer; 600 lpm	431	16,560	180
	3201	Card Reader; 300 cpm	173	6,670	32

*Includes prime-shift maintenance.■

Raytheon PTS-100 Display Terminal System



A PTS 100 system can include from 1 to 32 CRT display units, as well as a variety of auxiliary I/O devices. Display screen capacities of 480, 960, and 1920 characters are available.

A minicomputer-based family of display/keyboard terminals offered in clustered system configurations.

The system is a direct replacement for the IBM 3270 and 2260, Honeywell VIP 7700, and UNIVAC Uniscope 100 and 200 display terminals. Peripherals include printers, card readers, magnetic stripe readers, and tape cassette recorders.

Transmission can be synchronous or asynchronous in half- or full-duplex mode at speeds up to 9600 bps using ASCII or EBCDIC.

A two-display, IBM 3270 emulation system leases for $276 per month, including maintenance under a three-year lease.

A larger system with 32 displays, emulating the IBM 3270, leases for $2,005 per month, including maintenance under a three-year lease.

MANAGEMENT SUMMARY

The Raytheon PTS-100 is a minicomputer-based, clustered display terminal that operates under the direction of various Raytheon emulation programs. Raytheon offers the PTS-100 as a replacement for IBM's 3270 Information Display System (BSC and SDLC versions of both the 3271 and the 3274 controllers are supported) and 2260 Display Station in both local and remote environments, for Honeywell VIP 7700, and for Univac Uniscope 100 and 200 display terminals. A leading supplier of reservation and departure control systems to major airlines, Raytheon also offers the PTS-100 as an add-on or replacement terminal (also via software emulation) for IBM's 2948/2915 display terminals used in its PARS/IPARS airline reservation system.

The PTS-100 is available in clustered versions that accommodate up to 32 display units. Screen capacities include 480-, 960-, and 1920-character displays. Users can specify either of two display arrangements for the 960-, and 1920-character screen capacities when ordering the PTS-100.

System peripherals include serial and line printers and card readers. The terminal's peripheral-handling capability is determined by the number of multiplexer subchannels included. The basic terminal provides 4 or 7, while an expanded terminal provides as many as 23. Each subchannel can operate in either simplex or half-duplex mode and can handle one data stream at a time. Communications and low-speed I/O devices interface the multiplexer subchannels; the mini-computer's high-speed I/O bus can interface a host computer via a channel interface.

The PTS-100 was originally marketed as a user-programmable terminal system. Although some software is still available from Raytheon that can support user programming of the PTS-100, including two macro assemblers, an operating system, and a set of utility programs, Raytheon has stated that these tools are rarely used by their customers. The PTS-100 is currently marketed strictly as a replacement for the non-

CHARACTERISTICS

VENDOR: Raytheon Data Systems Company, Division of Raytheon Company, 1415 Boston-Providence Turnpike, Norwood, Massachusetts 02062. Telephone (617) 762-6700.

DATE OF ANNOUNCEMENT: May 1971.

DATE OF FIRST DELIVERY: October 1972.

NUMBER DELIVERED TO DATE: 50,000 systems with over 125,000 display stations.

SERVICED BY: Raytheon Data Systems Company.

MODELS

Four controller models are available, including one small, one medium, and two large cluster controllers.

- **Model 1001A—A small cluster controller with up to 16K bytes of memory that accommodates one to four keyboard/display stations and one or two printers. The 1001A is dedicated to the PARS/IPARS environment.**
- **Model 1009—A medium cluster controller with up to 64K bytes of memory that accommodates up to 16 keyboard/display stations and up to four printers.**
- **Model 1018—A large cluster controller with up to 128K bytes of memory that accommodates up to 32 keyboard/display stations and up to 11 I/O subsystems.**
- **Model 1025—A large cluster controller with up to 128K bytes of memory that accommodates up to 32 keyboard/display stations and up to 23 I/O subsystems. The 1025 can be directly attached to an IBM System/360 or 370 computer system.**

Raytheon PTS-100
Display Terminal System

programmable display terminals it emulates; if non-standard programs are required, Raytheon provides them on an RPQ basis. Users who need a programmable terminal system capability now should inquire about Raytheon's PTS-1200 system, which utilizes many of the same components as the PTS-100 and provides full distributed processing support. Users who may need a programmable capability in the future should consider the PTS-100 Model 1025 cluster controller, which is field-upgradeable to a PTS-1200 configuration.

Raytheon introduced the PTS-100 in May 1971, and production deliveries began during the last quarter of 1972. Raytheon currently has about 50,000 systems (125,000 displays) installed.

Service is provided by Raytheon Data Systems, with more than 100 service locations in the U.S. and abroad. Although Raytheon's newer PTS-2000 System, which was announced in April 1980, provides many of the same functions as the PTS-100 (except for the IPARS capability, which is available exclusively on the PTS-100), Raytheon plans to continue to support and upgrade the PTS-100 for at least another two years.

USER REACTION

Datapro conducted telephone interviews in March 1981 with 6 users of the Raytheon PTS-100, who reported on their experience with a total of over 300 units. The user ratings and written comments of a seventh user, who responded to our 1981 survey on alphanumeric display terminals but who could not be reached by telephone, are also included in the comments below; this user had a total of 500 units installed.

Two of the users had PTS-100 equipment in place at a dozen locations, while the remainder used the PTS-100 at one or two sites. The average configuration included a cluster controller with 11 display stations. Six of the seven users were using IBM emulators (five used the 3270 and one, the 2260) and one emulated the Univac Uniscope 100 and 200 terminals. The units had been installed for an average of over 2½ years. None of the users were doing any programming themselves, although one stated that he was beginning to do so. All of the users leased their terminals from Raytheon, although one said his firm had recently chosen to purchase any additional units needed. All maintenance was being performed by Raytheon.

These users' ratings were as follows:

	Excellent	Good	Fair	Poor	WA*
Overall performance	3	3	1	0	3.3
Ease of operation	2	5	0	0	3.3
Keyboard feel and usability	1	6	0	0	3.1
Manufacturer's software	2	3	0	1	3.0
Hardware reliability	4	2	1	0	3.4
Maintenace service	2	4	0	1	3.0
Technical support	2	3	1	1	2.9

*Weighted Average on a scale of 4.0 for Excellent.

The ratings, although somewhat lower than those compiled in Datapro's 1978 report on the PTS-100, remain indicative of satisfied users. Three of the users noted the price of the PTS-100 as their reason for choosing

CONFIGURATION

The basic PTS-100 System (all models) is built around a 16-bit minicomputer with 16K or 32K bytes of MOS semiconductor memory, expandable to 64K or 128K bytes in 16K- or 32K-byte increments. Memory size selected is a function of the emulator to be used and the number and type of peripherals to be configured. In addition to its complement of CRT display units, the system can include serial and line printers and card readers as peripheral devices. A magnetic tape cassette recorder is included with each controller for program loading.

The minicomputer features a bidirectional I/O bus with a maximum transfer rate of 1 million bytes/second. The I/O bus can support up to eight high-speed host processor channel interfaces and special user interfaces.

Low-speed I/O devices are attached via a multiplexer channel with a maximum transfer rate of 9600 bits/second. By means of an adapter, each of eight multiplexer subchannels can accommodate one peripheral device or communications interface operating in the half-duplex or simplex mode; full-duplex operation requires two subchannels. One multiplexer subchannel is dedicated to input from all keyboards associated with the attached display units, while a second is used for communications; therefore, six subchannels are available for external device usage. Model 1025 can accommodate 1 or 2 additional multiplexer channels to provide a total of 14 or 23 usable subchannels.

The PTS-100 System is designed for remote operation in a communications environment or for local operations as a computer peripheral subsystem for an IBM System/370 or System/360 via the computer's byte or block multiplexer or selector channel. The data transfer rate in this mode is 200,000 bytes/second.

The parameters of each of the models of the PTS-100 System are listed below:

Model	Memory Size, bytes	Multiplexer Subchannels	Maximum Display Units 1920 Char.	960 Char.	480 Char.
1001A	16K	4	—	4	—
1009	32K or 64K	4	4	8	16
1018	16K to 128K	7/11	32	32	32
1025*	16K to 128K	7/15/23	32	32	32

***Can accommodate one or two additional multiplexer channels up to a maximum of 23 subchannels.**

Display arrangements can be mixed on the same controller for Models 1018 and 1025.

TRANSMISSION SPECIFICATIONS

Synchronous or asynchronous in the half- or full-duplex mode. Four modem adapters are each designed to accommodate specific transmission codes and code levels, including 6-level, 6-unit code; 8-level, 8-unit code; and 10-level, 8-unit code. Each adapter provides an EIA Standard RS-232-C or CCITT V.24 modem interface and can operate at speeds up to 9600 bits/second. The adapter designed for 10-level, 8-unit code supplies its own clocking; however, clocking derived from an external modem must be applied to the other adapters.

DEVICE CONTROL

The nucleus of the PTS-100 is a display-oriented minicomputer that executes all terminal operations under program control. Keyboards are not connected to their corresponding display monitors; data keyed and data displayed are entirely controlled by the stored program. All peripheral devices are interrupt-driven, and, except for the displays, transfer data through the arithmetic-logic unit of the processor. Programs can be loaded locally from cassette tape, or remotely via the communications facility.

Raytheon PTS-100
Display Terminal System

it over similar units, and were satisfied with their choice. Reliability, durability, and the ability to quickly reconfigure the system were hailed as further advantages. As one user stated, "It amazes me how much of a beating these things can take from our users and still keep running."

Although all the users expressed satisfaction with the PTS-100 hardware, one user felt that the system required too much equipment to operate in a small grouping, and that the display was difficult to adjust.

We received mixed reactions from these users with regard to Raytheon's field and technical support. Although two of the users (located in two different regions) praised the field and technical support, three of the users were less than satisfied. "It's easy to get answers to problems on the phone, but they (Raytheon) are short sometimes as far as on-site support," one user reported. Two others expressed stronger discontent: one felt that technical support was a distinct disadvantage of the system, while the other felt that his firm would have purchased more hardware from Raytheon had their maintenance and field support been better. One former Raytheon user, who reported that he had recently replaced his Raytheon terminals with another vendor's equipment and who was therefore not included in the ratings and comments above, stated that although he was satisfied with the hardware itself, he bought other equipment because of the lack of local Raytheon support.

Upon examining a pre-publication copy of this report, Raytheon stated that the negative comments regarding field service reflect some isolated local service problems that have since been corrected.□

Communications compatibility is a function of the program loaded. Under Raytheon-supplied emulator programs, the PTS-100 can operate as a local or remote IBM 2260 Display Station, as a local or remote IBM 3270 Information Display System (BSC and SDLC versions of both the 3271 and 3274 controllers are supported), a Honeywell VIP 7700, a Univac Uniscope 100 or 200, or as an IBM PARS/IPARS airlines reservation terminal.

The 2260 and 3270 Remote Emulators operate at speeds up to 9600 bps in a point-to-point or multipoint arrangement. The 3270 emulator will not operate in the Transparent Text mode, although it can be used in a multipoint arrangement with IBM BSC terminals operating in the Transparency mode. The 3270 Emulator operates with either ASCII or EBCDIC transmission code. The PARS/IPARS Emulator transforms the PTS-100 into a replacement for the IBM 2946 or 2948 and is compatible with the IBM 1006 line control discipline.

COMPONENTS

CRT DISPLAY: Both 9-inch and 15-inch (diagonal measurement) CRTs are available in the following standard display arrangements:

Characters/Display:	480	960	960	1920	1920
Lines/Display:	12	15	12	24	30
Characters/Line:	40	64	80	80	64

A character set of 64 ASCII symbols, including upper-case alphabetics, numerics, and special characters, is displayed in green against a dark background. An optional 96-character set of displayable symbols includes lower-case alphabetics. Characters are generated by a 7-by-7 dot matrix (for 64-character screens) or 7-by-9 dot matrix (for 80-character screens).

KEYBOARD: Two typewriter-style keyboards (both ASCII), one without and one with a numeric keyset, are available with the 2260 Emulator. A 69-key data entry and a 69- or 81-key typewriter keyboard are available with the 3270 Emulator. EBCDIC-only keyboards are provided with the Local 3270 Emulator; while EBCDIC or ASCII keyboards are available with the Remote 3270 Emulator. The 69-key format includes 2 Program Attention keys, and the 81-key format adds 12 Program Function keys. Appropriate keyboards are provided with the PARS/IPARS, Honeywell, and Univac emulators. A magnetic stripe reader may be added to the keyboard for security.

PRINTERS: Available serial printers are rated at 30, 50, 100, and 120 cps. Available line printers include the Dataproducts Model 2230, rated at 300 lpm, and Model 2260, rated at 600 lpm. Boarding pass and ticket printers are available for airline applications.

CARD READER: Reads 80-column cards punched in Hollerith or binary code at a rated speed of 300 cards/minute. Input hopper and output stacker capacities are 600 cards each.

CASSETTE TAPE RECORDER: Included with each PTS-100 for program loading. Records data on a "Philips-type" cassette, which contains 300 feet of 0.15-inch magnetic tape recorded at 800 bits/inch. Record length is variable, with 60 bytes/record minimum. Total cassette capacity is rated at 120,000 bytes for 80-byte records or 307,000 bytes for 960-byte records. Read/write and rewind tape speeds are 10 and 40 inches/second, respectively. Maximum rewind time is about 90 seconds.

PRICING

The Raytheon PTS-100 is available for purchase on a two- to five-year lease. Raytheon declined to supply complete pricing information, but furnished prices for several representative systems and auxiliary devices. All processor configurations include a cassette drive for program loading and system interfacing. Purchase prices include installation. Maintenance prices are for a one-year contract covering eight hours per day, five days per week.

Raytheon PTS-100
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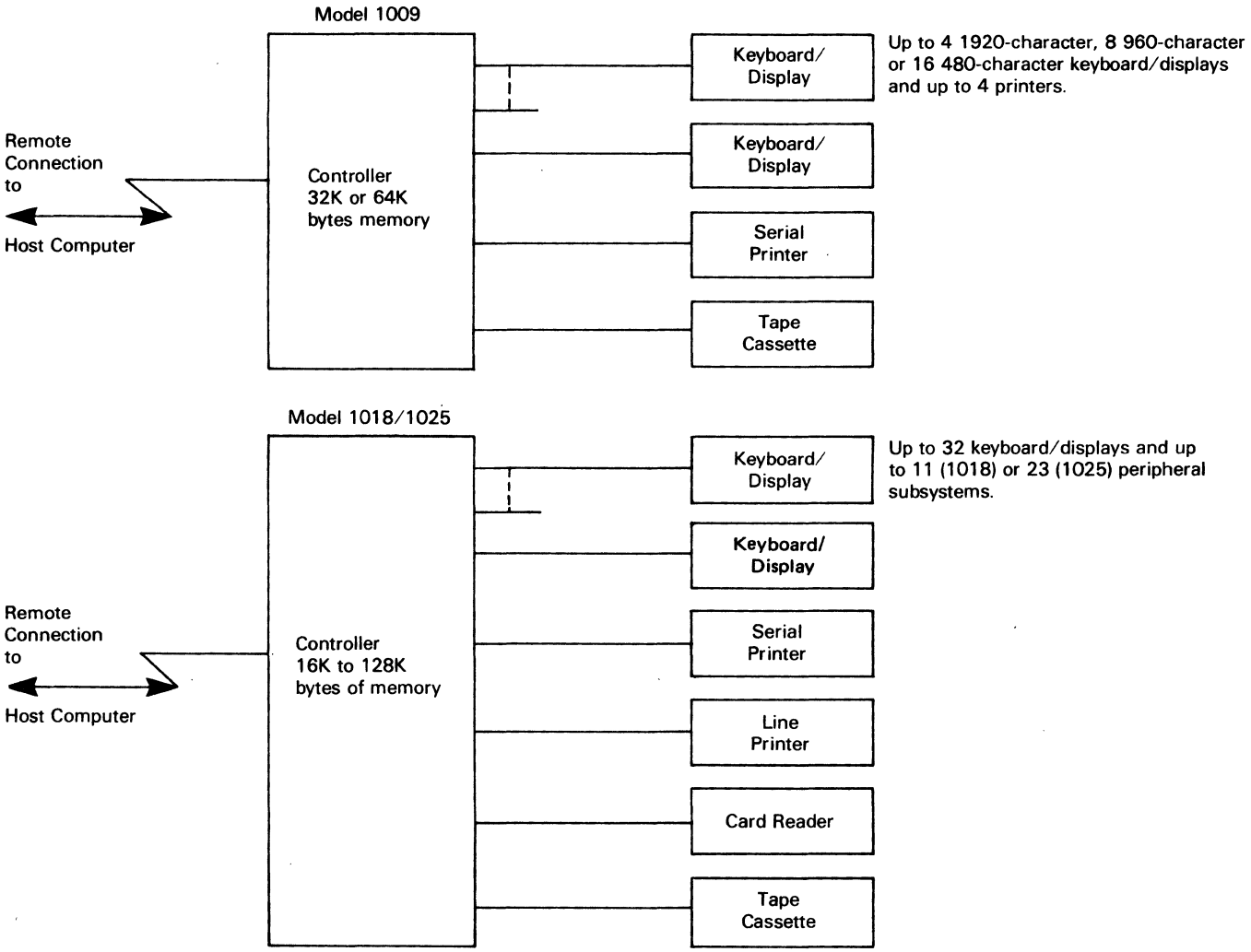
Configuration



		Monthly Charge*	Purchase	Monthly Maint.
1008R	3270 Remote Emulation; 16K bytes, one 960- or 1920-character display station	$ 205	$ 8,860	$ 46
1008R	3270 Remote Emulation; 32K bytes, two 1920-character display stations	276	11,755	62
1008R	3270 Remote Emulation; 32K bytes, eight 960- or 1920-character display station	594	25,135	134
1018R	3270 Remote Emulation; 48K bytes, 16 1920-character display stations	1,100	47,650	254
1018R	3270 Remote Emulation; 96K bytes, 32 1920-character display stations	2,005	84,585	464
1025L	3270 Local Emulation; 32K bytes, eight 1920-character display stations	$ 784	$34,160	$203
1025L	3270 Local Emulation; 96K bytes, 32 1920-character display stations	2,158	91,570	515
3472	Printer; 120 cps	128	3,750	50
3301	Printer; 300 lpm	371	12,800	91
3306	Printer; 600 lpm	532	23,489	115
3201	Card Reader; 300 cpm	105	4,250	29

*For 3-year lease, including prime-shift maintenance.■

Raytheon PTS-2000 Information Display System

MANAGEMENT SUMMARY

Raytheon Data Systems' PTS-2000 Series is designed to be a replacement for, or alternative to, the IBM 3270 family. The first components of the system were introduced domestically in April 1980. A number of planned enhancements have since been implemented, including the introduction of new controller models, printer models, and a color display.

The PTS-2000 family offers a small cluster system supporting up to eight devices and emulating the IBM 3276 communications protocol, and large cluster systems supporting up to 32 devices and emulating IBM 3272 or 3274 communications protocols. Both Binary Synchronous Communications (BSC) and Synchronous Data Link Control (SDLC) are supported. A recent enhancement to the PTS-2000 system added two new local control units, which operate in IBM 3274 and IBM 3272 emulation mode, respectively, and feature support of up to 32 devices over a local channel.

The PTS-2000 controllers contain built-in diagnostics, up to two 32K byte memory modules, and a minifloppy diskette drive. The minifloppy diskette drive has 70K bytes of formatted data storage, and serves as the program load device and software distribution medium. Originally, data transmission to and from the host at speeds up to 7200 bps was accommodated; 9600 bps capability has since been added.

An expansion capability allows the PTS-2000 system to be field-upgraded from 3276-mode to 3274-mode by adding a converter to the existing PTS-2000 controller, and loading a 3274-mode software diskette. The user need not replace installed equipment or cabling.

The PTS-2000 system's display stations are intended as replacements for the IBM 3278 display. Screen capacities of 960, 1920, 2560 and 3440 characters are supported, and are operator selectable through the keyboard. Any

A family of microprocessor-controlled display stations, controllers, and printers offering plug-compatibility with second generation IBM 3270 components.

The PTS-2000 Series configurations range from a small cluster of 8 devices in an IBM 3276-type network, to a large cluster of 32 devices in an IBM 3272 or 3274-type network. The PTS-2000 display terminal features a 15" diagonal screen which can accommodate 960, 1920, 2560, or 3440 characters. A color display is also available. Typewriter or data entry style keyboards with 87 keys can be selected. The small cluster control unit supports up to 8 devices; the large cluster control units provide support for up to 32 devices. The controllers can support either SNA/SDLC or BSC modes of operation. An installed small cluster system may be field-upgraded to the large cluster system by adding a converter unit to the small cluster control unit.

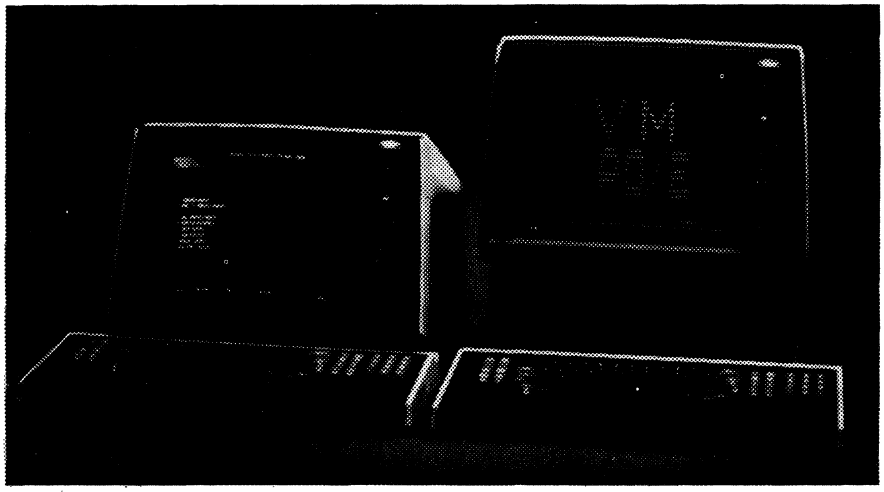
A typical small cluster system, consisting of six display stations with keyboards two printers, and a 3276-mode controller operating under SDLC or BSC protocol, sells for $29,710, on a two-year lease, the monthly cost is $1,020, including maintenance.

CHARACTERISTICS

VENDOR: Raytheon Data Systems Company, Division of Raytheon Company, 1415 Boston-Providence Turnpike, Norwood, MA 02062. Telephone (617) 762-6700.

DATE OF ANNOUNCEMENT: April 1980.

DATE OF FIRST DELIVERY: April 1980.



Raytheon's PTS-2000 Information Display System is a plug-compatible alternative to the IBM 3270 second generation components, including the 3274 Control Unit and the 3278 and 3279 Displays. The PTS-2000 is available in small or large cluster, remote or local configurations, and can operate using either BSC or SDLC line protocol. The monochrome displays (pictured here) feature screen capacities ranging from 960 to 3440 characters. Raytheon has also introduced a color display for use with the PTS-2000 system.

Raytheon PTS-2000 Information Display System

combination of the four sizes can be mixed within a single PTS-2000 system. The units feature a 15-inch video display monitor, with characters displayed in green on a dark background. Each terminal also contains both RAM and ROM, enabling it to execute some software functions previously manageable only by controller units. Also supported are attributes such as dual intensity, protected, blanked, and numeric only fields. Available options include a selector light pen and a cursor position indicator.

Raytheon has also added a color display terminal to the PTS-2000 product line. The display is intended as a replacement for the IBM 3279 Models 2A and 3A. Screen capacities of 960, 1920 and 2560 characters are standard, and the unit can operate in two-color (white and green) or four color (white, green, red, and blue) mode.

A variety of keyboards are available for use with the display units. All keyboards are detached and connected to the display via a four-foot cable. Keyboards are available in either typewriter or data entry style, in an 87-key configuration. Raytheon has also added a special "human factors" keyboard to its line; this special keyboard reduces the need for the operator to depress the ALT key simultaneously with other keys to activate alternate functions. The keyboard is intended for handicapped operators who cannot depress two keys at once, and is also convenient for operators who frequently use the ALT key. All keyboards offered by Raytheon for use with the PTS-2000 are microprogrammable; alphanumeric, function, and cursor control key arrays are separated by dividers to prevent accidental depression of control keys. N-key rollover and a palm rest feature are also standard.

Raytheon also makes a variety of printers available for use with the PTS-2000 system. Printer models include: a 180-cps dot matrix character printer; a 120-cps dot matrix screen printer; and 300- and 600-lpm impact line printers.

Options which have been added recently to the PTS-2000 product line include two performance monitors — the Response Time Monitor for the display terminals, and the Printer Performance Monitor for the 180-cps character printer. These performance monitors collect data on display response times and printer workload, provide for retrieval of data by the host, permit or forbid operator access to display statistics, and permit easy identification of traffic overload situations and excessive host processing times. Options scheduled for availability later this year include a letter-quality printer and a local format storage option.

Raytheon has announced its intent to have the PTS-2000 family form the foundation of the company's information processing product line for the 1980s. Future anticipated expansions include network functions such as combined word and data processing, common data bases of varying capacities, specialized terminals and communications protocols, and message-switching, data concentration, and protocol translation tasks.

NUMBER DELIVERED TO DATE: Over 2500 display units.

SERVICED BY: Raytheon.

CONFIGURATION

The PTS-2000 is currently available in three configurations. The first, a remote small cluster system, offers support of eight devices, either displays, printers, or both, in an IBM 3276-type network. The small cluster system can be field up-graded to a large cluster system, offering support of 32 devices in an IBM 3274-type network. The field upgrade is accomplished by adding a converter to the already-installed PTS-2000 controller, and loading a 3274-mode software diskette. For new systems, a remote large cluster controller is available. A third configuration provides a local large cluster system, in an IBM 3274- or 3272-type network.

TRANSMISSION SPECIFICATIONS

The PTS-2000 system supports synchronous communications using IBM's Binary Synchronous Communications (BSC) or Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC), at line speeds up to 9600 bps. One modem adapter with external clocking is provided; a second modem adapter is available optionally. An RS-232-C modem interface is standard. Both ASCII and EBCDIC codes are accommodated.

DEVICE CONTROL

All components of the PTS-2000 system feature microprocessor-based electronics. The control unit contains up to two 32K-byte memory modules, plus a minifloppy diskette drive with 70K bytes of formatted data storage. Each terminal also contains its own memory: up to 32K bytes of RAM and 8K bytes of ROM.

The minifloppy diskette drive contained in the controller serves as the program load device and software distribution medium. Individual microprocessors within the keyboards and displays distribute the processing load internally. The display format is controlled and defined by the system's software. Included in the display format are display attributes and screen editing capabilities.

The cursor is operator-selectable as either a solid block or underline, blinking or non-blinking. Control keys enable the cursor to be moved up, down, left or right for data entry, modification, or deletion. Information may be entered or deleted, or characters can be moved, at the location signaled by the cursor.

Raytheon makes available, as options, performance monitors for the system's display terminals and for the 180-cps character printer. The Response Time Monitor collects statistics during the normal operation of the display, including: average and longest response times; response time of last transaction; number of response times greater than x; number of transactions sent to host and number of messages received from host; and average sizes of transactions sent and messages received. The Printer Performance Monitor collects statistics during the normal operation of the R2187 Printer, including: total number of lines and pages printed; number of host-initiated messages printed; average host message size; largest host message; number of operator-initiated local prints; and average and longest times between print operations.

DIAGNOSTICS

Diagnostic programs exist in the control unit at four levels: power on, start up, on-line, and off-line. Self-test is performed at power on. The results of diagnostic tests, as well as the

Raytheon PTS-2000 Information Display System

> Datapro received an insufficient number of responses on the PTS-2000 system in the 1982 display terminal survey, and Raytheon declined to provide us with user names, therefore, no User Reaction section is included in this report.□

status of the controller's circuits, are identified by LEDs located on the front panel of the controller. Those that monitor the critical functions of the system are visible without removing the front cover of the control unit. During system interaction, status is also displayed on the terminal screen during system interaction.

In the system's display station, self-test diagnostics and non-application dependent programs reside in ROM. Each display and keyboard is designed for self-test prior to the system's installation; this is accomplished by plugging the units into a standard AC outlet, and testing the keyboard, verifying the operation of the display screen, and implementing a number of other diagnostic procedures. All keyboard and display functions can be tested as part of the system or as stand-alone devices. Host interaction is not required to test the display station.

COMPONENTS

R2076 REMOTE CONTROL UNIT: A small cluster controller which can support up to eight devices, in an IBM 3276-type network. The unit contains built-in diagnostics and self-test features. Up to two 32K-byte memory modules are included. An internal minifloppy diskette drive, with 70K bytes of formatted storage, acts as the program load and software distribution medium. Removable panels provide access to all internal components.

R2074 REMOTE CONTROL UNIT: A large cluster controller which can support up to 32 devices, in an IBM 3274-type network. Built-in diagnostics and self-test features are included, as are up to two 32K-byte memory modules. An internal mini-floppy diskette drive, with 70K bytes of formatted storage, acts as the program load and software distribution medium. Removable panels provide access to all internal components.

R2064 CONVERTER: The R2076 small cluster controller can be field-upgraded to the large cluster configuration through the addition of the R2064 converter unit. The converter allows the user to upgrade his/her PTS-2000 system to meet added requirements without replacing existing equipment.

R2074-LA and R2074-LD LOCAL CONTROL UNITS: Large cluster controllers which can support up to 32 devices, in an IBM 3272- or 3274-type network. The R2074-LA is functionally equivalent to the IBM 3274-1A (SNA) Control Unit; the R2074-LD is functionally equivalent to the IBM 3274-1D (3272 extended) and 3274-1B (3272 emulation) Control Units, which use non-SNA local channel attachment discipline. Both units contain built-in diagnostic and self-test features. The units consist of a central processing unit, a diskette-based program load device, a channel interface unit, and one or two device adapters.

R2078-2 and R2078-4 DISPLAY TERMINALS: The display is microprocessor-based, and contains its own memory—16K bytes of RAM and 8K bytes of ROM—for the execution of software functions previously manageable only by controller units. The unit features a 15" diagonal, non-glare display screen. Model R2078-2 features screen capacities of 960 (12 lines by 80 columns), 1920 (24 lines by 80 columns) and 2560 characters (32 lines by 80 columns) using BSC protocol, and 960 and 1920 characters utilizing SNA/SDLC. Model R2078-4 features screen capacities of 960, 1920, 2560 and 3440 (43 lines by 80 columns) characters, using either BSC or SNA/SDLC. Characters on both models are formed utilizing a 13 x 14 dot matrix, and are displayed in green (P31 phosphor) on a dark background. A status line appears on the screen's last displayable row.

Display attributes include dual intensity, protected, blanked, light pen detectable, and numeric only fields. Display adjustments, located on the terminal's front panel, include high/low brightness, power on, mono/dual case, and test control knobs. Available options include light pens and cursor position indicators.

R2079 COLOR DISPLAY TERMINAL: A microprocessor-based display terminal which is functionally equivalent to the IBM 3279 Models 2A and 3A. Data fields may be displayed in two or four colors. In two-color mode, protect and intensify attributes are displayed in white and green; in four-color mode, protect and intensify attributes are displayed in white, green, red, and blue. The terminal's base color switch defines the color mode. Screen capacities of 960 (12 lines by 80 columns), 1920 (24 lines by 80 columns), and 2560 (32 lines by 80 columns) characters are standard. The R2079 may be mixed with the R2078 monochrome display in both small and large cluster systems.

KEYBOARDS: Three styles of keyboards are currently available. They include an 87-key typewriter-style keyboard (R2606-1), an 87-key data entry-style keyboard (R2606-2), and a "Human Factors" keyboard (R2606-11). Typewriter-style models are available for either ASCII or EBCDIC codes. The keyboards are movable, and attached to the display via a four-foot cable. The keyboard layout styles may be mixed, in any combination, within the PTS-2000 system.

Each keyboard contains groups of alphanumeric, cursor control, and function keys, separated into sections by dividers to prevent accidental depression of control keys. Features included on all models are: N-key rollover; automatic repeat action on specific keys; audible tone; audible key click; and a palm rest. A security key lock is optional.

The "Human Factors" keyboard reduces the need to depress the ALT key simultaneously with other keys to activate alternate functions. This keyboard was designed as a convenience for operators who frequently activate ALT functions; it is essential for handicapped operators who cannot depress two keys at once.

R2185-2 SCREEN PRINTER: A table-top, microprocessor-based dot matrix printer that attaches directly to an R2078 or R2079 Display Terminal. The unit is used to produce hard copies of on-screen material, with printing initiated by the operator. The unit prints bidirectionally at a print rate of 120 characters per second. Characters are formed via a 9-by-9 dot matrix. The R2185-2 normally uses roll paper, but can also accept fanfold or cut sheets. Print format is up to 80 characters per line, at 10 characters per inch. Vertical spacing is 6 lines per inch. Spool ribbon is utilized. A 96-character ASCII set is standard.

R2187 CHARACTER PRINTER: A table-top microprocessor-based dot matrix character printer. The unit features logic seeking, bidirectional printing at a print rate of 180 characters per second. Up to six-part forms can be accommodated. Operator controls include setting forms length, line spacing, and maximum line width. Print format is up to 132 characters per line, at 10 characters per inch. Characters, are formed via a 7-by-9 dot matrix. Vertical spacing is switch-selectable at either 6 or 8 lines per inch. The unit utilizes a cartridge ribbon with a Mobius loop. An optional printer stand with forms basket is available. A 64-character EBCDIC set is standard.

R2189-3 and R2189-6 LINE PRINTERS: Impact line printers that operate at speeds of 300 (R2189-3) or 600

Raytheon PTS-2000 Information Display System

(R2189-6) lines per minute. The print format is 132 characters per line, at 10 characters per inch. Vertical spacing is switch- or software-selectable at 6 or 8 lines per inch. Fanfold forms from 4 to 16 inches wide, or up to six-part forms may be accommodated. Characters are formed utilizing a 9-by-9 dot matrix. Both models utilize an electronic print mechanism comprised of spring leaf hammers and associated coils mounted to a hammer bank. A full 108-character set is standard, with both ASCII and EBDIC character sets; the controller's protocol determines which of the character sets is used.

PRICING

The Raytheon PTS-2000 system is available for purchase, or on a one-, two-, or three-year lease (through Raytheon's leasing company). Maintenance prices are for a one-year contract, covering eight hours per day, five days per week. Volume discounts are available to customers who purchase equipment under volume order agreements (with certain restrictions).

		Monthly Charge*				
		1-year Lease	2-year Lease	3-year Lease	Purchase	Monthly Maint.
R2076	Small Cluster Controller (Remote)	$139	$116	$102	$2,900	$22
R2074	Large Cluster Controller (Remote)	333	258	229	7,000	60
R2064	Converter	194	142	127	4,200	38
R2074-LA	Large Cluster Controller (Local-SNA)	604	475	430	13,490	97
R2074-LD	Large Cluster Controller (Local-3272)	604	475	430	13,490	97
R2078-2	Display	74	61	55	1,775	11
R2078-4	Display	92	75	67	2,450	12
R2079	Color Display	126	99	89	3,035	21
R2606-1	87-Key Typewriter Keyboard	12	9	8	285	2
R2606-2	87-Key Data entry Keyboard	12	9	8	285	2
R2606-11	Human Factors Keyboard	14	11	10	365	2
R2185-2	Screen Printer	96	78	70	1,850	28
R2187	Character Printer	240	200	179	5,200	52
R2189-3	Line Printer	400	353	322	9,100	130
R2189-6	Line Printer	560	485	453	13,000	180
F2782	Performance Monitor	7	6	6	210	1
R2079/80	Light Pen and Adapter	22	19	17	510	5

*Includes prime-shift maintenance. ■

Raytheon PTS-2000 Information Display System

MANAGEMENT SUMMARY

Raytheon Data Systems' PTS-2000 Series is designed to be a replacement for, or alternative to, the IBM 3270 family. The first components of the system were introduced domestically in April 1980; the initial testing and introduction of the system had taken place in Germany a year earlier. Along with the PTS-2000's domestic introduction, Raytheon also announced future plans for the expansion and enhancement of the system. A number of these planned enhancements have since been implemented.

The first member of the PTS-2000 family is a small cluster system offering support of up to eight devices, and emulating the IBM 3276 communications protocol. The initial offering featured communications under Binary Synchronous Communications (BSC) protocol; shortly thereafter, the capability to operate under IBM's Systems Network Architecture (SNA) utilizing Synchronous Data Link Control (SDLC) was added.

A significant enhancement to the system occurred in October 1980 when Raytheon introduced an expansion capability permitting the PTS-2000 to support up to 32 devices in an IBM 3274-type large cluster system. This expansion capability allows the user to field upgrade his PTS-2000 system from 3276-mode to 3274-mode by adding a converter to his existing PTS-2000 controller, and loading a 3274-mode software diskette. The user need not replace installed equipment or cabling.

A family of microprocessor-controlled display stations, controllers, and printers offering plug-compatibility with IBM 3276 and 3274 display systems.

The PTS-2000 Series can be field-upgraded from a small cluster of 8 devices in an IBM 3276-type network, to a large cluster of 32 devices in an IBM 3274-type network. The PTS-2000 display terminal features a 15" diagonal screen which can accommodate 960, 1920, 2560, or 3440 characters. Typewriter or data entry style keyboards with 87 keys can be selected. The system's printer is a 120 cps bidirectional dot matrix unit. The small cluster control unit supports up to 8 devices; the large cluster control unit provides support for up to 32 devices. An installed small cluster system may be upgraded to the large cluster system by adding a converter unit to the small cluster control unit.

A typical IBM 3276-type small cluster system, consisting of six display stations, two printers, and a 3276-mode controller operating under SDLC or BSC protocol, sells for $26,360; on a two-year lease, the monthly cost is $859, including maintenance.

Raytheon's PTS-2000 Information Display System is shown here operating as a small cluster system emulating IBM's 3276 communications protocol. The PTS-2000 will perform all of the most common business functions, including data entry, inquiry and response, and distributed processing tasks. The user may field-upgrade his existing small cluster system to a large cluster system emulating IBM 3274 communications protocol.

Raytheon PTS-2000 Information Display System

The PTS-2000 system's display station is intended as a replacement for the IBM 3278 display. The unit was originally introduced with screen capacities of 960, 1920, and 2560 characters; a 3440-character screen capacity has since been added. Screen capacities are operator selectable through the keyboard, and any combination of the four sizes can be mixed within a single PTS-2000 system. The unit features a 15" video display monitor, with characters displayed in green on a dark background. Characters are generated utilizing a 13 x 14 dot matrix. Each terminal also contains both RAM and ROM, enabling it to execute some software functions previously manageable only by controller units. Also supported are attributes such as dual intensity, protected, blanked, and numeric only fields. Available options include a selector light pen and a cursor position indicator.

A variety of keyboards are available for use with the display unit. All keyboards are detached and connected to the display via a four-foot cable. Keyboards are available in either typewriter or data entry style, in an 87-key configuration. Raytheon has also added a special "human factors" keyboard to its line; this special keyboard reduces the need for the operator to depress the ALT key simultaneously with other keys to activate alternate functions. The keyboard is intended for handicapped operators who cannot depress two keys at once, and is also convenient for operators who frequently use the ALT key. All keyboards offered by Raytheon for use with the PTS-2000 are microprogrammable; alphanumeric, function, and cursor control key arrays are separated by dividers to prevent accidental depression of control keys. N-key rollover and a palm rest feature are also standard.

A 180 cps dot matrix character printer is provided for use with the PTS-2000 system. The microprocessor-based unit prints bidirectionally, is logic seeking, and requires no special software. As with the display unit, the printer units are connected to the PTS-2000 controller via coaxial cable. The use of coaxial cable allows the user to replace older units with the PTS-2000 units without rewiring. The coaxial cable also permits terminals or printers to be remoted up to 5000 feet from the controller.

The PTS-2000 controllers contain built-in diagnostics, up to two 32K byte memory modules, and a minifloppy diskette drive. The minifloppy diskette drive has 70K bytes of formatted data storage, and serves as the program load device and software distribution medium. Originally, data transmission to and from the host at speeds up to 7200 bps was accommodated; 9600 bps capability has since been added. The basic small cluster control unit supports attachment of up to eight devices—a converter and software diskette are required to accomplish the upgrade to 32 devices. For new systems, a large cluster controller is available.

Raytheon has announced its intent to have the PTS-2000 family form the foundation of the company's informa-

CHARACTERISTICS

VENDOR: Raytheon Data Systems Company, Division of Raytheon Company, 1415 Boston-Providence Turnpike, Norwood, MA 02062. Telephone (617) 762-6700.

DATE OF ANNOUNCEMENT: April 1980.

DATE OF FIRST DELIVERY: April 1980.

NUMBER DELIVERED TO DATE: 2500 display units.

SERVICED BY: Raytheon.

CONFIGURATION

The PTS-2000 is currently available in two configurations. The first, a small cluster system, offers support of eight devices, either displays, printers, or both, in an IBM 3276-type network. The small cluster system can be field upgraded to a large cluster system, offering support of 32 devices in an IBM 3274-type network. The field upgrade is accomplished by adding a converter to the already-installed PTS-2000 controller, and loading a 3274-mode software diskette. For new systems, a large cluster controller is available.

TRANSMISSION SPECIFICATIONS

The PTS-2000 system supports synchronous communications using IBM's Binary Synchronous Communications (BSC) or Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC), at line speeds up to 9600 bps. One modem adapter with external clocking is provided; a second modem adapter is available optionally. An RS-232-C modem interface is standard. Both ASCII and EBCDIC codes are accommodated.

DEVICE CONTROL

All components of the PTS-2000 system feature microprocessor-based electronics. The control unit contains up to two 32K-byte memory modules, plus a minifloppy diskette drive with 70K bytes of formatted data storage. Each terminal also contains its own memory: up to 32K bytes of RAM and 8K bytes of ROM.

The minifloppy diskette drive contained in the controller serves as the program load device and software distribution medium. Individual microprocessors within the keyboards and displays distribute the processing load internally. The display format is controlled and defined by the system's software. Included in the display format are display attributes and screen editing capabilities.

The cursor is operator-selectable as either a solid block or underline, blinking or non-blinking. Control keys enable the cursor to be moved up, down, left, or right for data entry, modification, or deletion. Information may be entered or deleted, or characters can be moved, at the location signaled by the cursor.

DIAGNOSTICS

Diagnostic programs exist in the control unit at four levels: power on, start up, on-line, and off-line. Self-test is performed at power on. The results of diagnostic tests, as well as the status of the controller's circuits, are identified by LEDs located on the front panel of the controller. Those that monitor the critical functions of the system are visible without removing the front cover of the control unit. During system interaction, status is also displayed on the terminal screen during system interaction.

Raytheon PTS-2000 Information Display System

tion processing product line for the 1980's. Future anticipated expansions include network functions such as combined word and data processing, common data bases of varying capacities, specialized terminals and communications protocols, and message-switching, data concentration, and protocol translation tasks.□

In the system's display station, self-test diagnostics and non-application dependent programs reside in ROM. Each display and keyboard is designed for self-test prior to the system's installation; this is accomplished by plugging the units into a standard AC outlet, and testing the keyboard, verifying the operation of the display screen, and implementing a number of other diagnostic procedures. All keyboard and display functions can be tested as part of the system or as stand-alone devices. Host interaction is not required to test the display station.

COMPONENTS

R2076 CONTROLLER: A small cluster controller which can support up to eight devices, in an IBM 3276-type network. The unit contains built-in diagnostics and self-test feaures. Up to two 32K-byte memory modules are included. An internal minifloppy diskette drive, with 70K bytes of formatted storage, acts as the program load and software distribution medium. Removable panels provide access to all internal components.

R2074 CONTROLLER: A large cluster controller which can support up to 32 devices, in an IBM 3274-type network. Built-in diagnostics and self-test features are included, as are up to two 32K-byte memory modules. An internal minifloppy diskette drive, with 70K byes of formatted storage, acts as the program load and software distribution medium. Removable panels provide access to all internal components.

R2064 CONVERTER: The R2076 small cluster controller can be field-upgraded to the large cluster configuration through the addition of the R2064 converter unit. The converter allows the user to upgrade his PTS-2000 system to meet added requirements without replacing existing equipment.

R2078 CRT DISPLAY: The system's alphanumeric display is microprocessor-based, and contains its own memory—16K bytes of RAM and 8K bytes of ROM—for the execution of software functions previously manageable only by controller units. The unit features a 15" diagonal, nonglare display screen. Two models are available: the R2078-2 and R2078-4. Model R2078-2 features screen capacities of 960 (12 lines by 80 columns), 1920 (24 lines by 80 columns) and 2560 characters (32 lines by 80 columns) using BSC protocol, and 960 and 1920 characters utilizing SNA/SDLC. Model R2078-4 features screen capacities of 960, 1920, 2560, and 3440 (43 lines by 80 columns) characters using either BSC or SNA/SDLC. Characters on both models are formed utilizing a 13 x 14 dot matrix, and are displayed in green (P31 phosphor) on a dark background. A status line appears on the screen's last displayable row.

Display attributes include dual intensity, protected, blanked, light pen detectable, and numeric only fields. Display adjustments, located on the terminal's front panel, include high/low brightness, power on, mono/dual case, and test control knobs. Available options include light pens and cursor position indicators.

KEYBOARDS: Three styles of keyboards are currently available. They include an 87-key typewriter-style keyboard, an 87-key data entry-style keyboard, and a "Human Factors" keyboard. Typewriter-style models are available for either ASCII or EBCDIC codes. The keyboards are movable, and attached to the display via a four-foot cable. The keyboard layout styles may be mixed, in any combination, within the PTS-2000 system.

Each keyboard contains groups of alphanumeric, cursor control, and function keys, separated into sections by dividers to prevent accidental depression of control keys. Features included on all models are: N-key rollover; automatic repeat action on specific keys; audible tone; audible key click; and a palm rest. A security key lock is optional.

The "Human Factors" keyboard reduces the need to depress the ALT key simultaneously with other keys to activate alternate functions. This keyboard was designed as a convenience for operators who frequently activate ALT functions; it is essential for handicapped operators who cannot depress two keys at once.

R2187 PRINTER: A table-top microprocessor-based dot matrix character printer. The unit features logic seeking, bidirectional printing at a print rate of 180 characters per second. Up to six-part forms can be accommodated. Operator controls include setting forms length, line spacing, and maximum line width. Print format is up to 132 characters per line, at 10 characters per inch. Vertical spacing is switch-selectable at either 6 or 8 lines per inch. The unit utilizes a cartridge ribbon with a Mobius loop. An optional printer stand with forms basket is available.

PRICING

The Raytheon PTS-2000 system is available for purchase, or on a one-, two-, or three-year lease. Maintenance prices are for a one-year contract, covering eight hours per day, five days per week.

		Monthly Charge*				
		1-year Lease	2-year Lease	3-year Lease	Purchase	Monthly Maint.
R2076	Small Cluster Controller	$115	$ 95	$ 84	$2,850	$22
R2074	Large Cluster Controller	251	194	173	6,320	60
R2064	Converter	136	99	89	3,470	38
R2078-2	Display	69	56	50	1,815	10
R2078-4	Display	81	66	59	2,390	11
	87-Key Typewriter Keyboard	11	8	7	280	2
	87-Key Data entry Keyboard	11	8	7	280	2
	Human Factors Keyboard	13	10	9	360	2
R2187	Printer	228	190	170	5,470	52

*Includes prime-shift maintenance.■