

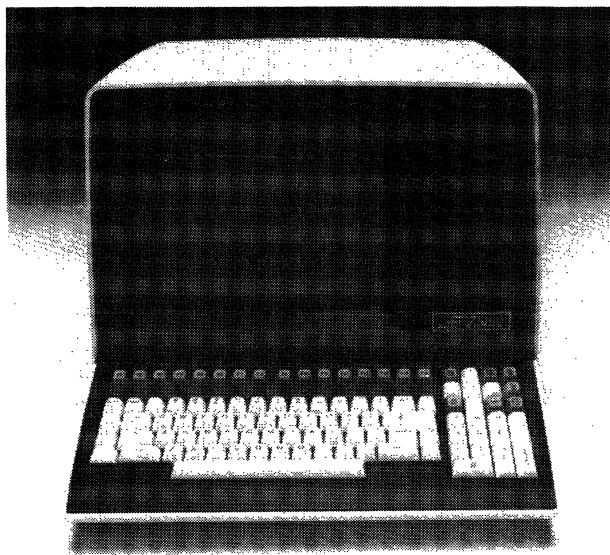
# Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

Alphanumeric display terminals represent one of the most dynamic areas of the computer industry. Highly visible to the general public, they are associated with convenience, speed, and glamour. Pressure to install display terminals also comes from the growing emphasis by the major computer companies on integrated computing/communications networks. Because of the broad range of prices and capabilities and the high level of marketing activity, it is important that, as a prospective buyer, you see beyond the aura that surrounds display terminals and consider the facts. The practical information presented in this report, such as equipment specifications, cost, reliability, and vendor support, is designed to guide you in making informed decisions.

## General Categories

All the terminals covered in this report have three features in common: 1) each has a keyboard that can generate and a monitor that can display a full alphanumeric character/code set; 2) each has the capability to send and receive data via communications lines to a remote host computer; and 3) each is marketed for general-purpose usage in the United States and Canada and is identified as a distinct product to end users.

Display terminals fall into one of three general categories: dumb, smart, and user-programmable. This report concerns itself with dumb and smart terminals, according to Datapro's definitions. User-programmable terminals have



Known for manufacturing sophisticated intelligent display terminals, Zentec entered the field of low-price smart display terminals with the introduction of the Zephyr in late 1979. The Zephyr can display 2000 characters, arranged in 25 lines of 80 characters each, and can transmit data in character, line, or block format at speeds from 110 up to 19,200 bps. The Zephyr also features a 128 ASCII character code, two pages of text storage, 16 program function keys, and an optional printer port. The single-unit price for the Zentec Zephyr is \$1,350, but OEM discounts are available.

**A complete overview of general-purpose, non-user-programmable, alphanumeric display terminals—including display terminal characteristics, market perspectives, a summary of user experience with over 18,000 installed units, buying guidance, and comparison charts of 210 commercially available terminals from 68 vendors.**

been placed into a distinct and separate section (C21) because of their sophistication, features, and price. Naturally, there is some overlap between dumb, smart, and user-programmable terminals. The definitions of these categories are given as follows:

*Dumb* terminals offer a limited number of functions; most feature Teletype compatibility.

*Smart* terminals offer extended functions, such as editing and formatted data entry. In some cases, the user can tailor the terminal to fit his own application via a limited degree of programming, such as format creation and parameter definition.

*User-programmable* terminals feature software support. The vendor typically provides an operating system, an assembler- or compiler-driven programming language, subroutines, I/O utilities, one or more protocol emulators, and one or two application programs, such as data entry and text editing.

For more information on user-programmable terminals, see report number C21-010-101, entitled "User-Programmable Terminals—Basic Characteristics."

We have not identified a separate category of "intelligent" terminals because the industry does not exhibit a consistent correlation between the name and the device functions. Some "intelligent" terminals are programmed via factory-installed firmware and give the user no more capability to create programs than the "smart" terminals defined above. Other terminals marketed as "intelligent" are fully user-programmable.

But what about price? As usual, price is in proportion to capability. Dumb display terminals are the least expensive and typically range between \$800 and \$1,500 in purchase price for single quantities. Smart terminals are generally priced between dumb terminals and programmable terminals, with some overlap in both directions. (Naturally, added capabilities, such as program function keys and additional display stations, raise the price.) Quantity discounts available from some vendors can reduce per-unit costs, typically by 10 to 30 percent.

Some of the more prominent dumb terminals are those offered by Applied Digital Data Systems (ADDS), Bee- ➤

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▷ hive, Hazeltine, Ann Arbor, and Lear Siegler. Some of the more prominent smart terminals include the Hewlett-Packard 2640 series, the IBM 3270 Information Display system, the Racal-Milgo 40+ and System 400, the Teletype Model 40, and the Univac Uniscope terminals.

### Microprocessor Mystique

The introduction of the alphanumeric display terminal was a major milestone in the development of computer communications. Its inception in 1965 revolutionized the data communications environment, which had previously been the sole domain of the teleprinter. The display terminal market soon exploded with scores of vendors and a plethora of models in the wake of accelerated user demands.

Initially, display terminal prices were prohibitively high for many applications as a result of low-volume production and the material and assembly cost of discrete components. But significant technical achievements in the semiconductor industry drove display terminal prices down as terminals composed of discrete components gradually gave way to those containing ever-increasing amounts of integrated circuitry. Large-scale integration, involving the full use of integrated circuitry, was considered a major technical achievement that would cause a trend toward price stability in the industry.

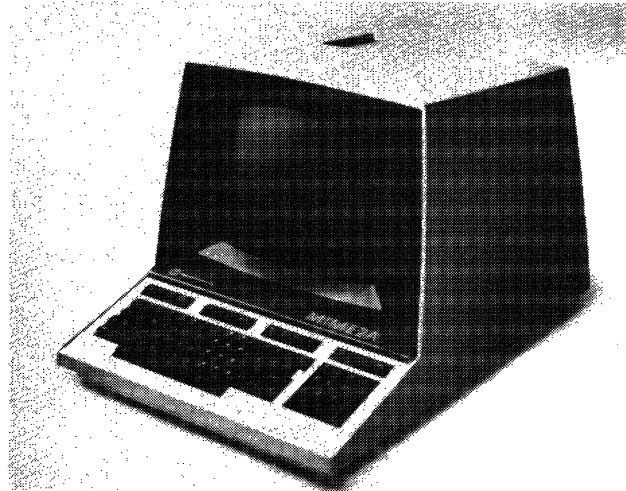
But then a bombshell exploded in the semiconductor industry, driving terminal prices to incredibly low levels. The bombshell was the microprocessor—another milestone that is revolutionizing the whole computer industry.

From the terminal user's point of view, the advent of microprocessor technology offers only one advantage: price. In the highly competitive terminal marketplace, prices have plunged. In fact, the full capabilities of a unit can often be grossly under-utilized and its cost still justified.

However, now that most display terminals being produced and sold today are microprocessor-based, this price plunge is beginning to bottom-out. Vendors are now offering more features to be competitive rather than price breaks. The user still benefits from this by having more sophistication at a lesser price.

Most of the display terminals introduced in the past two or three years are microprocessor-controlled; industry sources estimate that at least 50 percent of the installed display terminals will feature microprocessor control in 1980, as compared with only 10 percent in early 1975. Vendors have found that the magic device has substantially cut design, development, and production costs, and easily lends itself to a variety of applications. Moreover the microprocessor precludes obsolescence, since future functions can be implemented via reprogramming.

Microprocessor-based programs (firmware) reside in ROM or PROM memory. ROM-resident programs,



One of a number of display terminals that emulate DEC's VT-52, Micro-Term's MIME-2A can also emulate the Hazeltine 1500 and Soroc 120. While other emulations are optionally available, all emulations are switch selectable. The MIME-2A also features 128 displayable ASCII characters, 7x11 dot matrix character cell, and a serial printer port. The single-unit price for Micro-Term's MIME-2A is \$995.

which are inexpensive when reproduced in large quantities, control those features which are permanent and unchangeable; while PROM-resident programs are typically produced in smaller quantities and implement customized or modifiable features. Either type can be replaced by simply removing the old chip and putting in a new one. This flexibility is highly beneficial to the manufacturer, since older equipment can be updated and non-standard customer specifications fulfilled without costly hardware changes. Theoretically, program interchangeability might also benefit the user, but in practice it is doubtful that the requirements of a particular user will change often enough to make it a great advantage. The fact that PROM replacement generally must be done at the factory or by a field service technician precludes frequent PROM replacement.

In addition to controlling basic terminal functions, the microprocessor firmware can provide protocol emulation, define the character/code sets to be generated by the keyboard and displayed on the screen, implement special features, set control parameters, etc. Firmware specifications are generally determined at the time of order, and once the firmware is in place, execution is transparent to the user. Some vendors have predetermined programs from which to choose; a few permit the user to submit his own firmware specifications.

### Display Media

Alphanumeric display terminals, the subject of this report, are designed principally to display messages composed of alphanumeric characters, although a limited graphic capability may be an added feature. Alphanumeric terminals are attracting most of the attention and generating most of the revenue in the current display market. Graphic display ▷

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▷ terminals, which are covered in a separate DATAPRO 70 report (70D-010-91), account for only a small portion of the overall market.

Until recently the CRT (cathode ray tube) was virtually the sole means for displaying dynamic visual information, for business as well as entertainment use (in commercial television). Other devices for displaying information are now gaining popularity. These non-CRT devices include LED's (light emitting diodes, such as those used in calculators), plasma (gaseous) displays (such as the Burroughs Self-Scan panel), liquid-crystal displays, etc. But CRT displays still dominate the display industry, because they are still by far the cheapest method for displaying large amounts of data. Solid-state displays, such as those mentioned above, are currently limited to displays ranging from a few characters to a line of some two or three dozen characters (although Burroughs uses its Self-Scan panel to display up to 480 characters in a 12-line by 40-character format in its TD 730 unit.) Because of their prohibitive costs for displaying large quantities of data such as the 2000-character displays in current use, solid-state displays are still a long way from replacing the ubiquitous CRT.

### Industry Profile

The computer terminal market has been and will continue to be one of the fastest-growing segments of the computer industry. Estimates of its growth rate vary between 15 and 30 percent per year. According to optimistic industry sources, the terminal marketplace has barely been penetrated, the demand is "insatiable," and the potential is "seemingly endless." Predictions that, as office equipment, display terminals will soon become as familiar as telephones or typewriters do not seem unreasonable.

As far as trends in the past year in the industry, growth and upheaval continued on corporate level with acquisitions, mergers, bankruptcies, and personnel spin-offs forming new ventures. On the marketing level, emulation/compatibility is still the number one force in the industry (see User Experience). Beside emulation of IBM's 3270 Series, the most activity in alphanumeric display terminals centers on compatibility with Digital Equipment's VT-52 and VT-100, particularly in the wake of DEC production problems and backlog of orders on the VT-100. There are no fewer than a dozen vendors who now produce terminals with DEC VT-52 compatibility. In addition to a diversity of display terminals and their features, specialized terminals such as hand-held, color, and touch-input display terminals have shown some growth in the marketplace in the past year.

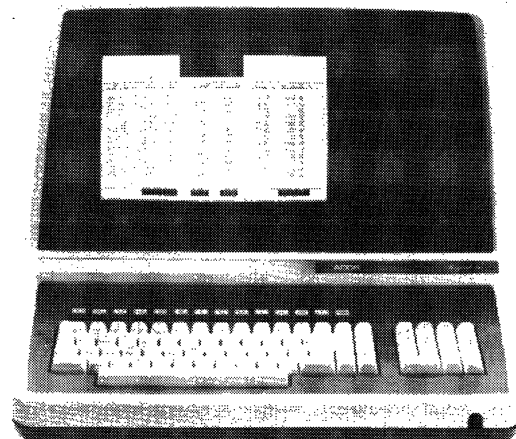
### Display or Teleprinter?

If you are using teleprinter terminals for communications and plan to add to or replace your current units, be sure to consider display terminals as an alternative. Based on current prices, many display terminals can now compete with the lowest-priced teleprinters (even the ubiquitous Teletype units); the average unit price of display units

continues to shrink as the result of microprocessor technology and high-volume production techniques.

In choosing between teleprinters and display terminals, you'll want to consider these factors:

- *Output medium*—Although in some applications the need for all output to be recorded in print is justifiable, in many cases it is simply custom or habit. Display terminals provide faster, more convenient access to required information, and can usually be equipped with auxiliary printers to produce hard-copy records of the displayed data when required.
- *Operating speeds*—Teleprinters are generally far slower in operation than their counterpart display terminals. Typical print speeds range from 10 to 30 characters per second for most teleprinters (though a few are capable of 120 cps or even higher speeds). Typical display speeds range from 300 to 1200 characters per second.
- *Editing and formatting*—Teleprinters are designed primarily for message or data communications, and they generally do not provide sophisticated capabilities for data editing or formatting. When implemented, editing is usually limited to a single line (the one just keyed) unless the teleprinter includes a cassette tape unit, which can significantly enhance the edit capability but naturally increases the cost. Formatted data entry/output is featured on some printers, but again the cost is driven upward. Unless there is a definite requirement for printed copy, a display terminal will usually be the better buy.
- *Reliability*—Most of the current teleprinters are reasonably reliable devices, but like all mechanical devices ▷



As a member of Applied Digital Data System's Regent family, the ADDS Regent 40 has a switch-selectable foreign character font feature as standard. The Regent 40 also features a 12-inch diagonal screen to display 1920 characters, limited graphics, a terminal status line, a 20 mA current loop in addition to an RS-232C interface, terminal bypass printing, and compatibility with the Regent 100. The base model of the Regent 40 is priced at \$1,400. ADDS display terminals are serviced by GE or TRW.

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- ▷ they are subject to wear and misalignment. Display terminals offer generally higher reliability as a result of their totally electronic operation.

### Major Display Markets

Excluding specialized terminals for dedicated markets such as brokerage houses, banks and retail POS, the alphanumeric display terminal industry has focused its attention on three principal markets: Teletype replacement, IBM 3270 replacement, and user-programmable terminals.

The most active of these three markets has been, and will probably continue to be, that of Teletype replacement, because it represents the greatest profit potential for the small terminal manufacturers.

Replacements for the IBM 2260 have long passed their peak of market penetration and are now offered by a few independents on an "as available" basis. The IBM replacement industry is now directed mainly toward 3270 replacements. Terminals based on microprocessors or mini-computers promise to capture both the IBM 2260 and IBM 3270 replacement markets by virtue of their software emulation capability.

### IBM's Best-Seller, the 3270

The IBM 3270 has strongly impacted the alphanumeric display terminal market since deliveries began late in 1971. Representing a significant price/performance improvement over its forerunner, the IBM 2260, the 3270 continues to carve a sizeable slice of the marketplace. While IBM regained some of its position with the 3270, the independents began to catch up. Then, in May 1977, IBM introduced a few surprises. The 3278 display and 3274 controller set a new price/performance target for the independents, costing up to 50 percent less than previous configurations. Also introduced was a combined display-controller, the 3276, that supports small clusters of up to eight displays and printers. New printers were also included in the announcement. Fully as surprising as the cost reductions, which caused a flurry of price changes among the independents, were the new large-capacity display formats that IBM introduced. With the exception of Courier's Model 270, there has been little indication that other vendors plan to match IBM's 2560- and 3440-character formats.

IBM incorporated some self-diagnostic capabilities into the new 3270's, but did not include user programmability, which is still a strong selling point among the independents (see C21-010-101). Instead, IBM has fully committed itself to distributed processing. Starting with SDLC, then SNA, and now ACF (Advanced Communications Function), IBM has introduced a complete method for integrating all of a user's computing facilities into a single system with distributed resources. This, too, impacts the market as replacement and add-on products surface.

Numerous independent vendors offer direct replacements for IBM's 3270 Information Display System. Among these are Computer Optics, Honeywell (AFID), ITT Courier,

MDS Trivex, Memorex, Northern Telecom Systems Corp., Telex Terminal Communications, and Basic Four/Wordstream. Other vendors whose products are microprogrammable can also provide IBM 3270 compatibility. As one might expect, the independents are offering more than just substantial price reductions. Enhancements include additional screen sizes, increased configuration flexibility, greater printing capabilities, data validation via user programs, display enhancements, etc. Most of these enhancements require some alterations to the IBM communications software, but these can generally be implemented by a minor partial sysgen to write the new operating parameters. Not all these enhancements are offered for the same terminal, so users should examine each product separately for those characteristics that satisfy the needs of their specific applications.

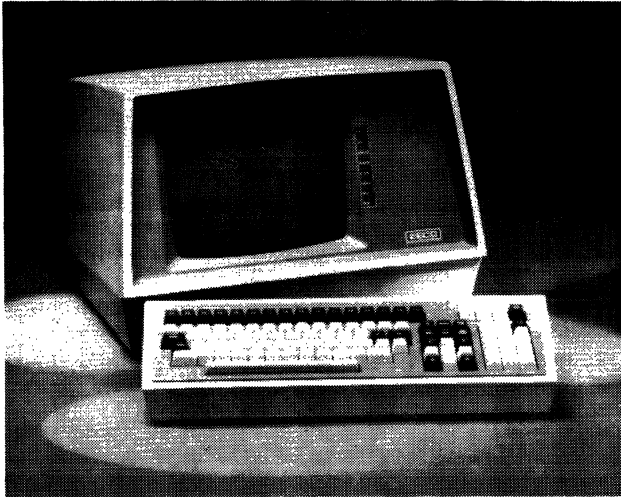
Vendors who sell directly to the IBM market have been impacted by the introduction of SDLC. A number of vendors, including Telex Terminal Communications, Dataview, MDS Trivex, Computers Optics, Olivetti, Honeywell (AFID), Northern Telecom Systems Corp., ITT Courier, and Teletype, now offer IBM SDLC compatibility, while others are planning to be compatible with SDLC in the future. Vendors whose products are microprocessor-based can provide SDLC compatibility at any time by merely changing the microprograms that control the units' operations. Vendors whose market is the low-speed (asynchronous) Teletype-compatible environment need not concern themselves with SDLC in the immediate future, but they may at some time need to respond to IBM's 3767 and 3770 series typewriter terminals, which can operate with SDLC.

### The Teletype Replacement Market

While some of the independents pursued the IBM replacement market, others have chosen to take on Teletype. This is by no means an easy task when you stop to consider that the outright purchase price of a Teletype Model 33 ASR starts at less than \$1,100 and that a KSR costs as little as \$810. But the independents offer more than just a CRT in place of a printer. The Model 33, as you probably know, is a limited-usage machine, supposedly good for about four hours per day. Its heavy-duty equivalent, the Model 35, carries a price tag about three or four times as high. Both machines provide limited transmission rates of 10 characters per second. And what about paper tape? It's cheap but crude compared with the use of magnetic tape cassettes. These limitations provide the prime incentives for teletypewriter replacement.

CRT terminals can compete with the price of the Teletype Model 33 and provide the kind of equipment reliability required for continuous usage by virtue of the use of electronic components. In addition, CRT terminals can offer transmission speeds that are limited only by the inherent capacity restraints of the communications facility. Many of the Teletype-compatible CRT terminals offer a range of switch-selectable speeds from 10 to 240 characters per second. Other features, such as an edit capability and the transmission of message blocks, can be

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The EECO Editor I appears to a typical alphanumeric display terminal with a detachable keyboard. But, the Editor I has 16 program keys, an optional color screen, a 128 character set, up to eight pages of optional storage, a Burroughs TD831 emulation option with multipoint operation, and many screen management features.

▷ considered as gravy. To satisfy specific user needs, such as occasional printed output and a recording medium for on- or off-line operation, many vendors supply low-priced, nonimpact printers and magnetic tape cassette recorders.

### The Controversial Teletype Model 40

When the independent CRT manufacturers began to impact the Teletype terminal market, Teletype Corporation witnessed steadily declining revenues—a strong impetus that forced Teletype to change its image from that of an old-line supplier of low-speed, message-oriented equipment to that of a sophisticated terminal manufacturer. Though long dedicated to the production of teleprinters and punched tape equipment, Teletype gained experience with CRT terminals in the late 1960's, when development began on communication display terminals for AT&T in-house applications such as order entry.

Teletype's impressive display terminal, the Model 40, was unveiled in May 1973. The unit was offered on a purchase-only basis by Teletype, a subsidiary of AT&T's Western Electric Company, and as the Dataspeed 40 Service, a tariffed service offered by AT&T and its Bell System operating companies. The Model 40 offered an impressive collection of capabilities and features at very competitive prices. Teletype has since expanded its original Model 40 into three asynchronous versions for dial-up, leased point-to-point, and multipoint (multidrop) applications. And in May 1975, Teletype introduced a clustered, synchronous version of the Model 40 that provides hardware and software compatibility with the BSC version of the IBM 3270.

The joint introduction of the Teletype Model 40 and AT&T Dataspeed 40 service spread waves of apprehension that penetrated the very foundation of the communications terminal industry, largely composed of small,

independent manufacturers. The independents complained bitterly that AT&T was entering the data processing business, which it is prohibited from doing by the FCC. They charged that the Model 40 was clearly designed for data processing purposes and not just for message transmission as were the earlier teleprinters. AT&T repudiated the accusation, claiming that the offering was just an advancement in telecommunications technology and "in no way constitutes a data processing service."

AT&T announced in November 1975 that it would offer the new binary synchronous version of the Model 40 in mid-1976 under the Dataspeed 40 banner. When AT&T filed its tariff for the new service, it was attacked by strong protests from IBM, the Computer and Communications Industry Association (CCIA), and the Computer Business Equipment Manufacturers Association (CBEMA). All three challenged AT&T's latest Dataspeed 40 offering by filing separate protests with the FCC. Each based its arguments on the 1956 antitrust consent decree that forbids AT&T from entering into an *unregulated* business. In their separate statements, the three factions alleged that the new terminal is "not simply a communications terminal, but is actually an *intelligent, programmable computer terminal*." However, IBM suggested that the FCC should request the Justice Department to seek a modification of the decree; should this be accomplished, AT&T could market the terminals on a competitive basis. According to IBM, users would benefit from the additional competition in this industry segment.

AT&T "shares IBM's apparent concern that some competitors are regulated and others are not." AT&T commented that "since the services in question are so clearly subject to regulation under the Communications Act of 1934, there would appear to be a more obvious solution than the one offered by IBM." The solution appeared to be a reference to AT&T's consistent opposition, during the eight years since the Carterfone decision, to deregulation of the terminal market. One of AT&T's key objections is that the interconnect industry is unregulated, while its own PBX's, telephone systems, and Dataspeed 40 terminals are regulated.

AT&T responded to the Dataspeed 40 tariff objections filed by IBM, CBEMA, and the CCIA with the charge that they were attempting to use the FCC to prevent or delay the availability of the new Dataspeed 40 service. AT&T further commented that the three factions are imposing a technological freeze on the telecommunications industry that would return it to an earlier era. In its reiterated denial that the Dataspeed 40 is a data processing device, AT&T stated that Dataspeed 40 services represent "merely an *evolutionary technological improvement of services traditionally offered by communications common carriers*. The only changes from earlier equipment (teletypewriters) were that, in place of electromechanical equipment, Dataspeed 40 uses solid-state circuitry to aid in message preparation and to permit operation at higher speeds." AT&T remarked that just because a device communicates with a computer or operates in a data processing system, this does not remove it from the control of the Communications Act of 1934. ▷

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➤ On March 3, 1976, the FCC's Common Carrier Bureau rejected AT&T's application to tariff its binary synchronous Dataspeed 40 service on the basis that it was "inextricably intertwined with data processing." The proposed tariff was rejected on the very date on which it would have become effective. In November 1976, however, the FCC overturned the March 1976 rejection of the proposed Dataspeed 40/4 tariff by the chief of its Common Carrier Bureau. The FCC reversal permits the Bell System to tariff its hotly contested terminal for *interstate* (across state lines) service as a data communications device. (*Intrastate* tariffs for the Dataspeed 40/4 service have already been approved by most states.) The FCC reversal was made contingent on the outcome of the pending Computer Inquiry rulemaking (Docket 20828). The FCC made it clear that this was not a final policy decision on the 40/4, but it is highly unlikely that the FCC would rescind such an authorization once deep penetration of the 40/4 has been established. AT&T's interstate Dataspeed 40/4 tariff became effective on January 19, 1977 despite petitions filed by the CCIA and IBM (which were overruled), and AT&T has begun to market the 40/4 as an interstate communications service.

### User Experience

To assess the current level of user satisfaction with display terminals, and to determine the patterns of usage of these terminals, Datapro conducted an extensive user survey. A Reader Survey form was included in the January 1980 supplements to DATAPRO 70 and DATAPRO REPORTS ON DATA COMMUNICATIONS, and mailed to all subscribers. By March 1, usable responses had been received from 308 users with a total of 18,119 installed display stations.

Because many of the users reported on more than one model of display, the user replies generated a total of 549 responses or individual equipment ratings and profiles. The orientation of the users participating in the survey can be shown by the following table:

Responses on:	Responses		Displays	
	Number	Percent	Number	Percent
IBM displays	209	38	7,869	43
Other displays	340	62	10,250	57
Total	549		18,119	

Overall, the average number of displays per response was 33, while the average number of displays per responding user was 59.

The users were asked to rate the overall performance, ease of operation, hardware reliability, maintenance service, and software and technical support for each display by assigning a rating of excellent, good, fair, or poor. The resulting ratings for over 50 popular display models or families are summarized in the accompanying table. Any model or category that received more than two user responses is identified by manufacturer; models, categories, or manufacturers receiving only one or two responses is identified by manufacturer; models, cate-

gories, or manufacturers receiving only one or two responses were categorized as "other." Prospective buyers should note that the small sample sizes for some of these models make it unwise to draw firm conclusions from the indicated ratings.

To put the raw counts into a form more readily grasped, Datapro calculated a weighted average for each rating category. Each user response was assigned a weight of one, and the ratings were weighted on the conventional scale of 4, 3, 2, and 1 for excellent, good, fair, and poor, respectively. The data is presented as an additional information source, not as the final word on the worth of the displays represented. Individual vendor's ratings are tabulated on page 108.

The ratings assigned by the responding users can also be combined to form this overall picture of current user satisfaction with the IBM displays, other manufacturers' displays, and all displays:

	Weighted Averages		
	IBM displays	Other displays	All displays
Overall performance	3.5	3.3	3.4
Ease of operation	3.3	3.3	3.3
Display clarity	3.3	3.3	3.3
Keyboard feel & usability	3.3	3.1	3.2
Hardware reliability	3.5	3.2	3.3
Maintenance service	3.2	3.0	3.1
Technical support	3.1	2.7	2.9
Number of responses	209	340	549

The ratings of all display terminals, both IBM and non-IBM, were better or the same as compared to the ratings found in last year's survey. All IBM ratings were up, with the exception of the maintenance service and technical support categories, which remained the same. While the overall performance and ease of operation remained the same for non-IBM display terminals; the display clarity, keyboard feel & usability, hardware reliability, maintenance service, and technical support showed notable gains. The composite ratings showed improvement, with the exception of the ease of operation category, which remained at 3.3.

The users were asked whether they were using their terminals as plug-compatible replacement for another vendor's terminals. Of the total 549 users responding, 235 were using IBM 3270, IBM 2260, Burroughs TD Series, Honeywell VIP Series, or DEC VT Series; 276 were using terminals made by another vendor to emulate one of these or to emulate Teletype's Model 33/35 teleprinters; and 103 were using terminals made by another vendor but were not emulating any other terminal. The users not using one of the above-mentioned terminals Σ can be tabulated as follows:

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V Plug-Compatibility with:	Number of User Responses	Percent of Responses	Within			
			Now	Percent	2 Years	Percent
Teletype 33/35	75	24%	451	82%	30	5%
IBM 3270/3275/3277	143	46				
IBM 2260/2265	2	1	148	27	63	11
Burroughs TD Series	12	4				
Honeywell VIP Series	9	3	393	72	34	6
DEC VT-50/52	18	6	69	13	59	11
Other emulations	17	5				
No emulation	38	12	16	3	46	8
			165	30	25	5
			32	6	10	2

Clearly, the replacement of Teletype 33/35 teleprinters and IBM display units continues to dominate the replacement market segment, even though many displays having compatibility with other vendors' protocols have been introduced.

The users were also asked questions designed to determine the current usage patterns for display units. Of the total 549 users, 140 reported having single display station configurations, and 258 reported having clustered display station configurations. (Users were counted in more than one category if they reported multiple types of usage.)

Single-station configurations can be summarized as follows:

	Remote Connection to Computer (via Communications Lines)	Local Computer Connection
Number of user responses	206	235
Percent of total user responses	38%	43%
Number of display stations	2,994	4,803
Percent of total display stations	17%	27%

Cluster configurations are described below:

	Remote Connection to Computer (via Communications Lines)	Local Computer Connection
Number of user responses	161	177
Percent of total user responses	29%	32%
Number of controllers	1,311	323
Number of displays	6,178	4,640
Average displays per controller	5	14
Percent of total display stations	34%	26%

When queried about what applications they presently used their terminals for, most users indicated interactive data entry & inquiry and program development. Users were also asked what applications they planned in the next two years. The current and planned applications are noted in the following table:

Interactive data entry & inquiry	451	82%	30	5%
Text editing/ word processing	148	27	63	11
Program development	393	72	34	6
Intracompany message traffic	69	13	59	11
Business graphics	16	3	46	8
System console	165	30	25	5
Other	32	6	10	2

On the subject of color display terminals, most users (76%) responded no when asked if they currently were using a color display, while 1% responded yes; 17% responded that they intended to put a color display into use within the next two years. The most frequently mentioned application of a color display was business graphics. The results of the question on color display usage are listed below:

Color Display Usage	Total	Percent
Yes	7	1%
No	419	76%
Yes, within 2 years	93	17%

When asked who performs maintenance and repair service on their display terminals, most users indicated the manufacturer. The responses were as follows:

Maintenance	Total	Percent
Manufacturer	416	76%
In-house	48	9%
Third-party	99	18%

The final question in our survey asked what peripherals, if any, were attached to these terminals. Of the 549 users, 220 or 40% reported that they use a station printer, while less than one percent recorded the use of an OCR wand. These and the other results are listed in the following:

Peripheral Usage	Total	Percent
Station printer	220	40%
Diskette	25	5%
OCR wand	2	1%
Tape cartridge/ cassette	9	2%
Other	14	3%

### Buying Guidance

In selecting a display terminal, as in acquiring most other types of computer equipment, your chances of picking the unit that's best for your installation will be far greater if you're willing to take the time to go about it in a systematic, logical way. The following selection procedure should help you get the maximum gain in computer throughput per dollar spent.

1. Define the essential parameters for a display terminal that will satisfy your needs. The entries in the comparison charts in this report, together with the text

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### USERS' RATINGS OF ALPHANUMERIC DISPLAY TERMINALS

Display Supplier and Model	No. of User Responses	No. of Displays in Use	Weighted Averages and Response Counts																																					
			Overall Performance					Ease of Operation					Display Clarity					Keyboard Feel and Usability					Hardware Reliability					Maintenance Service					Technical Support							
			WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P								
ADDIS Regent 100	3	19	3.0	1	2	0	0	0	2.7	1	1	0	0	1	3.7	2	1	0	0	0	2.7	1	1	0	0	1	3.3	2	0	1	0	3.0	1	0	1	0	2.0	0	1	0
ADDIS, others and unspecified	8	77	3.4	3	5	0	0	0	3.3	3	4	1	0	0	3.5	4	4	0	0	0	3.4	3	5	0	0	0	3.5	4	4	0	0	3.1	2	4	1	0	2.9	1	5	2
Subtotals	11	96	3.4	4	7	0	0	0	3.1	4	5	1	1	1	3.5	6	5	0	0	0	3.2	4	6	0	1	1	3.5	6	4	1	0	3.1	3	4	2	0	2.7	1	6	2
Beehive, all models	6	544	3.3	2	4	0	0	0	2.5	2	3	1	0	0	3.3	2	4	0	0	0	3.3	2	4	0	0	0	3.0	2	2	2	0	3.2	1	4	0	0	2.8	1	3	2
Burroughs TD 700 Series	4	181	3.3	1	3	0	0	0	3.8	3	1	0	0	0	4.0	4	0	0	0	0	4.0	4	0	0	0	0	3.0	1	2	1	0	2.0	0	0	4	0	2.0	0	0	4
Burroughs TD 800 Series	3	347	3.0	0	3	0	0	0	2.7	0	2	1	0	0	3.0	1	1	1	0	0	3.0	1	1	1	0	0	2.7	0	2	1	0	2.7	1	0	2	0	1.3	0	0	1
Burroughs TD 830 Series	14	571	3.5	7	7	0	0	0	3.4	7	6	1	0	0	3.3	5	8	1	0	0	3.1	4	8	2	0	0	3.2	5	7	2	0	2.8	2	9	1	2	2.4	1	5	6
Subtotals	21	1,099	3.4	8	13	0	0	0	3.4	10	9	2	0	0	3.4	10	9	2	0	0	3.3	9	9	3	0	0	3.1	6	11	4	0	2.6	3	9	7	2	2.1	1	5	11
DatagraphX 132 A/B	3	5	3.7	2	1	0	0	0	3.0	1	1	1	0	0	4.0	3	0	0	0	0	3.0	2	0	0	0	1	3.7	2	1	0	0	3.7	2	1	0	0	3.3	2	0	1
Datamedia, all models	8	14	3.6	5	3	0	0	0	3.6	5	3	0	0	0	3.4	4	3	1	0	0	3.3	2	6	0	0	0	3.5	4	4	0	0	3.4	4	3	1	0	3.1	4	2	1
Datapoint, all models	6	58	3.3	2	4	0	0	0	3.7	4	2	0	0	0	3.2	1	5	0	0	0	3.2	1	5	0	0	0	3.2	2	3	1	0	3.5	4	1	1	0	3.6	3	2	0
DEC VT-05	3	24	3.7	2	1	0	0	0	3.7	2	1	0	0	0	3.0	1	1	1	0	0	2.7	1	0	2	0	0	3.3	1	2	0	0	2.7	1	1	0	1	2.3	1	0	1
DEC VT-52	6	47	3.5	4	1	0	0	0	3.3	3	2	1	0	0	3.5	3	3	0	0	0	3.3	2	4	0	0	0	3.3	4	1	0	1	2.8	1	3	2	0	2.3	0	3	2
DEC VT-100	9	27	3.7	6	3	0	0	0	3.6	6	2	1	0	0	3.7	6	3	0	0	0	3.7	6	3	0	0	0	3.7	7	2	0	0	3.2	4	3	2	0	3.0	4	2	2
DEC, others and unspecified	3	10	3.3	1	2	0	0	0	3.3	1	2	0	0	0	3.3	1	2	0	0	0	3.3	1	2	0	0	0	3.5	1	1	0	0	3.0	1	1	0	1	2.0	0	1	0
Subtotals	21	103	3.6	13	7	1	0	0	3.5	12	7	2	0	0	3.5	11	9	1	0	0	3.4	10	9	2	0	0	3.6	13	6	0	1	3.0	7	8	5	1	2.6	5	6	5
Delta Data, all models	3	34	3.7	2	1	0	0	0	3.7	2	1	0	0	0	3.7	2	1	0	0	0	3.7	2	1	0	0	0	3.3	2	0	1	0	3.0	1	0	1	0	2.7	1	0	2
General Terminal (Infoton) 100	4	31	3.3	1	3	0	0	0	3.3	1	3	0	0	0	3.3	2	1	1	0	0	3.0	1	2	1	0	0	3.3	1	3	0	0	3.0	1	2	1	0	2.7	0	2	1
General Terminal, others and unspecified	4	15	3.0	1	2	1	0	0	3.3	1	3	0	0	0	3.0	1	2	1	0	0	2.5	1	1	1	0	0	2.8	1	2	0	1	3.3	1	2	0	0	3.3	1	2	0
Subtotals	8	46	3.1	2	5	1	0	0	3.3	2	6	0	0	0	3.1	3	3	2	0	0	2.8	2	3	2	0	0	3.0	2	5	0	1	3.1	2	4	1	0	3.0	1	4	1
Hazeltine 1500 Series	8	906	3.1	2	5	1	0	0	2.9	2	4	1	1	0	3.3	4	2	2	0	0	2.6	1	4	2	1	0	2.8	1	5	1	1	2.8	1	4	3	0	2.7	1	4	1
Hazeltine 2000	4	157	3.0	0	4	0	0	0	2.8	0	3	1	0	0	2.5	0	2	2	0	0	2.8	0	3	1	0	0	2.5	0	2	2	0	3.0	1	2	1	0	1.8	0	1	1
Hazeltine, others and unspecified	8	210	2.8	0	6	2	0	0	3.4	4	3	1	0	0	2.9	2	3	3	0	0	3.1	2	5	1	0	0	2.8	0	7	0	1	2.6	0	5	1	1	2.4	0	4	2
Subtotals	20	1,273	3.0	2	15	3	0	0	3.1	6	10	3	1	0	3.0	6	7	7	0	0	2.9	3	12	4	1	0	2.7	1	14	3	2	2.7	2	11	5	1	2.4	1	9	4
Hewlett-Packard 2621	4	32	3.8	3	1	0	0	0	3.3	1	3	0	0	0	3.5	2	2	0	0	0	3.5	2	2	0	0	0	3.0	1	2	1	0	3.5	2	2	0	0	3.0	1	2	1
Hewlett-Packard 2640	4	17	4.0	4	0	0	0	0	3.8	3	1	0	0	0	3.8	3	1	0	0	0	3.8	3	1	0	0	0	3.8	3	1	0	0	4.0	4	0	0	0	3.5	2	2	0
Hewlett-Packard 2645	5	127	4.0	5	0	0	0	0	3.8	3	2	0	0	0	3.8	4	1	0	0	0	3.8	4	1	0	0	0	3.6	3	2	0	0	3.6	4	0	0	0	3.0	1	3	1
Subtotals	13	176	3.9	12	1	0	0	0	3.5	7	6	0	0	0	3.7	9	4	0	0	0	3.7	9	4	0	0	0	3.5	7	5	1	0	3.7	10	2	1	0	3.2	4	7	2
Honeywell VIP 7700	6	174	2.8	1	3	2	0	0	2.8	0	5	1	0	0	2.5	1	1	4	0	0	2.7	0	4	2	0	0	3.3	2	4	0	0	3.2	1	5	0	0	3.0	1	4	1
Honeywell VIP, other and unspecified	5	35	3.2	2	2	1	0	0	3.0	2	1	2	0	0	2.4	1	1	2	1	0	3.0	2	1	2	0	0	3.2	2	2	1	0	3.0	1	3	1	0	2.6	1	2	1
Subtotals	11	209	3.0	3	5	3	0	0	2.9	2	6	3	0	0	2.5	2	2	6	1	0	2.8	2	5	4	0	0	3.3	4	6	1	0	3.1	2	8	1	0	2.8	2	6	2
IBM 3275	12	149	3.3	3	9	0	0	0	3.2	2	10	0	0	0	2.8	0	10	2	0	0	3.1	2	9	1	0	0	3.2	2	10	0	0	2.8	0	10	2	0	3.1	2	9	1
IBM 3276	19	125	3.7	14	5	0	0	0	3.2	6	10	3	0	0	3.7	13	6	0	0	0	3.5	11	6	2	0	0	3.5	12	5	2	0	3.3	6	12	1	0	3.1	6	9	4
IBM 3277	70	2,562	3.5	36	32	2	0	0	3.4	33	35	2	0	0	3.2	22	38	10	0	0	3.4	32	34	3	1	0	3.5	37	30	3	0	3.3	29	30	11	0	3.2	28	29	10
IBM 3278	85	4,593	3.6	54	31	0	0	0	3.2	28	47	10	0	0	3.5	42	41	2	0	0	3.2	31	39	12	2	0	3.6	51	31	3	0	3.3	34	42	6	2	3.0	24	43	14
IBM 3270, other and unspecified	9	234	3.6	5	4	0	0	0	3.1	1	8	0	0	0	3.4	4	5	0	0	0	3.3	3	6	0	0	0	3.7	6	3	0	0	3.2	2	7	0	0	3.4	3	5	0
IBM, others and unspecified	14	226	2.9	5	3	5	1	0	3.1	4	6	1	0	0	2.9	5	3	2	2	0	2.9	2	5	3	0	0	2.7	4	4	2	0	2.9	1	10	2	0	2.7	2	7	2
Subtotals	209	7,869	3.5	117	84	7	1	0	3.3	74	116	16	1	0	3.3	86	103	16	2	0	3.3	81	99	21	3	0	3.5	112	83	12	2	3.2	72	111	22	2	3.1	65	102	31
ITT Courier 270/2700/2750	21	1,003	3.2	5	15	1	0	0	3.2	6	14	1	0	0	3.2	8	10	3	0	0	3.3	9	9	3	0	0	3.0	4	12	5	0	3.0	5	12	4	0	2.9	4	11	6
ITT Courier 7700/7750	4	36	3.8	3	1	0	0	0	3.8	3	1	0	0	0	3.8	3	1	0	0	0	3.5	2	2	0	0	0	3.5	2	2	0	0	3.5	2	2	0	0	3.5	2	2	0
ITT Courier, others and unspecified	7	167	3.1	3	2	2	0	0	3.1	1	6	0	0	0	3.3	2	5	0	0	0	3.6	4	3	0	0	0	2.7	2	3	2	0	2.6	1	3	2	1	2.3	0	4	1
Subtotals	32	1,206	3.3	11	18	3	0	0	3.3	10	21	1	0	0	3.3	13	16	3	0	0	3.4	15	14	3	0	0	3.0	8	17	5	1	3.0	8	17	6	1	2.8	6	17	7
Lear Siegler ADM-3A	14	227	3.5	7	7	0	0	0	3.4	6	8	0	0	0	2.9	3	7	4	0	0	3.1	4	7</																	



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organization, the location and staffing of the closest service point, the promised response time for emergency service, the hours during which service is available, the nature and frequency of preventive maintenance, the size and location of the spare parts inventory, the procedure for handling engineering change orders, and the scope of the supplier's training program for his service technicians.

4. *Talk to users.* The terminals that appear most promising at this point should now be further investigated by conferring with present users. The users' ratings given in this report should serve as a first cut. Then ask each supplier for a list of customers. Be selective. Ask for installations similar to the one you're planning, at least with respect to communications discipline and number of terminals. And don't take no for an answer. Then, find out all you can from each user. Ask why he chose that unit, when it was installed, what problems were encountered in installing it, how many failures have occurred, how quickly they were corrected, and whether any incompatibilities have been detected. Finally, ask how he thinks the terminal or the associated support could be improved. The answers to these questions are likely to be enlightening, not only about the display terminals but about mainframe support as well.
5. *Choose the vendor and model.* By now, you should have all the information you'll need to choose the terminal that will satisfy your requirements at the lowest overall cost. If so, it's just about time to place your order.
6. *Negotiate a sound contract.* Now that you know which terminal you want, don't just sign the supplier's standard contract or order form. If you do, you're likely to end up with a lot less security and support than the user who's willing to take the time and trouble to indulge in some old-fashioned haggling. What's more, you may even be able to shave some more dollars off the price tag.

### Display Terminal Characteristics

The accompanying comparison charts summarize the characteristics of 210 commercially available alphanumeric display terminals from 68 vendors. Nearly all of the information was supplied by the manufacturers during the months of February and March 1980. Their cooperation is acknowledged and greatly appreciated.

Datapro sent repeated requests for information to 106 companies known or believed to be in the display terminal business. The 68 usable responses summarized in our charts provide a comprehensive picture of the commercial display terminals that are currently available in the United States and Canada. *The absence of any specific company from our charts means that the company either failed to respond to our repeated information requests or was unknown to us.*

The chart entries and their significance are explained in the following paragraphs.

### Terminal Description

Display terminals are available in one of two basic terminal configurations: *stand-alone* and *cluster*. Stand-alone units are typically those that contain all components that support the operation of the terminal including display, keyboard, interface, and power supply within a single cabinet. Auxiliary units such as printers, cassette tape drives, etc., are usually external devices. Sometimes a stand-alone unit includes separate cabinets for terminal control and keyboard/display sections, and it may even include one or two separate displays. A cluster configuration typically includes a terminal control unit and a number of individual cable-connected keyboard/display units, which can often be located several thousand feet from the controller. In some cases, the vendor provides a multiplexer that accommodates a cluster of stand-alone terminals. A *local cluster* arrangement refers to a terminal that can be attached directly to a computer I/O channel and can operate as an on-line peripheral subsystem. A *remote cluster* arrangement refers to a terminal that is connected to the host computer via a communications facility. The size of a cluster arrangement is defined by the *maximum number of displays per controller*.

Terminals that are designed to be hand-held, such as the Taumark Tera or the Termiflex HT Series, or to be hand-carried, like the Microterm ACT-1A (9 lbs.) or Terminal Data 675 (19 lbs.) are noted in the entry *transportability*.

Some terminals are designed as direct replacements for other terminals. In the alphanumeric display terminal market, replacement terminals fall into four principal categories: those designed to replace an IBM 3270 and/or 3275, those designed to replace an IBM 2260 and/or 2265, those designed to replace a Teletype Model 33 and 35 teleprinter, and those designed to replace a Teletype Model 40 display terminal.

Some vendors provide *compatibility* with other terminals such as those produced by Burroughs, Digital Equipment, Honeywell, and Univac. For example, a dozen vendors or more—including Ann Arbor, Telaray, Volker-Craig, and Hazeltine—are currently marketing units compatible with Digital Equipment's VT-52 terminal—while Data-graphiX, Visual Technology, Datamedia, and Micro-Term produce terminals that offer compatibility with DEC's newer and more sophisticated VT-100 terminal.

Either of two types of compatibility may be offered: transmission compatibility or "plug-to-plug" compatibility. Transmission compatibility requirements include identical protocol, code and unit code structure, timing, asynchronous or synchronous operation, and transmission speed. Some vendors even provide identical cables, which is a cost-effective consideration in a local cluster environment. Most vendors with transmission-compatible units offer additional features and functions that the original vendor's equipment does not have, implemented via minor changes in host software. Units with true plug-to-plug compatibility not only have identical transmission parameters, but also identical features and functions; no alteration to host software is necessary, but no enhance-

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ments beyond the original vendor's equipment are available. For example, although numerous vendors offer IBM 3270 compatibility, only a few, including ITT Courier, Memorex, Telex, MDS Trivex, and Basic Four/Wordstream, make a true plug-for-plug replacement for the 3277 display station.

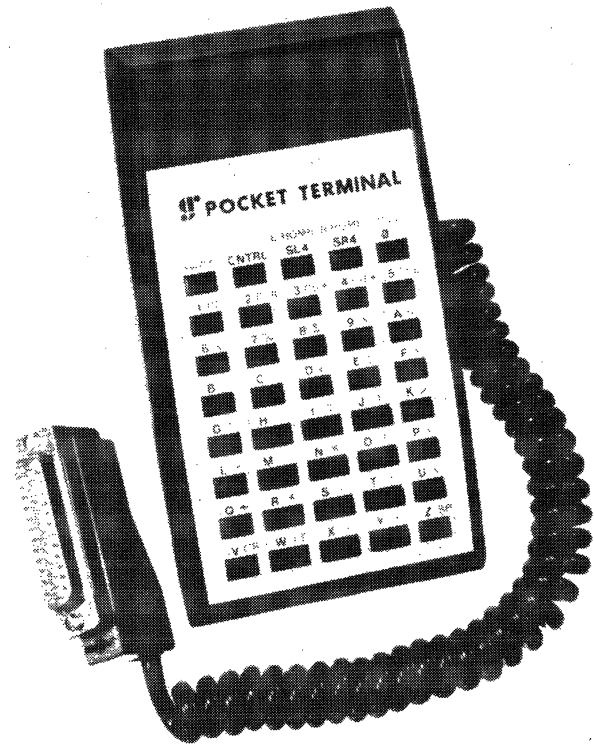
Programmability for processor-controlled terminals can be implemented via a combination of different techniques. The entry *user-programmable* defines the capability for the terminal to operate under the direction of a user-created application program stored within the terminal (see C21-010-101). This requires the provision of an assembly-like language at the very least. Programmability via user-defined parameters or user-defined firmware refers to the use of fixed programs, such as a data entry program where the user defines field length and type, duplication, skipping, etc.

The entry *self diagnostics* denotes the terminal's capability to identify failures via self-generated test procedures. Failures are typically indicated by displayed text patterns, by indicator lamps, or by messages appearing on the 25th line of the display screen. Self-diagnostics are typically performed while the terminal is in the off-line mode.

### Display Parameters

Printed information is generally arranged according to an orderly format consisting of a maximum number of printed lines per page and characters per line. This orderly arrangement is also used to characterize the arrangement of data display on the face of a CRT screen or other display device. The electronic circuitry that produces the display image is designed to a specified set of parameters that define the capacity (i.e., the maximum number of display positions) and the display format (i.e., the maximum number of displayable lines and displayable characters per line). The most common display capacity is 1920 characters arranged in 24 lines of 80 characters. A few vendors, including Datamedia, DatagraphiX, DEC, and Visual Technology, offer 132-character display lines, which can eliminate the need to revise or patch software designed for standard 132-column printers or to maintain dual sets of programs for 80-column and 132-column output. Information is displayed in a rectangular area smaller than the total surface area of the display device. The factors that determine the required size of the display area are the display arrangement and the size of the displayable characters, which is normally a fixed parameter.

Symbol formation and the set of displayable symbols are functions of the character generator, which accepts coded characters (typically ASCII) from the computer and keyboard and converts them to a number of dots or strokes so that the form of the symbol or image can be displayed. In CRT's, characters are formed by a variety of techniques, including dots, strokes, starburst, or monoscope. The dot technique is by far the most popular. Each character is formed within a matrix of dots, and only those dots required to form the specific character are intensified.



The G.R. Electronics' Pocket Terminal may appear at first glance to be a pocket calculator, but it is a hand-held terminal capable of displaying 64 ASCII characters and transmitting the 128 ASCII character code. The display consists of one line of eight characters. Each alphanumeric symbol is formed by a 16-segment LED cell. Transmitting asynchronously in full duplex, the Pocket Terminal can transmit at rates up to 2400 bps. The terminal also has a 30 character memory.

Typically, a dot matrix contains 35 dots arranged 7 dots high by 5 dots wide. Characters can be made clearer by increasing the number of dots within the matrix. The stroke technique forms characters by drawing short straight lines between specified points.

Solid-state display devices, such as plasma (gas) and LED (Light Emitting Diodes) are gaining popularity, but at present are generally limited to small display capacities consisting of a few characters. These typically form a character image in much the same way as a CRT display (i.e., via a dot matrix), though some form symbols through line segments.

Display arrangement, display medium, and symbol formation all have a great impact on display clarity. Test several units to decide which is easiest on the operator's eyes.

Attention can be drawn to vital information and different types of significant data can be visually separated by the use of the following display features:

- Color—characters or fields can be separated by color, which can also be used to identify conditions or types of data. A few vendors, including Applied Digital, Σ

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▷ Intelligent Systems, Megadata, and IBM, offer up to eight colors as a standard feature; several other vendors offer a color option.

- Reverse video—displays a *negative* image of data, i.e., data normally displayed in white on a dark background is displayed in black on a white background. Characters or fields can be displayed in reverse video.
- Programmable brightness levels—visually separates different kinds of displayed information by displaying each type of data in a different intensity level, such as a fixed format and the entered data.
- Character and/or field blinking—vital information consisting of a single character or an entire field is blinked to attract attention.

Some terminals offer several of these display features, which can be combined to produce even more effective results.

Some applications require viewing more data than can be displayed at one time. The following features satisfy this need:

- Roll (or scroll)—this feature moves all displayed lines of data up or down by one line as a new line is added and an existing one removed. In some cases, the first line is linked with the last so that the data is rolled but not lost. Typically, data is lost as it rolls off the screen. This feature permits the user to scan through a volume of data to locate key information.
- Paging—this feature stores two or more frames or *pages* of data and displays any selected page.

Although roll and paging features can be software implemented in the host computer, the comparison chart entry applies to *only* those terminals that implement the features via hardware or firmware.

Many terminals provide the roll feature, but relatively few provide paging. Some provide both features.

The cursor marks the position on the screen where the next character will be read or written from memory. Cursor controls enable the operator to maneuver the cursor on the screen and facilitate the input and output of data. Typical cursor controls include:

- Move left (L)—moves the cursor one space to the left, which can be from the initial character position of a line to the last character position of the previous line if the terminal features wraparound.
- Move right (R)—moves the cursor one space to the right, which can be from the last character position of a line to the first character position of the next line if the terminal features wraparound.

- Move up (U)—moves the cursor to the same position on the previous line, which can be from the first line to the last line if the terminal features wraparound.
- Move down (D)—moves the cursor to the same position on the following line, which can be from the last line to the first line if the terminal features wraparound.
- Home top (H)—moves the cursor to the initial character position of the first line.
- Home bottom—moves the cursor to the initial character position of the last line.
- Tab—moves the cursor forward to the next tab stop or backward to the previous tab stop (backtab).
- Return (RT)—moves the cursor to the initial character position of the next line; this is identical to the carriage return function of a typewriter.
- Backspace—moves the cursor one space to the left.
- Line Feed—moves the cursor to the same position on the following line.

Some cursors blink, others keep moving as long as the control key remains depressed. All cursors should be of the nondestructive type. Different manufacturers use a variety of symbols to indicate the cursor position on the screen. Some terminals also have *addressable/readable cursors*, which enable the position of the cursor to be written or read by the host computer under program control.

Most businesses use printed forms for daily activities such as billing, ordering, payroll, etc. Some CRT terminals can duplicate the printed form on the face of the screen, and data can be keyed into the blank spaces just as the typist enters data into a printed form. This “fill-in-the-blanks” approach to data entry requires a *protected format* capability. Display terminals that incorporate this feature treat the fixed format differently from keyed data. Field identifiers such as “name” or “salesman number” are protected from inadvertent key entry, and data entry is confined to the variable fields (blank spaces) following the field identifiers. Some terminals automatically *tab* to the beginning of the next variable field immediately following the entry of the character that completes each field. The tab key is used where a field is partially filled.

Having completed entry into the fixed format, the operator transmits the data to the central computer. A feature called *partial screen transmit* promotes line economies by transmitting only the keyed data; the fixed format remains displayed and the “blanks” are erased for the next entry. This feature is also useful for transmitting only a portion of the displayed data such as a field, line, or block.

Editing features in a display terminal can consist of any

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▷ combination of the functions listed below, although the best terminal for editing purposes would include all of them. Each function is performed with respect to the current position of the cursor. The desirable editing functions are:

- Character insert—the capability to insert a character into an existing line of displayed text; the remaining characters shift to the right or “spread” to accommodate the added character. The spreading capability may terminate at the last character position of the line or at the last displayable position on the screen. Data is lost when it is spread beyond the termination point.
- Character delete—the capability to delete a character from an existing line of displayed text; the remaining text closes up when the character is deleted.
- Line insert—the capability to insert a line of text into existing text; the text spreads to accommodate the added line.
- Line delete—the capability to delete a line of text from existing text; the remaining text closes up when the line is deleted.
- Erase—the capability to erase a character, line of text, message, field, or the complete screen. Most terminals include character erase and some form of display erase, which may erase the entire contents of the display, just that portion following the cursor location, or a combination of both functions. Line erase is optional in many terminals.
- Character repeat—enters a continuous sequence of symbols as long as the appropriate key remains depressed.

### Keyboard Parameters

Keyboard *style* defines the general arrangement of keys; e.g., typewriter or data entry (keypunch) style. Data entry keyboards have a numeric keypad embedded in the alphabetic part of the keyboard which is accessed via numeric shift. The *character/code set* refers to the set of symbols that appear on the keytops and, in many cases, to the actual character codes generated for each key depression, such as ASCII, EBCDIC, APL, etc. Some terminals are available with more than one keyboard style to satisfy particular user needs.

Keyboards that can either fit flush against the display or be located some distance away via cable connection are referred to as *detachable* keyboards. This feature provides increased configuration flexibility and operator convenience.

Some terminals are available with *program function keys*. These are special keys whose character codes are interpreted by the user's program. A function key is used to reduce the number of required input keystrokes to save time and reduce the number of input errors. Depressing

one key could instruct the system to “sell one seat” or “call Chart A,” for example.

A *numeric keypad* is a special keyboard feature that includes a set or block of 10 numeric keys, usually located to the right of the main keygroup. These numeric keys are arranged in an adding-machine format and are particularly useful for applications that require a high volume of numeric entries or arithmetic calculations.

### Ancillary Devices

External I/O devices can add considerable flexibility to the applications possibilities for display terminals. A *cassette tape drive* or *diskette drive* can be used to store display formats, data to be transmitted, or user programs in the case of intelligent terminals. A *serial printer* provides hard copy when required.

These devices can usually be added to a terminal by the user via the terminal's RS-232 serial interface. The device is attached between the terminal and the external modem.

Although the above I/O devices are the most common, *other devices* can be and are used, such as industry-compatible 7- or 9-track magnetic tape drives, disk drives (cartridge or pack type), line printers, card readers, etc. Many units have an audible alarm which sounds whenever the operator's attention should be drawn to the prompting message area of the screen. Composite video permits multiple monitors to be attached to the terminal so that data may be viewed on more than one screen at the same time.

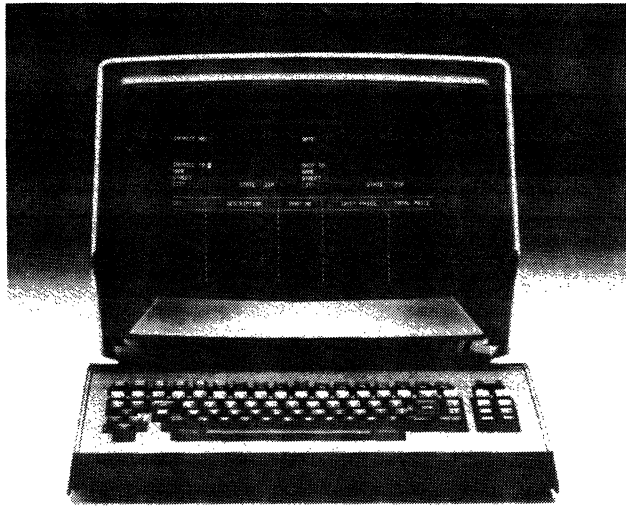
### Transmission Parameters

Nearly every display terminal contains a communications interface that enables communications between the terminal and the central computer site. Mode and technique define the operating mode and the method in which data is transmitted. There are three operating modes: simplex (transmission in one direction only), half duplex (transmission both directions, but not simultaneously), and full duplex (simultaneous transmission in both directions).

Data is transmitted synchronously or asynchronously. Asynchronous transmission is characterized by the transmission of data in irregular spurts, where the duration of time can vary between successive transmitted characters; the transmission from an unbuffered teletypewriter is a good example. Synchronous transmission implies the transmission of data in a steady stream. The time interval between successive characters is always precisely the same. The communications interface either provides clocking or accepts external clocking signals from the data set.

*Communications protocol* refers to the type of line discipline (control code sequence and control characters) that the terminal employs. The two most commonly used protocols are ASCII and IBM's binary Synchronous Communications (BSC) technique. IBM's latest protocol, Synchronous Data Line Control (SDLC), will be widely

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications



Introduced in September 1976, the Racal-Milgo System 400 display terminals are plug-compatible replacements for IBM 3270 & 2265, Honeywell VIP Series, and Univac Uniscope. The System 400 models feature 7 x 11 dot matrix for symbol formation, a detachable keyboard, 16 optional program function keys, and many screen management features.

used in the future. Other large mainframe vendors such as **▷** Burroughs, Honeywell, and Digital Equipment Corporation (DEC) have produced their own communications protocols.

The transmission *code* refers to the bit pattern of the transmitted characters. Two codes are prominent: EBCDIC and ASCII. The latter has been accepted as an industry and government standard, and is now the most commonly used code by display terminals.

The CRT terminal is a high-speed device that is usually capable of transmitting and receiving several thousand characters per second; however, it must run at a speed that is compatible with the communications system in which it is used. Most terminals are used on voice-grade facilities, which limit the transmission *speed* to a practical maximum of 4800 bits per second over the dial network and 9600 bits per second over leased or private lines.

Message *format* refers to the way data is transmitted, e.g., by block, by line, or by character. Terminals that are designed to be transmission-compatible with a Teletype unit transmit a character for each key depression. Buffered terminals transmit data in multi-character blocks. The line or block mode permits data to be composed and edited prior to each transmission and generally permits more efficient utilization of the communications facility. Some terminals offer manual selection between the modes.

*Multipoint operation* characterizes terminals that are capable of operating in a multiple-terminals-per-line environment such as that employed by the IBM 3270 and 2260/2265 display terminals. Basic to implementing this capability is the ability of a terminal to distinguish a control message intended for it alone. Polling invites the

terminals to send data. Addressing informs the terminal that a message from the central computer is coming, so that it will be conditioned to receive. Central control of the message traffic is maintained by the central computer.

*Auto answer* refers to the facility for unattended operation on the dial network whereby incoming calls are automatically answered and messages are received without human intervention.

*Auto call* refers to the facility for unattended operation on the dial network whereby outgoing calls are automatically "dialed" and messages are transmitted without human intervention.

Display terminals usually have a *terminal interface* that meets the standards of the EIA RS-232B/C specification or some other standard interface and connects to an external modem or acoustic telephone coupler.

Some terminals contain an *integral modem* that can be connected directly to a communications line. In some cases the vendor provides an integral *acoustic telephone coupler*, so that the terminal can be connected to a conventional telephone handset.

### Pricing and Availability

Terminal pricing is provided for unit quantities (one terminal) unless otherwise specified. One- and two-year lease prices, including maintenance, and purchase prices are shown for the complete terminal (including keyboard, display, and controller) for stand-alone units, and for the keyboard/display station and terminal controller for cluster units.

Single entries generally indicate the price of the basic unit without options; price ranges show the price of the basic unit and the price of an expanded unit with all options, or the price of the low end and high end of a multiple-unit family. In general, all prices exclude ancillary devices. In some cases, the terminal vendor offers a lease term other than those shown, such as a 4- or 5-year lease or a 30- or 60-day, short-term rental. In such cases, the lease prices and terms appear in the Comments at the bottom of the charts.

Many terminal vendors do not lease their equipment, and in these cases you'll find dashes in the lease price entries. Also, a number of terminal makers sell their wares on an OEM basis only, for incorporation into systems supplied by other vendors. Quantity discounts, and discounts for educational and other institutions, are often available.

*Date of first production delivery* indicates when the first production model of each terminal was delivered (or is scheduled to be delivered) to a customer.

*Display units installed to date* shows how many display units of each type had been delivered to customers as of approximately March 1, 1980. All figures were supplied by the vendors themselves, and a number of companies chose **▷** not to release this information.

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

➤ *Serviced by* specifies the party responsible for maintaining the terminal. In some cases the vendor provides total service; in others a national service organization is responsible. Service is sometimes rendered under the combined efforts of both the vendor and an independent service organization; usually in this situation, the vendor handles those areas close to his headquarters or where it has a multiplicity of installations, and the service company handles other geographical areas.

### Comments

Comments at the bottom of the charts describe significant or unusual features, capabilities, or applications which are not reflected in the standard entries.

### Vendors

Listed below, for your convenience in obtaining additional information, are the full names and addresses of the 68 vendors whose products are summarized in the comparison charts.

**Anderson Jacobson, Incorporated**, 521 Charcot Avenue, San Jose, CA 95131. Telephone (408) 263-8520.

**Ann Arbor Terminals, Incorporated**, 6175 Jackson Road, Ann Arbor, MI 48103. Telephone (313) 769-0926.

**Applied Digital Data Systems, Incorporated (ADDs)**, 100 Marcus Boulevard, Hauppauge, NY 11787. Telephone (516) 231-5400.

**Applied Dynamics International**, 3800 Stone School Road, Ann Arbor, MI 48104. Telephone (313) 973-1300.

**Basic Four/Wordstream, Incorporated**, (Division of MAI, Inc.), 300 East 44th Street, New York, NY 10017. Telephone (212) 557-3500.

**Beehive International**, 4910 Amelia Earhart Drive, Box 25668, Salt Lake City, UT 84125. Telephone (801) 355-6000.

**The Braegen Corporation**, 20740 Valley Green Drive, Cupertino, CA 95014. Telephone (408) 255-4200.

**Burroughs Corporation**, Room 4D20, Burroughs Place, Detroit, MI 48232. Telephone (313) 972-8068.

**Computer Optics, Incorporated**, Berkshire Industrial Park, Bethel, CT 06801. Telephone (203) 744-6720.

**Control Data Corporation**, 8100 34th Avenue South, Minneapolis, MN 55440. Telephone (612) 853-4656.

**Data General Corporation**, Route 9, Westboro, MA 01581. Telephone (617) 366-8911.

**DatagraphiX, Incorporated**, P.O. Box 82449, San Diego, CA 92138. Telephone (714) 291-9960.

**Datamedia Corporation**, 7300 North Crescent Boulevard, Pennsauken, NJ 08110. Telephone (609) 665-2382.

**Datapoint Corporation**, 9725 Datapoint Drive, San Antonio, TX 78284. Telephone (512) 699-7000.

**Data Terminals & Communications**, 590 Division Street, Campbell, CA 95008. Telephone (408) 378-1112.

**Dataview, Incorporated**, 23A Dana Street, Malden, MA 02148. Telephone (617) 322-2244.

**Delta Data Systems Corporation**, Woodhaven Industrial Park, Cornwells Heights, PA 19020. Telephone (215) 639-9400.

**Digi-log Systems, Incorporated**, Babylon Road, Horsham, PA 19044. Telephone (215) 672-0800.

**Digital Equipment Corporation (DEC)**, Main Street, Maynard, MA 01754. Telephone (617) 897-5111.

**EECO**, 1441 East Chestnut Avenue, Santa Ana, CA 92701. Telephone (714) 835-6000.

**Elbit U.S.A.** (a subsidiary of Elbit Computers, Ltd.), 8100 34th Avenue South, Box 0, Minneapolis, MN 55440. Telephone (612) 853-7050.

**G. R. Electronics Limited**, 1640 Fifth Street, Santa Monica, CA 90401. Telephone (213) 395-4774.

**General Digital Corporation**, 700 Burnside Avenue, East Hartford, CT 06108. Telephone (203) 298-7391.

**General Terminal Corporation** (formerly Infoton), 14831 Franklin Avenue, Tustin, CA 92680. Telephone (714) 730-0123.

**Hazeltine Corporation**, Greenlawn, NY 11740. Telephone (516) 261-7000.

Introduced in December 1979, Data General's Dasher D200 features a 7x11 dot matrix character cell for improved clarity, a recessed screen to reduce glare, and an attractively-designed display screen module that tilts and swivels to suit the operator. The Dasher D200's keyboard consists of a typewriter keypad, a 12-key screen management keypad, a 14-key numeric keypad, and a 15-key program function keypad. A printer interface, which can be used for split baud transmission, is optional.



## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

- **Hewlett-Packard**, Data Terminals Division, 19400 Homestead Road, Cupertino, CA 95014. Telephone (408) 257-7000.
- Honeywell Corporation**, Airline and Financial Industries Division (formerly Incoterm), 65 Walnut Street, Wellesley Hills, MA 02181. Telephone (617) 237-2100.
- Honeywell Information Systems, Incorporated**, 200 Smith Street, Waltham, MA 02154. Telephone (617) 895-6000.
- Human Designed Systems, Incorporated**, 3700 Market Street, Philadelphia, PA 19104. Telephone (215) 382-5000.
- Informer, Incorporated**, 8332 Osage Avenue, Los Angeles, CA 90045. Telephone (213) 649-2030.
- Intelligent Systems Corporation**, 5965 Peachtree Corners East, Norcross, GA 30071. Telephone (404) 449-5961.
- International Business Machines Corporation (IBM)**, Data Processing Division, 1133 Westchester Avenue, White Plains, NY 10604. Telephone (914) 696-1900.
- International Business Machines Corporation (IBM)**, General Systems Division, 875 Johnson Ferry Road N.E., Atlanta, GA 30342. Telephone (404) 256-7000.
- Intertec Data Systems Corporation**, 2300 Broad River Road, Columbia, SC 29210. Telephone (803) 798-9100.
- ITT Courier Terminal Systems, Incorporated**, 1515 West 14th Street, Tempe, AZ 84281. Mailing Address: P.O. Box 29039, Phoenix, AZ 85038. Telephone (602) 275-7555.
- Lear Siegler, Incorporated**, Data Products Division, 714 North Brookhurst Street, Anaheim, CA 92803. Telephone (714) 774-1010.
- Lee Data Corporation**, 5700 Green Circle Drive, Minnetonka, MN 55343. Telephone (612) 932-0300.
- MDS Trivex, Incorporated** (Division of Mohawk Data Sciences), 3180 Red Hill Avenue, Costa Mesa, CA 92626. Telephone (714) 546-7781.
- Megadata Computer & Communications Corporation**, 35 Orville Drive, Bohemia, NY 11716. Telephone (516) 589-6800.
- Memorex Corporation**, Communications Group, 18922 Forge Drive, Cupertino, CA 95014. Telephone (408) 996-9000.
- Microdata Corporation**, 17481 Red Hill Avenue, Irvine, CA 92714. Telephone (714) 540-6730.
- Micro-Term, Incorporated**, 1314 Hanley Industrial Court, St. Louis, MO 63144. Telephone (314) 968-8151.
- NCR Corporation**, EDP Products, Building 26, 3rd Floor, Main & K Streets, Dayton, OH 45479. Telephone (513) 449-6620.
- Northern Telecom Systems Corporation (NTSC)**, 6100 Blue Circle Drive, Minnetonka, MN 55343. Mailing Address: P.O. Box 1222, Minneapolis, MN 55440. Telephone (612) 932-8000.
- Olivetti Corporation of America**, 155 White Plains Road, Tarrytown, NY 10591. Telephone (914) 631-8100.
- Omron Systems**: See Ramtek.
- Paradyne Corporation**, 8550 Ulmerton Road, Largo, FL 33541. Telephone (813) 536-4771.
- Perkin-Elmer Data Systems**, Terminals Division, Route 10 and Emery Avenue, Randolph, NY 07810. Telephone (201) 366-5550.
- Perry Electronics**, 2424 Atlantic Avenue, Raleigh, NC 27604. Telephone (919) 876-8100.
- Phone 1**, P.O. Box 1522, Rockford, IL 61110. Telephone (815) 962-8927.
- Plantronics, Incorporated**, 345 Encinal Street, Santa Cruz, CA 95060. Telephone (408) 426-5858.
- Racal-Milgo, Incorporated**, 8600 N.W. 41st Street, Miami, FL 33166. Telephone (305) 592-8600.
- Ramtek Corporation**, 2211 Lawson Lane, Santa Clara, CA 95050. Telephone (408) 988-2211.
- Soroc Technology, Incorporated**, 165 Freedom Avenue, Anaheim, CA 92801. Telephone (714) 992-2860.
- Sycor**: See Northern Telecom.
- Taumarik, Incorporated**, 6621 Century Avenue, Middleton, WI 53562. Telephone (608) 831-9291.
- TEC, Incorporated**, 2727 North Fairview Avenue, Tucson, AZ 85705. Telephone (602) 792-2230.
- Tektronix, Incorporated**, Information Display Group, P.O. Box 500, Beaverton, OR 97077. Telephone (503) 644-0161.
- Teleram Communications Corporation**, 2 Corporate Park Drive, White Plains, NY 10604. Telephone (914) 694-9270.
- Teleray, Incorporated**, P.O. Box 24064, Minneapolis, MN 55424. Telephone (612) 941-3300.
- Teletype Corporation**, 5555 Touhy Avenue, Skokie, IL 60077. Telephone (312) 982-2000.
- TeleVideo, Incorporated**, 190 Coronado Drive, Santa Clara, CA 95051. Telephone (408) 246-5428.
- Telex Terminals**, 3301 Terminal Drive, Raleigh, NC 27611. Telephone (919) 834-5251.
- Termiflex Corporation**, 17 Airport Road, Nashua, NH 03060. Telephone (603) 889-3883.
- Terminal Data Corporation of Maryland**, 11878 Coakley Circle, Rockville, MD 20852. Telephone (301) 881-7655.
- Trivex**: See MDS Trivex.
- Univac Division**, Sperry Rand Corporation, P.O. Box 500, Blue Bell, PA 19424. Telephone (215) 542-4011.
- Visual Technology, Incorporated**, Railroad Avenue, Dundee Park, Andover, MA 01810. Telephone (617) 475-8056.
- Volker Craig Limited**, 266 Marstand Drive, Waterloo, Ontario, Canada N2J 3Z1. Telephone (519) 884-9300.
- Western Union Data Services Company**, 1 Lake Street, Upper Saddle River, NJ 07458. Telephone (201) 825-5333.
- Westinghouse Canada, Limited**, Information Displays, Electronic Systems Division, Box 5009, 777 Walker's Lane, Burlington, Ontario, Canada L7R 4B3. Telephone (416) 528-8811.
- Zentec Corporation**, 2400 Walsh Avenue, Santa Clara, CA 95050. Telephone (408) 246-7662.□

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Anderson Jacobson AJ 510	Ann Arbor Terminals Model 400E	Ann Arbor Terminals K1680 COMPAT	Ann Arbor Terminals K2480 COMPAT	Ann Arbor Terminals ADM3A COMPAT
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No No  Std.	Stand-alone 1 No No Std. No No  No	Stand-alone 1 No No Std. No No  No	Stand-alone 1 No No Std. No No  No	Stand-alone 1 No No Std. Lear Siegler ADM-3A No  No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  15-in. diag. 128 ASCII 7 x 10 dot matrix No Std. Std. Std.  Up std. No U, D, L, R, H, Rt.  Std. Both std. Std. Std. Std. Std. Char., line, screen std. Std.	480 to 1920 24 x 80 std.; 12 x 40, 24 x 40 opt. 8 x 10; 15-in. diag. 64 std.; 95 opt. 7 x 7 dot matrix No Std. Std. Std. Char. std.  Std. Add. std.; read opt. No No Opt. No No Screen std.  Std.	1286 16 x 80; opt. 16 x 32, 8 x 32 8 x 10; 15-in. diag. 64; opt. 95 7 x 7 dot matrix No Std. Std. Std. Char. std.  Std. No U, D, L, R, H, Rt.  Std. No No No No Screen std.  Std.	1920 24 x 80; opt. 24 x 40 8 x 10; 15-in. diag. 64; opt. 95 7 x 7 dot matrix No Std. Std. Std. Char. std.  Std. No U, D, L, R, H, Rt.  Std. No No Opt. No No Screen std.  Std.	1920 24 x 80  15-in. diag. 95 7 x 7 dot matrix No No No No No Screen std.  Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII; APL opt. No No Std.	Data entry  128 ASCII Std. Up to 36 opt. Std.	Data entry  128 ASCII Std. Up to 36 opt. Std.	Data entry  128 ASCII Std. Up to 36 opt. Std.	Teletype  128 ASCII Std. Up to 36 opt. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	Opt. Opt. Opt. —	No No No —	No No No No	No No No No	No No No —
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous ASCII ASCII 110 to 9600 Char., line, page No No No No RS-232C  No No	Half/full-duplex std. Asynchronous — ASCII Up to 9600 Char. only No No No No RS-232 std.; 20 mA opt. No No	Half/full-duplex Asynchronous No ASCII 110 to 9600 Char. only No No No No RS-232 std.; 20 mA opt. No No	Half/full-duplex Asynchronous No ASCII 110 to 9600 Char. only No No No No RS-232 std.; 20 mA opt. No No	Half/full-duplex std. Asynchronous — ASCII 110 to 9600 Char. only No No No No RS-232 std.; 20 mA opt. No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	87 83 — — 1,995-2,195 — 11/78 — Anderson Jacobson	— — — — 1,200 — 12/77 5,000 Ann Arbor Terminals	— — — — 1,200 — 3/78 1,000 Ann Arbor Terminals	— — — — 1,200 — 3/78 3,000 Ann Arbor Terminals	— — — — 1,400 — 11/78 300 Ann Arbor Terminals
<b>COMMENTS</b>	40-char. graphics set std.				



**Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications**

SUPPLIER AND MODEL	Ann Arbor Terminals VT52 COMPAT	Ann Arbor Terminals 4080 COMPAT	Ann Arbor Terminals 6080 COMPAT	Applied Digital Data Systems (ADDS) MRD 460	Applied Digital Data Systems (ADDS) Envoy 620
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Stand-alone	Stand-alone	Stand-alone
Maximum displays/controller	1	1	1	1	1
Transportability	No	No	No	No	Yes
IBM compatibility	No	No	No	No	No
Teletype compatibility	Std.	Std.	Std.	Std.	Std.
Other compatibility	DEC VT-52	Ann Arbor K4080D	No	No	No
User programmable	No	No	No	No	No
Self diagnostics	No	No	No	No	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1920	3200	4800	1920	1920
Display arrangement, lines x chars./line	24 x 80	40 x 80	60 x 80	24 x 80	24 x 80
Display area, h x w, inches	15-in. diag.	15-in. diag.	8 x 10; 15-in. diag.	9/25-in. diag.	2 x 3; 5" diag.
Total displayable symbols	95	95	96	64	64
Symbol formation	7 x 7 dot matrix	7 x 7 dot matrix	7 x 7 dot matrix	5 x 7 dot matrix	5 x 7 dot matrix
Color	No	No	No	8 colors std.	No
Reverse video	No	Std.	Std.	Std.	No
Programmable brightness levels	No	Std.	Std.	2 std.	No
Character and/or field blinking	No	Char. std.	Char. std.	Both std.	No
Roll	Std.	Std.	Std.	No	Up std.
Paging	No	No	No	No	No
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H	U, D, L, R, H
Cursor blinking	Std.	Std.	Std.	Opt.	Std.
Addressable/readable cursor	Addressable only	Addressable only	No	Both std.	Addressable only
Protected format	No	No	No	Std.	No
Partial screen transmit	No	No	No	No	No
Tabulation	Std.	Std.	No	Std.	No
Character insert/delete	No	No	No	No	No
Line insert/delete	No	No	No	No	No
Erase	Screen, line std.	Screen std.	Screen std.	Char., line, screen std.	Char., screen std.
Character repeat	Std.	Std.	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter	Teletype	Data entry	Typewriter	Typewriter
Character/code set	128 ASCII	128 ASCII	128 ASCII	ASCII	ASCII
Detachability	Std.	Std.	Std.	Std.	No
Program function keys	Up to 28 opt.	Up to 36 opt.	Up to 36 opt.	No	No
Numeric keypad	Std.	Std.	Std.	Std.	No
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	RS-232 interface	RS-232 interface
Diskette drive (floppy disk)	No	No	No	RS-232 interface	RS-232 interface
Serial printer	No	No	No	No	Impact, non-impact
Other devices	—	—	No	None	Audible alarm std.
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex opt.	Half/full-duplex std.	Half/full-duplex	Half/full-duplex	Half/full-duplex
Technique	Asynchronous	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Communications protocol	—	—	No	ASCII	ASCII
Code	ASCII	ASCII	ASCII	ASCII	ASCII
Speed, bits/second	110 to 9600	110 to 9600	110 to 9600	Up to 1500 cps	Up to 9600
Format: character, line, or block	Char. only	Char. only	Char. only	Char. only	Char. only
Multipoint operation (pollable/addr.)	No	No	No	No	No
Auto answer	No	No	No	No	No
Auto call	No	No	No	No	No
Terminal interface	RS-232 std.; 20 mA opt.	RS-232; 20 mA opt.	RS-232 std.; 20 mA opt.	RS-232C, CCITT V.24, 20 mA TTL	RS-232C, CCITT V.24, 20 mA
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	Std.
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	—	—	—	—	—
Display station, 2 year lease, \$/mo.	—	—	—	—	—
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	1,400	1,595	1,895	Contact vendor	2,250
Controller, purchase, \$	—	—	—	—	—
Date of first production delivery	11/78	2/79	4/79	9/75	10/75
Display units installed to date	3,000	500	100	700	500
Serviced by	Ann Arbor Terminals	Ann Arbor Terminals	Ann Arbor Terminals	TRW/GE	TRW/GE
<b>COMMENTS</b>					

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Applied Digital Data Systems (ADDS) Regent 100	Applied Digital Data Systems (ADDS) Regent 200	Applied Digital Data Systems (ADDS) Regent 20	Applied Digital Data Systems (ADDS) Regent 25	Applied Digital Data Systems (ADDS) Regent 40
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Stand-alone	Stand-alone	Stand-alone
Maximum displays/controller	No	No	1	1	1
Transportability	No	No	No	No	No
IBM compatibility	No	No	No	No	No
Teletype compatibility	Std.	Std.	Std.	Std.	Std.
Other compatibility	No	No	No	No	No
User programmable	No	No	No	No	No
Self diagnostics	Std.	Std.	No	No	Std.
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1920	1920	1920	1920	1920
Display arrangement, lines x chars./line	24 x 80	24 x 80	24 x 80	24 x 80	24 x 80
Display area, h x w, inches	12-in. diag.	12-in. diag.	8 x 10; 12-in. diag.	8 x 10; 12-in. diag.	8 x 10; 12-in. diag.
Total displayable symbols	128	128	128	128	128
Symbol formation	8 x 8	8 x 8	5 x 8 dot matrix	5 x 8 dot matrix	7 x 8 dot matrix
Color	No	No	No	No	No
Reverse video	Std.	Std.	Std.	Std.	Std.
Programmable brightness levels	2 std.	2 std.	No	No	Std.
Character and/or field blinking	Std.	Std.	No	No	Field std.
Roll	Up std.	Up std.	Up std.	Up std.	Up std.
Paging	No	No	No	No	No
Cursor positioning; Up, Down, Left, Right, Home, Return	Std.	Std.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	Std.	—	Selectable	Selectable	Selectable
Addressable/readable cursor	Both std.	Both std.	Addressable	Addressable	Both
Protected format	No	Std.	No	No	No
Partial screen transmit	No	Std.	No	No	No
Tabulation	No	Std.	No	No	No
Character insert/delete	No	Opt.	No	No	No
Line insert/delete	No	Opt.	No	No	Std.
Erase	Page, line, screen std.	Std.	Line, EOP, screen	Line, EOP, screen	All std.
Character repeat	Std.	Std.	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter	Typewriter	Typewriter	Typewriter	Typewriter
Character/code set	128 ASCII	128 ASCII	128 ASCII	128 ASCII	128 ASCII
Detachability	Opt.	Opt.	No	No	No
Program function keys	8/16 opt.	8/16 std.	No	No	8/16 std.
Numeric keypad	Std.	Std.	No	Std.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	RS-232C	RS-232C	No	No	No
Diskette drive (floppy disk)	RS-232C	RS-232C	No	No	No
Serial printer	RS-232C	RS-232C	EIA RS-232	EIA RS-232	EIA RS-232
Other devices	—	—	Audible alarm std.	Audible alarm std.	Audible alarm std.
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex
Technique	Asynchronous	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Communications protocol	ASCII	ASCII	ASCII	ASCII	No
Code	ASCII	ASCII	ASCII	ASCII	ASCII
Speed, bits/second	75 to 9600	75 to 9600	Up to 9600	Up to 9600	Up to 9600
Format: character, line, or block	Char.	Char./line/block	Character	Character	Character
Multipoint operation (pollable/addr.)	No	No	No	No	No
Auto answer	No	No	No	No	No
Auto call	No	No	No	No	No
Terminal interface	RS-232C; 20 mA	RS-232C, 20 mA	RS-232C	RS-232C	RS-232C; 20 mA dc
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	—	—	—	—	—
Display station, 2 year lease, \$/mo.	—	—	—	—	—
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	1,325-1,450	1,795-1,940	995	1,095	1,400
Controller, purchase, \$	—	—	—	—	—
Date of first production delivery	8/77	9/77	3/79	3/79	3/79
Display units installed to date	15,000	5000	5,000	8,000	5,000
Serviced by	—	—	GE/TRW	GE/TRW	GE/TRW
<b>COMMENTS</b>	Features include terminal status line, limited graphics, and terminal bypass printing	Features include terminal status line, limited graphics, and terminal bypass printing	Std. switch selectable foreign character font. Monitor mode displays control code.	Std. switch selectable foreign character font. Monitor mode displays control code. Numeric pad is switch selectable function keypad	Foreign character fonts available; terminal status line; monitor mode; terminal bypass printing; limited graphics; Regent 100 compatibility.

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	Applied Digital Data Systems (ADDS) Regent 60	Applied Dynamics International Series 60	Basic Four/ Wordstream (Div. of MAI) Model G77C	Beehive International Model DM10	Beehive International Model DM1A
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No No Std.	Either 10 No No Std. Several opt. User-defined firmware Opt.	Cluster 32 No 3270 No No No No	Stand-alone 1 No No Std. No — Std.	Stand-alone 1 No No Std. No — Std.
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  8 x 10; 12-in. diag. 128 7 x 8 dot matrix No Std. Std. Field std.	256 to 2000 8 x 32, 16 x 40, 20 x 50, 24 x 80, 25 x 80 15-in. diag. 64 std., 128 opt. 5 x 7 std., 7 x 9 opt. No Std. Std. Std.	1920 24 x 80  7 x 10.5, 14-in. diag. 64 5 x 7 dot matrix No No Std. No	1920 24 x 80 plus 25th status line 8.5 x 6.5; 12" diag. 128 ASCII 5 x 7 dot matrix No Std. 8-level video Both std.	1920 24 x 80 plus 25th status line 8.5 x 6.5; 12" diag. 128 ASCII 5 x 7 dot matrix No Std. 8-level video Both std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Up std. 1 page U, D, L, R, H, Rt.  Selectable Both Std. Std. Forward/back std. Std. Std. All std.	Std., switch-select. Yes, up to 32 pgs. U, D, L, R, H, Rt.  Std. Both std. Opt. Opt. Opt. Opt. Std.	No No U, D, L, R, H, Rt.  Opt. Std. Std. Std. Std. No Char., screen std.	Roll or page std. Single page U, D, L, R, H, Rt.  Blinking block Both std. No No Forward tab No No Screen, end-of-line, end-of-page Std.	Roll or page std. Single page U, D, L, R, H, Rt.  Blinking block Both std. No No Forward tab No No Screen, end-of-line, end-of-page Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No EIA RS-232 Audible alarm std.	RS-232C RS-232C RS-232C —	No No Impact Audible alarm, ID card reader, light pen, security keylock opt.	No No No No	No No No Std. bidirectional RS-232C aux. port
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous No ASCII Up to 9600 All std. No No No RS-232C; 20 mA dc No No	Half/full-duplex Asynchronous Any ASCII std. 55 to 19,200 Char., line, block Opt. No No RS-232 std.; 20/60 mA, TTL opt. No No	See comments — — — — — — — — — — —	Half/full-duplex Asynchronous — ASCII 110 to 19,200 Character No No No No RS-232C, 20 mA std. No No	Half/full-duplex Asynchronous — ASCII 110 to 19,200 Character No No No No RS-232C, 20 mA std. No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	— — — — 1,795 — 3/79 2,000 GE/TRW	— — — — 1,520 720 9/78 Over ADI	— — — — 2,300 — 1/75 20,000 Sorbus	Purchase only — — — — — 8/78 — Beehive, Western Union	Purchase only — — — — 1,395 — 8/78 — Beehive, Western Union
<b>COMMENTS</b>	Foreign character fonts available; terminal status line; monitor mode; terminal bypass printing; limited graphics; Regent 100 compatibility	All units utilize the same hardware; firmware controlling 2 microprocessors customizes the unit to customer speci- fications without in- curring engineer- ing charges	Replaces IBM 3277-2 Display Sta- tion; plugs into IBM 3271-2 (remote), 3271-2 (local), or 3791 (remote) Con- trol Units and Local Display Adapter for System/3	Line lock/memory lock with invisible address pointer std.; 11-char. line draw- ing set; 16 non-dis- playable video attri- bute characters per display line; status and mode visible on 25th display line	All std. features of Micro Bee plus buf- fered bidirectional aux. port; permits split-speed operation between terminal and aux. device or CPU and aux. de- vice

**Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications**

SUPPLIER AND MODEL	Beehive International Model DM1S	Beehive International Model DM20	Beehive International Model DM30	Braegen 3081	Braegen 3161
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No See comments See comments Yes, via user-defined firmware Std.	Stand-alone 1 No No Std. No No Std.	Stand-alone 1 No No Std. No No Std.	Cluster 32 No 3270, 1403, 2501 No No No No	Cluster 32 No 3270 local & BSC No No No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80 plus 25th status line 8.5 x 6.5; 12" diag. 128 ASCII 5 x 7 dot matrix No Std. 8-level video Both std.	1920 24 x 80 plus 25th status line 8.5 x 6.5; 12" diag. 128 ASCII 5 x 7 dot matrix No Std. 8-level video Both std.	1920 24 x 80 plus 25th status line 8.5 x 6.5; 12" diag. 128 ASCII 5 x 7 dot matrix No Std. 8-level video Both std.	480/1920 12 x 40, 24 x 80 12-inch. diag. 196 7 x 9 dot matrix No Std. 2 std. Std.	1920 24 x 80 15-in. diag. 196 7 x 9 dot matrix No Std. 2 std. Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII Std. 12 user-defined std. Std.	Typewriter  128 ASCII Std. 16 std. Std.	Typewriter  128 ASCII Std. 16 std. Std.	Typewriter, data entry, console 256 EBCDIC Std. 10 std., 15 opt. Opt.	Typewriter, data entry, console 256 EBCDIC Std. 10 std., 15 opt. Opt.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No No Std. bidirectional RS-232C aux. port	No No No Std. bidirectional RS-232C aux. port	No No No Std. bidirectional, RS-232C aux. port	No Std., single impact Alarm, disk, line printer, card reader	No Std., single impact Alarm, disk, line printer, card reader
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous — ASCII 110 to 19,200 Character No No No RS-232C, 20 mA std.	Half/full-duplex Asynchronous ASCII ASCII 110 to 19,200 Char., line, blk., fld. No No No RS-232C, 20 mA	Half/full-duplex Asynchronous ASCII ASCII 110 to 19,200 Char., line, fld., blk. No No No RS-232C, 20 mA	Half-duplex Synchronous BSC ASCII, EBCDIC 1200 to 19,200 Char./block Std. No No RS-232C	Half-duplex Synchronous BSC Typewriter/EBCDIC 1200 to 19,200 Char./block Std. No No RS-232C
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 1,345 — 8/78 — Beehive, Western Union	Purchase only — — — 1,695 — 10/78 — Beehive, Western Union	Purchase only — — — 1,995 — 6/79 — Beehive, Western Union	70 67 250 240 2,700 9,000 — 1,000 Braegen	70 67 250 240 2,700 9,000 3/80 2 Braegen
<b>COMMENTS</b>	All std. features of Micro Bee 1A plus opt. emulation pkgs. for DEC VT52, Data General Dasher, ADDS Regent 100, Microdata Prism; also available without software as OEM unit	Fully buffered communications; full editing facilities; line drawing forms mode; capability to time-share aux. to main port and screen; line lock/memory lock, with invisible address pointer std.	All standard DM features plus two page display memory, full editing and formatting facilities, memory lock, parallel printer interface	May be connected to up to 8 IBM hosts, local & remote, and switched to operate with 14 different applications	May be connected to up to 8 IBM hosts, local & remote, and switched to operate with up to 14 different applications

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	Burroughs TD 500 Series	Burroughs TD 730	Burroughs TD 830	Computer Optics CO:77/78	Control Data Model 714
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Stand-alone	Either	Either
Maximum displays/controller	1	1	1	32	15
Transportability	No	No	No	No	No
IBM compatibility	No	3275 opt.	3275 opt.	3270 Series	No
Teletype compatibility	No	No	No	No	No
Other compatibility	Burroughs	Burroughs	Burroughs	No	No
User programmable	No	No	No	No	No
Self diagnostics	Yes	Yes	Yes	Yes	Yes
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	600	480	2000	1920, 2560, 3440	1280/1920
Display arrangement, lines x chars./line	15 x 40	12 x 40	80 x 25	25 x 80, 32 x 80, 43 x 80	16 x 80; 24 x 80
Display area, h x w, inches	5-/9-in. diag.	4.7 x 8.4	7.5 x 9	15-in. diag.	8 x 10
Total displayable symbols	96 ASCII	128	128	96	96
Symbol formation	7 x 9 dot matrix	5 x 7 dot matrix	5 x 7 dot matrix	7 x 9 dot matrix	5 x 9 dot matrix
Color	No	No	No	No	No
Reverse video	Std.	No	Std.	Std.	Yes
Programmable brightness levels	No	No	Std.	2 std.	No
Character and/or field blinking	No	Std.	Std.	Std.	No
Roll	—	Std.	Std.	No	Std.
Paging	—	Std.	Std.	No	No
Cursor positioning: Up, Down, Left, Right, Home, Return	—	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	—	Std.	Std.	Opt.	Std.
Addressable/readable cursor	—	Std.	Std.	No	No
Protected format	—	Std.	Std.	Std.	Std.
Partial screen transmit	—	Std.	Std.	Std.	Std.
Tabulation	—	Std.	Std.	Std.	Std.
Character insert/delete	—	Std.	Std.	Std.	Std.
Line insert/delete	—	Std.	Std.	Std.	Std.
Erase	—	Std.	Std.	Char., field, screen std.	Char., screen std. line opt.
Character repeat	—	Std.	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter or numeric/function	Typewriter	Typewriter	Typewriter, data entry, other	Typewriter
Character/code set	128 ASCII	128 ASCII	128 ASCII	128 EBCDIC/ASCII	ASCII
Detachability	Std.	Std.	Std.	Std.	No
Program function keys	Yes	—	—	Up to 24 std.	8
Numeric keypad	Opt.	Opt.	Opt.	Opt.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	Single/dual	Single/dual	No	No
Diskette drive (floppy disk)	No	No	No	3274 type only	No
Serial printer	No	Impact	Impact	Impact	Impact/non-impact
Other devices	ID card reader, magnetic card reader	Line printers, audible alarm, ID card reader	Line printers, audible alarm, ID card reader	Line printer, light pen, etc.	Audible alarm std.
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half-duplex	Half-duplex	Half-duplex	Half-duplex	Half/full-duplex
Technique	Asynchronous	Async./sync.	Async./sync.	Synchronous	Synchronous
Communications protocol	Burroughs	BSC/Burr.	BSC/Burr.	BSC/SDLC	ASCII/CDC MODE 4
Code	ASCII	ASCII	ASCII	ASCII/EBCDIC	ASCII
Speed, bits/second	Up to 9600	Up to 38,400	Up to 38,400	1200 to 9600	2000 to 9600
Format: character, line, or block	Block	Char./block	Char./block	Block	Block
Multipoint operation (pollable/addr.)	Std.	Std.	Std.	Std.	Std.
Auto answer	No	No	No	No	No
Auto call	No	No	No	No	No
Terminal interface	RS-232C	RS-232C	RS-232C	RS-232C	RS-232C
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	84-105	120-130	124-154	65	112-259
Display station, 2 year lease, \$/mo.	—	—	—	57	—
Controller, 1 year lease, \$/mo.	—	—	—	250	—
Controller, 2 year lease, \$/mo.	—	—	—	225	—
Display station, purchase, \$	1,975-2,450	2,715-2,865	2,796-2,951	1,800-2,250	4,490-10,108
Controller, purchase, \$	—	—	—	4,000-7,000	—
Date of first production delivery	4/78	6/77	8/76	1st qtr. 1974	5/78
Display units installed to date	—	—	—	5000	Over 500
Serviced by	Burroughs	Burroughs	Burroughs	Computer Optics and Pertec, Inc.	CDC
<b>COMMENTS</b>					

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Control Data Model 751	Control Data Model 752	Control Data Model 756	Data General Dasher D1 (Model 6052)	Data General Dasher D2 (Model 6053)
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Stand-alone	Stand-alone	Stand-alone
Maximum displays/controller	1	1	1	1	1
Transportability	No	No	No	No	No
IBM compatibility	No	No	No	No	No
Teletype compatibility	Std.	Std.	Std.	Std.	Std.
Other compatibility	No	No	No	No	No
User programmable	No	No	No	No	No
Self diagnostics	Yes	Yes	Std.	Yes	Yes
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1920	1920	1920	1920	1920
Display arrangement, lines x chars./line	24 x 80	24 x 80	24 x 80	24 x 80	24 x 80
Display area, h x w, inches	12-in. diag.	12-in. diag.	12-in. diag.	6 x 9	6 x 9
Total displayable symbols	128 ASCII	128 ASCII	128 ASCII	64	96
Symbol formation	7 x 9 dot matrix	7 x 9 dot matrix	7 x 9 dot matrix	5 x 7 dot matrix	5 x 8 dot matrix
Color	No	No	No	No	No
Reverse video	No	No	No	No	No
Programmable brightness levels	2 std.	2 std.	2 std.	No	2 std.
Character and/or field blinking	Both std.	Both std.	Both std.	Both std.	Both std.
Roll	Up std.	Up std.	Up std.	Up std.	Up std.
Paging	Opt.	No	No	No	No
Cursor positioning: Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	Std.	Std.	Std.	Std.	Std.
Addressable/readable cursor	Std.	Addressable only	Addressable only	Addressable only	Addressable only
Protected format	Std.	No	Std.	No	No
Partial screen transmit	Std.	No	Std.	Yes	Yes
Tabulation	Std.	No	Std.	No	No
Character insert/delete	Std.	No	Std.	No	No
Line insert/delete	Std.	No	Std.	No	No
Erase	Char., line, screen std.	Char., line, screen std.	Char., line, screen std.	Line, screen std.	Line, screen std.
Character repeat	Std.	Std.	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter	Typewriter	Typewriter	Teletype	Typewriter
Character/code set	64/96 ASCII	64/96 ASCII	64/96 ASCII	64 ASCII	96 ASCII
Detachability	Std.	Std.	Std.	Std.	Std.
Program function keys	No	No	12 std., 24 possible	8 std.	11 std.
Numeric keypad	Std.	Std.	Std.	Std.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	Single/dual drive	No	No	No	No
Diskette drive (floppy disk)	No	No	No	No	No
Serial printer	Impact/non-impact	Impact/non-impact	Impact/non-impact	Yes	Yes
Other devices	Audible alarm std.	Audible alarm std.	Audible alarm std.	—	—
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex	Half/full-duplex	Half/full-duplex	Full-duplex	Full-duplex
Technique	Asynchronous	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Communications protocol	ASCII	ASCII	ASCII	ASCII	ASCII
Code	ASCII	ASCII	ASCII	ASCII	ASCII
Speed, bits/second	110 to 9600	110 to 9600	110 to 9600	110-19,200	110-19,200
Format: character, line, or block	Char./line/page	Char. only	Char./block	Char. only	Char. only
Multipoint operation (pollable/addr.)	Opt.	No	No	No	No
Auto answer	Opt.	No	No	No	No
Auto call	No	No	No	No	No
Terminal interface	RS-232C, current loop	RS-232C, current loop	RS-232C, current loop	RS-232C, 20 mA	RS-232C, 20 mA
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	100-134	55	70	Purchase only	Purchase only
Display station, 2 year lease, \$/mo.	—	—	—	—	—
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	3,150-3,765	1,650-1,750	2,197	1,990	2,290
Controller, purchase, \$	—	—	—	400	400
Date of first production delivery	9/76	3/77	6/78	10/76	10/76
Display units installed to date	Over 500	Over 500	—	—	—
Serviced by	CDC	CDC	CDC	Data General	Data General
<b>COMMENTS</b>				Monitor tilts and swivels.	Monitor tilts and swivels.

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	Data General Dasher D3 (Model 6093)	Data General Dasher D100 (Models 6106, 6107)	Data General Dasher D200 (Models 6108, 6109)	DatagraphiX 132A	DatagraphiX 132B
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No No Std.	Stand-alone 1 No No Std. No No Std.	Stand-alone 1 No No Std. No No Std.	Stand-alone 1 No No Std. No No Yes	Stand-alone 1 No No Std. No No —
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  12-in. diag. 96 ASCII plus 5 x 8 dot matrix No Std. Std. Std. Std.  No No U, D, L, R, H, Rt.  Std. Both std. Std. Std. Std. Std. Std. Line, screen std.  Std.	1920 24 x 80  12-in. diag. 96 ASCII 7 x 11 dot matrix No Std. Std. Std. Std.  No No U, D, L, R, H, Rt.  No Both std. No Std. No No No Line, screen std.  Std.	1920 24 x 80  12-in. diag. 96 ASCII 7 x 11 dot matrix No Std. Std. Std. Std.  No Both std. No Std. No No No Line, screen std.  Std.	3960 30 x 132  8 x 11 96 Charactron No No Yes No  Yes No U, D, L, R, H, Rt.  Std. Yes No Yes Std. Std. Std. Char., line, screen std. Std.	3960 30 x 132  8 x 11 96 Charactron No No Yes No  Yes Yes U, D, L, R, H, Rt.  Std. Yes Yes Yes Std. Std. Std. Std. Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII Std. 13 std. Std.	Typewriter  128 ASCII Std. No Std.	Typewriter  128 ASCII Std. 19 std. Std.	Typewriter  128 ASCII Std. No No	Typewriter  128 ASCII Std. 12 std. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No Interface std. Tone on bell	No No Opt. interface Tone on bell	No No Opt. interface Tone on bell	No No RS-232C Audible alarm	No No RS-232C Audible alarm
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Full-duplex Asynchronous ASCII ASCII Up to 19,200 Char., block No No No No RS-232C, 20 mA std. No No	Full-duplex Asynchronous ASCII ASCII Up to 19,200 Character No No No No RS-232C, 20 mA std. No No	Full-duplex Asynchronous ASCII ASCII Up to 19,200 Character No No No No RS-232C, 20 mA std. No No	Half/full-duplex Asynchronous ASCII ASCII 110-9600 Char., line, block No No No No RS-232C, 20 mA No No	Full-duplex Asynchronous ASCII ASCII 110 to 9600 Char., line, block No No No No RS-232C, 20 mA No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	N/A N/A N/A N/A 2,590 — 6/79 — Data General	N/A N/A N/A N/A 1,750 — 2/80 — Data General	N/A N/A N/A N/A 1,950 — 2/80 — Data General	226-265 Conditional — — 3,950-4,450 — 11/77 — DatagraphiX	255-284 Conditional — — 4,450-4,950 — 11/78 — DatagraphiX
<b>COMMENTS</b>	Lease and Rental available via third parties and terminal resellers. Monitor tilts and swivels.	Lease and rental available via third parties and terminal resellers. Monitor tilts and swivels. Printer interface option is an additional \$400.	Lease and rental available via third parties and terminal resellers. Monitor tilts and swivels. Printer interface option is an additional \$400.	Memory buffer of 60 or 120 lines	Memory buffer of 60 or 120 lines

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	DatagraphiX 132-1	DatagraphiX 132-70 System	Datamedia Elite 1521A	Datamedia Elite 3000A Series	Datamedia Elite 3045A APL/ASCII
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone — No No Std. See comments No Std.	Either 32 No See comments No Univac opt. No —	Stand-alone 1 No No Std. No No Std.	Stand-alone 1 No No Std. See comments No Std.	Stand-alone 1 No No Std. No No Std.
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	3168 24 x 132  5.5 x 10 96 ASCII Charactron No No 2 std. Char. std.  No No U, D, L, R, H, Rt.  Std. Both std. No No Forward/back std. No No Line & screen std.  Std.	Up to 3564 12 x 40 to 27 x 132  8 x 11 96 Charactron No No 2 std. No  No No U, D, L, R, H, Rt.  Std. Addressable Std. Std. Forward/back std. Std. Std. Char., line, screen std. Std.	1920 24 x 80  6 x 9 (8.5 x 11 opt.) 128 ASCII 5 x 9 dot matrix No No 2 opt. No  Up std. No U, D, L, R, H, Rt., new line std. Std. Addressable only No No Forward std. No No Char., line, screen std. Std.	1920 24 x 80  6 x 9 (8.5 x 11 opt.) 128 ASCII 5 x 9 dot matrix No Std. 2 std. Char., field std.  Up std. No U, D, L, R, H, Rt., new line std. Std. Both std. Std. Std. Forward/back std. Std. Std. Char., line screen std. Std.	1920 24 x 80  6 x 9 (8.5 x 11 opt.) See comments 5 x 9 dot matrix No No 2 std. No  Up std. No U, D, L, R, H, Rt., new line std. Std. Both std. Std. Std. Forward/back std. Std. No Char., line, screen std. Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII No No Std.	Typewriter  EBCDIC & ASCII Std. 12 std. Std.	Typewriter  128 ASCII Std. 12 opt. Opt.	Typewriter  128 ASCII Std. 10 std. Std.	Typewriter  128 ASCII or APL Std. 10 std. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No Yes Audible alarm std.	No No Yes Audible alarm std.	RS-232C interface RS-232C interface RS-232C interface Audible alarm, com- posite video out std.	RS-232C interface RS-232C interface RS-232C interface Audible alarm, com- posite video out std.	RS-232C interface RS-232C interface RS-232C interface Audible alarm, com- posite video std.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous ASCII ASCII 300 to 19,200 Char. only No No No No RS-232C, 20 mA dc No No	Half/full-duplex Synchronous BSC EBCDIC & ASCII Up to 9600 Block only Std. No No No RS-232C	Half/full-duplex Asynchronous ASCII ASCII 50 to 9600 Char. only No No No RS-232C std., 20 mA opt. No No	Half/full-duplex Asynchronous ASCII ASCII 50 to 9600 Char., line, block Opt. No No No RS-232C std.; 20 mA opt. No No	Half/full-duplex Asynchronous ASCII ASCII/APL 50 to 9600 Char., line, block No No No RS-232C std.; 20 mA opt. No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 2,150 — 1/80 — DatagraphiX	219 — 195 — 4,450 4,000 2/80 — DatagraphiX	— — — — 1,295-1,695 — 10/77 Over 3000 Datamedia	— — — — 1,595-1,995 — 2/78 Over 2000 Datamedia	— — — — 1,795-2,195 — 3/78 Over 1000 Datamedia
<b>COMMENTS</b>	Optional VT-100/ VT-52 compatibility. English language menu for ease of operator set-up. A 25th status line. Quantity discounts available.	Compatible with all remote stand-alone and cluster con- figurations for all 3277 and 3278 ter- minal models. Quantity discounts available for termi- nals.		DEC VT-52, Data General Dasher 6053, Datamedia Elite 2500 com- patibility available.	Total displayable symbols: 128 ASCII, 32 APL, 62 overstrike char- acters



## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Datamedia DT 80/1	Datamedia DT 80/5 (APL)	Datapoint 3600 & 3610	Datapoint 8200	Datapoint 3670
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable	Stand-alone 1 No No Std. DEC VT-100 No	Stand-alone 1 No No Std. DEC VT-100/APL No	Stand-alone 1 No No No Datashare No	Stand-alone 1 No No Std. Datashare No	Stand-alone 1 No 3277-BSC No Datashare See comments
Self diagnostics	Std.	Std.	No	Std.	Std.
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line	1920-3168 24 x 80; 24 x 132	1920-3168 24 x 80; 24 x 132	1920 24 x 80	1920 24 x 80	1920 24 x 80
Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking	6 x 9 (8.5 x 11 opt.) 96 ASCII & 31 spec. 7 x 9 dot matrix No No 2 std. Std.	6 x 9 (8.5 x 11 opt.) See comments 7 x 9 dot matrix No Std. 2 std. Std.	5 x 8 96 5 x 7 dot matrix No No No No	5 x 8 96 5 x 7 dot matrix No No Std. No	5 x 8 96 5 x 7 dot matrix No Std. No No
Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase	Up, down std. No U, D, L, R, H, Rt., new line std. Std. Both std. No No Forward No No Char., line, screen std. Std.	Up, down std. No U, D, L, R, H, Rt., new line std. Std. Both std. No No Forward No No Char., line, screen std. Std.	Up std. No U, D, L, R, H, Rt. Std. Addressable only No No Std. No No Char. std. No	Up std. No U, D, L, R, H, Rt. Std. Addressable only No No No Char. & screen std. Std.	Up std. No U, D, L, R, H, Rt. Std. Addressable only Yes Yes Forward/back std. Std. No Char., line, screen std. Std.
Character repeat	Std.	Std.	No	Std.	Std.
<b>KEYBOARD PARAMETERS</b> Style	Typewriter	Typewriter	Typewriter	Typewriter	Typewriter
Character/code set Detachability Program function keys Numeric keypad	96 ASCII & 31 spec. Std. 18 std. Std.	See comments Std. 18 std. Std.	ASCII Opt. No Std.	ASCII Std. 12 std. Std.	ASCII Std. 12 std. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	RS-232C interface RS-232C interface RS-232C interface Audible alarm, composite video in/out	RS-232C interface RS-232C interface RS-232C interface Audible alarm, composite video in/out	No No Impact Audible alarm std.	No No Impact Audible alarm std.	No No No Audible alarm std.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface	Half/full-duplex Async./sync. ASCII ASCII 50 to 9600 Character No No No RS-232C std.; 20 mA opt. No No	Half/full-duplex Asynchronous ASCII/APL ASCII 50 to 9600 Character No No No RS-232C std., 20 mA opt. No No	Full-duplex Asynchronous ASCII ASCII 110 to 9600 Char. only No No No RS-232B/C No No	Full-duplex Asynchronous ASCII ASCII 50 to 9600 Character No No No RS-232C No No	Full-duplex Synchronous BSC EBCDIC 9600 Block No No No RS-232C No No
Integral modem Integral acoustic coupler	No No	No No	No No	No No	No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	— — — — 1,995-2,395 — 8/79 — Datamedia	— — — — 2,295-2,695 — 3/80 — Datamedia	77 70 — — 1,370 — 12/74 20,000 Datapoint	74 70 — — 1,450 — 9/79 N/A Datapoint	138 126 328 273 3,395 6,550 12/79 N/A Datapoint
<b>COMMENTS</b>		Total displayable symbols: 128 ASCII/APL, 31 spec., 69 over- strike. Character/ code set: 96 ASCII, 31 spec., 128 APL			Through the use of a Datapoint 1500, the 3670 can be clustered (up to 16) and be user-pro- grammable via user- created programs

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Data Terminals & Communica- tions DTC-382V	Dataview Marquis	Dataview Marquis/X-Y	Dataview Monarch	Dataview Monarch-52
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone 1	Stand-alone 1	Stand-alone 1	Stand-alone 1	Stand-alone 1
Maximum displays/controller	No	No	No	No	No
Transportability	No	No	No	Opt.	No
IBM compatibility	Std.	Std.	No	Std.	Std.
Teletype compatibility	No	No	No	DEC; others opt.	No
Other compatibility	No	No	No	No	No
User programmable	No	No	No	No	No
<b>Self diagnostics</b>	No	Yes	Std.	Std.	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1920	1920	1920	1920	1920
Display arrangement, lines x chars./line	24 x 80	24 x 80	24 x 80	24 x 80	24 x 80
Display area, h x w, inches	7 x 9; 12-in. diag.	12-in. diag.	7 x 9	7 x 9	12-in. diag.
Total displayable symbols	128 ASCII	64	96	128	128 ASCII
Symbol formation	7 x 9 dot matrix	5 x 7 dot matrix	7 x 9	7 x 9	5 x 7 dot matrix
Color	No	No	No	No	No
Reverse video	Std.	No	Std.	Std.	No
Programmable brightness levels	Std.	—	Std.	2 std.	No
Character and/or field blinking	Std.	No	Std.	No	No
<b>Roll</b>	Up & down std.	Yes	Std. up & down	Up & down std.	No
<b>Paging</b>	4 std., 8 opt.	No	No	Opt., 2 pages	No
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	Horiz. bottom line	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	Std.	Yes	Std.	Std.	Std.
Addressable/readable cursor	Addressable only	Yes	Addr. std./read. opt.	Both std.	Addressable only
Protected format	Std.	No	No	Opt.	No
Partial screen transmit	Std.	No	No	Opt.	No
Tabulation	Forward/back std.	No	Std. forward	Std.; back opt.	Std.
Character insert/delete	Std.	No	No	Opt.	No
Line insert/delete	Std.	No	No	Opt.	No
Erase	Std.	Screen std.	Char. & screen std.	Char., line, screen std.	Line, screen std.
<b>Character repeat</b>	Std.	Yes	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
<b>Style</b>	Typewriter	Typewriter	Typewriter	Typewriter	Typewriter
<b>Character/code set</b>	128 ASCII	ASCII	128 ASCII	128 ASCII/EBCDIC	ASCII
<b>Detachability</b>	No	No	Opt.	Opt.	No
<b>Program function keys</b>	19 std.	No	No	3 opt.	3 std.
<b>Numeric keypad</b>	Std.	No	Opt.	Std.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	RS-232C interface	RS-232C interface	No
Diskette drive (floppy disk)	Dual drive	No	RS-232C interface	RS-232C interface	No
Serial printer	Impact	No	RS-232C interface	RS-232C interface	Printer port EIA
Other devices	Dual floppy disk drive; second RS-232C interface opt.	Audible alarm	—	—	Audible alarm std.
<b>TRANSMISSION PARAMETERS</b>					
<b>Mode</b>	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex
<b>Technique</b>	Asynchronous	Asynchronous	Asynchronous	Async./sync.	Asynchronous
<b>Communications protocol</b>	ASCII	ASCII	ASCII	ASCII/BSC	ASCII
<b>Code</b>	ASCII/EBCDIC	ASCII	ASCII/EBCDIC	ASCII/EBCDIC	ASCII
<b>Speed, bits/second</b>	9600	Up to 9600	75 to 9600	75 to 19,200	50 to 19,200
<b>Format: character, line, or block</b>	Character	Character	Char. only	Char., block opt.	Character
<b>Multipoint operation (pollable/addr.)</b>	No	No	No	Opt.	No
<b>Auto answer</b>	No	No	No	No	No
<b>Auto call</b>	No	No	No	No	No
<b>Terminal interface</b>	RS-232C	RS-232C, 20 & 60 mA current loop	RS-232C, 20 mA current loop	RS-232C & 20 mA current loop	RS-232C of 20 mA current loop std.
<b>Integral modem</b>	No	No	No	No	No
<b>Integral acoustic coupler</b>	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	—	—	—	—	—
Display station, 2 year lease, \$/mo.	—	—	—	—	—
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	5,700*	805	895-1,295	1,435-1,995	1,360
Controller, purchase, \$	Included in above	—	—	—	—
Date of first production delivery	1978	1/77	9/77	1/78	12/78
Display units installed to date	600	—	—	—	—
Serviced by	DTC/Dow Jones or third parties	Dataview (factory)	Dataview (factory)	Dataview (factory)	Dataview
<b>COMMENTS</b>	*The video display is mounted above the printer and sold as one unit. A metal wheel print mechanism is available. Printer buffer is 256 characters			Emulation protocol for several prominent terminals; Intel 8055; split data rates	Plug-for-plugin replacement for DEC VT-52 and VT-100; keyboard layout is identical to VT-52; split baud rate std.

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Dataview Titan	Delta Data Systems Model 4050	Delta Data Systems Model 2830	Digi-Log TeleComputer II	Digital Equipment Model VT-52
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No Opt. Opt. Opt. No  Std.	Stand-alone 1 No No Std. See comments Opt.  No	Either — No No Std. Burroughs TD830 No  Std.	Stand-alone 10 Opt.; 22 lbs. No No Std. No No  No	Stand-alone 1 No No Std. No No  No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  7 x 9 128 7 x 9 No Std. 2 std. Char. std.; field opt.  Up & down std. 2 std.; 30 opt. U, D, L, R, H, Rt.  Std. Both std. Std. Std. Std.; back opt. Std. Std. Char., line, screen std. Std.	2000 25 x 80  6 x 11 224 5 x 7 dot matrix No Std. Opt. Both std.  Up & down std. Std. U, D, L, R, H, Rt.  Std. Std. Std. Std. Std. Std. Char., line, screen std. Std.	1920 24 x 80  15-in. diag. 136 7 x 9 dot matrix No Std. Std. Both std.  Up & down std. 12 pages std. U, D, L, R, H, Rt.  Std. Both std. Std. No Forward/back std. Std. Std. Char., line, screen std. Std.	1280/640 16 x 40/80  Variable 64; 96 opt. 5 x 7 dot matrix No No No Both opt.  Up std. — U, D, L, R, H, Rt.  Opt. Opt., addr. only No No No Screen std.  Std.	1920 24 x 80  8.7 x 4.3 128 7 x 7 No No No No  No No U, D, L, R, H, Rt.  Std. Addressable only No No Std. No Line, screen std.  Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII/EBCDIC Opt. 3 std.; others opt. Std.	Typewriter  ASCII; others opt. Opt. 8 std.; others opt. Std.	Typewriter, data entry 128 ASCII Std. No Std.	Teletype  ASCII Yes No No	Typewriter  ASCII No 3 std. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	RS-232C interface RS-232C interface RS-232C interface —	RS-232C interface RS-232C interface Impact/non-impact Audible alarm std.; light pen opt.	No No Impact/non-impact Audible alarm std.	RS-232C interface RS-232C interface RS-232C interface 5-inch portable CRT, audible alarm	No No Non-impact Audible alarm std.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Async./sync. ASCII/BSC/SDLC ASCII/EBCDIC 75 to 19,200 Char./line/block Std. No No RS-232C & 20 mA current loop No No	Half/full-duplex Async./sync. ASCII; others opt. ASCII; others opt. 110 to 9600 Char./block Opt. No No RS-232C, current loop No No	Half/full-duplex Async./sync. Burroughs TDI ASCII Up to 9600 Char./block Std. No No RS-232C std., CCITT opt. No No	Half/full-duplex Asynchronous ASCII ASCII 75 to 9600 Char. only No No RS-232C, CCITT, or 20/60 mA dc Opt. Opt.	See comments Asynchronous No ASCII 75 to 9600 Char. only No No RS-232C, 20 mA current loop No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Served by	— — — — 2,195 (base) — 5/78 — Dataview (factory)	150-170 138-156 — — 2,995-3,500 — 5/78 4000 Delta & Sorbus	— — — — 2,950 — 9/79 1000 Delta & Sorbus	— — — — 250-350 1,395-1,570 9/75 Over 1000 Digi-Log	Purchase only — — — 2,100 — 12/75 — DEC
<b>COMMENTS</b>	Emulation protocol for several prom- inent terminals; Intel 8055; split data rates	Plug-to-plug replacement for Univac & Honey- well displays	Leasing available through distri- butors	Over 2800 units delivered, includ- ing Models 33 and 209, now discon- tinued	Transmission modes are full-duplex and full-duplex with local copy

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	Digital Equipment Model VT-55	Digital Equipment Model VT-61/t	Digital Equipment Model VT-100	EECO Editor I	Elbit DS 1920
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Stand-alone	Either	Stand-alone
Maximum displays/controller	1	1	1	1	1
Transportability	No	No	No	No	No
IBM compatibility	No	No	No	No	No
Teletype compatibility	Std.	Std.	Std.	Std.	Std.
Other compatibility	No	No	No	See comments	No
User programmable	No	No	No	No	No
Self diagnostics	No	Yes	Yes	Std.	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1920	1920	1920; 3168 opt.	1920	1920
Display arrangement, lines x chars./line	24 x 80	24 x 80	24 x 80; 24 x 132 opt.	24 x 80	24 x 80
Display area, h x w, inches	8.7 x 4.3	8.7 x 4.3	8 x 4.5	6.5 x 8.4; 12-in. diag.	15-in. diag.
Total displayable symbols	128	128	128	128	64/96/128
Symbol formation	7 x 7	7 x 8 dot matrix	7 x 9 dot matrix	5 x 9 dot matrix	7 x 9 dot matrix
Color	No	No	No	Opt.	No
Reverse video	No	Std.	Yes	Std.	No
Programmable brightness levels	No	No	Yes	2 std.	2 std.
Character and/or field blinking	No	No	Yes	Std.	Std.
Roll	No	Up & down std.	Up, down, smooth	Up std., down opt.	No
Paging	No	Yes	No	Opt. up to 8 pages	No
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	Std.	Std.	Std.	Std., user-selectable	Std.
Addressable/readable cursor	Addressable only	Std.	Yes	Both std.	Addressable only
Protected format	No	Std.	No	Std.	Std.
Partial screen transmit	No	Std.	No	Std.	No
Tabulation	Std.	Std.	Std. & program. tabs	Forward & back std.	Forward std.
Character insert/delete	No	Std.	No	Std.	Std.
Line insert/delete	No	Std.	No	Std.	No
Erase	Line, screen std.	Char., line, screen std.	Line, screen, partial line, partial screen	Char., line, screen std.	Line, screen std.
Character repeat	Std.	Std.	Yes	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter	Typewriter	Typewriter	Typewriter/data entry, or option	Typewriter
Character/code set	128 ASCII	ASCII	ASCII	128 ASCII	96/128 ASCII
Detachability	No	No	Yes	Std.	Std.
Program function keys	3 std.	19	4 std.	16 std. (32 func.)	No
Numeric keypad	Std.	No	Yes	Std.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	No	No
Diskette drive (floppy disk)	No	No	No	No	No
Serial printer	Non-impact	No	No	No	RS-232C interface
Other devices	—	Audible alarm std.	Audible alarm std.	Audible alarm std.	Audible alarm std.
<b>TRANSMISSION PARAMETERS</b>					
Mode	See comments	See comments	Full-duplex	Half/full-duplex	Half/full-duplex
Technique	Asynchronous	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Communications protocol	ASCII	ASCII	ASCII	ASCII	ASCII
Code	ASCII	ASCII	ASCII	ASCII	ASCII
Speed, bits/second	75 to 9600	75 to 9600	50 to 19,200	50 to 19,200	110 to 9600
Format: character, line, or block	Char. only	Char./block	Char. only	Char./segment/page	Char./block
Multipoint operation (pollable/addr.)	No	No	No	Burr. TD800 opt.	No
Auto answer	No	No	No	No	No
Auto call	No	No	No	No	No
Terminal interface	RS-232C, 20 mA current loop	RS-232C or 20 mA dc	RS-232C; current loop opt.	RS-232C, 20 mA dc	RS-232C, 20 mA dc
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	Purchase only	Purchase only	Purchase only	Purchase only	Purchase only
Display station, 2 year lease, \$/mo.	—	—	—	—	—
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	2,750	3,275	1,900	1,750	1,000-1,300
Controller, purchase, \$	—	—	—	—	—
Date of first production delivery	—	7/76	—	2/77	1/76
Display units installed to date	—	—	—	4000	Over 5000
Serviced by	DEC	DEC	DEC	EECO	ELBIT and third party
<b>COMMENTS</b>	Also provides graphics capability; transmission modes are full-duplex and full-duplex with local copy	Transmission modes are full-duplex and full-duplex with local copy	ANSI std. escape sequences; all user controls and adjustments can be done from keyboard; customized parameters can be saved in non-volatile memory; line drawing set std.	Std. one-year warranty; programmable keyboard; Burroughs TD 831 emulation opt.	Several models available

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	Elbit DS 2000-A	Elbit DS 376X/377X	G. R. Electronics Ltd. Pocket Terminal	General Digital Corp. Vue Point	General Terminals Corporation GT-100
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No No	Cluster 16 3271-2/3277-2 No No No	Stand-alone 1 Hand-held — ASCII std. — No	Stand-alone 1 Portable case Special order Opt. No Via user-defined parameters Opt.	Stand-alone — No No Std. See comments Via user-defined parameters No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80, plus status line 15-in. diag. 128 ASCII 7 x 9 dot matrix No Std. 2 std. Both std.	1920 24 x 80 15-in. diag. 64/96 ASCII 5 x 8 dot matrix No No 2 std. No	8 1 line-8 characters 0.18 x 2.0 in 64 ASCII 16 segment LED — No Location blinking	480 12 x 40 5 x 9 96 ASCII 5 x 7 No No Std. Char. or field std.	2000 24 x 80, plus 25th status line 6.5 x 8.5 128 ASCII 9 x 9 dot matrix No Std. 2 std. No
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  64/96 ASCII Std. No Std.	Typewriter, data entry 96 EBCDIC Std. 12 std. No	Alphanumeric calculator-style 128 ASCII Portable No Std.	Typewriter opt.  128 ASCII Std. Via touch screen Via touch screen	Typewriter  128 ASCII No 16 opt. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No No RS-232C interface std., audible alarm std.	No No Matrix impact Audible alarm std., keylock std., light pen opt.	No No No None	No No Non-impact No	No No RS-232C std. Audible alarm std., composite video opt.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous ASCII ASCII 50 to 19,200 Char., line, block No No No RS-232C, 20 mA current loop No No	Half/full-duplex Synchronous BSC ASCII/EBCDIC 1200 to 9600 Block only Std. No No RS-232C No No	Full-duplex Asynchronous — ASCII Up to 2400 Character No No No RS-232C or 20 mA	Full-duplex Asynchronous EIA RS-232C ASCII 300-19,200 Character Opt. No No RS-232C std., 20 mA opt. No No	Half/full-duplex Asynchronous ASCII ASCII 110-19,200 Char. std., opts. No No No RS-232C, 20 mA No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 1,300-1,900 — 10/79 — Elbit	Purchase only — — — 1,800-2,500 5,500-7,000 5/79 (376X); 1/77 Over 1000 Elbit	— — — 395 5/77 2,500 G.R. Electronics Ltd.	— — — 3,500-5,285 — 9/79 35 General Digital Corp.	Purchase only — — — 1,095 — 12/78 — Factory, distributors
<b>COMMENTS</b>	Microprocessor based; utilizing the attribute approach for ex- tensive display features	Direct interchang- able replacements for IBM 3271-2 control unit (Elbit DS 376X) and 3277-2 display station, (Elbit DS 377X)		The VuePoint is a touch-input termi- nal with optional keyboard and print- er	Emulates DEC VT- 52, ADDS 520, 580, Hazeltine 1500, ADM-3A. Solid-state key- board; metal case construction; 32 char. line drawing set, Z-80 micro- processor based

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	General Terminal Corporation GT-101	General Terminal Corporation GT-110	General Terminal Corporation GT-400	Harris 8000 Series	Hazeltine 1410
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone — No No Std. See comments Via user-defined parameters Std.	Stand-alone — No No Std. See comments Via user-defined parameters Std.	Stand-alone — No No Std. See comments Via user-defined parameters No	Cluster 32 No 3270 BSC & SDLC No Burr., HIS, Univac No Std.	Stand-alone 1 No No Yes No No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	2000 24 x 80, plus 25th status line 6.5 x 8.5 96 ASCII plus 9 x 9 dot matrix No Std. 2 std. No  Up std. No U, D, L, R, H, Rt. Std. Both std. Std. Std. Forward/back std. Std. Std. Char., line, field, std. Std.	2000 24 x 80, plus 25th status line 6.5 x 8.5 96 ASCII plus 9 x 9 dot matrix No Std. 2 std. Char., line, field, std. Up std. No U, D, L, R, H, Rt. Std. Both std. Std. Std. Forward/back std. Std. Std. Char., line, field, std. Std.	2000 25 x 80 6.5 x 8.5 128 ASCII 9 x 9 dot matrix No Std. 2 std. Char., line, field, std. Up std. 3 pages opt. U, D, L, R, H, Rt. Std. Both std. Std. Std. Forward/back std. Std. Std. Char., line, screen, std. Std.	Up to 1920 12 x 40/80, 24 x 80, 22 x 42, 16 x 64 12-in. diag. 96/128 ASCII 7 x 9 dot matrix No No 2 std. Std. — No U, D, L, R, H, Rt. Std. Std. Std. Std. Yes Yes Char., line, screen Std.	1920 24 x 80  6 x 9 64 ASCII 5 x 7 No No No No Up std. No U, D, L, R, H, Rt. No Std. No No No No Screen std. No
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII No 16 or 24 opt. Std.	Typewriter  128 ASCII No 16 std., 24 opt. Std.	Typewriter  128 ASCII Std. 8 std.; 24 opt. Std.	Typewriter, data entry, others ASCII, EBCDIC Std. Up to 36 Std.	Teletype  128 ASCII No No Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No RS-232C std. Audible alarm std., composite video opt.	No No RS-232C std. Audible alarm std., composite video opt.	No No RS-232C std. Audible alarm std., buffered printer port opt.	No Dual drive opt. 45, 60, 120, 165 cps Hard disk, 200 lpm line printer	No No No No
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous ASCII ASCII 110-19,200 Char., field, block No No No RS-232C, 20 mA	Half/full-duplex Asynchronous ASCII ASCII 110-19,200 Char., field, block No No No RS-232C, 20 mA	Half/full-duplex Asynchronous ASCII, polling opt. ASCII 50-19,200 Char., line, block Opt. No No RS-232C, 20/60 mA	Half/full-duplex Async./sync. BSC, SDLC ASCII, EBCDIC 1200 to 9600 Character/block Std. Opt. No RS-232C	Half/full-duplex Asynchronous ASCII ASCII Up to 9600 Character No No No RS-232C
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 1,095 — 2/80 Factory, distributors	Purchase only — — — 1,249 — 4/80 Factory, distributors	Purchase only — — — 1,625 — 6/77 Factory, distributors	Contact vendor for pricing — — — — — 1976 3000 systems Harris	— — — — 900 — 7/78 See comments Hazeltine (factory)
<b>COMMENTS</b>	Compatible with I-200 and ADM-3A control set. Solid-state keyboard; metal case; 32 character line drawing set std.; Z-80 microprocessor based	Compatible with I-200 and ADM-3A; foreign character sets available; 32 char. line drawing set; 64 block char. set; metal case; Z-80 microprocessor based	Model GT-400/B compatible with Burroughs TD830. GT-400 optionally emulates Hazeltine 2000. Metal case; solid-state keyboard; line drawing set opt.; Z-80 microprocessor	An interactive terminal system with enhanced capabilities for local format storage & queued transaction handling	Said to be lowest IC-count terminals in industry; based on microcomputer technology; two-year warranty is standard; over 90,000 Hazeltine displays (all models) have been delivered.

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	Elbit DS 2000-A	Elbit DS 377X	Elbit DS 376X	G. R. Electronics Ltd. Pocket Terminal	General Digital Corp. Vue Point
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No No No	Stand-alone See comments No 3277-2 No No No	Cluster 16 No 3271-2 No No No	Stand-alone 1 Hand-held — ASCII std. No	Stand-alone 1 Portable case Special order Opt. No Via user-defined parameters Opt.
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80, plus status line 15-in. diag. 128 ASCII 7 x 9 dot matrix No Std. 2 std. Both std.  Up std. 2 pages std. U, D, L, R, H, Rt.  Std. Both std. Std. Std. Forward std. Std. Std. Char., line, screen std. Std.	1920 24 x 80 15-in. diag. 64/96 ASCII 5 x 8 dot matrix No No 2 std. No  No No U, D, L, R  No Addressable only Std. Std. Std. Std. No Char., line, screen std. Std.	1920 24 x 80 15-in. diag. 64/96 ASCII 5 x 8 dot matrix No No 2 std. No  No No U, D, L, R  No Addressable only Std. Std. Std. Std. No Char., line, screen std. Std.	8 1 line-8 characters  0.18 x 2.0 in 64 ASCII 16 segment LED No No No Location blinking  No Yes —  Std. No No No Std. No Yes  Std.	480 12 x 40  5 x 9 96 ASCII 5 x 7 No No Std. Char. or field std.  Up std. 3 pages std., 51 opt. All & random  Std. Addressable Std. No Forward std. No — Char., line, screen & partial screen Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  64/96 ASCII Std. No Std.	Typewriter, data entry 96 EBCDIC Std. 12 std. No	Typewriter, data entry 96 EBCDIC Std. 12 std. No	Alphanumeric calculator-style 128 ASCII Portable No Std.	Typewriter opt.  128 ASCII Std. Via touch screen Via touch screen
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No No RS-232C interface std., audible alarm std.	No No No Audible alarm std. keylock std., light pen opt.	No No No Matrix impact Audible alarm std., keylock std., light pen opt.	No No No None	No No No Non-impact No
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous ASCII Code 50 to 19,200 Char., line, block No No No RS-232C, 20 mA current loop No No	Half/full-duplex Synchronous BSC ASCII/EBCDIC 1200 to 9600 Block only Std. No No RS-232C No No	Half/full-duplex Asynchronous BSC ASCII/EBCDIC 1200 to 9600 Block only Std. No No RS-232C No No	Full-duplex Asynchronous — ASCII Up to 2400 Character No No No RS-232C or 20 mA	Full-duplex Asynchronous EIA RS-232C ASCII 300-19,200 Character Opt. No No RS-232C std.; 20 mA opt. No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 1,300-1,900 — 10/79 — Elbit	Purchase only — — — 1,800-2,500 — 1/77 Over 1000 Elbit	Purchase only — — — 5,500-7,000 — 5/79 100 Elbit	— — — — 395 — 5/77 2,500 G.R. Electronics Ltd.	— — — — 3,500-5,285 — 9/79 35 General Digital Corp. The VuePoint is a touch-input termi- nal with optional keyboard and print- er
<b>COMMENTS</b>	Microprocessor based; utilizing the attribute approach for ex- tensive display features	Direct interchang- able replacement for IBM 3277-2 display station, using IBM 3271-2 and 3272-2 control units, or Elbit DS 376-X control unit	The DS 376X con- troller is housed in the cabinet of a DS 377-X station		

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	General Terminal Corporation GT-100	General Terminal Corporation GT-101	General Terminal Corporation GT-110	General Terminal Corporation GT-400	Hazeltine 1410
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone — No No Std. See comments Via user-defined parameters No	Stand-alone — No No Std. See comments Via user-defined parameters Std.	Stand-alone — No No Std. See comments Via user-defined parameters Std.	Stand-alone — No No Std. See comments Via user-defined parameters No	Stand-alone 1 No No Yes No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	2000 24 x 80, plus 25th status line 6.5 x 8.5 128 ASCII 9 x 9 dot matrix No Std. 2 std. No  Up std. No U, D, L, R, H, Rt.  Std. Both std. Opt. Opt. Forward/back std. Opt. Std. Char., line, screen std. Std.	2000 24 x 80, plus 25th status line 6.5 x 8.5 96 ASCII plus 9 x 9 dot matrix No Std. 2 std. No  Up std. No U, D, L, R, H, Rt.  Std. Both std. Std. Std. Forward/back std. Std. Std. Char., line, field, std. Std.	2000 24 x 80, plus 25th status line 6.5 x 8.5 96 ASCII plus 9 x 9 dot matrix No Std. 2 std. Char., line, field std. Up std. No U, D, L, R, H, Rt.  Std. Both std. Std. Std. Forward/back std. Std. Std. Char., line, field std. Std.	2000 25 x 80 6.5 x 8.5 128 ASCII 9 x 9 dot matrix No Std. 2 std. Char., line, field std. Up std. 3 pages opt. U, D, L, R, H, Rt.  Std. Both std. Std. Std. Forward/back std. Std. Std. Char., line, screen std. Std.	1920 24 x 80 6 x 9 64 ASCII 5 x 7 No No No No Up std. No U, D, L, R, H, Rt.  No Std. No No No No No Screen std. No
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII No 16 opt. Std.	Typewriter  128 ASCII No 16 or 24 opt. Std.	Typewriter  128 ASCII No 16 std., 24 opt. Std.	Typewriter  128 ASCII Std. 8 std.; 24 opt. Std.	Teletype  128 ASCII No No Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No RS-232C std. Audible alarm std., composite video opt.	No No RS-232C std. Audible alarm std., composite video opt.	No No RS-232C std. Audible alarm std., composite video opt.	No No RS-232C std. Audible alarm std., buffered printer port opt.	No No No No
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous ASCII ASCII 110-19,200 Char. std., opts. No No No RS-232C, 20 mA  No No	Half/full-duplex Asynchronous ASCII ASCII 110-19,200 Char., field, block No No No RS-232C, 20 mA  No No	Half/full-duplex Asynchronous ASCII ASCII 110-19,200 Char., field, block No No No RS-232C, 20 mA  No No	Half/full-duplex Asynchronous ASCII, polling opt. ASCII 50-19,200 Char., line, block Opt. No No No RS-232C, 20/60 mA  No No	Half/full-duplex Asynchronous ASCII ASCII Up to 9600 Character No No No RS-232C  No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 1,095 — 12/78 Factory, distributors	Purchase only — — — 1,095 — 2/80 Factory, distributors	Purchase only — — — 1,249 — 4/80 Factory, distributors	Purchase only — — — 1,625 — 6/77 Factory, distributors	— — — — 900 — 7/78 See comments Hazeltine (factory)
<b>COMMENTS</b>	Emulates DEC VT-52, ADDS 520, 580, Hazeltine 1500, ADM-3A. Solid-state keyboard; metal case construction; 32 char. line drawing set; Z-80 microprocessor based	Compatible with I-200 and ADM-3A control set. Solid-state keyboard; metal case; 32 character line drawing set std., Z-80 microprocessor based	Compatible with I-200 and ADM-3A; foreign character sets available; 32 char. line drawing set; 64 block char. set; metal case; Z-80 microprocessor based	Model GT-400/B compatible with Burroughs TDB30. GT-400 optionally emulates Hazeltine 2000. Metal case; solid-state keyboard; line drawing set opt.; Z-80 microprocessor	Said to be lowest IC-count terminals in industry; based on microcomputer technology; two-year warranty is standard; over 90,000 Hazeltine displays (all models) have been delivered.



Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	Hazeltine 1420	Hazeltine 1500 Series	Hazeltine 1552	Hazeltine Modular One	Hewlett-Packard 2621A/P
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Yes No No No	Stand-alone 1 No No Std. No No	Stand-alone 1 No No Yes DEC VT-52 No	Stand-alone 1 No No Std. See comments No	Stand-alone 1 No No Std. No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  6 x 9 96 5 x 9 No No Yes Char. std.  Up std. 1 U, D, L, R, H, Rt.  No Both std. No No Forward/back std. No Std. Line & screen std.  Std.	1920 24 x 80  6 x 9 128 7 x 10 dot matrix No Std. Std. No  Up std. No U, D, L, R, H, Rt.  Both std. Std.; 1510 & 1520 Std.; 1510 & 1520 Std. No Std. Char., line, screen std. Std.	1920 24 x 80  6 x 9 128 7 x 10 No Std. Std. No  Up & down std. 1 U, D, L, R, H, Rt.  No Std. No No Forward/back std. No Std. Line & screen std. Std.	1920 24 x 80  6.0 x 9.0 64 std.; 96 opt. 7 x 9 dot matrix No Std. 2 std. Field std.  Up std. No U, D, L, R, H, Rt.  Opt. (no cost) Std. Std. Std. Std. Std. Char., line, screen std. Std.	1920 24 x 80  12-in. diag. 128 ASCII 7 x 9 dot matrix No No No No Std. Char., line std. Fwd./back std. Std. Std. Char., line, screen std. Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII No 12 std. Std.	Typewriter  128 ASCII No Std., 1510 & 1520 Std.	Typewriter  128 ASCII No 3 std. Std.	Typewriter  ASCII Std. 8 std. Std.	Typewriter  128 ASCII Std. 8 std. Embedded std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No Interface opt. only —	No No RS-232C interface —	No No Interface opt. only —	No No No Audible alarm std.	No No Integ. therm. (2621P) No
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous None ASCII Up to 9600 Character No No No RS-232C std., 20 mA opt. No No	Half/full-duplex Asynchronous ASCII ASCII Up to 19,200 Char., line, block No No No RS-232C, 20 mA dc current loop No	Half/full-duplex Asynchronous None ASCII Up to 9600 Character No No No RS-232C, 20 mA std. No No	Half/full-duplex Async.; sync. opt. User-defined ASCII 110 to 9600 Char.; block opt. Opt. No No RS-232B/C, 20 mA dc current loop No	Full-duplex Asynchronous ASCII ASCII 110 to 9600 Char., line No No No RS-232C No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	— — — — 995 — 10/79 — Hazeltine	— — — — 1,225-1,650 — 6/7 1977 See 1410 TRW/Hazeltine	— — — — 1,500 — 6/79 — TRW	— — — — 2,050 — 2/76 See 1410 TRW/Hazeltine	83/146 — — — 1,495/2,650 — 10/78 — HP
<b>COMMENTS</b>	A two-year warranty is standard	1500 Conversational Terminal; 1510 Buffered Terminal; 1520 Buffered Terminal with additional 2K Print Buffer	Full VT-52 compatibility; three month on-site warranty	Extensive choice of no-charge and low-cost options including emulators for Burroughs, Honeywell, & Univac displays	Interactive terminal with enhanced high-resolution display, 8 screen-labeled control keys, soft configuration, and integral 120-cps thermal printer (2621P only)

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Hewlett-Packard 2640B	Hewlett-Packard 2641A	Hewlett-Packard 2645A	Honeywell VIP 7100/7105	Honeywell VIP 7200
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Stand-alone	Stand-alone	Stand-alone
Maximum displays/controller	1	1	1	1	1
Transportability	No	No	No	No	No
IBM compatibility	No	No	No	No	No
Teletype compatibility	Opt.	Opt.	Opt.	Std.	Std.
Other compatibility	No	No	No	No	No
User programmable	No	No	No	No	No
Self diagnostics	Std.	Std.	Std.	No	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1920	1920	1920	960	1920
Display arrangement, lines x chars./line	24 x 80	24 x 80	24 x 80	12 x 80	24 x 80
Display area, h x w, inches	5 x 10	5 x 10	5 x 10	12-in. diag.	12-in. diag.
Total displayable symbols	128; 512 opt.	128; 512 opt.	128; 512 opt.	63/95	64/95
Symbol formation	7 x 9 dot matrix	7 x 9 dot matrix	7 x 9 dot matrix	5 x 7 dot matrix	5 x 7 dot matrix
Color	No	No	No	No	No
Reverse video	Std.	Std.	Std.	No	No
Programmable brightness levels	2 opt.	2 opt.	2 opt.	No	Std.
Character and/or field blinking	Opt.	Opt.	Opt.	No	Opt.
Roll	Std.; up & down	Std.; up & down	Std.; up & down	Std.; up only	Std. up only
Paging	Std.	Std.	Std.	No	No
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	L, R, Rt.	U, D, L, R, H, Rt.
Cursor blinking	Std.	Std.	Std.	No	Std.
Addressable/readable cursor	Std.	Both std.	Both std.	No	Std.
Protected format	Std.	Std.	Std.	No	No
Partial screen transmit	Std.	Std.	Std.	No	No
Tabulation	Std.	Std.	Std.	No	No
Character insert/delete	Std.	Std.	Std.	No	No
Line insert/delete	Std.	Std.	Std.	No	No
Erase	Char., line, screen	Char., line, screen	Char., line, screen	Screen std.	Line & screen std.
Character repeat	Std.	Std.	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter	Typewriter	Typewriter	Typewriter	Typewriter
Character/code set	128 ASCII	128 ASCII	128 ASCII	128 ASCII	128 ASCII
Detachability	Std.	Std.	Std.	Std.	Std.
Program function keys	8 std.	8 std.	8 std.	Std.	14 std.
Numeric keypad	Std.	Std.	Std.	No	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	Dual drive	Dual drive	No	No
Diskette drive (floppy disk)	No	No	No	No	No
Serial printer	Impact/non-impact	Impact/non-impact	Impact/non-impact	No	No
Other devices	Audible alarm std.	Audible alarm std.	Audible alarm std.	Audible alarm std.	Auxiliary port connection
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex	Half/full-duplex	Half/full-duplex	Full-duplex	Half/full-duplex
Technique	Asynchronous	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Communications protocol	ASCII	ASCII/BSC	ASCII/BSC	ASCII	ASCII
Code	ASCII	ASCII/EBCDIC	ASCII/EBCDIC	ASCII	ASCII
Speed, bits/second	110 to 2400	110 to 9600	110 to 9600	75 to 9600	75 to 9600
Format: character, line, or block	Block/char.	Block/char.	Block/char.	Char. only	Char./block
Multipoint operation (pollable/addr.)	No	Opt.	Opt.	No	No
Auto answer	Opt.	Opt.	Opt.	No	No
Auto call	No	No	No	No	No
Terminal interface	RS-232C, current loop	RS-232C, current loop	RS-232C, current loop	RS-232C, CCITT, or 20/60 mA dc	RS-232C, 20 mA current loop
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	167	209	183	Purchase only	Purchase only
Display station, 2 year lease, \$/mo.	—	—	—	—	—
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	3,250	4,100	3,500	1,500	1,980
Controller, purchase, \$	—	—	—	—	—
Date of first production delivery	1/75	1/77	10/76	12/76	5/77
Display units installed to date	See comments	See comments	See comments	Over 2000	Over 5000
Serviced by	HP	HP	HP	Honeywell	Honeywell
<b>COMMENTS</b>	Over 45,000 264X terminals have been installed	Over 45,000 264X terminals have been installed	Over 45,000 264X terminals have been installed		

**Alphanumeric Display Terminals—Management Perspective  
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SUPPLIER AND MODEL	Honeywell VIP 7700R/ 7705R	Honeywell VIP 7760	Honeywell VIP 7800 Series	Honeywell VIP 7801/7802	Honeywell VIP 7804/7805
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Cluster	Stand-alone	Stand-alone	Stand-alone
Maximum displays/controller	1	8 to 32	1	1	1 to 32
Transportability	No	No	No	No	No
IBM compatibility	No	No	No	No	No
Teletype compatibility	No	No	Std.	Std.	No
Other compatibility	Honeywell	Honeywell	Honeywell	No	Honeywell
User programmable	No	No	No	No	No
Self diagnostics	Yes	Yes	Std.	Std.	Std.
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1920	960/1920	1920	2000	2000
Display arrangement, lines x chars./line	24 x 80	12/24 x 80	24 x 80	25 x 80	25 x 80
Display area, h x w, inches	12-in. diag.	6 x 9	12-in./15-in. diag.	12-in./15-in. diag.	12-in./15-in. diag.
Total displayable symbols	63/95	96	106	106	106
Symbol formation	5 x 7 dot matrix	7 x 9 dot matrix	7 x 10 dot matrix	7 x 10 dot matrix	7 x 10 dot matrix
Color	No	No	No	No	No
Reverse video	No	No	Std.	Std.	Std.
Programmable brightness levels	No	No	Std.	Std.	Std.
Character and/or field blinking	Both std.	Std.	Std.	Std.	Std.
Roll	No	No	Std.	Std.	Std.
Paging	No	Std.	Opt.	No	No
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	Std.	Std.	Opt.	Opt.	Opt.
Addressable/readable cursor	Addressable only	Std.	Both std.	Both std.	Both std.
Protected format	Std.	Std.	Std.	Std.	Std.
Partial screen transmit	Std.	Std.	Std.	Std.	Std.
Tabulation	Std.	Std.	Std.	Std.	Std.
Character insert/delete	Std.	Std.	Std.	Std.	Std.
Line insert/delete	Std.	Std.	Std.	Std.	Std.
Erase	Char., line, screen std.	Char., line, screen std.	End-of-page, line, end-of-field std.	EOP, line, field std.	EOP, line, field std.
Character repeat	Std.	Std.	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter	Typewriter	Typewriter	Typewriter	Typewriter
Character/code set	128 ASCII	ASCII	128 ASCII	128 ASCII	128 ASCII
Detachability	Std.	Opt.	Std.	Std.	Std.
Program function keys	Std.	26 std.	12 std.	12 std.	12 std.
Numeric keypad	Std.	Std.	Std.	Std.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	No	No
Diskette drive (floppy disk)	No	Yes, std.	No	No	No
Serial printer	Impact	Opt.	Opt.	Opt.	Opt.
Other devices	No	No	Audible alarm, auxiliary, port connection	Audible alarm, keylock	Audible alarm, keylock
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half-duplex	Half/full-duplex	Full-duplex—TWA	Full-duplex-TWA	Half-duplex-TWA
Technique	Synchronous	Synchronous	Async./sync.	Asynchronous	Synchronous
Communications protocol	Honeywell	Honeywell	Honeywell	None	Honeywell
Code	ASCII	ASCII	ASCII	ASCII	ASCII
Speed, bits/second	2400/4800/9600	2400/4800/9600	110 to 19,200	19,200	Up to 19,200
Format: character, line, or block	Block only	Block only	Char., line, page	Char., line, page	Block
Multipoint operation (pollable/addr.)	Std.	Std.	Std.	No	Std.
Auto answer	Opt.	Opt.	No	Std.	Std.
Auto call	No	No	No	No	No
Terminal interface	RS-232C, CCITT, or MIL STD 188	RS-232C, CCITT V.24	RS-232C, 20 mA	RS-232C, 20 mA	RS-232C
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	—	—	—	—	—
Display station, 2 year lease, \$/mo.	—	—	—	—	—
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	—	1,750	2,885-3,360	2,885-3,195	3,060-3,360
Controller, purchase, \$	3,390-3,990	16,800	—	—	—
Date of first production delivery	3/77	5/76	10/78	—	—
Display units installed to date	Over 5000	Over 2000	500	—	—
Serviced by	Honeywell	Honeywell	Honeywell	Honeywell	Honeywell
<b>COMMENTS</b>	Up to 3 units can be multidropped on a single line	Local diskette user control parameters	Horizontal and vertical line graphics form creation; 25th display line for status; opt. 72-line scrolling; buffered print adapter; choice of white or green phosphor.	25th display line for status and bi-directional conversation. Optional 72 line x 80 character scrolling storage, 100 line buffered print adapter, graphics available	Terminals can be daisy-chained. Optional scrolling with 48 line storage; 100 line buffer and print adapter; 25th display line for status/communication

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Honeywell (AFID) SPD 320/330 & SPD 320/ 300 LFC	Human Designed Systems Concept 100	Human Designed Systems Concept APL	Human Designed Systems Concept 520 Series	Informer 301 Series
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Cluster 32 No 3270 BSC, SDLC No No No No	Stand-alone 1 No No Std. No Via user-defined parameters No	Stand-alone 1 No No Std. No Via user-defined parameters No	Stand-alone 1 No No Std. DEC VT-52 Via user-defined parameters No	Stand-alone 1 No No Std. No No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	960/1920 12/24 x 40/80  6.5 x 9 64 7 x 10 dot matrix No No 2 std. Std.  No No U, D, L, R, H, Rt.  Std. Std. Std. Std. Std. Std. Std. Char., line, screen std. Std.	1920 24 x 80  12-in. diag. 128 ASCII, 384 user 7 x 11 dot matrix No Std. 3 std. Char. std.  Std.; up & down 4 pages opt. U, D, L, R, H, Rt.  Std. Std. Std. Std. Std. fwd./back/field Std. Std. Char., line, screen, memory std. Std.	1920 24 x 80  12-in. diag. 128 ASCII/APL 7 x 11 dot matrix No Std. 3 std. Char. std.  Std.; up & down 4 pages opt. U, D, L, R, H, Rt.  Std. Std. Std. Std. Std. fwd./back/field Std. Std. Char., line, screen, memory std. Std.	1920 24 x 80  12-in. diag. 128 ASCII, 384 user 7 x 11 dot matrix No Std. 3 std. Char. std.  Std.; up & down 4 pages opt. U, D, L, R, H, Rt.  Std. Std. Std. Std. Std. fwd./back/field Std. Std. Char., line, screen, memory std. Std.	512; 1024 opt. 16 x 32; 16 x 64 opt.  3.5 x 4.5 64 ASCII; 96 opt. 5 x 7 dot matrix No No 2 std. Char. opt.  Up std. No U, D, L, R, H, Rt.  Opt. Addressable only Std. No No No Screen std. Opt.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  EBCDIC/ASCII Std. 24 std. Std.	Typewriter  128 ASCII Std. 8 std.; 11 opt. Std.	Typewriter  128 ASCII/APL Std. 8 std., 11 opt. Std.	Typewriter  128 ASCII; opt. APL Std. 8 std., 11 opt. Std.	Typewriter  ASCII Opt. 10 std. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	Single Dual on LFC Impact Audible alarm std.	No No No Opt. peripheral interface	No No No Opt. peripheral interface	No No No Opt. peripheral interface	No No No Audible alarm std. Composite video opt.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Synchronous BSC/SDLC ASCII/EBCDIC 1200 to 9600 Block only Std. No No No RS-232C	Half/full-duplex Asynchronous ASCII ASCII 50 to 9600 Char./block No No No RS-232C, 20 mA opt. No No	Half/full-duplex Asynchronous — ASCII 50-9600 Char., block No No No RS-232C, 20 mA opt. No No	Half/full-duplex Asynchronous — ASCII 50-9600 Char., block No No No RS-232C, 20 mA opt. No No	Half/full-duplex Asynchronous ASCII ASCII 110 to 9600 Character No No No RS-232C; 20 mA opt. No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Contact vendor — — — — — 1974 — Honeywell AFID	Purchase only — — — 1,575-2,500 — 3/78 — HDS	— — — — 1,400-2,030 — 3/78 — HDS	— — — — 1,360-1,675 — 1/80 — HDS	— — — — 850-1,895 — 10/72 — Informer, third party
<b>COMMENTS</b>	See Report C21-480-101 for details on the Incoterm product line; Incoterm was acquired by Honeywell early in 1978	Business graphics std.; windowing capability std.; networking; program-mable function keys	Business graphics std.; windowing capability std.; networking; program-mable function keys	Business graphics std.; windowing capability std.; networking; program-mable function keys	

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Informer 302 Series	Informer 304 Series	Intelligent Systems Intecolor 3600 Series	Intelligent Systems Intecolor 8000 Series	IBM 3271/3277 Information Display System
<b>TERMINAL DESCRIPTION</b>	Stand-alone	Stand-alone	Stand-alone	Stand-alone	Cluster
Maximum displays/controller	1	1	1	1	32
Transportability	No	No	No	No	No
IBM compatibility	No	No	No	No	3270 System
Teletype compatibility	Std.	Std.	Std.	Std.	No
Other compatibility	No	See comments	No	ADD5, Haz. 1500	No
User programmable	No	No	Via user-defined firmware	Via user-defined firmware	No
Self diagnostics	No	Std.	No	Opt.	Via host DEMF software
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	512	512 to 1920	1024/2048	3840/1920	480/1920
Display arrangement, lines x chars./line	16 x 32	16 x 32, 12 x 40, 16 x 64, 24 x 80	16/32 x 64 (reg./ double-hgt. ch.)	48/24 x 80 (reg./ double-hgt. ch.)	12 x 40; 24 x 80
Display area, h x w, inches	3.5 x 4.5	5.25 x 6.75	13-in. diag.	13-, 19-, 25-in. diag.	14-in. diag.
Total displayable symbols	64 ASCII	128 ASCII	64; 192 opt.	64; 192 opt.	64 std.; 120 APL opt.
Symbol formation	5 x 7 dot matrix	7 x 9 dot matrix	5 x 7 dot matrix	5 x 7 dot matrix	7 x 9 dot matrix
Color	No	No	8 fore; 8 back std.	8 fore.; 8 back. std.	No
Reverse video	No	Std.	Std.	Std.	No
Programmable brightness levels	2 std.	2 std.	No	No	2 std.
Character and/or field blinking	No	Char. std.	Std.	Std.	No
Roll	No	Up & down std.	Up std.	Up std.	No
Paging	No	Up to 4 pages std.	3 pages opt.	No	No
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R
Cursor blinking	Opt.	Selectable	Std.	Std.	No
Addressable/readable cursor	Addressable only	Both std.	Both std.	Std.	Addressable only
Protected format	Std.	Std.	Opt.	Opt.	Std.
Partial screen transmit	Std.	Std.	Std.	Std.	Std.
Tabulation	Forward std.	Fwd./back/std.	Fwd. std.	Fwd. std.	Std.
Character insert/delete	No	Std.	Opt.	Opt.	Std.
Line insert/delete	No	Yes	Opt.	Opt.	No
Erase	Screen, unprotected	Char., line, screen std.	Screen std.; char., line std.	Char., line, screen std.	Char., line, screen std.
Character repeat	Opt.	Std.	Opt.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter	Typewriter	Typewriter	Typewriter	Several
Character/code set	ASCII	ASCII	192 ASCII	192 ASCII	ASCII/EBCDIC
Detachability	Opt.	128 opt.	No	Std.	Std.
Program function keys	10 std.	28 std.	16 opt.	16 opt.	Std.
Numeric keypad	Std.	Std.	Opt.	Opt.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	No	No
Diskette drive (floppy disk)	No	No	Opt.	Opt.	No
Serial printer	No	RS-232C interface	Opt.	Opt.	Impact
Other devices	Audible alarm std.	Audible alarm, composite video	RS-232C interface std.	RS-232C interface std.	Audible alarm, I.D. reader, light pen, keylock
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex
Technique	Asynchronous	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Communications protocol	ASCII	ASCII	ASCII	ASCII	BSC/SDLC
Code	ASCII	ASCII	ASCII	ASCII	ASCII/EBCDIC
Speed, bits/second	110 to 9600	50 to 19,200	110-9600	110 to 9600	1200 to 9600
Format: character, line, or block	Block	Char., line, block	Char., std., block opt.	Char. std., block opt.	Block only
Multipoint operation (pollable/addr.)	Std.	Selectable	No	No	Std.
Auto answer	No	No	No	No	No
Auto call	No	No	No	No	No
Terminal interface	RS-232C	RS-232C, 20 mA opt.	RS-232C std.	RS-232C std., 20 mA opt.	RS-232C
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	—	—	Purchase only	Purchase only	92-185
Display station, 2 year lease, \$/mo.	—	—	—	—	78-158
Controller, 1 year lease, \$/mo.	—	—	—	—	173-705
Controller, 2 year lease, \$/mo.	—	—	—	—	147-602
Display station, purchase, \$	1,595-1,995	1,350	1,995	1,895	2,094-3,468
Controller, purchase, \$	—	—	—	—	3,315-9,128
Date of first production delivery	10/74	12/78	6/79	4/76	2nd qtr. 1972
Display units installed to date	—	—	1000	Over 10,000	—
Serviced by	Informer, third party	Informer, third party	Factory, depot or third party	Factory, depot or third party	IBM
<b>COMMENTS</b>		Optional emula- tions: DEC VT-52, TEC 425, NCR 101 & 301, Data Gen- eral 6053, ADDS Regent 100 and Lear Siegler ADM-1A	Full 128 x 128 color graphics std.	Features high reso- lution graphics: 160 x 192 std., 384 x 480 opt.; powered by an Intel 8080 micro- processor	See Report C21-491-101 for details

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	IBM 3274/3278 Information Display System	IBM 3275 Information Display System	IBM 3276/ 3278-3279 Information Display System	IBM 5250 Information Display System	Intertec Data Systems Intertube III
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Cluster 32 No 3270 System No No No No  Via host DEMF software	Stand-alone 1 No 3270 System No No No  Via host DEMF software	Cluster 8 No 3270 System No No No  Via host DEMF software	Either Up to 9 No SDLC No No No  Yes	Stand-alone 1 No No Std. No Via user-defined parameters Std.
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	See comments 12 x 40; 12/24/ 32/43 x 80 14-in. diag. 64; 96; 120 APL 7 x 9/14, 7 x 11 No No 2 std. No  No No U, D, L, R, H, Rt.  Std. Addressable only Std. Std. Std. Std. No Char., line, screen std. Std.	1920 24 x 80 — 14-in. diag. 64 std.; 120 APL opt. 7 x 9 dot matrix No No 2 std. No  No No U, D, L, R  No Addressable only Std. Std. Std. Std. No Char., line, screen std. Std.	See comments 12/24/32/43 x 80 14-in. diag. 96; 120 APL opt. 7 x 9/14, 7 x 11 3279 only No No 2 std. No  No No U, D, L, R, H, Rt.  No Addressable only Std. Std. Std. Std. No Char., line, screen std. Std.	960, 1920 12/24 x 80 12-/15-in. diag. 96; 188 Multi-Net! opt. 8 x 16 dot matrix No Std. Std. Std.  Std. No U, D, L, R, H, Rt.  Std. Both std. Std. Std. Std. Std. No Char., field, screen std. Std.	2000 25 x 80 12-in. diag. 128 ASCII 8 x 10 No Std. Std. Std.  Std. Std. U, D, L, R, H, Rt.  Std. Std. Std. Std. Std. Std. Std. Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Several  ASCII/EBCDIC Std. Std. Std.	Several  ASCII/EBCDIC Std. Opt. Std.	Several  ASCII/EBCDIC Std. Opt. Std.	Typewriter  EBCDIC Std. 24 std. Std.	Typewriter  ASCII No 14 std. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No Impact Aud. alarm, mag. slot reader, light pen, keylock, I.D. reader, Encrypt/ Decrypt	No No Impact Audible alarm, I.D. card reader, light pen, keylock	No No Impact Audible alarm, mag. slot reader, light pen, keylock, Encrypt/Decrypt	No No Impact Mag. stripe reader, selector light pen, aud. alarm, keylock	No No RS-232C Audible alarm std.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Synchronous BSC/SDLC ASCII/EBCDIC 1200 to 9600 Block only Std. No No RS-232C  No No	Half/full-duplex Synchronous BSC/SDLC ASCII/EBCDIC 1200 to 9600 Block only Std. No No RS-232C  No No	Half/full-duplex Synchronous BSC/SDLC ASCII/EBCDIC 1200 to 9600 Block only Std. No No RS-232C  No No	Half/full-duplex Synchronous BSC/SDLC EBCDIC 1200 to 9600 Block only Yes Yes No RS-232C, twinax cable Opt. No	Half/full-duplex Asynchronous ASCII ASCII 110 to 9600 Char., line, block Opt. Opt. Opt. RS-232C  No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	76-133 65-113 385-872 328-743 2,700-4,275 13,190-28,600 2/78 — IBM	150-207 128-176 — — 3,315-4,510 2 qtr. 1972 — IBM	76-150 65-127 187-316 159-272 2,700-5,255 6,390-11,070 2/78 — IBM	99-124 84-105 203-261 173-222 3,010-3,740 5,645-7,440 1/78 — IBM	— — — — 995 — 8/78 Over 10,000 Intertec & third party
<b>COMMENTS</b>	Display positions available include 480, 960, 1920; 2560, and 3440; controller accommodates 3278 & 3277 display stations: see Report C21-491-101 for details	See Report C21-491-101 for details	Display positions available include 960, 1920, 2560, and 3440; see Report C21-491-101 for details	Workstations for IBM S/34, S/38, and Series/1; 5251-1/11 is remote cluster or local station; 5251-2/12 is remote cluster controller/station; 5252 is remote cluster or local dual station	Z-80 processor based; single board design; uses specially designed non-glare, high resolution CRT

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SUPPLIER AND MODEL	Intertec Data Systems Emulator	ITT Courier 270	ITT Courier 275	ITT Courier 277	ITT Courier 7700
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. See comments Via user-defined parameters Std.	Cluster 32 No 3270, full line No No No Std.	Stand-alone — No IBM 3275 No No No Std.	Cluster 32 No IBM 3277 No No No Std.	Cluster 32 No No HIS VIP 7700/7760 No Std.
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  12-in. diag. 128 ASCII 8 x 10 No Std. Std. Std.  Std. Std. U, D, L, R, H, Rt. Std. Std. Std. Std. Std. Std. Std. Std. Std.	480 to 3440 12 x 40; 12, 24, 32, or 43 x 80 7 x 10 64 std., 96 opt. 7 x 9/12 dot matrix No Opt., cursor only 2 std. Field opt.  No No U, D, L, R, H, Rt. Opt. Both std. Std. Std. Std. Std. No Char., line, screen std. Std.	480, 960, 1920 12 x 40; 12, 24, 32, or 43 x 80 7 x 10 64 std., 96 opt. 7 x 9 dot matrix No 2 std. Field opt.  No No U, D, L, R, H, Rt. Opt. Both std. Std. Std. Std. Std. No Char., line, screen std. Std.	480, 1920 12 x 40, 24 x 80  7 x 10 64 std., 96 opt. 7 x 9 dot matrix No 2 std. Field opt.  No No U, D, L, R, H, Rt. Opt. Both std. Std. Std. Std. Std. No Char., line, screen std. Std.	960/1920 12 x 24/80  7 x 10, 15-in. diag. 96 std., 128 opt. 8 x 10 dot matrix No Cursor Std. Both std.  No No U, D, L, R, H, Rt. Std. Addressable only Std. Std. Std. Fwd./back tab std. Std. Std. Char., line, screen, variable fields std. Typamatic keys std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  ASCII No 14 std. Std.	Typewriter, data entry, APL, console 64 ASCII, 96 EBC Std. 12 std., 24 opt. Opt.	Typewriter, data entry 64 ASCII, 96 EBC Std. 6 std., 12 opt. Opt.	Typewriter, data entry 64 ASCII, 96 EBC Std. 6 std., 12 opt. Opt.	Typewriter, data entry 96 ASCII; 128 opt. Std. Std. Opt.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No RS-232C Audible alarm std.	No Single Impact —	No No Impact —	No No No —	No Single, dual opt. Impact Mag. badge rdr., line printers, tilt/swivel base, line extenders, etc.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous ASCII ASCII 110 to 9600 Char., block Opt. No No RS-232C	Half-duplex Synchronous BSC, SNA SDLC ASCII, EBCDIC 9600 Block Std. No No RS-232 B/C	Half-duplex Synchronous BSC ASCII, EBCDIC To 9600 Block Std. No Yes RS-232 B/C	See comments See comments See comments See comments See comments See comments See comments See comments See comments See comments	Half/full-duplex Synchronous HIS VIP 7700/7760 ASCII Up to 9600 Block Std. Opt. No RS-232C, CCITT
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	— — — — 895 — 3/80 — Intertec & third party	Contact vendor Contact vendor Contact vendor Contact vendor Contact vendor — 1974 — ITT Courier	Contact vendor Contact vendor Contact vendor Contact vendor Contact vendor — 1974 — ITT Courier	Contact vendor Contact vendor Contact vendor Contact vendor Contact vendor Contact vendor 1977 — ITT Courier	Contact vendor Contact vendor Contact vendor Contact vendor Contact vendor Contact vendor 1977 — ITT Courier
<b>COMMENTS</b>	Emulates DEC VT-52, Lear Siegler ADM-3A, Hazeltine 1500 series, Soroc 120; all emulations keyboard selectable	Fully compatible with IBM 3270 Information Display System including 3271/2/4/6/7/8		Interfaces to IBM 3271, 3272 and 3790 controllers (or System/3) in same manner as on IBM 3277	Fully compatible with computers that support Honeywell VIP 7700/7760; redundant terminal controller opt.; integral line monitor function; format reveal mode; forms composition mode

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	ITT Courier 7750	Lear Siegler ADM-1A	Lear Siegler ADM-2	Lear Siegler ADM-3A	Lear Siegler ADM-31
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Either	Stand-alone	Stand-alone	Stand-alone	Stand-alone
Maximum displays/controller	4	1	1	1	1
Transportability	No	No	No	No	No
IBM compatibility	No	No	No	No	No
Teletype compatibility	No	Std.	Std.	Std.	Std.
Other compatibility	HIS VIP 7700/7760	Datapoint	Burroughs TD-800	No	No
User programmable	No	No	No	No	No
Self diagnostics	Std.	No	No	No	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	960/1920	1920	1920	1920	1920
Display arrangement, lines x chars./line	12/24 x 80	24 x 80	24 x 80	24 x 80	24 x 80
Display area, h x w, inches	7 x 10, 15-in. diag.	12-in. diag.	12-in. diag.	12-in. diag.	12-in. diag.
Total displayable symbols	96 std., 128 opt.	96	128	64/96 opt.	128 ASCII
Symbol formation	8 x 10 dot matrix	5 x 7 dot matrix	5 x 9 dot matrix	5 x 7 dot matrix	7 x 11 dot matrix
Color	No	No	No	No	No
Reverse video	Cursor	No	No	No	Std.
Programmable brightness levels	Std.	No	No	No	Std.
Character and/or field blinking	Both std.	No	Std.	No	Std.
Roll	No	Up std.	Up std.	Std., up only	Up std.
Paging	No	No	No	No	2 pages std.
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt., new line
Cursor blinking	Std.	Std.	No	No	—
Addressable/readable cursor	Addressable only	Std.	Std.	Std.	Std.
Protected format	Std.	Std.	Std.	No	Std.
Partial screen transmit	Std.	Opt.	Std.	No	Std.
Tabulation	Fwd./back tab std.	Std.	Std.	No	Std.
Character insert/delete	Std.	Opt.	Std.	No	Std.
Line insert/delete	Std.	Opt.	Std.	No	Std.
Erase	Char., line, screen, variable fields std. Typamatic key std.	Char., screen std.; line opt.	Char., line, screen std.	Char., screen std.	Std.
Character repeat	Std.	Std.	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter, data entry	Typewriter	Typewriter	Typewriter	Typewriter
Character/code set	96 ASCII; 128 opt.	ASCII	ASCII	64 ASCII	128 ASCII
Detachability	Std.	No	Std.	No	No
Program function keys	Std.	No	16 std.	No	1 std. (2-key seq.)
Numeric keypad	Opt.	Opt.	Std.	Opt.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	No	No
Diskette drive (floppy disk)	No	No	No	No	No
Serial printer	Impact	Impact	Impact	No	Impact
Other devices	Mag. badge rdr., line printers, tilt/swivel base, line extenders, etc.	Audible alarm opt.	Audible alarm std.	Audible alarm std.	Audible alarm std.
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex
Technique	Synchronous	Asynchronous	Async./sync.	Asynchronous	Asynchronous
Communications protocol	HIS VIP 7700/7760	ASCII	ASCII	ASCII	ASCII
Code	ASCII	ASCII	ASCII	ASCII	ASCII
Speed, bits/second	Up to 9600	110 to 9600	110 to 9600	75 to 19,200	50 to 9600
Format: character, line, or block	Block	Char./block	Char./block	Char./block	Char./block
Multipoint operation (pollable/addr.)	Std.	Opt.	Opt.	Opt.	Opt.
Auto answer	No	No	No	Opt.	No
Auto call	No	No	No	No	No
Terminal interface	RS-232C, CCITT	RS-232C, current loop	RS-232C, current loop	RS-232C, current loop	RS-232C, 20 mA current loop
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	Contact vendor	Purchase only	Purchase only	Purchase only	Purchase only
Display station, 2 year lease, \$/mo.	Contact vendor	—	—	—	—
Controller, 1 year lease, \$/mo.	Contact vendor	—	—	—	—
Controller, 2 year lease, \$/mo.	Contact vendor	—	—	—	—
Display station, purchase, \$	Contact vendor	1,595	2,095	895	1,450
Controller, purchase, \$	Contact vendor	30,000	20,000	—	—
Date of first production delivery	Contact vendor	8/73	6/74	1/76	8/78
Display units installed to date	1977	See comments	See comments	90,000	8,000
Serviced by	ITT Courier	Lear Siegler & third party	Lear Siegler & third party	Lear Siegler & third party	Lear Siegler & third party
<b>COMMENTS</b>	Full compatible with computers that support Honeywell VIP 7700/7760; integral line monitor function; format reveal mode; forms composition mode	Lear Siegler has delivered well over 125,000 displays of all models	Lear Siegler has delivered well over 125,000 displays of all models		



## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Lear Siegler ADM-42	Lee Data Corporation Model 310	MDS Trivex 40/80	MDS Trivex Plus 70	MDS Trivex Plus 80
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No No	Cluster 32 No 3274/3278 No No No	Either 32 No 2260/2265 No No No	Either 32 No 3270/3275 No No No	Cluster 32 No 3278 No No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	2000 25 x 80  15-in. diag. 128 ASCII 7 x 11 dot matrix No Std. Std. Std. Up std. 2 std.; 4, 6, 8 opt. U, D, L, R, H, Rt., new line — Std. Std. Std. Std. Std. Std. Std. Std. Std.	1920, 3440, 3564 24 x 80, 43 x 80, 27 x 132 15-in. diag. 128 7 x 9 dot matrix No Std. Std. Field std. CPU controlled No U, D, R, L — Std. Std. Std. Std. Std. Std. Std. Std.	240/480/960 6/12 x 40; 12 x 80  6 x 9 64 5 x 7 dot matrix No No No Std. No No U, D, L, R, H, Rt. — Opt. Std. Std. Std. Std. Std. Char., line, screen std. Std.	1920 25 x 80  8 x 11 64; 96 7 x 9 dot matrix No No 2 std. Std. No No U, D, L, R — Opt. Std. Std. Std. Std. Std. No Char., screen std. Std.	480 to 3440 12 x 40 to 43 x 80  15-in. diag. 96 7x14, 7x9 dot matrix No No Std. No No U, D, L, R, H, Rt. — Opt. Std. Std. Std. Std. Std. Std. Char., line, screen std. Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII Std. 16 std. Std.	Typewriter, data entry, keypunch 96 EBCDIC Std. 24 std. Opt.	Typewriter, data entry ASCII Std. No Std.	Typewriter, data entry, console EBCDIC Std. 12 opt. Opt.	Typewriter, data entry, keypunch ASCII, EBCDIC Std. 12 std., 24 opt. Opt.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No Impact Audible alarm std.	No Single Matrix 120/180 cps Audible alarm std.	No No Impact None	No No Impact Audible alarm std., I.D. card reader, light pen opt.	No No — Audible alarm, security lock, light pen
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Async.; sync. opt. ASCII ASCII 50 to 9600 Char./block Opt. No — RS-232C, 20 mA current loop No No	Half/full-duplex Synchronous BSC EBCDIC 2400 to 19,200 Block Std. Opt. No RS-232C, CCITT No No	Half-duplex Async./sync. ASCII ASCII Up to 9600 Block only Std. No No RS-232C No No	Half-duplex Synchronous BSC/SDLC EBCDIC 110-9600 Block only Std. Opt. No RS-232C No No	Half-duplex Synchronous BSC/SDLC ASCII, EBCDIC Up to 9600 Block Std. No No RS-232C No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 1,795 — 8/78 3,000 Lear Siegler & third party	Contact vendor — — — Contact vendor — 9/79 — Lee Data Corporation	— — — — — 4/71 4,000 MDS	62-97 52-88 150 (remote) 135 (remote) 2,900 4,185 (remote) 5/75 Over 3,000 MDS	57-106* 45-91* — — 1,830-3,819* — 2/80 — MDS
<b>COMMENTS</b>		3278 or 3277 type- writer keyboard available. The screen has a status line		Local price for 1-year lease of controller is \$187; \$170 for 2-year lease; \$5,390 for purchase	*Prices reflect basic unit of Model 1 through Model 4 with all options and add-on equip- ment. Line print- ers will be avail- able in late 1980

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Megadata SiR-1000 C-4/8	Megadata Series 2001 Workstation	Megadata MC-77	Megadata System 700	Megadata System 700/RTE
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No Any IBM exc. SDLC Std. See comments No	Stand-alone 1 No Any IBM exc. SDLC Std. See comments No	Either 8 No 3277 Std. Hazeltine, Univac No	Either 8 No Any IBM exc. SDLC Std. See comments Via user-defined firmware Yes	Stand-alone 1 No Opt. Opt. See comments No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1536 64 x 24  10 x 10 192 7 x 8 dot matrix Std. 4 or 8 Opt. Std. Std.  Std. Opt. U, D, L, R, H, Rt.  Std. Std. Std. Std. Std. Std. Std. Char., line, screen std. Std.	1600 80 x 20  8.5 x 11 128 8 x 12 dot matrix Std. Std. Std.  Std. 75 per diskette U, D, L, R, H, Rt.  Std. Std. Std. Std. Std. Std. Std. Char., word, sen- tence, para., blk. std. Std.	1920 80 x 24  7.5 x 9.25 128 7 x 9 dot matrix No No Opt. Opt.  Std. Std. U, D, L, R, H  Std. Std. Std. Std. Std. Std. Std. Char., line, screen std. Std.	960/1920/2160 80 x 24/27; 64 x 24  8.5 x 11 64 to 256 7x9;8x10/12;12x15 No Std. 2 std. Std.  Up & down std. Opt. U, D, L, R, H, Rt.  Std. Std. Std. Std. Std. Std. Std. Char., line, screen std. Std.	1600, 1920 80 x 20, 80 x 24  8.5 x 11; 15-in. diag. 128 ASCII 8 x 12, 7 x 9 No Std. Std. Std.  Up & down std. 25 pages of diskette U, D, L, R, H, Rt.  Std. Both std. Std. Std. Std. Std. Std. Char., word, sentence, para., block std. —
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  ASCII Opt. 51 Std.	Typewriter  — 71 Std.	Typewriter  128 ASCII No 29 std. Std.	Typewriter  ASCII Std. 71 std. Std.	Typewriter  128 ASCII Std. 71 Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	Single/dual Single/dual Impact Card reader, paper tape punch, audible alarm, ID card reader	Single/dual Single/dual Impact Card reader, disk, paper tape punch, audible alarm, ID card reader, light pen	No Single/dual Impact —	Single/dual Single/dual Impact/non-impact Mag. tape, disk, line printers, audible alarm, ID reader, light pen	Single/Dual Dual std. Impact Card reader, disk, paper tape punch, audible alarm, ID card reader, light pen
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half-duplex Async./sync. ASCII ASCII See comments Char./block Std. Opt. No RS-232C  Opt. Opt.	Half/full-duplex Async./sync. ASCII/BSC std. ASCII/EBDCIC See comments Char./block Std. Opt. Opt. RS-232C std., 20 mA opt. Opt. Opt.	Half/full-duplex Asynchronous ASCII, 83B3 ASCII Up to 19,200 Char./block Std. No No RS-232C, 20 mA current loop No	Half/full-duplex Async./sync. ASCII/BSC ASCII/EBDCIC Up to 19,200 Char./block Std. Opt. Opt. RS-232C, 20/60 mA  Opt. Opt.	Half/full-duplex Async./sync. ASCII/BSC ASCII/EBDCIC Up to 19,200 Char./block Std. Opt. Opt. RS-232C std., 20 mA opt. Opt. Opt.
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Third-party lease — — — 5,000-7,500 — 1973 Over 500 Megadata & third party	Third-party lease — — 12,500-15,000 — 6/77 Over 100 Megadata & third party	Third-party lease — — 3,000 — 1/77 1,750 Megadata & third party	Third-party lease — — — 4,000-12,000 6,400-9,400 — 2/76 Over 4,500 Megadata & third party	Third-party lease Third-party lease — — 8,800 — 2/80 N/A Megadata & third party
<b>COMMENTS</b>	Compatibilities in- clude Burroughs, Univac, Honeywell, & Hazeltine, trans- mission speed up to 9600 bps (async.) or 19,200 bps (sync.)	Includes dual floppy disk drives and 55- cps bidirectional printer; compat. with Burr., Univac, Honeywell, & Hazel.; transmission speed up to 9600 bps (async.) or 19,200 bps (sync.)	Desktop terminal with 12-bit micro and 4K to 64K bytes of memory; uses DEC assembly lan- guage; other com- patibilities include Burroughs, Univac, Honeywell, & Hazeltine	Desktop terminal with integral dual mini-floppy disk drive and 55 cps letter quality printers; compat- ible with Bur- roughs, Univac, Honeywell, & Hazeltine	

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Megadata System 850	Memorex 1377-1/1377-4	Memorex 2076/2078	Microdata PRISM II	Micro-Term ACT-5A
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Cluster	Cluster	Stand-alone	Stand-alone
Maximum displays/controller	1	32	8	—	1
Transportability	No	No	No	No	No
IBM compatibility	No	3277-2	3276/3278	No	No
Teletype compatibility	Std.	No	No	Std.	Std.
Other compatibility	Opt.	No	No	No	No
User programmable	No	No	No	No	Opt.
Self diagnostics	Opt.	Std.	Std.	Std.	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	2,000	1920	960, 1920, 2560, 3440	1920	1920
Display arrangement, lines x chars./line	80 x 25 (1 status line)	24 x 80	12/24/32/43 x 80	24 x 80	24 x 80 and 48 x 39
Display area, h x w, inches	8.5x11; 15-in. diag.	7 x 9.5	8 x 10	7 x 9	6 x 8; 12-in. diag.
Total displayable symbols	128 ASCII	—	96	96	128
Symbol formation	7 x 9 dot matrix	7 x 8 dot matrix	7 x 9/14, 7 x 8/12	5 x 7 dot matrix	7 x 11 dot matrix
Color	No	No	No	No	No
Reverse video	Std.	No	No	Std.	Std.
Programmable brightness levels	Std.	2 std.	2 std.	Opt.	Full/half intensity
Character and/or field blinking	Std.	No	No	Opt.	Both std.
Roll	Up std.	No	No	Std.	Up/down std.
Paging	4 pages std.	No	No	No	No
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	Std.	No	Std.	Selectable	Std.
Addressable/readable cursor	Both std.	Std.	Addressable only	Both std.	Std.
Protected format	Std.	Std.	Std.	Opt.	Std.
Partial screen transmit	Std.	Std.	Std.	—	Std.
Tabulation	Std.	Std.	Forward/back std.	Forward std.	Std.
Character insert/delete	Std.	Std.	Std.	No	Std.
Line insert/delete	Std.	No	No	No	Std.
Erase	Char., line, screen std.	Char., line, screen std.	Char., line, screen std.	Line & screen std.	Line, screen, std.
Character repeat	Std.	Some keys	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter	Typewriter, data entry, console	Typewriter, data entry, keypunch	Typewriter	Typewriter
Character/code set	128 ASCII	EBCDIC/ASCII	96 EBDCIC	ASCII	128 ASCII
Detachability	Std.	No	Std.	Std.	No
Program function keys	Opt.	12 std.	10, 12, 24 opt.	No	Std.
Numeric keypad	Std.	Opt.	No	Std.	Inlaid & separate keypad
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	No	No
Diskette drive (floppy disk)	No	No	No	No	No
Serial printer	Impact	No	No	Opt.	No
Other devices	4K bits of EAROM to store commonly used telephone number, & codes	Audible alarm std., light pen opt.	Audible alarm, light pen, alt. coaxial cable, keylock	—	Serial printer port
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex
Technique	Async./sync.	Synchronous	Synchronous	Asynchronous	Asynchronous
Communications protocol	ASCII	BSC	BSC	—	Serial ASCII
Code	ASCII	EBCDIC	EBCDIC	ASCII	ASCII
Speed, bits/second	Up to 9600	1200-19,200	1200-9600	Up to 19,200	Up to 19,200
Format: character, line, or block	Char./block	Block	Block	Character	Char., line, block
Multipoint operation (pollable/addr.)	Opt.	Std.	Std.	No	No
Auto answer	Std.	No	No	No	No
Auto call	Std.	No	No	No	No
Terminal interface	RS-232C	RS-232C	RS-232C	RS-232C	RS-232C, 20 mA std.
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	Third-party lease	—	—	—	—
Display station, 2 year lease, \$/mo.	Third-party lease	80	62-80	—	—
Controller, 1 year lease, \$/mo.	—	209-500	105-132	—	—
Controller, 2 year lease, \$/mo.	—	2,600	2,395-3,160	—	—
Display station, purchase, \$	1,995	6,050-9,326	4,494-5,904	Contact vendor	945
Controller, purchase, \$	—	5/76	2/80	—	—
Date of first production delivery	5/80	Over 40,000	—	1/80	9/78 (ACT-V)
Display units installed to date	N/A	Memorex	Memorex	—	3000
Serviced by	Megadata & third party	—	—	Microdata	Micro-Term & dealers
<b>COMMENTS</b>	Desktop terminal with 8-bit micro-processor, up to 24K RAM/PROM memory, with Auto-Dial, printer and current loop interfaces standard	Microprocessor-based replacement for IBM 3277-2. Display Unit; attaches to Memorex or IBM controller; 25th display line for line and column indicators and systems status	Tiltable display, anti-glare screen, line & column indicators std., protected field indicator opt., separate controller, light-weight and energy efficient	Microprocessor controlled	Unique split screen feature with 48 lines of 39 characters. Optional 1K RAM available for user down loading, one-year limited warranty

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Micro-Term MIME-2A	Micro-Term MIME 314	Micro-Term MIME 100	NCR 796 Series Models 301 & 401	NCR 796-501
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Stand-alone	Stand-alone	Stand-alone
Maximum displays/controller	1	1	1	1	1
Transportability	No	No	No	No	No
IBM compatibility	No	No	No	No	No
Teletype compatibility	Std.	Std.	Std.	Std.	No
Other compatibility	See comments	See comments	See comments	No	NCR BSC
User programmable	Opt.	No	No	No	No
Self diagnostics	No	No	Yes	No	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1920	1920	3168	1920	1920
Display arrangement, lines x chars./line	24 x 80	24 x 80	24 x 80 or 24 x 132	24 x 80	24 x 80
Display area, h x w, inches	6 x 8; 12-in. diag.	6 x 8; 12-in. diag.	6 x 8; 12-in. diag.	8 x 10	8 x 10; 12-in. diag.
Total displayable symbols	128	96	96	64; 96 (401)	96
Symbol formation	7 x 11 dot matrix	5 x 9 dot matrix	7 x 9 dot matrix	5 x 7 dot matrix	5 x 7
Color	No	No	No	No	No
Reverse video	Std.	Std.	Std.	No	Std., selectable
Programmable brightness levels	Full/half intensity	Full/half intensity	Full/half intensity	2 std.	2 std.
Character and/or field blinking	Both std.	No	Both std.	Std.	Both std.
Roll	Up/down std.	Up std.	Up/down std.	Std.	Std.
Paging	No	No	No	—	No
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H	U, D, L, R, H
Cursor blinking	Std.	No	Std.	—	—
Addressable/readable cursor	Std.	Std.	Std.	Std.	Addressable std.
Protected format	Std.	No	See comments	Std.	Std.
Partial screen transmit	Std.	Std.	Std.	Std.	Std.
Tabulation	Std.	Std.	Std.	Std.	Std.
Character insert/delete	Std.	Std.	Std.	Std., 301	Std.
Line insert/delete	Std.	Std.	Std.	Std., 401 only	Std.
Erase	Line, screen std.	Line, screen std.	Line, screen std.	Screen std.	Screen std.
Character repeat	Std.	Std.	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter	Typewriter	Typewriter	Typewriter	Typewriter
Character/code set	128 ASCII	96 ASCII	128 ASCII	ASCII	128 ASCII
Detachability	No	No	No	No	No
Program function keys	Std.	No	Std.	—	No
Numeric keypad	Inlaid & separate keypad	Inlaid & separate keypad	Yes	Std.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	No	No
Diskette drive (floppy disk)	No	No	No	No	No
Serial printer	No	No	No	Yes	Impact, non-impact
Other devices	Serial printer port	—	Serial printer port	Audible alarm std.	Parallel printer
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full duplex	Half/full duplex	Full-duplex	Half/full-duplex	Half-duplex
Technique	Asynchronous	Asynchronous	Asynchronous	Asynchronous	Synchronous
Communications protocol	Serial ASCII	Serial ASCII	Serial ASCII	Serial ASCII	Serial ASCII, BSC
Code	ASCII	ASCII	ASCII	ASCII	ASCII
Speed, bits/second	110 to 19,200	110 to 9600	50 to 19,200	110 to 9600	Up to 9600
Format: character, line, or block	Char., line, block	Block std.	Char., line, block	Char./block	Line/block
Multipoint operation (pollable/addr.)	No	No	No	Std., 301 only	Std.
Auto answer	No	No	No	No	No
Auto call	No	No	No	No	No
Terminal interface	RS-232C, 20 mA	RS-232C, 20 mA	RS-232C or 20 mA	RS-232C	RS-232C
Integral modem	Std.	Std.	Std.	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	—	—	—	80-150	155
Display station, 2 year lease, \$/mo.	—	—	—	—	145 (3-year)
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	995	845	1,795	2,000-3,500	3,750
Controller, purchase, \$	—	—	—	—	—
Date of first production delivery	8/78 (MIME-I/II)	2/80	2/80	1/74	8/76
Display units installed to date	2000	—	—	10,000	Over 1,500
Serviced by	Micro-Term & dealers	Micro-Term & dealers	Micro-Term & dealers	NCR	NCR
<b>COMMENTS</b>	Exact emulation of VT-52, Hazeltine 1500, Soroc 120 (switch selectable). Other emulations available. One-year limited warranty	Exact emulation of Lear Siegler ADM-3A, Hazeltine 1410, Micro-Term ACT-IV (switch selectable), two-year limited warranty	Exact emulation of VT-100, plus enhanced mode allowing insert/delete capabilities. One-year limited warranty	Manufactured by ADDS as model 880A (301)	

Alphanumeric Display Terminals—Management Perspective  
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SUPPLIER AND MODEL	NCR 7900 Model 1	NTSC Model 82	NTSC Model 251	NTSC Model 255	NTSC Model 258
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Cluster	Cluster	Stand-alone	Either
Maximum displays/controller	—	16	32	1	24
Transportability	No	No	No	No	No
IBM compatibility	No	3270 BSC	3270	3275	3270/3275 BSC
Teletype compatibility	Std.	No	No	No	No
Other compatibility	No	No	No	No	No
User programmable	No	No	No	Via user-defined parameters	Via user-defined parameters
Self diagnostics	Std.	Yes	Yes	Yes	Yes
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	2000	1920	480/1920	480/1920	480/1920
Display arrangement, lines x chars./line	25 x 80	24 x 80	12 x 40; 24 x 80	12 x 40; 24 x 80	12 x 40; 24 x 80
Display area, h x w, inches	8 x 6; 12-in. diag.	14-in. diag.	4.5 x 8.2; 5.8 x 8.5	4.5 x 8.2; 5.8 x 8.5	—
Total displayable symbols	64, 96, 128 selectable	96	64; 96 opt.	64; 96 opt.	64; 96
Symbol formation	7 x 7 dot matrix	7 x 9 dot matrix	9 x 7 dot matrix	9 x 7 dot matrix	9 x 7 dot matrix
Color	No	No	No	No	No
Reverse video	Std.	No	No	No	No
Programmable brightness levels	No	2 std.	2 std.	2 std.	2 std.
Character and/or field blinking	Std.	Both std.	Field std.	Field std.	Field std.
Roll	Up std.	No	No	No	No
Paging	No	No	No	No	No
Cursor positioning: Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	Std.	Std.	Std.	Std.	Std.
Addressable/readable cursor	Addressable only	Addressable only	Std.	Std.	Std.
Protected format	No	Std.	Std.	Std.	Std.
Partial screen transmit	No	Std.	Std.	Std.	Std.
Tabulation	No	Std.	Std.	Std.	Std.
Character insert/delete	No	Std.	Std.	Std.	Std.
Line insert/delete	No	Std.	No	No	No
Erase	Line, screen std.	Char., line, screen std.	Char., screen std.	Char., screen std.	Char., screen std.
Character repeat	Std.	Std.	Partial	Partial	Partial
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter	Typewriter, data entry, keypunch	Typewriter, data entry	Typewriter, data entry	Typewriter, data entry
Character/code set	64, 96, 128 ASCII	96 ASCII	ASCII/EBCDIC	ASCII/EBCDIC	ASCII/EBCDIC
Detachability	No	Std.	Std.	Std.	Std.
Program function keys	1 key (96 functions)	Up to 12 std.	12 opt.	12 opt.	12 opt.
Numeric keypad	Std., touch-tone style opt.	Opt.	Opt.	Opt.	Opt.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	No	No
Diskette drive (floppy disk)	No	Single drive	Dual	Dual	Dual
Serial printer	Impact, non-impact	Impact	Impact	Impact	Impact
Other devices	Audible alarm std.	Aud. alarm, line printer, switchable displays btwn. Mod. 74, 78, 82, & 85	Audible alarm, ID card reader std. light pen opt.	Audible alarm, ID card reader std. light pen opt.	Audible alarm, ID card reader std. light pen opt.
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex	Half/full-duplex	Half-duplex	Half-duplex	Half-duplex
Technique	Asynchronous	Synchronous	Synchronous	Synchronous	Synchronous
Communications protocol	ASCII	BSC	BSC	BSC	BSC
Code	ASCII	EBCDIC	ASCII/EBCDIC	ASCII/EBCDIC	ASCII/EBCDIC
Speed, bits/second	50-19,200	Up to 9600	1200 to 4800	1200 to 4800	1200 to 4800
Format: character, line, or block	Char. or line	Block only	Block only	Block only	Block only
Multipoint operation (pollable/addr.)	No	Std.	Std.	Std.	Std.
Auto answer	Std.	Yes	Yes	Yes	Opt.
Auto call	No	No	No	No	No
Terminal interface	RS-232	RS-232C	RS-232C	RS-232C	RS-232C
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	95	71 w/keyboard	37	113	37
Display station, 2 year lease, \$/mo.	—	68 w/keyboard	30	83	30
Controller, 1 year lease, \$/mo.	—	320 (see comments)	133	—	185
Controller, 2 year lease, \$/mo.	—	300 (see comments)	113	—	94
Display station, purchase, \$	2,000	2,352 w/keyboard	3,420	4,730	3,420
Controller, purchase, \$	—	10,500 (see comm.)	4,330	—	6,250
Date of first production delivery	6/79	2/77	10/73	10/73	10/73
Display units installed to date	1,000	Over 1000	Over 13,000	Over 13,000	Over 13,000
Serviced by	NCR	NTSC	NTSC	NTSC	NTSC
<b>COMMENTS</b>					
	Four video attributes (blink, half-intensity, reverse video, or underline) may be combined. Weighs 25 lbs.	Available as a single- or dual-processor config. for on- and off-line data entry & batch processing; controller price includes first display station, integrated diskette, and 24K bytes of memory			

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	NTSC Model 291	NTSC Model 296	Olivetti TCV-280 System BS-281 & BS-286	Paradyne 7801 CRT Console	Paradyne 7802 Visual Display Unit 77
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Cluster 16 3270 BSC/SDLC No No No No Std.	Cluster 8 3270 BSC/SDLC No No No No Std.	Cluster 16 (281); 8 (286) No 3270 BSC & SDLC No No No No Yes	Cluster 15 No No Std. IBM 1052 No No	Cluster 6 No Yes, 3277 No No No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  15-in. diag. 64; 96 9 x 7 dot matrix No No 2 std. No  No No U, D, L, R, H, Rt. Std. Addressable only Std. Std. Std. Std. Std. No Char., screen std. Std.	1920 24 x 80  15-in. diag. 64; 96 9 x 7 dot matrix No No 2 std. No  No No U, D, L, R, H, Rt. Std. Addressable only Std. Std. Std. Std. Std. No Char., screen std. Std.	1920 24 x 80  15-in. diag. 64 7 x 9 dot matrix No No 2 std. Both std.  No No U, D, L, R, H, Rt. Std. Both std. Std. Std. Fwd./back std. Std. No Char., line, screen std. Std.	1920 24 x 80  8 x 10; 12-in. diag. 64 5 x 7 dot matrix No No No No U, D, L, R, H No Addressable only No No No No Char., screen std. No	1920 24 x 80  12-in. diag. 96 ASCII 7 x 11 dot matrix No Std. 2 std. No  No No U, D, L, R, H, Rt. No Std. Std. Std. Std. Std. No Char., line, screen std. Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter, data entry, keypunch ASCII/EBCDIC Std. 12 opt. Opt.	Typewriter, data entry, keypunch ASCII/EBCDIC Std. 12 opt. Opt.	Typewriter, data entry, keypunch ASCII/EBCDIC Std. 12 opt. Opt.	Typewriter  ASCII No No No	Typewriter  128 ASCII No 16 std. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No Impact ID card reader & light pen opt.	No No Impact ID card reader & light pen opt.	No No Impact Audible alarm, ID reader, light pen	No No No Audible alarm std., composite video	No No Yes Audible alarm std.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Synchronous BSC/SDLC ASCII/EBCDIC 1200 to 9600 Block only Std. No No RS-232C	Half/full-duplex Synchronous BSC/SDLC ASCII/EBCDIC 1200 to 9600 Block only Std. No No RS-232C	Half/full-duplex Synchronous BSC/SDLC ASCII/EBCDIC 1200 to 9600 Block Std. No No RS-232C	Half/full-duplex Asynchronous Paradyne SDLC EBCDIC Up to 9600 Char. only Std. No No No RS-232C	Half/full-duplex Asynchronous Paradyne SDLC EBCDIC 75 to 9600 Char./block No No No RS-232C
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by.	56 45 269 214 2,700 11,530 12/77 NTSC	56 45 167 135 2,700 7,520 12/77 NTSC	— — — — 2,080 7,690 (281); 3,080 10/78 N/A Olivetti	— 134 — — 3,000 — 7/76 200 Paradyne	— 155 — — 3,800 — 10/77 400 Paradyne
<b>COMMENTS</b>			The internal con- troller is capable of supporting up to 16 (281) or 8 (286) Olivetti TCV-287 or printers	Display used as 1052-compatible unit for PIX II Data Communication System console	Display used as 3270-compatible unit for PIX II Data Communica- tion System

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	Perkin-Elmer Owl-1200	Perkin-Elmer Bantam-550	Perry PE 9000 Series	Phone 1 P1-11	Phone 1 P1-14
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No No No	Stand-alone 1 No No Std. No No	Stand-alone 1 No No Std. No No	Either 24 No 3272/3271 Cont. Std. No No	Either 24 No 3272/3271 Cont. Std. No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  12-in. diag. 128 ASCII 7 x 11 dot matrix No Std. 2 std. Std.  Up std. No U, D, L, R, H, Rt.  Opt. Std. Std. Std. Std. Std. Std. Std. Std. Std. Std. Std. Std. Std.	1920 24 x 80  12-in. diag. 128 ASCII 5 x 9 dot matrix No Std., switchable No No  Std. No U, D, L, R, H, Rt.  No Addressable std. No No Fixed tab stops No No Char., screen std. Std.	480/1280/1920 8 x 60; 16/24 x 80  9-/12-in. diag. 64/96; 128 opt. 5 x 7 dot matrix No No No Std. (9700)  Up std. (9900) Opt. (9900) U, D, L, R, H, Rt.  Std. Addressable std. No No No Opt. (9900) Opt. (9900) Screen std. Std. (9900)	1920 24 x 80  12-in. diag. 128 7 x 9 dot matrix No No Std. No  Up std. No U, D, L, R, H  No Both std. Std. Std. Fwd./back tab std. Std. Std. Line, screen std. Std.	1920 24 x 80  12-in. diag. 128 7 x 9 dot matrix No No Std. No  Up std. No U, D, L, R, H  No Both std. Std. Std. Fwd./back tab std. Std. Std. Line, screen std. Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII No 16 std. Std.	Typewriter  128 ASCII No No Std., "shadowed"	Typewriter  64/128 ASCII No No Std.	Typewriter  ASCII No 32 std. Std.	Typewriter  ASCII No 32 std. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No Impact/non-impact Audible alarm std.	No No Via "wye" aux. port Audible alarm opt.	RS-232 interface RS-232 interface Impact Audible alarm std.	No No Impact Audible alarm	No No Impact Audible alarm, hand-fed card reader, and badge reader
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous Teletype ASCII 75 to 9600 Char./block Opt. No No No RS-232C, CCITT, or 20 mA dc No No	Half/full-duplex Asynchronous Teletype ASCII 110 to 9600 Character No No No RS-232C std. 20 mA dc opt. No No	Half/full-duplex Asynchronous ASCII ASCII 50 to 9600 Char./block No No No RS-232C, 20/60 mA dc opt. No No	Half/full-duplex Async./sync. TTY, BSC ASCII, EBCDIC To 9600 Char./block Std. Opt. No RS-232C Opt. Opt.	Half/full-duplex Async./sync. TTY, BSC ASCII, EBCDIC To 9600 Char./block Std. Opt. No RS-232C Opt. Opt.
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 2,195 — 3/77 — Perkin-Elmer	Leases from dealer only — — 966 — 12/78 — Perkin-Elmer	Purchase only — — — 975-2,250 — 7/77 — Perry and third party	40 33 415 (3271 compat.) 332 (3271 compat.) 1,050 8,300 9/76 205 Phone 1 exchange	40 33 415 (3271 compat.) 332 (3271 compat.) 2,600 8,300 9/76 105 Phone 1 exchange
<b>COMMENTS</b>			Several models of Centronics printers are available. For character and dis- play options, con- tact vendor.	Basic station is TTY compatible; Phone 1 emulation controllers provide for IBM 3271 com- patibility	Basic station is TTY compatible; Phone 1 emulation controllers provide for IBM 3271 com- patibility

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Plantronics VuSet DS-150C	Racal-Milgo 40+ MPL Data Display System	Racal-Milgo System 400	Ramtek 8030 Series	Ramtek 8120
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Stand-alone	Stand-alone	Stand-alone
Maximum displays/controller	1	1	1	1	1
Transportability	No	No	No	No	No
IBM compatibility	No	No	3275, 2265	No	No
Teletype compatibility	Std.	No	No	Std.	Std.
Other compatibility	No	AT&T #8A1	Honeywell, Univac	Burroughs & Univac	No
User programmable	No	No	No	Opt.	No
Self diagnostics	No	Std.	Std.	Yes	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	64/128	1920	960/1920	1920	1920
Display arrangement, lines x chars./line	4/8 x 16	24 x80	12/24 x 80	24 x 80	24 x80
Display area, h x w, inches	3-in. diag.	5.75 x 10.5	5.75 x 10.5	8 x 10	8 x 10
Total displayable symbols	64	127 ASCII	127 ASCII	128; 224 opt.	128, 224 opt.
Symbol formation	5 x 7 dot matrix	7 x 11 dot matrix	7 x 11 dot matrix	9 x 14 dot matrix	9 x 14 dot matrix
Color	No	No	No	No	No
Reverse video	No	Opt.	Std.	Std.	Std.
Programmable brightness levels	No	2 std.	3 std.	2 std.	2 std.
Character and/or field blinking	Both std.	Opt.	Std.	Field std.	Field std.
Roll	No	Std., up & down	No	Std.	Std.
Paging	No	—	No	Opt., up to 10 pages	Opt., up to 10 pages
Cursor positioning: Up, Down, Left, Right, Home, Return	—	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	No	No	No	Std.	Std.
Addressable/readable cursor	No	Addressable only	Addressable only	Std.	Std.
Protected format	No	Opt.	Std.	Std.	Std.
Partial screen transmit	No	Std.	Std.	Std.	Std.
Tabulation	No	Opt.	Std.	Std.	Std.
Character insert/delete	No	Std.	Std.	Std.	Std.
Line insert/delete	No	Std.	Std.	Std.	Std.
Erase	Screen std.	Char., line, screen std.	Char., line, screen std.	Char., line, screen std.	Char., line, screen std.
Character repeat	No	No	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Touch-Tone or alphanumeric	Typewriter	Typewriter	Typewriter, data entry	Typewriter, data entry
Character/code set	DTMF; 97 ASCII	127 ASCII	127 ASCII	128 ASCII	128 ASCII
Detachability	Std.	Std.	Std.	No	No
Program function keys	No	No	16 opt.	16 std.	16 std.
Numeric keypad	No	Opt.	Opt.	Std.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	No	RS-232 interface
Diskette drive (floppy disk)	No	No	No	Dual drive	RS-232 interface
Serial printer	No	Impact	Impact	RS-232 interface	RS-232 interface
Other devices	—	Audible alarm std.	Audible alarm std.	Audible alarm std.	Audible alarm std.
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex
Technique	Asynchronous	Asynchronous	Async./sync.	Async./sync.	Asynchronous
Communications protocol	ASCII	Bell 8A1	IBM, HIS, Univac	ASCII/BSC	ASCII
Code	ASCII	ASCII	ASCII/EBCDIC	ASCII/EBCDIC	ASCII/EBCDIC
Speed, bits/second	110, 150, 300	1200 to 4800	50 to 9600	Up to 9600	Up to 9600
Format: character, line, or block	Char. only	Char./block	Char./block	Char./block	Char., line, block
Multipoint operation (pollable/addr.)	No	Std.	Std.	Opt.	No
Auto answer	No	Opt.	Opt.	Opt.	No
Auto call	No	No	No	No	No
Terminal interface	RS-232C	RS-232C	RS-232C	RS-232C, 20 mA current loop	RS-232C
Integral modem	Std.	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	See comments	161-191	135-160	Purchase only	—
Display station, 2 year lease, \$/mo.	—	140-161	130-155	—	—
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	—	4,585-5,020	4,455-4,950	—	2,750
Controller, purchase, \$	—	—	—	—	—
Date of first production delivery	4/73	2/76	10/76	8/76	8/76
Display units installed to date	4,000	Over 1500	Over 2500	Over 500	3,500
Serviced by	Local telephone co.	ICC/Racal-Milgo	ICC/Racal-Milgo	Ramtek & third party	Ramtek & third party
<b>COMMENTS</b>					
	Leased to user by local telephone co. for about \$30 to \$55 per month; unit attaches directly to telephone set or private line		Printer prices include buffer and interface	Uses Intel 8080 microprocessor with 8K to 64K RAM; contains 4K PROM loader	Uses Intel 8080 microprocessor



Alphanumeric Display Terminals—Management Perspective  
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SUPPLIER AND MODEL	Ramtek 8210/UET	Soroc IQ 120	Soroc IQ 140	Taumark Tera System Handheld Terminal	TEC, Inc. Model 70
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Stand-alone	Radio net. cluster	Stand-alone
Maximum displays/controller	1	1	1	250	1
Transportability	No	No	No	Yes	No
IBM compatibility	No	No	No	3270 opt.	No
Teletype compatibility	No	Std.	Std.	Std. (controller)	Std.
Other compatibility	Univac Uniscope	No	No	To customer reqs.	See comments
User programmable	No	No	No	On custom systems	No
Self diagnostics	Yes	No	No	On custom systems	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1920	1920	1920	64	2000
Display arrangement, lines x chars./line	24 x 80	24 x 80	24 x 80	4 x 16	25 x 80
Display area, h x w, inches	8 x 10	12-in. diag.	12-in. diag.	2.5 x 3.62	6 x 9
Total displayable symbols	128	96	128	64 ASCII std.	126
Symbol formation	9 x 14 dot matrix	5 x 9 dot matrix	5 x 9 dot matrix	5 x 7 dot matrix	7 x 9 dot matrix
Color	No	No	No	No	No
Reverse video	Std.	No	Std.	No	Opt.
Programmable brightness levels	2 std.	2 std.	2 std.	No	Opt.
Character and/or field blinking	Char., field std.	No	Std.	No	Opt.
Roll	No	Std., up only	Std., up only	Up, down, std.	Up std.
Paging	No	No	No	1920-char. buf. opt.	3 opt.
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	Right, left, line advance	U, D, L, R, H, Rt.
Cursor blinking	Std.	No	Std.	No	Std.
Addressable/readable cursor	Std.	Addressable only	Both std.	Addr. std., read opt.	Both std.
Protected format	Std.	Std.	Std.	16 1-line form. std.	Opt.
Partial screen transmit	Std.	Std.	Std.	Std.	Opt.
Tabulation	Std.	Std.	Std.	No	Opt.
Character insert/delete	Std.	No	Std.	No	Opt.
Line insert/delete	Std.	No	Std.	No	Opt.
Erase	Char., line, screen std.	Line, screen std.	Line, screen std.	Char., line, screen std.	Char., screen std., line opt.
Character repeat	Std.	Std.	Std.	No	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Typewriter, data entry	Typewriter	Typewriter	40-key alphanumeric std., others opt.	Typewriter, TTY
Character/code set	125 ASCII, 3 spl.	96 ASCII	96 ASCII	64 ASCII std.	128 ASCII
Detachability	No	No	Std.	No	Std.
Program function keys	18 std.	No	16 std.	Opt.	8 std.
Numeric keypad	Std.	Std.	Std.	Std.	Opt.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	RS-232 interface	No	No	No	—
Diskette drive (floppy disk)	RS-232 interface	No	No	No	Single
Serial printer	RS-232 interface	No	No	No	Impact, non-impact
Other devices	Audible alarm std.	—	—	Bar code reader, A/D probe, audible alarm, battery-low indicator	Magnetic stripe card reader; audible alarm std.
<b>TRANSMISSION PARAMETERS</b>					
Mode	Full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex
Technique	Async./sync.	Asynchronous	Asynchronous	Async./sync./bisync.	Async. std., sync. opt.
Communications protocol	Univac Uniscope	ASCII	ASCII	ASCII std., BSC opt.	See comments
Code	ASCII	ASCII	ASCII	ASCII std., EBC. opt.	ASCII
Speed, bits/second	Up to 9600	75 to 19,200	110 to 19,200	600 to 50K (cont.)	50-9600
Format: character, line, or block	Block	Char./block	Char./block	Block	Char./line, blk. opt.
Multipoint operation (pollable/addr.)	Std.	No	Opt.	Std. (terminals)	Opt.
Auto answer	Std.	No	No	No	No
Auto call	No	No	No	No	No
Terminal interface	Univac Uniscope	RS-232C, 20 mA current loop	RS-232C, 20 mA current loop	RS-232C, 20 mA (controller)	RS-232C, TTL std.; 20/60 mA dc opt.
Integral modem	No	No	No	Std. (terminal)	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	—	Purchase only	Purchase only	Lease through third party	—
Display station, 2 year lease, \$/mo.	—	—	—	—	—
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	3,200	995	1,495	3,600 (w/o radio)	1,535-1,975
Controller, purchase, \$	—	—	—	5,250 (w/o radio)	—
Date of first production delivery	6/78	11/76	8/78	7/78	4/77
Display units installed to date	200	10,000	500	—	1800
Serviced by	Ramtek & third party	Soroc	Soroc	Taumark, Inc.	TEC
<b>COMMENTS</b>	Uses Intel 8080 microprocessor			Provides 2-way on-line comm. via FM radio btwn. mobile personnel & base station controller, which controls network & converts radio protocol to acceptable digital format for host comp.	Compatible with Uniscope, rack-mount AVA

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	TEC, Inc. Models 410/ 415, 420/425, & 430/435	TEC, Inc. Model 440	TEC, Inc. Models 450/455 & 460/465	TEC, Inc. Model 500	TEC, Inc. Model 510
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Stand-alone	Stand-alone	Stand-alone
Maximum displays/controller	1	1	1	1	1
Transportability	No	No	No	No	No
IBM compatibility	No	No	No	No	No
Teletype compatibility	No	Std.	Std. (450/455)	Std.	Std.
Other compatibility	No	No	No	ADM 3A	ADM-3A
User programmable	No	No	No	No	No
Self diagnostics	No	No	No	No	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1000/1920	1920	1000/1920	2000	2000
Display arrangement, lines x chars./line	20 x 50; 24 x 80	24 x 80	20 x 50; 24 x 80	25 x 80	25 x 80
Display area, h x w, inches	6 x 9	6 x 9	6 x 9	6 x 9	6 x 9
Total displayable symbols	68	64	68	126	95
Symbol formation	5 x 7 dot matrix	5 x 7 dot matrix	5 x 7 dot matrix	7 x 9 dot matrix	6 x 8 dot matrix
Color	No	No	No	No	No
Reverse video	Opt.	No	No	Std.	Std.
Programmable brightness levels	No	No	No	No	No
Character and/or field blinking	Std.	No	Std.	No	Std.
Roll	Std.	Std.	Std.	Up std.	Up std.
Paging	No	No	No	No	No
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	Rt., LF, BS	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	Std.	Std.	Std.	Std.	Std.
Addressable/readable cursor	Std.	No	Std.	Both std.	Both std.
Protected format	Std.	No	Std.	No	Std.
Partial screen transmit	No	No	Std.	No	Std.
Tabulation	Std.	No	Std.	No	Forward/back std.
Character insert/delete	Std.	No	Std.	No	No
Line insert/delete	Std.	No	Std.	No	No
Erase	Line, screen std.	Char., screen std.	Line, screen std.	Char., screen std.	Char., screen std.
Character repeat	Std.	Std.	Std.	Yes	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Teletype	Teletype	TTY/typewriter	Teletype	Typewriter
Character/code set	68 ASCII	64 ASCII	68 ASCII	128 ASCII	128 ASCII
Detachability	Std.	Std.	Std.	No	No
Program function keys	No	No	No	No	No
Numeric keypad	Opt.	None	Std., opt. 450/455	Opt.	Opt.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	—	No
Diskette drive (floppy disk)	No	No	Single	Single	No
Serial printer	RS-232 interface	RS-232 interface	RS-232 interface	Impact, non-impact	No
Other devices	Audible alarm std.	Audible alarm std.	Audible alarm std.	—	Auxiliary I/O
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex	Half/full-duplex
Technique	Asynchronous	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Communications protocol	ASCII	ASCII	ASCII/Burroughs	ASCII	ASCII
Code	ASCII	ASCII	ASCII	ASCII	ASCII
Speed, bits/second	110 to 9600	110 to 9600	110 to 9600	50-9600	110 to 9600
Format: character, line, or block	Block only	Char. only	Char./block	Character	Char., line, block
Multipoint operation (pollable/addr.)	Std. (420/425)	No	Std., 460/465	No	No
Auto answer	No	No	No	No	No
Auto call	No	No	No	No	No
Terminal interface	RS-232C, 20/60 mA dc	RS-232C, 20/60 mA dc	RS-232C, 20/60 mA dc	RS-232C, TTL, 20/60 mA dc opt.	RS-232C std.; 20/60 mA dc opt.
Integral modem	No	No	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	Purchase only	Purchase only	Purchase only	Purchase only	Purchase only
Display station, 2 year lease, \$/mo.	—	—	—	—	—
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	2,440-2,700	1,920	2,480	995	618-886
Controller, purchase, \$	—	—	—	—	—
Date of first production delivery	2/70	1/72	70; 74, 460/465	4/78	9/79
Display units installed to date	7000 (all mdls.)	1200	6500	600	Over 500
Serviced by	TEC	TEC	TEC	TEC	TEC
<b>COMMENTS</b>	Models 410/415 have parallel (TTL logic) interface; 420/425 have serial interface; rack-mounted units available		Rack mount available; Models 460/465 offer Burroughs TD 800 polling protocol		

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	TEC, Inc. Model 570	TEC, Inc. Model 610	TEC, Inc. Models 1401, 1440, 1445, 2401, & 2402	Tektronix 4024	Tektronix 4025
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No Via user-defined firmware Std.	Stand-alone 1 No No Std. ADM-3A No	Stand-alone 1 No No Std. No No	Stand-alone 1 No Std. No No No	Stand-alone 1 No Std. No No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	2000 25 x 80  6 x 9 128 6 x 8 dot matrix No Std. Std. Std. Up std. 3 pages opt. U, D, L, R, H, Rt.  Std. Both std. Std. Std. Std. Std. Std. Char., line, screen std. Std.	2000 25 x 80  6 x 9 95 6 x 8 dot matrix No Std. No Std. Up std. No U, D, L, R, H, Rt.  Std. Both std. Std. Std. Forward/back std. No No Char., screen std. Std.	960 (1401) 1920 12/24 x 80  6 x 9 64/96/128 5 x 7 dot matrix No No 2 std.; 1401 & 240x Std.; 1401 & 240x Std. No U, D, L, R, H, Rt.; LF, BS (1440) Std. Std.; 1401 & 240x Std.; 1401 & 240x Std.; 1401 & 240x No No Screen std. Std.	2720 34 x 80  6.7 x 9 64/96; 128 opt. 7 x 9 dot matrix No No 2 std. Both std. Std. Std. U, D, L, R, H, Rt.  No Yes Yes Std. Std. Std. Std. Std.	2720 34 x 80  6.7 x 9 64/96; 128 opt. 7 x 9 dot matrix No Std. 2 std. Both std. Std. Std. U, D, L, R, H, Rt.  No Yes Yes Std. Std. Std. Std. Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII Opt. 7 std. Opt.	Typewriter  128 ASCII Opt. No Opt.	Teletype  ASCII Std. No Opt.	Typewriter  128 ASCII Std. 12 Std.	Typewriter  128 ASCII Std. 12 Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No Single Non-impact, impact —	No No No Auxiliary I/O	RS-232C interface No RS-232C interface Audible alarm std.	No No Impact (4642) 4632 Hard Copy Unit, 4924 Car- tridge Tape Drive, 4662 Plotter	No No Impact (4642) 4631 Hard Copy Unit, 4924 Car- tridge Tape Drive, 4662 Plotter
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous TTY ASCII 50 to 19,200 Char., line, block No No No RS-232C, TTL, 20/60 mA std.	Half/full-duplex Asynchronous ASCII ASCII 110 to 9600 Char., line, block No No No RS-232C std.; 20/60 mA dc opt.	Half/full-duplex Asynchronous ASCII ASCII 110 to 9600 Char./block No No No RS-232C, 20/60 mA dc	Half/full-duplex Asynchronous ASCII ASCII 50 to 4800 Block Opt. No No RS-232C, 20 mA current loop	Half/full-duplex Asynchronous ASCII ASCII Up to 9600 Block Opt. No No RS-232C, 20 mA current loop
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 1,115-1,425 — 3/79 100 TEC	Purchase only — — — 748-1081 — N/A TEC	Purchase only — — — 1,125-1,725 — 11/74 to 4/75 7000 TEC	Purchase only — — — 2,995 (base) — — — Tektronix	Purchase only — — — 3,595 (base) — — — Tektronix
<b>COMMENTS</b>			Model 2402 is a 2401 with lower case alphabets	Has 4K to 32K memory; 32 line drawing characters	Has 4K to 32K memory; can have 6 char. sets; up to 31 char. sets with Graphics option

Alphanumeric Display Terminals—Management Perspective  
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SUPPLIER AND MODEL	Teleram P1888	Teleram 2277	Teleray 10	Teleray 11 (APL)	Teleray 12
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 Yes (22 lbs.) No Std. See comments Via user-defined firmware Yes	Either 15 Yes (35 lbs.) Programmable Opt. Most minicomp. Via user-defined parameters Opt.	Stand-alone 1 No No Std. See comments Via user-defined parameters No	Stand-alone 1 No No Std. — Via user-defined parameters No	Stand-alone 1 No No Std. — Via user-defined parameters No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	884 17 x 52  4.5 x 5.5 128; sec. set opt. 7 x 9 dot matrix No Yes Yes Yes  Up, down std. Unlimited pages U, D, L, R, H, Rt.  No Std. Yes Std. Std. Std. Std. Std. Std. Std. Std. Std. Std.	1840 23 x 80; one status line 7.2x9.6; 12-in. diag. 128; 256 opt. 7 x 9 dot matrix No Std. Std. Std.  Up, down std. Unlimited pages U, D, L, R, H, Rt.  Opt. Std. Opt. Std. Std. Fwd. std.; back opt. Std. Std. Char., word, text area std. Std.	1920 24 x 80 or 40  6 x 8.5; 12-in. diag. 128 ASCII 7 x 9 No Std. Std. Std.  Up and down std. No U, D, L, R, H, Rt.  Std. Both std. Std. Std. Std. Forward/back std. Std. Std. EOL, EOP, Page Std.	1920 24 x 80 or 40  6 x 8.5; 12-in. diag. 128 ASCII & 96 APC 7 x 9 No Std. Std. Std.  Up and down std. No U, D, L, R, H, Rt.  Std. Both std. Std. Std. Std. Forward/back std. Std. Std. EOL, EOP, Page Std.	3,840 (2 pages) 24 x 80 or 40  6 x 8.5; 12-in. diag. 128 ASCII 7 x 9 No Std. Std. Std.  Up and down std. 2 pages std. U, D, L, R, H, Rt.  Std. Both std. Std. Std. Std. Forward/back std. Std. Std. EOL, EOP, Page Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  128 ASCII Yes No Opt.	Typewriter  128 ASCII Opt. (Mark II only) Up to 10 opt. Opt.	Typewriter, N/+ key rollover 128 ASCII Std. 8 std., 16 opt. Std.	Typewriter N-key rollover 128 ASCII & 96 APL Std. 8 std. Std.	Typewriter, N-key rollover 128 ASCII Std. 8 std. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	Yes Yes Yes Through RS-232C interface	Single Single built-in impact, non-impact Line printers, modem, tape punches, etc.	No No No RS-232C peripheral port.	No No No RS-232C peripheral port	No No No RS-232C peripheral port.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous ASCII ASCII, TTS, BAUDOT 110 to 1200 Block Std. Std. Opt. RS-232C  Yes Std.	Half/full-duplex Asynchronous ASCII ASCII Select., 110 to 9600 Char., line, block Std. Std. Opt. RS-232C  Opt. Std.	Half/full-duplex Asynchronous ASCII ASCII Up to 19,200 Char./block No Std. No RS-232C std.; 20 mA opt.  No No	Half/full-duplex Asynchronous ASCII ASCII/APL Up to 19,200 Char./block No Std. No RS-232C std.; 20 mA opt.  No No	Half/full-duplex Asynchronous ASCII ASCII Up to 19,200 Char./block No Std. No RS-232C std.; 20 mA opt.  No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 5,495 — 10/74 — Teleram, GE	Purchase only — — — 6,495 Varies with size 4/78 — Teleram, GE	64-72 56-62 — 1,190-1,285 — 9/78 — Teleray	86 74 — 1,590 — 7/79 — Teleray	95 84 — 1,690 — 9/79 — Teleray
<b>COMMENTS</b>	216K char. cassette storage; 18 x 13 x 7 in. size; compat- ible with all ASCII computer systems and devices which accept EIA std. inputs	Text-editing com- munications termi- nal virtual scroll al- lows variable-length input; up to 14,000 words; automatically acquired directory displays all items recorded on disk- ette	Compatibility op- tions: DEC VT-52, DG 6053, Micro- data Prism. Avail- able in five enclo- sure styles, 527- character func- tion storage buffer	Available in 3 enclosure styles. 527-character function storage buffer	7,500-character function storage buffer

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	Teletype Model 40/1	Teletype Model 40/2	Teletype Model 40/3	Teletype Model 40/4	Teletype Model 4540 Series
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No No Std.	Stand-alone 1 No No Std. No No Std.	Stand-alone 1 No No No No No Std.	Either 1, 2, or 36 No 3270 BSC No No No Std.	Cluster 1 to 32 No 3270 BSC, SDLC No No No Std.
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  5.25 x 11.25 127 7 x 9 dot matrix No No 2 opt. Std., char. only  Std., up & down Opt. 2/3 pages U, D, L, R, H, Rt. No No Opt. Std. Opt. Std. Std. Screen std. Partial	1920 24 x 80  5.25 x 11.25 127 7 x 9 dot matrix No No 2 opt. Std., char. only  Std., up & down Opt. 2/3 pages U, D, L, R, H, Rt. No No Opt. Std. Opt. Std. Std. Screen std. Partial	1920 24 x 80  5.25 x 11.25 127 7 x 9 dot matrix No No 2 opt. Std., char. only  Std., up & down Opt. 2/3 pages U, D, L, R, H, Rt. No No Opt. Std. Opt. Std. Std. Char., line, screen std. Partial	1920 24 x 80  5.25 x 11.25 127 7 x 9 dot matrix No No 3 std. Field std.  No No U, D, L, R, H, Rt. Opt. Std. Std. Std. Yes Std. Std. Screen std. Partial	1920 24 x 80  5.25 x 11.25 127 7 x 9 dot matrix No No 3 std. Field std.  No No U, D, L, R, H, Rt. Opt. Std. Std. Std. Yes Std. Std. Screen std. Partial
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  127 ASCII No No No	Typewriter  127 ASCII No No No	Typewriter  127 ASCII Std. No No	Typewriter, data entry 96 ASCII/EBCDIC Opt. 12 std. Opt. (typewriter keyboard only)	Typewriter, data entry 96 ASCII/EBCDIC Opt. 12 std. Opt. (typewriter keyboard only)
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No Impact Audible alarm std.	No No Impact Audible alarm std.	No No Impact Audible alarm std.	No No Impact Audible alarm std.	No No Impact Audible alarm std., magnetic stripe reader opt.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half-duplex Asynchronous ASCII ASCII 1050/1200 Line/block No Std. No RS-232C  No No	Half/full-duplex Asynchronous ASCII ASCII 110 to 4800 Block/char. No Std. No RS-232C or 20/60 mA dc No No	Half-duplex Asynchronous ASCII ASCII 1050/1200 Block only Std. Std. No RS-232C  No No	Half-duplex Synchronous BSC, SDLC ASCII/EBCDIC 2400/4800/9600 Block only Std. Std. No RS-232C  No No	Half-duplex Synchronous BSC, SDLC ASCII/EBCDIC 2400/4800/9600 Block only Std. Std. No RS-232C  No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 4,250-5,323 — 10/73 — Teletype & Bell	Purchase only — — — 4,722-5,463 — 10/73 — Teletype & Bell	Purchase only — — — 4,808-5,258 1,485-1,492 10/73 — Teletype & Bell	Purchase only — — — 1,335-1,820 Contact vendor 11/75 — Teletype & Bell	Purchase only — — — 2,255-2,793 3,775-5,464 3/79 — Teletype & Bell
<b>COMMENTS</b>	For use on the dial network (DDD); also available from AT&T (Bell System) as Dataspeed 40, and from leasing companies	For use on the dial network (DDD); also available from AT&T (Bell System) as Dataspeed 40, and from leasing companies	For multipoint leased-line operation; also available from AT&T (Bell System) as Dataspeed 40, and from leasing companies	Also available from AT&T (Bell System) as Dataspeed 40/4, Mini-cluster sup. up to 3 dev.; Maxi-cluster supports up to 36 dev.; Stand-alone available in private line or dial-up version	Also available from AT&T (Bell System) as Dataspeed 4540, requires only ordinary two-twisted-pair wires for connection up to 5000 feet from controller to display

## Alphanumeric Display Terminals—Management Perspective and Equipment Specifications

SUPPLIER AND MODEL	Teletideo TVI-912B/ TVI-920B	Teletideo TVI-912C/ TVI-920C	Telex Terminal Communications TC 275	Telex Terminal Communications TC 276	Telex Terminal Communications TC 278
<b>TERMINAL DESCRIPTION</b>					
Stand-alone or cluster	Stand-alone	Stand-alone	Both	Cluster	Stand-alone
Maximum displays/controller	1	1	8	32	1
Transportability	No	No	No	No	No
IBM compatibility	No	No	3276 BSC/SDLC	3278 BSC/SDLC	3275
Teletype compatibility	Std.	Std.	No	No	No
Other compatibility	No	No	No	No	No
User programmable	No	No	No	No	No
Self diagnostics	Std.	Std.	Std.	Std.	No
<b>DISPLAY PARAMETERS</b>					
Display positions, chars./display	1920	1920	1920	1920	480/1920
Display arrangement, lines x chars./line	24 x 80	24 x 80	24 x 80	24 x 80	12 x 40; 24 x 80
Display area, h x w, inches	12-in. diag.	12-in. diag.	15-in. diag.	15-in. diag.	14-in. diag.
Total displayable symbols	96 ASCII	96 ASCII	96 EBCDIC/ASCII	96 EBCDIC/ASCII	96
Symbol formation	6 x 8 dot matrix	6 x 8 dot matrix	9 x 14	9 x 14	7x9/7x8 dot matrix
Color	No	No	No	No	1 std.
Reverse video	Std.	Std.	No	No	No
Programmable brightness levels	2 char., 1 field	2 char., 1 field	Std.	Std.	2 std.
Character and/or field blinking	Field std.	Field std.	No	No	No
Roll	Up std.	Up std.	No	No	No
Paging	2 pages opt.	2 pages opt.	No	No	No
Cursor positioning; Up, Down, Left, Right, Home, Return	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.	U, D, L, R, H, Rt.
Cursor blinking	Std., selectable	Std., selectable	Std.	Std.	No
Addressable/readable cursor	Both std.	Both std.	Both std.	Both std.	Std.
Protected format	Std.	Std.	Std.	Std.	Std.
Partial screen transmit	Std.	Std.	Std.	Std.	Std.
Tabulation	Column/field std.	Column/field std.	Forward/back std.	Forward/back std.	Std.
Character insert/delete	Std.	Std.	Std.	Std.	Std.
Line insert/delete	Std.	Std.	No	No	Std.
Erase	Line, screen std.	Line, screen std.	Char., screen std.	Char., screen std.	Char., line, screen std.
Character repeat	Std.	Std.	Std.	Std.	Std.
<b>KEYBOARD PARAMETERS</b>					
Style	Teletype	Typewriter	Typewriter, data entry	Typewriter, data entry	Typewriter/data entry
Character/code set	128 ASCII	128 ASCII	64 ASCII, 96 EBCDIC	64 ASCII/96 EBCDIC	ASCII/EBCDIC
Detachability	No	No	Std.	Std.	Std.
Program function keys	11 std. (920B only)	11 std. (920C only)	24 opt.	24 opt.	Opt.
Numeric keypad	Std.	Std.	Opt.	Opt.	Std.
<b>ANCILLARY DEVICES</b>					
Cassette tape drive	No	No	No	No	No
Diskette drive (floppy disk)	No	No	No	No	No
Serial printer	No	No	Impact, matrix	Impact, matrix	Impact
Other devices	Extension printer port, bell	Extension printer port, bell	Security lock, audible alarm, light pen	Security lock, audible alarm, light pen	Audible alarm, light pen, mag. stripe reader opt.
<b>TRANSMISSION PARAMETERS</b>					
Mode	Half/full-duplex	Half/full-duplex	Half/full-duplex	—	Half-duplex
Technique	Asynchronous	Asynchronous	Synchronous	—	Synchronous
Communications protocol	ASCII	ASCII	BSC, SDLC	BSC, SDLC	BSC, SDLC
Code	ASCII	ASCII	ASCII, EBCDIC	ASCII, EBCDIC	ASCII/EBCDIC
Speed, bits/second	75-9600	75-9600	2400 to 9600	—	1200 to 4800
Format: character, line, or block	Char., line, block	Char. line, block	Block	Block	Block only
Multipoint operation (pollable/addr.)	No	No	Std.	Std.	Std.
Auto answer	No	No	No	—	No
Auto call	Auto dial opt.	Auto dial opt.	No	—	No
Terminal interface	RS-232C, 20 mA std.	RS-232C, 20 mA std.	RS-232C	—	RS-232C
Integral modem	Opt.	Opt.	No	No	No
Integral acoustic coupler	No	No	No	No	No
<b>PRICING AND AVAILABILITY</b>					
Display station, 1 year lease, \$/mo.	Purchase only	Purchase only	N/A	N/A	N/A
Display station, 2 year lease, \$/mo.	—	—	143	61	120-128
Controller, 1 year lease, \$/mo.	—	—	—	—	—
Controller, 2 year lease, \$/mo.	—	—	—	—	—
Display station, purchase, \$	875-945	950-1,030	4,200	1,950	4,110
Controller, purchase, \$	—	—	—	—	—
Date of first production delivery	3/79	9/79	9/79	7/79	7/74
Display units installed to date	10,000	10,000	750	2,500	—
Serviced by	GE Intr. & Comm.	GE Intr. & Comm.	Telex Service Co.	Telex Service Co.	Telex Service Co.
<b>COMMENTS</b>					

**Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications**

SUPPLIER AND MODEL	Teletype Model 40/1	Teletype Model 40/2	Teletype Model 40/3	Teletype Model 40/4	Teletype Model 4540 Series
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No No	Stand-alone 1 No No Std. No No	Stand-alone 1 No No No No No	Either 1, 2, or 36 No 3270 BSC No No No	Cluster 1 to 32 No 3270 BSC, SDLC No No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning; Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  5.25 x 11.25 127 7 x 9 dot matrix No No 2 opt. Std., char. only  Std., up & down Opt. 2/3 pages U, D, L, R, H, Rt.  No No Opt. Std. Opt. Std. Std. Screen std.  Partial	1920 24 x 80  5.25 x 11.25 127 7 x 9 dot matrix No No 2 opt. Std., char. only  Std., up & down Opt., 2/3 pages U, D, L, R, H, Rt.  No No Opt. Opt. Opt. Std. Std. Screen std.  Partial	1920 24 x 80  5.25 x 11.25 127 7 x 9 dot matrix No No 2 opt. Std., char. only  Std., up & down Opt., 2/3 pages U, D, L, R, H, Rt.  No No Opt. Opt. Opt. Std. Std. Char., line, screen std.  Partial	1920 24 x 80  5.25 x 11.25 127 7 x 9 dot matrix No No 2 opt. Field std.  No No U, D, L, R, H, Rt.  Opt. Std. Std. Std. Yes Std. Std. Screen std.  Partial	1920 24 x 80  5.25 x 11.25 127 7 x 9 dot matrix No No 3 std. Field std.  No No U, D, L, R, H, Rt.  Opt. Std. Std. Std. Yes Std. Std. Screen std.  Partial
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Typewriter  127 ASCII No No No	Typewriter  127 ASCII No No No	Typewriter  127 ASCII Std. No No	Typewriter, data entry 96 ASCII/EBCDIC Opt. 12 std. Opt. (typewriter keyboard only)	Typewriter, data entry 96 ASCII/EBCDIC Opt. 12 std. Opt. (typewriter keyboard only)
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No Impact Audible alarm std.	No No Impact Audible alarm std.	No No Impact Audible alarm std.	No No Impact Audible alarm std.	No No Impact Audible alarm std., magnetic stripe reader opt.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half-duplex Asynchronous ASCII ASCII 1050/1200 Line/block No Std. No RS-232C	Half/full-duplex Asynchronous ASCII ASCII 110 to 4800 Block/char. No Std. No RS-232C or 20/60 mA dc	Half-duplex Asynchronous ASCII ASCII 1050/1200 Block only Std. Std. No RS-232C	Half-duplex Synchronous BSC ASCII/EBCDIC 2400/4800/9600 Block only Std. Std. No RS-232C	Half-duplex Synchronous BSC, SDLC ASCII/EBCDIC 2400/4800/9600 Block only Std. Std. No RS-232C
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 4,250-5,323 — 10/73 Teletype & Bell	Purchase only — — — 4,722-5,463 — 10/73 Teletype & Bell	Purchase only — — — 4,808-5,258 1,485-1,492 10/73 Teletype & Bell	Purchase only — — — 1,335-1,820 Contact vendor 11/75 Teletype & Bell	Purchase only — — — 2,255-2,793 3,775-5,464 3/79 Teletype & Bell
<b>COMMENTS</b>	For use on the dial network (DDD); also available from AT&T (Bell System) as Dataspeed 40, and from leasing companies	For use on the dial network (DDD); also available from AT&T (Bell System) as Dataspeed 40, and from leasing companies	For multipoint leased-line operation; also available from AT&T (Bell System) as Dataspeed 40, and from leasing companies	Also available from AT&T (Bell System) as Dataspeed 40/4, Mini-cluster sup. up to 3 dev.; Maxi-cluster supports up to 36 dev.; Stand-alone available in private line or dial-up version	Also available from AT&T (Bell System) as Dataspeed 4540, requires only ordinary two-twisted-pair wires for connection up to 5000 feet from controller to display

Alphanumeric Display Terminals—Management Perspective  
and Equipment Specifications

SUPPLIER AND MODEL	Teletype TVI-912B/ TVI-920B	Teletype TVI-912C/ TVI-920C	Telex Terminal Communications TC 275	Telex Terminal Communications TC 276	Telex Terminal Communications TC 278
<b>TERMINAL DESCRIPTION</b> Stand-alone or cluster Maximum displays/controller Transportability IBM compatibility Teletype compatibility Other compatibility User programmable  Self diagnostics	Stand-alone 1 No No Std. No No Std.	Stand-alone 1 No No Std. No No Std.	Both 8 No 3276 BSC/SDLC No No No Std.	Cluster 32 No 3278 BSC/SDLC No No No Std.	Stand-alone 1 No 3275 No No No No
<b>DISPLAY PARAMETERS</b> Display positions, chars./display Display arrangement, lines x chars./line  Display area, h x w, inches Total displayable symbols Symbol formation Color Reverse video Programmable brightness levels Character and/or field blinking  Roll Paging Cursor positioning: Up, Down, Left, Right, Home, Return Cursor blinking Addressable/readable cursor Protected format Partial screen transmit Tabulation Character insert/delete Line insert/delete Erase  Character repeat	1920 24 x 80  12-in. diag. 96 ASCII 6 x 8 dot matrix No Std. 2 char., 1 field Field std.  Up std. 2 pages opt. U, D, L, R, H, Rt.  Std., selectable Both std. Std. Std. Column/field std. Std. Std. Line, screen std. Std.	1920 24 x 80  12-in. diag. 96 ASCII 6 x 8 dot matrix No Std. 2 char., 1 field Field std.  Up std. 2 pages opt. U, D, L, R, H, Rt.  Std., selectable Both std. Std. Std. Column/field std. Std. Std. Line, screen std. Std.	1920 24 x 80  15-in. diag. 96 EBCDIC/ASCII 9 x 14 No No Std. No  No No U, D, L, R, H, Rt.  Std. Both std. Std. Std. Forward/back std. Std. No Char., screen std. Std.	1920 24 x 80  15-in. diag. 96 EBCDIC/ASCII 9 x 14 No No Std. No  No No U, D, L, R, H, Rt.  Std. Both std. Std. Std. Forward/back std. Std. No Char., screen std. Std.	480/1920 12 x 40; 24 x 80  14-in. diag. 96 7x9/7x8 dot matrix 1 std. No 2 std. No  No No U, D, L, R, H, Rt.  No Std. Std. Std. Std. Std. Char., line, screen std. Std.
<b>KEYBOARD PARAMETERS</b> Style  Character/code set Detachability Program function keys Numeric keypad	Teletype  128 ASCII No 11 std. (920B only) Std.	Typewriter  128 ASCII No 11 std. (920C only) Std.	Typewriter, data entry 64 ASCII, 96 EBCDIC Std. 24 opt. Opt.	Typewriter, data entry 64 ASCII/96 EBCDIC Std. 24 opt. Opt.	Typewriter/data entry ASCII/EBCDIC Std. Opt. Std.
<b>ANCILLARY DEVICES</b> Cassette tape drive Diskette drive (floppy disk) Serial printer Other devices	No No No Extension printer port, bell	No No No Extension printer port, bell	No No Impact, matrix Security lock, audible alarm, light pen	No No Impact, matrix Security lock, audible alarm, light pen	No No Impact Audible alarm, light pen, mag. stripe reader opt.
<b>TRANSMISSION PARAMETERS</b> Mode Technique Communications protocol Code Speed, bits/second Format: character, line, or block Multipoint operation (pollable/addr.) Auto answer Auto call Terminal interface  Integral modem Integral acoustic coupler	Half/full-duplex Asynchronous ASCII ASCII 75-9600 Char., line, block No No Auto dial opt. RS-232C, 20 mA std. Opt. No	Half/full-duplex Asynchronous ASCII ASCII 75-9600 Char. line, block No No Auto dial opt. RS-232C, 20 mA std. Opt. No	Half/full-duplex Synchronous BSC, SDLC ASCII, EBCDIC 2400 to 9600 Block Std. No No RS-232C No No	— — BSC, SDLC ASCII, EBCDIC — Block Std. — — — No No	Half-duplex Synchronous BSC, SDLC ASCII/EBCDIC 1200 to 4800 Block only Std. No No RS-232C No No
<b>PRICING AND AVAILABILITY</b> Display station, 1 year lease, \$/mo. Display station, 2 year lease, \$/mo. Controller, 1 year lease, \$/mo. Controller, 2 year lease, \$/mo. Display station, purchase, \$ Controller, purchase, \$ Date of first production delivery Display units installed to date Serviced by	Purchase only — — — 875-945 — 3/79 10,000 GE Intr. & Comm.	Purchase only — — — 950-1,030 — 9/79 10,000 GE Intr. & Comm.	N/A 143 — 4,200 — 9/79 750 Telex Service Co.	N/A 61 — 1,950 — 7/79 2,500 Telex Service Co.	N/A 120-128 — — 4,110 — 1/74 — Telex Service Co.
<b>COMMENTS</b>					













