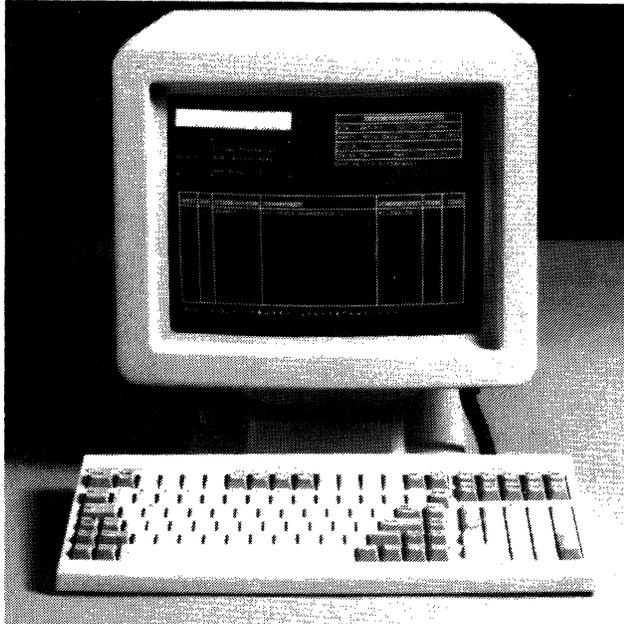


# Ann Arbor Display Terminals



*The Ann Arbor Genie XL is an ANSI-standard terminal designed for both conversational and form filling applications. The Genie XL features user-selectable display formats ranging from 18 lines to 30 lines of 80 characters each.*

## MANAGEMENT SUMMARY

**UPDATE:** *This report provides you with information on Ann Arbor Terminals' new product line, the XL Series. The XL Series terminals are ergonomically improved versions of several older Ann Arbor models. Also included is information on a new graphics terminal, the Ambassador GXL.*

Ann Arbor Terminals has been involved in the design and manufacture of CRT display terminals since 1970; it is the second-oldest manufacturer of CRT displays in the Teletype-compatible market. Display terminals are the company's only business. Originally, Ann Arbor manufactured low-priced, general-purpose displays. More recently, the company is pursuing the high-end of the terminal market, with fully featured terminals that include models aimed at the graphics and word processing markets.

The XL Series comprises Ann Arbor's current line of display terminal products. The series consists of repackaged versions of terminals introduced within the past few years, including the versatile Ambassador, low-end Genie, and top-of-the-line Guru. Each of these terminals has received an ergonomic facelift that includes a new enclosure design with a smaller footprint size, accomplished without sacrificing the terminal's full-sized 15-inch screen. A display tilt/swivel capability has been added as a standard feature, and the terminals' keyboard now features a low-profile design and 111 keys, each of which is programmable to 31 levels.

Ann Arbor Terminals offers a family of Teletype-compatible display units that feature a variety of editing functions and flexible display formats. A graphics model has also been added to the product line.

**MODELS:** Genie XL, Ambassador XL, Ambassador GXL, and Guru XL.

**DISPLAY:** All models include a 15-inch (diagonal) display screen with tilt/swivel capability; a variety of display formats are available, depending on the model selected.

**KEYBOARD:** All models include a detached, typewriter-style, 111-key keyboard with a low-profile design. Separate numeric and function keypads are standard.

**COMPETITION:** DEC, CIE Terminals, AT&T Teletype, Micro-Term, and several others.

**PRICE:** \$1,395 to \$3,090.

## CHARACTERISTICS

**VENDOR:** Ann Arbor Terminals, Inc., 6175 Jackson Road, Ann Arbor, Michigan 48103. Telephone (313) 663-8000.

**DATE OF ANNOUNCEMENT:** XL Series—July 1984.

**DATE OF FIRST DELIVERY:** XL Series—November 1984.

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

**SERVICED BY:** Ann Arbor Terminals.

## MODELS

All units are standalone, microprocessor-based, ASCII display terminals with detached keyboards. All XL Series terminals conform to the ANSI X3.64 standard for command code compatibility. Zoom control, which allows the user to regulate the amount of information displayed on a screen, is standard. The Ambassador XL and Guru XL are available in models with landscape (horizontal) and portrait (vertical) screen orientations.

The XL Series currently consists of four models:

**Genie XL**—features a maximum screen capacity of 2,400 characters in an arrangement of 30 lines by 80 characters. Two pages of display memory are standard. The Genie XL features line and block mode transmission capabilities.

**Ambassador XL**—features a maximum display capacity of 4,800 characters in an arrangement of 60 lines by 80 characters, and character, line, and block transmission capability. One page of display memory is standard.

**Ambassador GXL**—features a maximum screen capacity of 4,800 characters arranged in 60 lines by 80 characters, plus a graphics display of 768 by 600 pixels. The Ambassador GXL incorporates all of the alphanumeric features of the Ambassador XL, plus Tektronix 4010/4014-compatible graphics.

## Ann Arbor Display Terminals

- ▷ Ann Arbor's XL Series provides an impressive array of features and capabilities. All models conform to the ANSI X3.64 standard. The Genie XL is a character/block mode terminal with full editing, windowing, and zoom features. The terminal has user-selectable display capacities ranging from 18 lines to 30 lines of 80 characters each.

The company's older Ambassador model has been replaced by two newer versions: the Ambassador XL and Ambassador GXL. The Ambassador XL is an improved version of the Ambassador; it includes selectable display formats ranging from 18 lines to 60 lines of 80 characters each. The Ambassador GXL is the company's first graphics terminal; it includes all of the alphanumeric features of the Ambassador XL, plus Tektronix 4010/4014-compatible graphics capabilities.

The Guru XL is Ann Arbor's top-of-the-line product. The Guru XL includes selectable display formats up to 66 lines of 170 characters, for spreadsheet and multipage text editing applications. Up to 25K of display memory is available.

The Ambassador XL and Guru XL are available in two versions: landscape (horizontal) or portrait (vertical) screen orientations. In the portrait screen orientation version, the CRT is positioned vertically in the enclosure, to emulate an 8½-by-11 inch page of text for word processing applications.

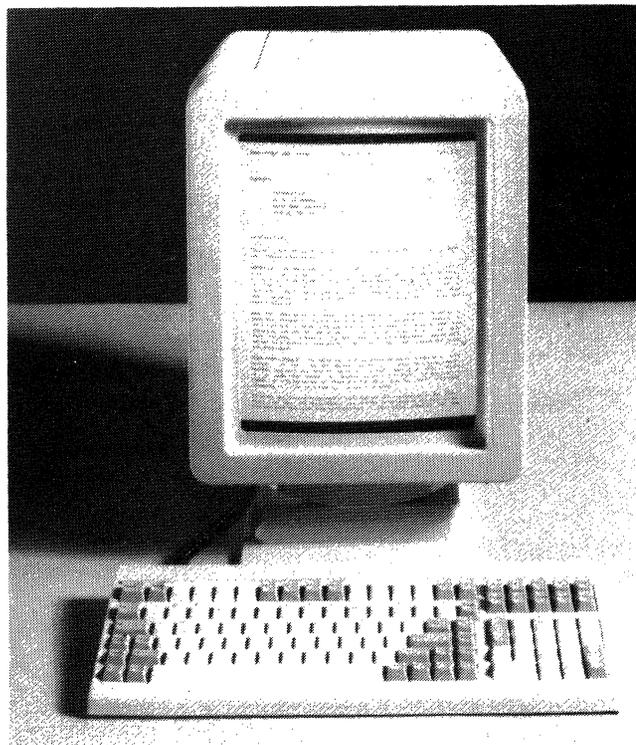
### COMPETITIVE POSITION

Initially, Ann Arbor Terminals was one of the many companies to compete in the general-purpose ASCII terminal market. In the past few years, prices for basic smart terminals have tumbled to levels hardly imagined 10 years ago; as this report was being written, Qume announced the QVT-101, a smart terminal with a single quantity price of \$395.

Many companies in the display terminal market have chosen to compete in the high-end of the market, in order to avoid such drastic price (and margin) cutting. Ann Arbor Terminals new XL Series is a family of fully featured terminals aimed at this market. Specialty niches in which the XL Series competes include the word processing and graphics terminal areas. The XL Series is also ANSI X3.64 compliant. As a result of this strategy, Ann Arbor competes with such vendors as DEC, CIE Terminals, AT&T Teletype, Micro-Term, and a variety of others. They do not compete with these companies across their entire product line, but rather with specific models within these lines (e.g., the Micro-Term Twist and CIE Terminals CIT-500 for word processing applications).

### ADVANTAGES AND RESTRICTIONS

Ann Arbor's strongest asset is the wide range of advanced features available on the XL Series terminals. The zoom control function, a unique feature offered on all Ann Arbor Terminals, allows the user to regulate the amount of information being displayed on the screen at any given time. By depressing the move down/move up control keys, a user



*The Guru XL (shown here) and Ambassador XL are available with portrait (vertical) screen orientations. The portrait versions of these terminals feature a vertically positioned CRT that emulates an 8½-by-11 page of text, for word processing applications. The Guru XL can be configured with a variety of display formats up to 66 lines of 170 columns each.*

- ▶ **Guru XL**—features a display capacity of 11,220 characters (66 lines by 170 characters), line and block mode transmission capabilities, and over 28K bytes of display memory.

### TRANSMISSION SPECIFICATIONS

Transmission is asynchronous in half- or full-duplex mode at keyboard-selectable speeds of 110 to 19,200 bits per second. Even parity generation is standard; odd parity or space or mark generation can be selected as an option. Parity checking on received data is not performed. All units are equipped with an RS-232-C interface.

All models provide for transmission on a character-by-character basis, by line, or by block of data. Key selection of 7- or 8-bit characters via a special meta key, and an RS-232-C printer port are standard features on all XL Series terminals.

### DEVICE CONTROL

Standard tab, cursor, and edit controls are offered on all models. Included among the cursor functions are: up, down, left, right, index, reverse index, preceding line, and next line. Edit controls feature insertion/replacement modes and insert/delete character/line functions. All XL Series terminals conform to ANSI-standard commands with selective and numeric parameters. DEC software compatibility is standard.

Display controls enable the operator to select the display parameters, select or change video attributes, split screen (with user-defined scrolling regions), scroll up or down, and zoom. Nonvolatile keyboard setup menus are equipped with

## Ann Arbor Display Terminals

can decrease the display format to a minimum of 18 lines by 80 characters, or increase it to the maximum display size for the model.

The wide range of selectable screen capacities available on the Ann Arbor terminals provides for flexibility in applications. Other advanced features include windowing/paging, split screen with independent scrolling regions, and full editing capabilities. The Ambassador GXL provides Ann Arbor with a strong presence in the graphics terminal market. And finally, the new ergonomic enclosure design, coupled with the standard 15-inch screen size, make the XL Series aesthetically pleasing.

In entering the market for word processing terminals with the portrait versions of the Ambassador XL and Guru XL, Ann Arbor is entering a market with few competitors. A logical reason for this is the lack of acceptance for these types of terminals. As mentioned above, CIE Terminals and Micro-Term also offer WP terminals with vertically oriented screens. To date, neither company has enjoyed significant success in this market. Ann Arbor hopes to reverse this trend.

Since the XL Series terminals have been on the market a relatively short period of time, no User Reaction can be included in this report. □

► **English names.** Ann Arbor's zoom feature allows the user to move part of the display text offscreen to increase character size of the remaining text, then zoom back to a full-screen display. Multiple pages/windows may be designated, with independent cursors. Video attributes include bold, blink, blank, underline, and reverse video. Screen area qualifications are selectable and include protect, guard, numerics only, justify, and security. In setup mode, the operator can select transmission rate, send/print parameters, perform data line monitoring and confidence tests, and set cursor rendition, bell/key click controls, and other local mode controls.

The Ambassador XL, and Guru XL terminals are available with landscape (horizontal) or portrait (vertical) screen orientations. The landscape display is designed for applications involving vector graphics or large columns of data such as accounting spreadsheets; the portrait display provides the appearance of an 8½-by-11 inch page for word processing applications.

The Ambassador GXL Provides Tektronix 4010/4014-compatible graphics capabilities, and supports popular graphics software packages including Plot-10, DISSPLA, TELL-A-GRAPH, and SAS/GRAPH. A drawing area of 4096 by 4096 pixels is available, with drawing area to viewport mapping. Graphics modes available include Alphagraphics, Vector, Point Plot, Incremental Point Plot, and Polygon Draw and Fill. There are 11 line types and 16 fill patterns, including several which are user-programmable. Alphagra-

phics mode provides complete control of character size, spacing, rotation, and margins. Graphics input with crosshair cursor is controlled by an 8-way keypad or optional mouse. Hard-copy graphics output can be made to a wide range of dot matrix and laser printers from vendors including IDS, DEC, CIT, Anadex, Okidata, and Hewlett-Packard.

### COMPONENTS

**DISPLAY UNIT:** A 15-inch (diagonal measurement) CRT screen with a viewing area, 8 inches high by 10 inches wide is standard for all XL Series models. The Ambassador XL and Guru XL are also available in portrait display versions in which the CRT is positioned vertically to emulate an 8½-by-11 inch page of text. A display tilt/swivel capability is standard on all models. A rack-mount option is available on all models. Characters are displayed in white (P4) phosphor on the Guru XL, in Green (P39) phosphor on the Ambassador XL and Ambassador GXL, and in amber phosphor on the Genie XL. All XL Series models form characters within a 7-by-9 dot matrix. The 128-character ASCII set is displayable. Display formats range from 1,440 characters (18 lines by 80 characters) to the maximum display capacity of the model.

The Genie XL provides a maximum display format of 2,400 characters (30 lines by 80 characters), and two pages of display memory. The Ambassador XL and Ambassador GXL provide a maximum display capacity of 4,800 characters (60 lines by 80 characters), and one page of display memory. The Ambassador GXL also features 768-by-600 pixel resolution graphics display capability. The Guru features a maximum display capacity of 11,220 characters (66 lines by 170 characters), and 28K of display memory as standard.

**KEYBOARD:** All XL Series terminals are equipped with detached, typewriter-style keyboards with a low-profile design. Separate numeric and function keypads are featured on all models. All keyboards contain 111 keys; all keys are programmable to 31 levels. Keys are programmable with any ASCII string, with local-only, send-only, and repeat attributes. A Pause key and Meta key are included, and N-key rollover is a standard feature.

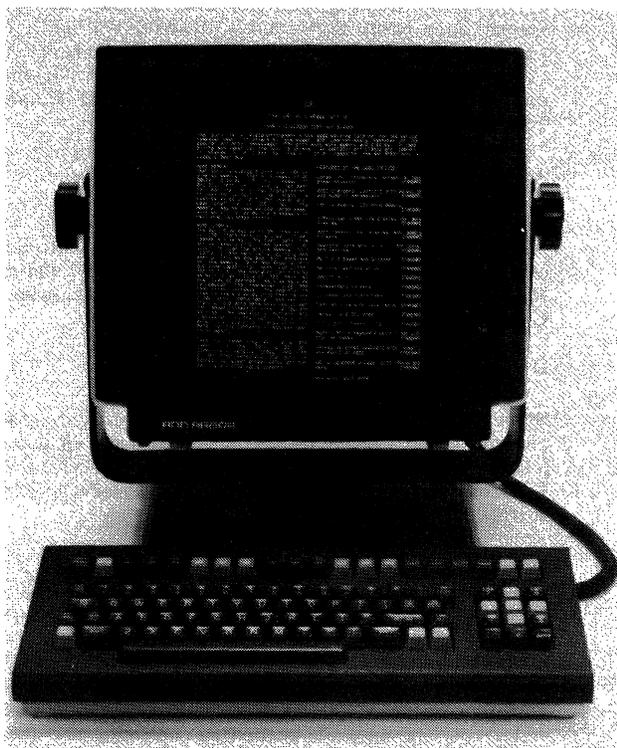
### PRICING

Ann Arbor Terminals' display terminals are available for purchase only. The terminals are covered under a 90-day (from date of shipment) factory service warranty on parts and labor. A one-year warranty may be purchased as an alternative to the standard 90-day warranty. In addition to Ann Arbor's Standard Service Program, the company provides an exchange program, as well as a Field Support Program. Contact Ann Arbor Terminals for more information on their customer service programs.

Models	Purchase Price (\$)
Genie XL	1,395
Ambassador XL	1,595
Ambassador GXL	3,090
Guru XL	2,395 ■



# Ann Arbor Display Terminals



*The Guru, Ann Arbor's newest terminal, offers a display format expandable to 66 lines by 170 characters and split screen capabilities. The unit shown above features the "portrait display" screen format and a tilt-and-swivel viewing stand.*

## MANAGEMENT SUMMARY

Ann Arbor Terminals offers four models in its current line of video display terminals: the Ambassador, the Genie, the Genie Plus, and the Guru. These models are ASCII terminals that feature a 15-inch display screen, a detached keyboard, an RS-232-C interface, and a wide variety of editing functions. Zoom control, which allows the user to increase or decrease the amount of information displayed on a screen, and multi-directional scrolling are standard.

The Ambassador, the oldest of the current offerings, features a display format expandable to 60 lines by 80 characters, block mode transmission, and a 94-key keyboard containing 38 programmable keys. One page of display memory is standard.

Genie and Genie Plus models feature maximum display formats of 30 lines by 80 characters. The Genie is a conversational terminal offering one page of display memory as standard (a second page of display memory as an option), an 82-key keyboard, and 26 programmable keys; the Genie Plus features block mode transmission, two pages of display memory as standard, and the same 94-key keyboard as used with the Ambassador. ➤

Ann Arbor offers a family of Teletype-compatible display units that feature a variety of editing functions and flexible display formats.

**MODELS:** Ambassador, Genie, Genie Plus, and Guru.

**DISPLAY:** A 15-inch (diagonal) CRT screen with an 8-by-10-inch viewing area.

**KEYBOARD:** Detached, typewriter-style keyboards featuring separate numeric keypads and 82- and 94-key layouts.

**COMPETITION:** DEC, C. Itoh, and Lear Siegler.

**PRICE:** \$1,195 to \$2,395.

## CHARACTERISTICS

**VENDOR:** Ann Arbor Terminals, Inc., 6175 Jackson Road, Ann Arbor, Michigan 48103. Telephone (313) 663-8000.

**DATE OF ANNOUNCEMENT:** Ambassador—May 1980; Genie and Genie Plus—November 1982; Guru—May 1983.

**DATE OF FIRST DELIVERY:** Ambassador—July 1980; Genie and Genie Plus—December 1982; Guru—June 1983.

**NUMBER INSTALLED TO DATE:** Approximately 75,000 terminals (current and predecessor models) since the company's establishment in March 1970.

**SERVICED BY:** Ann Arbor.

## CONFIGURATION

All units are standalone, microprocessor-based, ASCII display terminals with detached keyboards. Zoom control, which allows the user to regulate the amount of information displayed on a screen, is standard.

The family currently consists of four models:

**Ambassador**—This terminal features a maximum display capacity of 4800 characters in an arrangement of 60 lines by 80 characters, and character, line, and block transmission capability. One page of display memory is standard.

**Genie**—Maximum screen capacity for this conversational display unit is 2400 characters in an arrangement of 30 lines by 80 characters. One page of display memory is standard, and a second page is optional.

**Genie Plus**—This model offers the same screen capacity as the Genie (2400 characters), but includes two pages of display memory as standard, and line and block mode transmission capabilities.

**Guru**—A display capacity of 11,220 characters (66 lines by 170 characters), line and block mode transmission capabilities, and over 28K bytes of display memory are featured in this unit. ➤

## Ann Arbor Display Terminals

➤ The Guru, Ann Arbor's most recent addition, is a multi-page terminal featuring a display format expandable to 66 lines by 170 characters, block mode transmission, and over 28K bytes of display memory. The Guru uses the same keyboard as the Ambassador and the Genie Plus.

### COMPETITIVE POSITION

In the ASCII-compatible display terminal marketplace, Lear Siegler, C. Itoh, and Digital Equipment Corporation currently rank as the strongest competitors. Although not among the forerunners in this category, Ann Arbor Terminals has managed to maintain a significant share of the ASCII-compatible market since its establishment in 1970.

### ADVANTAGES AND RESTRICTIONS

One of Ann Arbor's strongest assets is an innovative approach which has helped keep it abreast in the current display terminal market. The zoom control function, a unique feature offered on all Ann Arbor Terminals, allows the user to regulate the amount of information being displayed on the screen at any given time. By depressing the move down/move up control keys, a user can decrease the display format to a minimum of 18 lines by 80 characters, or increase it to the maximum display size for the model.

Another unique feature is the portrait display format option. This option provides a CRT screen of 10 inches high by 8 inches wide, rather than the standard 8 inches high by 10 inches high, which may be advantageous in text editing and other applications. No major restrictions are evident among the units.

### USER REACTION

In September 1983, Datapro conducted telephone interviews with four users of Ann Arbor Terminals, who reported on a total of 366 terminals. Of these terminals, which had been installed for an average of two years, 358 units were Ambassador, 7 were Genie, and 1 was a Guru model. Ratings for all terminals are summarized below:

	Excellent	Good	Fair	Poor	WA*
Overall performance	3	0	1	0	3.5
Ease of use	1	2	1	0	3.0
Keyboard feel & usability	1	3	0	0	3.3
Display quality	2	1	1	0	3.3
Hardware reliability	1	2	0	1	2.8
Maintenance service**	2	0	0	0	4.0

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

\*\*One user had not required maintenance service; another user's company provided its own.

Among the respondents we contacted, the overall reaction to Ann Arbor display terminals was favorable. The only unfavorable comment came from a user who built his/her own viewing stands because he/she felt that the display was uncomfortable to use with the standard display unit base but that the optional tilt-and-swivel base was overly expensive. □

### TRANSMISSION SPECIFICATIONS

Transmission is asynchronous in half- or full-duplex mode at keyboard-selectable speeds of 110 to 19,200 bits per second. Even parity generation is standard; odd parity or space or mark generation can be selected as an option. Parity checking on received data is not performed. All units are equipped with an RS-232-C interface; RS-422/423 and 20 mA current loop interfaces are also available.

All models except the Genie provide for transmission on a character-by-character basis, by line, or by block of data. In the Genie, transmission is performed on a character-by-character basis only, as each key is depressed. Key selection of 7- or 8-bit characters via a special meta key, and an RS-232 printer port are standard features on Ambassador, Genie Plus, and Guru models.

### DEVICE CONTROL

Standard tab, cursor, and edit controls are offered on all models. Included among the cursor functions are: up, down, left, right, index, reverse index, preceding line, and next line. Edit controls feature insertion/replacement modes and insert/delete character/line functions.

Display controls enable the operator to select the display parameters, select or change video attributes, split screen, scroll up or down, and zoom. Video attributes include both, blink, blank, underline, and reverse video. Screen area qualifications are selectable and include protect, guard, numerics only, justify, and security. In set-up mode, the operator can select transmission rate, send/print parameters, perform data line monitoring and confidence tests, and set cursor rendition, bell/key click controls, and other local mode controls. The Genie is equipped with 26 programmable function keys; all other models include 38 function keys.

### COMPONENTS

**DISPLAY UNIT:** A 15-inch (diagonal measurement) CRT screen with a viewing area, 8 inches high by 10 inches wide is standard for all models. A tilt-and-swivel viewing stand and DEC mode capabilities are optionally available. A rack-mount option is available on all models except the Guru. Display formats range from 1440 characters (18 lines by 80 characters) to the maximum display capacity of the model.

The Ambassador provides a maximum display capacity of 4800 characters (60 lines by 80 characters), and one page of display memory. Optional display features on the Ambassador include: a portrait display format, which provides a vertical screen placement, and a Graphics Master function, which adds a 768 by 600-pixel vector graphics capability.

The Genie provides a maximum display format of 2400 characters (30 lines by 80 characters). One page of display memory is standard; an extra page of display memory can be selected as an option.

The Genie Plus offers the same screen capacity as Genie, plus the extra page of display memory as standard.

The Guru features a maximum display capacity of 11,220 characters (66 lines by 170 characters), and over 28K of display memory as standard. Portrait display format and Graphics Master functions are optionally available on the Guru.

**KEYBOARD:** All units feature detached, typewriter-style keyboards with separate numeric keypads. All keys are typamatic, and a caps lock permits the operator to inhibit

## Ann Arbor Display Terminals

► the generation of lower-case alphabets. The Genie features an 82-key keyboard with 26 programmable keys; all other models feature 38 programmable keys in a 94-key keyboard.

tiably. Factory maintenance and repair service is provided; Ann Arbor Terminals does not provide a monthly maintenance contract.

### PRICING

Ann Arbor Terminals' display terminals are available for purchase only. The terminals are covered under a 90-day warranty on parts and labor. Extended warranty is nego-

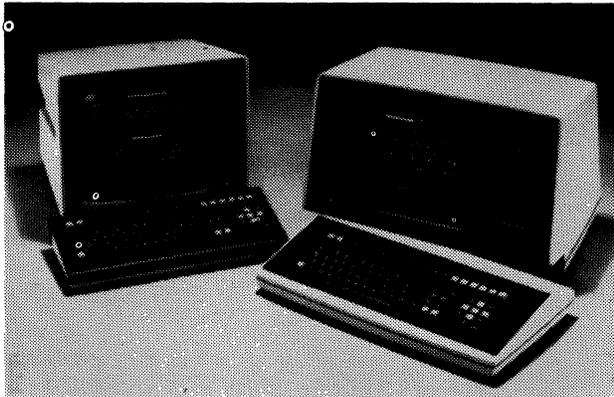
Ambassador  
Genie  
Genie Plus  
Guru

### Purchase Price

\$1,595  
1,195  
1,395  
2,395■



# Ann Arbor Alphanumeric Display Terminals



The Ambassador is Ann Arbor's most versatile terminal. Screen formats range from 1440 characters (18 lines of 80 characters) to 4800 characters (60 lines of 80 characters). All Ann Arbor terminals are available in the E-Case enclosure (shown on the left), or in the D-Case enclosure (shown on the right).

## MANAGEMENT SUMMARY

Ann Arbor Terminals' current line of display terminals consists of five models: the Ambassador, Model 400E, Model VT52-COMPAT, Model ADM3A-COMPAT, and Model DG-COMPAT. All models share many of the same basic components, including Ann Arbor's 15-inch "Smart Monitor," and a detachable keyboard. In addition, all models are available in either of two case enclosure styles: the E-Case, for desk-top or rack-mount configurations, or the D-Case, a larger case for desk-top configurations only.

The Ambassador is Ann Arbor's most versatile terminal. The unit features a standard display format of 30 lines by 80 characters; however, the Ambassador provides a Zoom Display feature which allows the operator to increase the screen capacity to 60 lines, or decrease capacity to 18 lines. The Ambassador features a variety of edit and erase commands, video attributes (bold, blink, blank, underline, and reverse video), and field definitions (protect, guard, numerics, justify, and security). Scrolling regions are selectable.

The Ambassador's detached keyboard contains 94 keys, including a numeric pad and 12 function keys. The 128-character ASCII set is generated. Transmission rates up to 19,200 bps are accommodated; an RS-232-C interface is standard. Data can be transmitted by character, line, or block. Self-diagnostics and a data line monitor mode are also standard. The Ambassador is designed to conform to most of the ANSI X3.64 standard.

Model 400E was introduced as a replacement for an older Ann Arbor unit, the 400D. It is a conversational (character-by-character transmission) terminal. Data can be displayed in any one of three keyboard-selectable modes: Roll, Scroll, or Page. The keyboard can be configured by the operator for full-ASCII character set ➤

A family of Teletype-compatible display terminals offering a variety of features, emulations, and configurations.

Standard features on all models include a 15-inch display screen, detachable typewriter-style keyboard, and an RS-232-C interface. Two types of display cases are available; rack-mounting is optionally available on some models. Display formats, function key availability, editing features, character attributes, and transmission modes and rates vary, depending on the model selected.

Purchase prices range from \$1,200 to \$1,600. End-user and OEM quantity discounts are available.

## CHARACTERISTICS

**VENDOR:** Ann Arbor Terminals, Inc., 6175 Jackson Road, Ann Arbor, Michigan 48103. Telephone (313) 663-8000.

**DATE OF ANNOUNCEMENT:** Model 400E—December 1977; Model VT52-COMPAT—November 1978; Model ADM3A-COMPAT—November 1978; Ambassador—May 1980; DG-COMPAT—January 1981.

**DATE OF FIRST DELIVERY:** Model 400E—December 1977; Model VT52-COMPAT—November 1978; Model ADM3A-COMPAT—November 1978; Ambassador—July 1980; DG-COMPAT—January 1981.

**NUMBER INSTALLED TO DATE:** Approximately 70,000 terminals (current and predecessor models) since the company's establishment in March 1970.

**SERVICED BY:** Ann Arbor.

## CONFIGURATION

All units are stand-alone, microprocessor-based. Teletype-compatible display terminals with detachable keyboards. Each is available in a choice of cabinets or as a rack-mounted unit.

The family currently consists of five models:

**Ambassador**—A Teletype-compatible terminal capable of transmitting data by character, line, or block. Standard screen capacity is 2400 characters, arranged in 30 lines of 80 characters; however, a Zoom Display feature can expand capacity to 4800 characters (60 lines by 80 characters), or decrease it to 1440 (18 lines by 80 characters). Display memory is 4400 characters, regardless of display arrangement.

**Model 400E**—A Teletype-compatible terminal fully-featured for conversational applications. Standard screen capacity is 1920 characters, arranged in 24 lines of 80 characters. Double-size and double-size character options permit display of 24 lines of 40 characters and 12 lines of 40 characters, respectively. Memory capacity is 2000 characters, regardless of display arrangement. ➤

## Ann Arbor Alphanumeric Display Terminals

▷ generation or generation of the 97-character Teletype 33 ASCII character set. Data can be accented (highlighted) via blinking, dual intensity, and reverse video. The cursor is readable as well as addressable, using independent X-Y coordinates. Up to 1920 normal-size, 960 double-wide, or 480 double-size characters can be displayed at one time on the screen. Regardless of screen capacity, display memory can store up to 2000 characters, and several commands are provided for accessing the memory not currently being displayed. Up to 36 optional program function keys store control sequences for transmission to the host.

The VT52-COMPAT and ADM3A-COMPAT provide emulation of Digital Equipment's Model VT52 and Lear Siegler's Model ADM-3A, respectively. Each features a 15-inch monitor, instead of the 12-inch monitor on the DEC and LSI units; detachable instead of attached keyboard; and keyboard-selection of operating parameters, instead of switch-selection. They also provide typamatic keyboards, character highlighting (optional on the VT52-COMPAT), and a self-test (VT52-COMPAT only), none of which are available on the DEC and LSI units.

Instead of DEC's Alternate Keypad Mode, a standard feature which converts the numeric keys in the numeric pad to program function keys, the VT52-COMPAT provides 28 optional dedicated program function keys. The VT52-COMPAT cabinet is more compact than the DEC unit's, in spite of the larger monitor size. The VT52-COMPAT does not provide DEC's Graphics Mode, Hold-Screen function, and optional printer interface.

The ADM3A-COMPAT provides an upper/lower case character set (as a no-cost option) and a separate numeric pad as standard instead of optional, but lacks 75, 150, and 19,200 bps transmission rates, the Split Baud Rate and Auto Answerback options, and the printer port provided by Lear Siegler. In January 1981, Ann Arbor introduced the Model DG-COMPAT, a unit which offers emulation of the Data General Dasher Models D100 and D200. The DG-COMPAT is intended for users of Data General's Eclipse, Nova, microNova, and Commercial Systems processors. Along with all of the standard Ann Arbor features, the DG-COMPAT provides a slave printer interface as standard; this feature is optional on the Dasher units.

### USER REACTION

In November 1981 Datapro conducted telephone interviews with six users of Ann Arbor display terminals. Four of these users reported on their experience with a total of 592 400E terminals (one user had an installed base of 400 units), which had been installed for an average of nearly 2½ years. The remaining two users reported on a total of 32 Ambassador terminals installed for an average of seven months. The ratings are summarized below: ▷

▶ **Model VT52-COMPAT**—Emulates the code structure and most of the command structure of Digital Equipment's Model VT52. DEC functions not supported are the Hold-Screen, Alternate-Keypad, and Graphic modes. Screen and memory capacity is 1920 characters, displayed in 24 lines of 80 characters.

**Model ADM3A-COMPAT**—Emulates the code structure and all functions of Lear Siegler's Model ADM-3A. Screen and memory capacity is 1920 characters, displayed in 24 lines of 80 characters.

**Model DG-COMPAT**—Emulates the code structure and functions of Data General's Dasher D100 and D200 displays. Screen and memory capacity is 1920 characters, displayed in 24 lines of 80 characters.

### TRANSMISSION SPECIFICATIONS

Transmission is asynchronous in half- or full-duplex mode at eight keyboard-selectable speeds of 110, 300, 600, 1200, 1800, 2400, 4800, or 9600 bits per second (19,200 bps speed is accommodated on the Ambassador). Even parity generation is standard; odd parity or space or mark generation can be selected as an option. Parity checking on received data is not performed. All units are equipped with an RS-232-C interface; a 20/60 mA current loop interface is also available.

### DEVICE CONTROL

**Ambassador:** Transmission is performed on a character-by-character basis, by line, or by block of data. The Ambassador provides 13 send controls and modes, as well as 10 print controls and modes, 11 receiving modes, and 11 operator convenience modes. (A special Meta key mode allows for the use of the Ambassador with software that permits use of the parity bit for 8-bit transmission.)

A total of 22 cursor controls are available, some of which are Set, Read, Save, and Restore. Twelve tab controls are provided, including column and field tab stops, and tab with justify. Thirteen erase controls are available, enabling the operator to erase a character, erase within a line, within a field, within an area, or within the entire display. Twelve edit controls are available, including insert/delete character/line, and the ability to locally rearrange data on the screen.

Display controls enable the operator to select the display parameters, select or change video attributes, or scroll up or down. Video attributes include both, blink, blank, underline, and reverse video. Screen area qualifications are selectable and include protect, guard, numerics only, justify, and security. In set-up mode, the operator can select transmission rate, send/print parameters, perform data line monitoring and confidence tests, and set cursor rendition, bell/key click controls, and other local mode controls. The Ambassador is equipped with 12 programmable function keys.

**All other models:** Transmission is performed on a character-by-character basis as each key is depressed. Terminal operating parameters are automatically established according to preset values during power-up. The parameters can be altered by the terminal operator by entering the Setup mode and keying in the desired parameter codes. The operator can select on-line or local mode; half- or full-duplex operation; transmission rate; Teletype or full-ASCII keyboard mode; and on certain models, Roll, Page, or Scroll display modes. The preset parameters are changeable in the field. Operator access to the Setup mode can optionally be inhibited.

The Teletype keyboard mode inhibits generation of 31 lower-case alphabets and special symbols, restricting the keyboard to the 97-character ASCII set used by the Teletype Model 33. Full-ASCII keyboard mode permits generation of the full 128-character ASCII set. If Model 400E or ADM3A-▶

## Ann Arbor Alphanumeric Display Terminals



	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>WA*</u>
Overall performance	4	2	0	0	3.7
Ease of use	4	2	0	0	3.7
Keyboard feel & usability	2	4	0	0	3.3
Display quality	2	4	0	0	3.3
Hardware reliability	1	4	1	0	3.0
Maintenance service**	2	1	0	0	3.7

\*Weighted Average based on a scale of 4.0 for Excellent.  
\*\*One user had not required maintenance, and two of the users serviced the terminals themselves.

The sophistication of the terminal functions, flexibility, and durability of the Ann Arbor terminals were among the reasons the units received such high ratings, according to those contacted. Two users liked the fact that the terminals followed the ANSI standard X3.64 so well. According to one, "The strongest selling point to me was the ANSI compatibility; I'd like to see more terminals conform to it." Another user felt the terminals were easy to program for, and that the flexible Set-Up mode permitted simple setting of terminal characteristics.

One user stated the terminals were extremely durable in an industrial environment, adding that the keyboards were highly resistant to damage from oil, etc. Favorable comments were also received on the terminal's video attributes and the 30-line scrollbar feature. Two of the users felt the terminals were reasonably priced.

Three of those contacted commended the Ann Arbor personnel, feeling they were very helpful, friendly, and responsive to their customer's needs.

When asked to describe product weaknesses, only one user had negative comments. This user said his units had a tendency to black out every once in a while for short periods, and that the keyboards sometimes would print double characters. □

▶ **COMPAT is equipped with a 64-character set of displayable symbols, keyed lower case alphabets are displayed as their upper-case equivalents.**

When the Roll display mode is used, and the bottom line of the display memory is filled, all lines automatically move up by one; new data is entered on the bottom line of the screen and the top line of data is lost.

If Page Mode (not available on the VT52-COMPAT and ADM3A-COMPAT) is selected, the cursor automatically returns to the top left of the screen when the bottom line is filled; as new data is entered, the top line of existing data is overwritten. An attempt by the operator to move the cursor above the beginning of the screen moves the cursor to the bottom line of the screen. On the Model 400E, which has a display memory capacity of 2000 characters, but a screen capacity of 480, 960, or 1920 characters (depending on the size of the displayed character), the operator may use the Set Screen Position command to select the section of memory to be viewed as a page on the screen. The "hidden" lines can also be accessed by using a Set Cursor command for a specific line in memory desired.

Scroll mode (available only on the 400E) is similar to Page mode except that it treats the entire display memory as a

single page. The data in memory is scrolled up and down on the screen without being lost unless overwritten by the operator.

Cursor controls include up, down, left, right, home, carriage return, and line feed. The VT52-COMPAT is also equipped with a reverse line feed, which moves the cursor one line above its present position. Standard configuration requires that line feed and carriage return be performed separately and provides automatic wraparound to a new line at the end of a line; options permit the line feed to be performed automatically when a carriage return is executed, and the line wraparound to be inhibited. The cursor is addressable on all units; the 400E also provides cursor readability as an option.

Data can be highlighted via blinking, reverse video, and dual display intensity character accents. This capability is standard on all units except the VT52-COMPAT, on which blinking is standard but reverse video and dual intensity are optional.

The only erase function provided clears the entire display memory, except on the VT52-COMPAT, which also provides line erasure.

### COMPONENTS

**CRT DISPLAY UNIT:** A 15-inch (diagonal measurement) CRT screen with a viewing area of 8 inches high by 10 inches wide. Standard display screen capacity is 1920 characters (24 lines of 80 characters) for the 400E, DG-COMPAT, VT52-COMPAT, and ADM3A-COMPAT; display capacity on the Ambassador ranges from 1440 characters (18 lines of 80 characters) to 4800 characters (60 lines of 80 characters). Display memory size is the same as screen size except on the 400E, which provides one additional "hidden" line in memory, and on the Ambassador, which has a display memory capacity of 4800 characters. The 400E also provides for optional alternate display arrangements that provide for double-wide characters (24 lines of 40 characters), and double-size characters (12 lines of 40 characters); in either case, display memory capacity remains at 2000 characters, allowing 50 lines of viewable data to be stored.

All models can display the 128-character ASCII set. The cursor is displayed as a blinking field. An option permits the cursor to be disabled for receive-only applications. The Ambassador provides a total of 22 cursor controls.

**400E and ADM3A-COMPAT KEYBOARD:** A 72-key typewriter-style, detachable keyboard with separate 12-key numeric pad. Cursor control keys are integral to the main keygroup. Up to 36 program function keys can optionally be accommodated in two rows above the main keygroup. In full-ASCII mode, the keyboard generates any of the 128 ASCII character codes. In Teletype mode, the keyboard generates the 97-character Teletype 33 ASCII character codes. All keys are typamatic, repeating automatically if held down for more than 1/2 second; the repeat capability can be disabled.

**VT52-COMPAT KEYBOARD:** An 81-key typewriter-style, detachable keyboard with separate numeric pad. Cursor control keys, 4 standard program function keys (equivalents to DEC's Blue, Red, and Gray keys, plus one extra key), and up to 28 optional program function keys are located in two rows above the main keygroup. The full 128-character ASCII set is generated. A caps-lock permits the operator to inhibit generation of lower-case alphabets. All keys are typamatic; the repeat capability can be disabled.

**DG-COMPAT KEYBOARD:** A 95-key typewriter-style, detached keyboard with separate cursor keys, a numeric pad, and 20 function keys active on the shift level. The keyboard generates the full 128-character ASCII set. All keys are typamatic; TTY lock is standard. ▶

## Ann Arbor Alphanumeric Display Terminals

- **AMBASSADOR KEYBOARD:** A 94-key typewriter-style, detached keyboard with a separate 12-key numeric/cursor control pad and 48 programmable function keys active on the shift level. The keyboard generates the full 128-character ASCII set. All keys are typamatic.

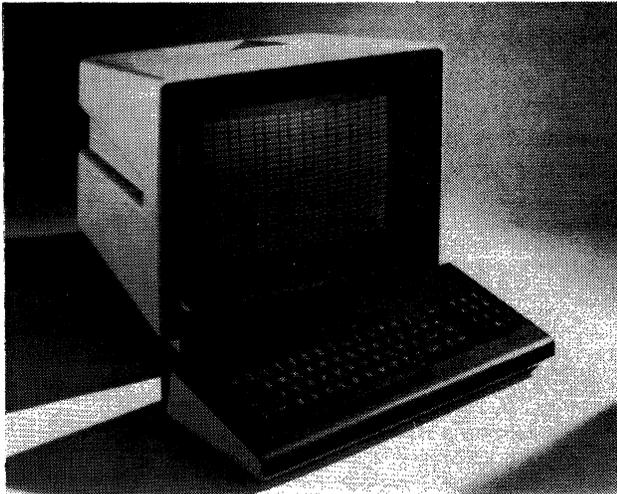
### PRICING

Ann Arbor Terminals' display terminals are available for purchase only. The terminals are covered under a 90-day warranty on parts and labor. Extended warranty is negotiable. Factory maintenance and repair service is

provided; Ann Arbor Terminals does not provide a monthly maintenance contract.

	<u>Purchase Price</u>
Ambassador (E-Case)	\$1,395
Ambassador (D-Case)	1,495
Model 400E	1,200
Model ADM3A-COMPAT	1,400
Model VT52-COMPAT	1,450
Model DG-COMPAT	1,600■

# Ann Arbor Terminals Alphanumeric Display Terminals



This Model 400E terminal shows the 15-inch "Smart Monitor", detachable keyboard, and compact cabinetry (15 inches wide, 14 inches high, and 13.6 inches deep) used on all Ann Arbor Terminals. Screen capacity shown is 1920 characters; options permit the 400E to display 960 double-wide or 480 double-size characters. Other models support a 3200- or 4800-character screen capacity using the same monitor.

## MANAGEMENT SUMMARY

Ann Arbor Terminals' family of stand-alone conversational CRT display terminals currently consists of five models: 400E, 4080-COMPAT, 6080-COMPAT, VT52-COMPAT, and ADM3A-COMPAT. The models share many of the same basic components, including Ann Arbor's "Smart Monitor", detachable keyboard, and cabinetry, which are designed for easy implementation of specific model requirements.

Model 400E replaces its predecessor, Model 400D. The newer unit features a more compact cabinet, and costs almost \$300 less than its predecessor. The 400E offers a broader range of features than many conversational terminals on the market today. Data can be displayed in any one of three keyboard-selectable modes: Roll, Scroll, or Page. The keyboard can be configured by the operator for full-ASCII character set generation or generation of the 97-character Teletype 33 ASCII character set. Data can be accented (highlighted) via blinking, dual intensity, and reverse video. The cursor is readable as well as addressable, using independent X-Y coordinates. Up to 1920 normal-size, 960 double-wide, or 480 double-size characters can be displayed at one time on the screen. Regardless of screen capacity, display memory can store up to 2000 characters, and several commands are provided for accessing the memory not currently being displayed. Up to 36 optional program function keys store control sequences for transmission to the host.

The 4080-COMPAT and the 6080-COMPAT are upward-compatible replacements for Ann Arbor Terminals' ➤

A family of five Teletype-compatible conversational terminals with detachable keyboards and 15-inch monitors that can display 480, 960, 1920, 3200, or 4800 characters.

Features include character-by-character transmission; even parity generation; keyboard-selectable operating parameters; typematic keyboard; Roll, Scroll, and Page display modes; composite video output; and blinking, reverse video, and dual intensity highlighting. Two models provide emulation of DEC's Model VT52 and Lear Siegler's Model ADM-3A.

Options include up to 36 program function keys; rack-mounting; generation of odd parity or a space or mark condition; cursor readability; and double-wide or double-size characters. All options are not available on all models.

Ann Arbor Terminals' equipment is available for purchase only. Unit pricing for the five models ranges from \$1200 to \$1,895. Substantial end-user and OEM quantity discounts are available.

## CHARACTERISTICS

**VENDOR:** Ann Arbor Terminals, Inc., 6175 Jackson Road, Ann Arbor, Michigan 48103. Telephone (313) 663-8000.

**DATE OF ANNOUNCEMENT:** Model 400E—December 1977; Model VT52-COMPAT—November 1978; Model ADM3A-COMPAT—November 1978; Model 4080-COMPAT—March 1979; Model 6080-COMPAT—April 1979.

**DATE OF FIRST DELIVERY:** Model 400E—December 1977; Model VT52-COMPAT—November 1978; Model ADM3A-COMPAT—November 1978; Model 4080-COMPAT—March 1979; Model 6080-COMPAT—April 1979.

**NUMBER INSTALLED TO DATE:** Approximately 20,000 terminals (current and predecessor models) since the company's establishment in March 1970.

**SERVICED BY:** Ann Arbor.

## CONFIGURATION

All units are stand-alone, microprocessor-based. Teletype-compatible display terminals with detachable keyboards. Each is available in a choice of cabinets or as a rack-mounted unit. Models 400E, VT52-COMPAT, and ADM3A-COMPAT are equipped with a composite video output interface, which can provide control for up to 10 auxiliary slave monitors; total connecting cable length cannot exceed 1000 feet. ➤

## Ann Arbor Terminals Alphanumeric Display Terminals

➤ Model K4080D, which is no longer available. The new models provide a screen capacity of 3200 and 4800 characters respectively. The basic 4080-COMPAT and 6080-COMPAT units cost about \$400 and \$100 less, respectively, than their predecessor. In addition, operating parameters are selected via the keyboard, instead of via switches; character accent functions, such as blinking, and intensity, and reverse video, are provided; and the cabinetry is more compact.

The VT52-COMPAT and ADM3A-COMPAT provide emulation of Digital Equipment's Model VT52 and Lear Siegler's Model ADM-3A respectively. Each features a 15-inch monitor, instead of the 12-inch monitor on the DEC and LSI units; detachable instead of attached keyboard; and keyboard-selection of operating parameters, instead of switch-selection. They also provide typamatic keyboards, character highlighting (optional on the VT52-COMPAT), and a self-test (VT52-COMPAT only), none of which are available on the DEC and LSI units.

Instead of DEC's Alternate Keypad Mode, a standard feature which converts the numeric keys in the numeric pad to program function keys, the VT52-COMPAT provides 28 optional dedicated program function keys. The VT52-COMPAT cabinet is more compact than the DEC unit's, in spite of the larger monitor size. The VT52-COMPAT does not provide DEC's Graphics Mode, Hold-Screen function, and optional printer interface. The basic VT52-COMPAT is priced at \$1,400, compared to \$1,900 for DEC's VT52.

The ADM3A-COMPAT provides an upper/lower case character set (as a no-cost option) and a separate numeric pad as standard instead of optional, but lacks 75, 150, and 19,200 bps transmission rates, the Split Baud Rate and Auto Answerback options, and the printer port provided by Lear Siegler. Most importantly, the ADM3A-COMPAT costs \$1,400, compared to \$1,050 for the LSI unit equipped with numeric pad and upper/lower case options, a disadvantage that would deter most prospective buyers unless they have had previous bad experiences with Lear Siegler equipment.

### USER REACTION

Datapro conducted telephone interviews with six users of Ann Arbor Terminals equipment, who reported on their experience with a total of 93 units. All were Model 400E terminals installed for more than one year. The ratings are summarized below.

	Excellent	Good	Fair	Poor	WA*
Overall performance	3	2	1	0	3.3
Ease of operation	4	2	0	0	3.7
Display clarity	1	4	0	0	3.2
Keyboard feel and usability	2	3	1	0	3.2
Hardware reliability	2	2	0	2	2.7
Maintenance service	0	2	1	0	2.7
Technical support	1	2	0	0	3.3

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

➤ The family currently consists of five models:

**Model 400 E**—A Teletype-compatible terminal fully-featured for conversational applications. Standard screen capacity is 1920 characters, arranged in 24 lines of 80 characters. Double-side and double-size character options permit display of 24 lines of 40 characters and 12 lines of 40 characters, respectively. Memory capacity is 2000 characters, regardless of display arrangement.

**Model VT52-COMPAT**—Emulates the code structure and most of the command structure of Digital Equipment's Model VT52. DEC functions not supported are the Hold-Screen, Alternate-Keypad, and Graphic modes. Screen/memory capacity is 1920 characters, displayed in 24 lines of 80 characters.

**Model ADM3A-COMPAT**—Emulates the code structure and all functions of Lear Siegler's Model ADM-3A. Screen/memory capacity is 1920 characters, displayed in 24 lines of 80 characters.

**Model 4080-COMPAT**—A Teletype-compatible conversational terminal with screen/memory capacity of 3200 characters, displayed 40 lines of 80 characters; upward-compatible in code structure and functions with predecessor Ann Arbor Terminals Model K4080D.

**Model 6080-COMPAT**—A Teletype-compatible conversational terminal with screen/memory capacity of 4800 characters, displayed in 60 lines of 80 characters; upward-compatible in code structure and functions (except for cursor addressing scheme) with predecessor Ann Arbor Terminals Model K4080D.

### TRANSMISSION SPECIFICATIONS

Transmission is asynchronous in half- or full-duplex mode at eight keyboard-selectable speeds of 110, 300, 600, 1200, 1800, 2400, 4800, or 9600 bits per second. Even parity generation is standard; odd parity or space or mark generation can be selected as an option. Parity checking on received data is not performed. All units are equipped with an RS-232C interface; a 20/60 mA current loop interface is also available.

### DEVICE CONTROL

Transmission is performed on a character-by-character basis as each key is depressed. Terminal operating parameters are automatically established according to preset values during power-up. The parameters can be altered by the terminal operator by entering the Setup mode and keying in the desired parameter codes. The operator can select on-line or local mode; half- or full-duplex operation; transmission rate; Teletype or full-ASCII keyboard mode; and on certain models, Roll, Page, or Scroll display modes. The preset parameters are changeable in the field. Operator access to the Setup mode can optionally be inhibited.

The Teletype keyboard mode inhibits generation of 31 lower-case alphabets and special symbols, restricting the keyboard to the 97-character ASCII set used by the Teletype Model 33. Full-ASCII keyboard mode permits generation of the full 128-character ASCII set. If Model 400E or ADM3A-COMPAT is equipped with a 64-character set of displayable symbols, keyed lower case alphabets are displayed as their upper-case equivalents.

When the Roll display mode is used, and the bottom line of the display memory is filled, all lines automatically move up by one; new data is entered on the bottom line of the screen and the top line of data is lost.

If Page Mode (not available on the VT52-COMPAT and ADM3A-COMPAT) is selected, the cursor automatically

➤ Three users who were providing their own maintenance service and technical support or had no experience with Ann Arbor Terminals in those areas declined to give ratings in those categories.

All the users interviewed felt that, for the most part, these terminals had served them well. Although various features were mentioned as advantages, no one particular feature was more frequently cited than another. One user was especially happy with the keyboard design. He also liked the ability to select the transmission rate via the keyboard, the availability of character accents, and the provision of a full upper/lower case displayable character set as a standard (no cost) feature. Another user mentioned that the terminal was very easy to use, and said that low cost had been a major factor in their decision to buy. Another user mentioned that although his terminals operated under a 24-hour duty cycle condition, they were extremely reliable.

Negative comments centered on Ann Arbor Terminals' maintenance and repair service. Three users had experienced turnaround times for repair service of 3 to 4 weeks, 2 to 3 weeks, and 4 to 6 weeks, respectively, which each felt was too long. Although none had experienced significant downtime (they all owned spares), each pointed out specific deficiencies in Ann Arbor Terminals' repair service policies: no "loaner" or exchange program for faulty parts, no fixed-cost replacement policy, and lack of better technical documentation so that they could make more repairs themselves. Two other users had experienced excellent turnaround time, attributing it to their close proximity to the factory; one of them found that when he hand-carried equipment to the factory for repair, the turnaround was 2 to 3 days.

Four of the six users had experienced extremely high "infant mortality" when their terminals were first installed; apparently this was related to a major design problem with the power supply. One user mentioned problems with the chassis frame, which was too weak. In all cases factory modifications were made under warranty, and no other consistent problems have occurred. □

➤ returns to the top left of the screen when the bottom line is filled; as new data is entered, the top line of existing data is overwritten. An attempt by the operator to move the cursor above the beginning of the screen moves the cursor to the bottom line of the screen. On the Model 400E, which has a display memory capacity of 2000 characters, but a screen capacity of 480, 960, or 1920 characters (depending on the size of the displayed character), the operator may use the Set Screen Position command to select the section of memory to be viewed as a page on the screen. The "hidden" lines can also be accessed by using a Set Cursor command for a specific line in memory desired.

Scroll mode (available only on the 400E) is similar to Page mode except that it treats the entire display memory as a single page. The data in memory is scrolled up and down on the screen without being lost unless overwritten by the operator.

Cursor controls include up, down, left, right, home, carriage

return, and line feed. The VT52-COMPAT is also equipped with a reverse line feed, which moves the cursor one line above its present position. Standard configuration requires that line feed and carriage return be performed separately and provides automatic wraparound to a new line at the end of a line; options permit the line feed to be performed automatically when a carriage return is executed, and the line wraparound to be inhibited. The cursor is addressable on all units; the 400E also provides cursor readability as an option.

Data can be highlighted via blinking, reverse video, and dual display intensity character accents. This capability is standard on all units except the VT52-COMPAT, on which blinking is standard but reverse video and dual intensity are optional.

The only erase function provided clears the entire display memory, except on the VT52-COMPAT, which also provides line erasure.

All units can be equipped with program function keys, which provide storage for control code sequences that can be transmitted to the host to initiate program functions or identify data. Program function keys are added to the keyboard in groups of four, up to a maximum of 36. On the VT52-COMPAT, the first four are standard (equivalents to DEC's Blue, Red, and Gray keys, plus one extra key) and the maximum is 32.

The VT52-COMPAT provides a forward tab that moves the cursor to the next stop. The tab stops are fixed at positions 9, 17, 25, 33, 41, 49, 57, 65, and 73.

An audible bell is standard on the ADM3A-COMPAT and VT52-COMPAT and optional on the 400E, 4080-COMPAT, and 6080-COMPAT.

## COMPONENTS

**CRT DISPLAY UNIT:** A 15-inch (diagonal measurement) CRT screen with a viewing area of 8 inches high by 10 inches wide. Standard display screen capacity is 1920 characters (24 lines of 80 characters) for the 400E, VT52-COMPAT, and ADM3A-COMPAT; 3200 characters 40 lines of 80 characters) for the 4080-COMPAT; and 4800 characters (60 lines of 80 characters) for the 6080-COMPAT. Display memory size is the same as screen size except on the 400E, which provides one additional "hidden" line in memory.

The 400E also provides for optional alternate display arrangements that provide for double-wide characters (24 lines of 40 characters), and double-size characters (12 lines of 40 characters); in either case, display memory capacity remains at 2000 characters, allowing 50 lines of viewable data to be stored.

The standard displayable character set is a 64-character ASCII set (contains no lower-case alphabets) on the 400E and ADM3A-COMPAT, and a 95- or 96-character ASCII set (contains upper- and lower-case alphabets) on all other units. The 95-character set is available as a no-cost option on the 400E and ADM3A-COMPAT. The VT52-COMPAT permits display of the full 128-character ASCII set during the Self-Test. Characters are formed by a 7-by-7 dot matrix in a 10-by-10 dot field. Alternate character sets are available upon special order.

The cursor is displayed as a blinking field. An option permits the cursor to be disabled for receive-only applications.

Data can be highlighted on all units via blinking, reverse video, and dual display intensity character accents. ➤

## Ann Arbor Terminals Alphanumeric Display Terminals

► **400E, 4080-COMPAT, 6080-COMPAT, and ADM3A-COMPAT KEYBOARD:** A 72-key typewriter-style, detachable keyboard with separate 12-key numeric pad. Cursor control keys are integral to the main keygroup. Up to 36 program function keys can optionally be accommodated in two rows above the main keygroup. In full-ASCII mode, the keyboard generates any of the 128 ASCII character codes. In Teletype mode, the keyboard generates the 97-character Teletype 33 ASCII character codes. All keys are tybamatic, repeating automatically if held down for more than 1/2 second; the repeat capability can be disabled.

**VT52-COMPAT KEYBOARD:** An 81-key typewriter-style, detachable keyboard with separate numeric pad. Cursor control keys, 4 standard program function keys (equivalents to DEC's Blue, Red, and Gray keys, plus one extra key), and up to 28 optional program function keys are located in two rows above the main keygroup. The full 128 character ASCII set is generated. A caps-lock permits the operator to

inhibit generation of lower-case alphabets. All keys are tybamatic; the repeat capability can be disabled.

### PRICING

Ann Arbor Terminals' display terminals are available for purchase only. End-user quantity discounts range from 5 percent on purchases of \$10,000 to 15 percent on purchases of \$40,000. OEM quantity discounts range from 5 percent on purchases of \$2,500 to 15 percent on purchases of \$10,000 over a six month period. Quantity discounts of up to 30 percent are negotiable. End users can get OEM discounts if the purchase volume exceeds a company-defined value; contact Ann Arbor. All discounts are computed by subtracting the appropriate percent of the Discount Base from the Unit Price.

The terminals are covered under a 90-day warranty on parts and labor. Extended warranty is negotiable. Factory maintenance and repair service is provided; Ann Arbor Terminals does not provide a monthly maintenance contract.

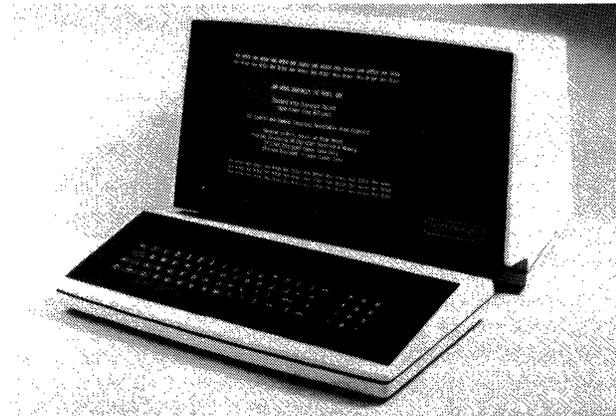
	Unit Price	Discount Base*
Model 400E Terminal	\$1,200	\$915
Model VT52-COMPAT Terminal	1,400	1,100
MODEL ADM3A-COMPAT Terminal	1,400	1,115
MODEL 4080-COMPAT Terminal	1,595	1,310
MODEL 6080-COMPAT Terminal	1,895	1,610

### Options

Rack-mounting	50	50
BNC Connector; for connection of auxiliary slave monitors; 400E, VT52-COMPAT and ADM3A-COMPAT only	10	10
Parity Transmit; provides generation of other than even parity	25	25
RS-232C Cable	10	10
Current Loop Interface and Cable	25	25
Dual Intensity and Reverse Video Character Accents; VT52-COMPAT only	50	50
Cursor Readability; 400E only	25	25
Automatic Line Feed on Carriage Return	10	10
Hold at End-Of-Line; inhibits automatic line wraparound	10	10
Delete Functions; inhibits Set-up mode, cursor display, and/or keyboard repeat	10	10
Bell; 400E, 4080-COMPAT, and 6080-COMPAT only	50	50
Program Function Keys; per 4-key group	15	15
Upper/Lower Case Displayable ASCII Character Set; 400E and ADM3A-COMPAT only	NC	NC
Double-Wide Characters; 400E only	25	25
Double-Size Characters; 400E only	50	50

\*Base price used in computing the amount of discount on either quantity or OEM discount arrangements.■

# Ann Arbor Terminals Model 400D Display Terminal



## MANAGEMENT SUMMARY

Ann Arbor Terminals introduced the Model 400D in August 1977 to the OEM and large end-user markets. The microprocessor-based terminal is a low-priced, stand-alone unit that operates in either "Teletype 33" or full ASCII modes. A basic terminal by design, the Model 400D features a large 15-inch screen and detachable keyboard. In addition to the standard desk-top version, the Model 400D is available as a rack-mounted or separately-cased controller with up to 10 individual slave display stations. Key features of the 400D include provision for operator alternation of pre-established operating parameters via single-key entries and provision for terminal control via received commands.

Salient features of the 400D include:

- A 2000-character display memory.
- Up to 1920 display positions.
- Upper only or upper and lower case ASCII display symbols.
- Addressable cursor.
- Individual cursor control keys.
- Numeric pad.
- Character-by-character transmissions.
- Key-selectable transmission rates from 110 to 9600 bps.
- Scroll, Roll, and Page modes.
- Highlighting.
- Double-height characters (optional).
- A 40-character line (optional).

A low-cost Teletype-compatible CRT keyboard/display terminal.

Standard features include 1920 display positions; upper case display symbols; addressable cursor; Scroll, Roll, and Page modes; key-selectable operating parameters; transmission rates from 110 to 9600 bps; etc. Options include lower case, double-height characters, a 40-character line, etc.

Available on a purchase basis only, the terminal is priced at \$1,470 for single units. Substantial quantity discounts of up to 30 percent are available.

## CHARACTERISTICS

**VENDOR:** Ann Arbor Terminals, Inc., 6107 Jackson Road, Ann Arbor, Michigan 48103. Telephone (313) 769-0926.

**DATE OF ANNOUNCEMENT:** August 1977.

**DATE OF FIRST DELIVERY:** September 1977.

**NUMBER INSTALLED TO DATE:** 100.

**SERVICED BY:** Ann Arbor.

## CONFIGURATION

Model 400D is a stand-alone, Teletype-compatible display terminal with detachable keyboard. The terminal features microprocessor control via an Intel 8080 with 2000 characters of display memory (25 lines). It is available as a desk-top unit with keyboard. A desk or rack-mounted controller for use with slaved monitors is available.

## TRANSMISSION SPECIFICATIONS

Transmission is asynchronous in the half- or full-duplex mode at 8 key-selectable rates of 110, 300, 600, 1200, 1800, 2400, 4800, or 9600 bits/second. The 10- or 11-unit, 8-level ASCII code is used. As an option, even parity is transmitted; parity checking is not performed on received data. The terminal is equipped with an RS-232C interface.

## DEVICE CONTROL

Transmission is performed on a character-by-character basis as each key is depressed. The terminal operating parameters are automatically established according to preset values during power-up. The parameters can be altered by the terminal operator by entering the Setup mode and keying the desired parameter codes. These parameters include data rate; Half-Duplex, Full-Duplex, or Local operating modes; Teletype or Full ASCII keyboard modes; and Page, Roll, or Scroll display modes. The preset parameters are changeable in the field.

Three display modes are provided: Page, Scroll, and Roll. Page Mode limits entry to within the screen boundaries. Scroll mode permits entry to any location within display memory, and the contents of display memory can be moved up or down by one line within the displayed area without

## Ann Arbor Terminals Model 400D Display Terminal

➤ The 400D is currently marketed to OEM vendors and end users. Substantial quantity discounts are provided. Factory service is provided by Ann Arbor Terminals.□

➤ losing data. The Roll mode operates the same as the Scroll mode, except that data is rolled up only, and each line rolled off the top of the screen is lost.

Two keyboard modes are provided: Teletype and Full ASCII. The Teletype mode restricts the character set to the 97-character Teletype 33 ASCII character set, which generates upper case alphabets only. The Full ASCII mode supports all 128 ASCII character codes. However, if the terminal is equipped with a 64-character set of displayable symbols, keyed lower case alphabets are displayed as their upper case equivalents.

The cursor is addressable. Separate cursor controls and commands position the cursor up, down, left, right, home, or to the beginning of a line.

Keyed or received commands can also erase the contents of display memory and initiate highlighting functions, including reduced or full intensity, blinking, and reverse video.

Optional functions include automatic line feed on carriage return, hold-at-end-of-line, and double-height character display. The hold-at-end-of-line feature inhibits cursor movement after it reaches the last display position; further cursor movement requires a carriage return and line feed.

### COMPONENTS

**CRT DISPLAY UNIT:** A 15-inch (diagonal measurement) CRT screen with a viewing area of 8 inches high by 10 inches wide. The standard display arrangement is 24 lines of 80 characters each for a total of 1920 display positions. Up to 20 lines of 80 characters are displayed with the Lower Case option. An optional display arrangement displays 50 lines of 40 characters. The character set contains 64 or 96 (optional) upper and lower (optional) case alphabetic, numeric, and special symbols. Each symbol is formed via a 5-by-7 dot

matrix within an 8-by-10 dot character cell. Data is displayed in white. Highlighting includes dual intensity, reverse video, and blink. The cursor is displayed as a blinking field.

**KEYBOARD:** A 72-key, typewriter-style, detachable keyboard with separate numeric pad. The keyboard provides full cursor controls and include Return, Line Feed, Break, Escape, Control, Space, and Shift functions. In Full ASCII mode, the keyboard generates any of 128 ASCII character codes. In Teletype mode, the keyboard generates any of the 97 Teletype 33 ASCII character codes. All keys are automatically repeatable.

### PRICING

The Model 400D is available for purchase only. End user quantity discounts range from 5 percent on purchases of \$10,000 to 15 percent on purchases of \$40,000. OEM quantity discounts range from 5 percent on purchases of \$2,500 to 15 percent on OEM purchases of \$10,000 over a six month period. Quantity discounts of up to 30 percent are negotiable. End users can get OEM discounts if the purchase volume exceeds a company defined value; contact Ann Arbor. The terminal is covered under a 90-day warranty on parts and labor. Extended warranty is negotiable. Factory maintenance service is provided.

	<u>Purchase Price</u>
Model 400D Terminal	\$1,470
Upper/Lower Case Character Set	100
40-Character Line**	25
Double-Height Characters**	25
Transmit Parity	25
Auto-Line Feed on CR	10
Hold at End of Line	10
Controller only*	820
Rack-Mounted Controller*	820
Controller and Monitor without Keyboard	1,170

\* Accommodates up to 10 monitors.

\*\*Typically ordered together.■