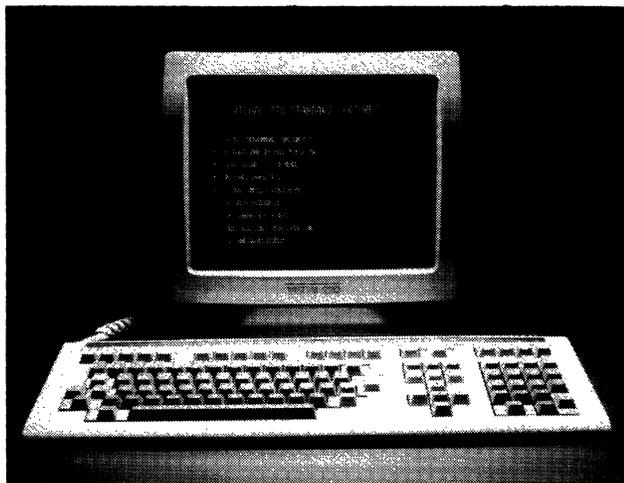# Visual Technology Display Terminals

The Visual 220 provides emulation of the Digital Equipment Corporation VT220. The Visual 220 includes a 14-inch tilt/swivel display, 80/132-column display capability, and a low-profile design keyboard.

MANAGEMENT SUMMARY

UPDATE: *This report has been updated to reflect recent changes in the Visual Technology terminal product line. The company has entered the Digital VT220 emulation market with the addition of the Visual 220, Visual 240, and Visual 241. It has also revamped the low-end of its product line, replacing the Visual 50 and Visual 55 with the Visual 60 and Visual 65, terminals that offer extended features and lower prices than their predecessors.*

Visual Technology began shipments of its initial display terminal, the Visual 200, in 1979. Since that time, the company has grown to become a leading supplier in the general purpose ASCII display terminal market. In the past year, the computer slump that has hit the industry has taken its toll on many of the independent terminal suppliers, and Visual has not escaped. The company reported a loss in the third quarter of 1984, the first quarter that the company had ever been in the red. An acquisition by 3270-compatible terminal maker Lee Data Corporation (Minneapolis, MN) fell through in early 1985 due to financial difficulties encountered by both companies. Visual's problems have stemmed from the general softness in the terminal industry, coupled with slow sales of the company's Commuter portable personal computer. Visual is currently in the process of trying to rebound from these problems.

A recent step in that direction has been the introduction of a line of terminals that emulate Digital Equipment Corporation's new VT200 series of terminals. The VT200 market is expected to be at least as lucrative as the emulation market for its predecessor, the VT100, and virtually every independent terminal maker has added at least one VT200 emulator to its product line. Visual Technology has intro- ▷

Visual Technology is a manufacturer of general-purpose ASCII display terminals. The company provides a broad product line, ranging from low-end smart editing terminals to fully featured graphics/alphanumerics models. Recent additions to the Visual product line include a family of emulators of the Digital Equipment Corporation VT200 series.

MODELS: Visual 60, Visual 65, Visual 102, Visual 220, Visual 240, Visual 241, Visual 300, Visual 330, Visual 383, Visual 500, and Visual 550.

DISPLAY: Display screen sizes are 12-inch (Visual 60, Visual 65, Visual 300, and Visual 330); 13-inch (Visual 241) and 14-inch (Visual 102, Visual 220, Visual 240, Visual 383, Visual 500, and Visual 550). The VT241 is a color graphics terminal; all other terminals are monochrome (green, white, or amber phosphor, depending on the model selected). The Visual 102, Visual 220, Visual 240, and Visual 241 provide selectable 80/132-column display formats; all other models feature 80-column formats only.

KEYBOARD: All models feature detached, typewriter-style keyboards with a low-profile design. Function keys are available on all keyboard models.

COMPETITION: Digital Equipment Corporation, Wyse Technology, Applied Digital Data Systems (ADDS), Esprit Systems, Lear Siegler, TeleVideo Systems, and several others.

PRICE: List purchase prices for the Visual Technology terminals range from $595 to $2,195.

CHARACTERISTICS

VENDOR: Visual Technology Incorporated, 1703 Middlesex Street, Lowell, MA 01851. Telephone (617) 459-4903.

DATE OF ANNOUNCEMENT: Visual 300 & Visual 330—September 1981; Visual 550—April 1982; Visual 500—August 1982; Visual 102—April 1983; Visual 383—May 1983; Visual 60 & Visual 65—April 1984; Visual 220, Visual 240, & Visual 241—November 1984.

DATE OF FIRST DELIVERY: Visual 300 & Visual 330—September 1981; Visual 550—May 1982; Visual 500—September 1982; Visual 102—May 1983; Visual 383—June 1983; Visual 60 & Visual 65—June 1984; Visual 220—April 1985; Visual 240 & Visual 241—May 1985.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: Visual Technology; Sorbus. ▶

Visual Technology Display Terminals

▷ duced a family of terminals that emulate each member of the DEC line: the Visual 220, a lower priced version of the Digital VT220; the Visual 240, a monochrome graphics terminal that replaces the Digital VT240; and the Visual 241, an emulator of the VT241 color graphics unit.

Visual has also replaced the models at the low-end of its product line, the Visual 50 and Visual 55, with two new offerings, the Visual 60 and Visual 65. The new terminals offer enhanced features, including a new, more compact, enclosure design, and are priced below their predecessors.

In addition to these new models, Visual offers six additional units. The Visual 300 and Visual 330 are the company's mid-range smart units. Both models contain a wide range of smart terminal features; the Visual 300 is a Digital VT100 emulator that conforms to the ANSI X3.64 standard, while the Visual 330 performs a range of ASCII terminal emulations.

The Visual 102 and Visual 383 are aimed at specific markets. The Visual 102 targets the Digital VT100 market (still an active one), providing VT102/VT100 emulation (including 132-column display capability). The Visual 383 is a Burroughs TD 830 emulator.

The Visual 500 and Visual 550 are the company's original graphics terminals. Both units provide Tektronix 4010 and PLOT 10 software compatibility, coupled with alphanumeric capabilities. A screen resolution of 768 by 585 pixels is standard for both models, as are a wide range of graphics functions.

All Visual Technology terminals incorporate an ergonomically designed enclosure that includes a tilt/swivel display and detachable, low-profile design keyboard. As we mentioned previously, the newer models also feature a ▷
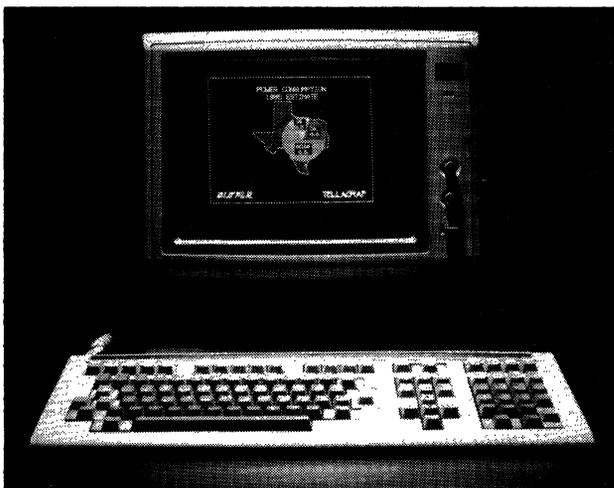
The Visual 241 is a color graphics terminal that emulates the Digital VT241. The Visual 241 supports Tektronix 4010/4014 and Digital ReGIS graphics protocols, making the unit compatible with a wide variety of graphics software packages. A 13-inch display screen with an 80/132-column display format is standard.

▶ MODELS

Visual's display terminal product line currently consists of 11 models:

- **Visual 60**—a low-end smart terminal with a variety of emulations and editing features.

- **Visual 65**—an enhanced version of the Visual 50.

- **Visual 102**—a Digital VT100/VT102-compatible model with optional graphics.

- **Visual 220**—a Digital VT220/VT100/VT52 compatible terminal.

- **Visual 240**—a Digital VT240 replacement terminal that features VT220 compatibility, as well as Tektronix 4010/4014 and Digital's ReGIS graphics compatibility.

- **Visual 241**—a replacement for the Digital VT241 color graphics terminal, featuring VT220 alphanumeric compatibility, and Tektronix 4010/4014 and Digital ReGIS graphics compatibility.

- **Visual 300**—a Digital VT100 compatible, ANSI X3.64 compliant terminal with a wide range of features.

- **Visual 330**—combines the features of the Visual 300 with emulation of several popular ASCII terminals.

- **Visual 383**—a Burroughs TD 830-compatible terminal.

- **Visual 500**—a graphics terminal with selectable emulation of a variety of popular ASCII terminals.

- **Visual 550**—a Digital VT100-compatible, ANSI X3.64 compliant graphics terminal.

TRANSMISSION SPECIFICATIONS

All models except the Visual 60, Visual 65, and Visual 383 feature asynchronous transmission, in half- or full-duplex mode, at rates from 50 to 19,200 bits per second. The Visual 60 and Visual 65 also feature half- or full-duplex asynchronous transmission, with transmission rates from 75 to 19,200 bps. The Visual 383 permits synchronous or asynchronous transmission, half-duplex only, at rates from 50 to 19,200 bps. All models feature an RS-232-C interface; a 20 ma current loop interface is optionally available on all models except the Visual 383. The Visual 383 provides a TDI (two-wire direct connect) interface in addition to the RS-232-C interface. All models also feature an RS-232-C auxiliary port; this port is buffered and features an independent transmission rate on all models except the Visual 60 and Visual 65. Odd, even, mark, space, and no parity are featured on all models except the Visual 383; odd (synchronous) or even (asynchronous) parity is featured for that model. All models use 7 or 8 bits per character, with 1 or 2 stop bits.

DEVICE CONTROL

Parameters for all Visual display terminals are set via a menu-style Set-Up Mode. The Visual 60, Visual 65, Visual 102, Visual 220, Visual 240, and Visual 241 transmit in conversational mode (character-by-character) only; the Visual 383 transmits in block mode only. The Visual 300, Visual 330, Visual 500, and Visual 550 transmit data in both conversational and block modes. The Visual 383 provides six pages of display memory as standard; eight pages of display memory are optional on the Visual 300. Protected fields are available on all models except the Visual 102. ▶

Visual Technology Display Terminals

▷ more compact design with a smaller footprint size. The Visual 60, Visual 65, Visual 300, and Visual 330 are equipped with 12-inch display screens, while the Visual 241 is equipped with a 13-inch screen; all other models feature a 14-inch display screen.

COMPETITIVE POSITION

Originally, Visual Technology's chief competition came from the large group of independent terminal vendors that manufacture general-purpose ASCII display terminals. Currently, Wyse Technology holds the number one spot in this market, having recently unseated TeleVideo Systems. Others who own a significant share of this market include Applied Digital Data Systems (ADDS), Lear Siegler, Esprit Systems, Liberty Electronics, and Qume. The market has been plagued recently by falling prices and the general slowness in the computer industry. The independent vendors will now also have to contend with the renewed presence of IBM, which recently introduced two new low-priced ASCII terminals.

The introduction of the Visual 220, Visual 240, and Visual 241 indicate that Visual Technology intends to be a major competitor in the Digital VT200-compatible terminal market. Since Digital's late-1983 announcement of the VT200 family (its line of successors to the immensely successful VT100 product line), virtually every independent terminal vendor has introduced at least one VT200 emulator. These vendors are banking on the VT200 replacement market being at least as successful as the VT100 market was. Visual Technology, however, is one of only a few vendors to introduce replacements for all three members of the VT200 family, rather than just the low-end VT220.

ADVANTAGES AND RESTRICTIONS

Much like the other leading ASCII terminal vendors mentioned above, Visual Technology provides a broad product line with a variety of features and capabilities. Visual can offer a low-end terminal with a low-end price ($595), it can offer Digital- and Burroughs-compatible units, and it can offer monochrome and color graphics units. Various other Visual terminals provide emulation of smart terminals from ADDS, Lear Siegler, and Esprit Systems. Another important move for Visual was its entry into the graphics market with the Visual 500 and 550, which provide an attractive range of graphics features at very reasonable prices (the company has recently slashed the price tags on these models to $1,595). Visual has also kept pace with the terminal industry's trend toward ergonomically designed terminals by introducing a more compact display enclosure with its new terminal models.

Like many other vendors in this market, Visual must ride out the current industry slump and overcome its financial problems. Although its acquisition by Lee Data fell through, it would seem that Visual Technology remains a prospect for acquisition. The company boasts a solid product line and a respectable share of the terminal market. ▷

▶ Split screen capability is available on the Visual 102, Visual 300, Visual 330, Visual 383, Visual 500, and Visual 550. Smooth scrolling is found on all models except the Visual 383, 500, and 550.

Video attributes, including blink, blank, bold, underline, and reverse are selectable on a character-by-character basis for all models. Reverse video is available as a screen attribute. Double-size characters are available on the Visual 102, Visual 220, Visual 240, and Visual 241.

Editing functions, including insert/delete line and insert/delete character, are available on all models except the Visual 50, which has insert/delete line only. Other features found on the Visual terminals include self-test, message framing (except the Visual 102), and answer back.

Graphics are standard on the Visual 240, Visual 241, Visual 500, and Visual 550; graphics are optional on the Visual 102. The Visual 240 and Visual 241 support the Tektronix 4010/4014 and Digital Equipment Corporation ReGIS graphics protocols, providing compatibility with the following graphics software packages: DECgraph, DECslide, PLOT 10, DISSPLA, TELL-A-GRAF, DI-3000/GRAF-MAKER, SAS/GRAPH, INFOgraf, SPSS, TEMPLATE, DR Graph, GSS, and the IBM Personal Computer graphics products. The Visual 500 and 550 are Tektronix 4010 and PLOT 10 compatible. Capabilities available include point plot; vector draw; eight fill styles; nine line styles; incremental plot; alpha graphics; rectangle, circle, arc draw; crosshair mode; and graphics print. Math symbols and double, triple, and quadruple size characters are also available.

The Visual 60 and Visual 65 offer code compatibility with the following terminals: ADDS Viewpoint, Digital VT52, Esprit Systems Esprit, and Lear Siegler ADM 3A. The Visual 102 provides compatibility with the Digital VT102, VT100, and VT52. The Visual 220 emulates the Digital 220; the Visual 240 and Visual 241 emulate the Digital VT240 and VT241, respectively. The Visual 300 provides compatibility with the Digital VT100, while the Visual 330 is compatible with the Data General Dasher D200, Digital VT52, Esprit Systems (Hazeltine) 1500, and Lear Siegler ADM 3A. The Visual 383 emulates the Burroughs TD 830. The Visual 500 provides emulation of the Tektronix 4010, as well as the Data General Dasher D200, Digital VT52, Esprit Systems (Hazeltine) 1500, and Lear Siegler ADM 3A. The Visual 550 also supports emulation of the Tektronix 4010, as well as the Digital VT100. The Visual 102, Visual 220, Visual 240, Visual 241, Visual 300, and Visual 550 comply with the ANSI X3.64 standard for code compatibility.

COMPONENTS

CRT DISPLAY UNIT: A 12-inch (diagonally measured) display screen is standard on the Visual 60, Visual 65, Visual 300, and Visual 330; the Visual 241 includes a 12-inch display screen. All other models are equipped with a 14-inch screen as standard. The 14-inch screen is also available as an option on the Visual 300 and Visual 330. Characters are displayed in white (P4 phosphor) on the Visual 300 and Visual 330, and in green (P31 phosphor) on the Visual 65, Visual 102, Visual 220, Visual 240, and Visual 383. Green (P39 phosphor) is standard on the Visual 500 and Visual 550. The Visual 241 features a color (P21) RGB monitor. Green (P31) characters are optional for the Visual 300 and Visual 330; amber phosphor characters are optionally available for the Visual 60, Visual 65, Visual 220, Visual 240, and Visual 241.

The standard display format is 24 lines by 80 characters on the Visual 60, Visual 65, Visual 300, Visual 330, and Visual 383. A 25th line serves as the status line. The Visual 102 and ▶

Visual Technology Display Terminals

▷ USER REACTION

In Datapro's 1985 Terminal Users Survey, conducted in conjunction with *Data Communications* magazine, a total of 27 responses were received from users of display terminals from Visual Technology. These users represented an installed base of approximately 1,063 terminals, including the Visual 300 and Visual 330 (4 users total), Visual 102 (5 users), Visual 383 (3 users), Visual 550 (1 user), and several older Visual models including the Visual 50, Visual 55, Visual 100, Visual 110, Visual 200, and Visual 210. These users were asked to rate their terminals in several specific categories. Their ratings are summarized in the following table.

	Excellent	Good	Fair	Poor	WA*
Overall performance	4	19	3	0	3.0
Ease of operation	8	15	3	0	3.2
Display clarity	12	8	7	0	3.2
Keyboard feel & usability	7	17	2	1	3.1
Ergonomics	1	14	9	1	2.6
Hardware reliability	3	15	6	3	2.7
Maintenance service/ technical support	4	11	9	2	2.7

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

When asked, in a separate question, whether or not they would recommend the Visual Technology display terminals to other users, 15 of the respondents indicated that they would, while only 4 stated that they would not; the remainder of the users were undecided or did not answer that question. In another question, the users were asked to name the factors that influenced their decision to purchase the Visual Technology terminals. A total of 46 percent of the users attributed their decision to the terminals' features and/or functionality, while another 48 percent named price as the determining factor. □

▶ Visual 220 feature selectable formats of 24 lines of 80 characters and 24 lines of 132 characters, with a 25th status line. The Visual 240 and Visual 241 provide selectable formats of 29 lines by 80 or 132 characters, with a 30th line serving as the status line. The Visual 500 and Visual 550 feature display formats of 33 lines by 80 characters.

Characters are formed on the Visual 60 and Visual 65 using a 7-by-9 dot matrix in a 9-by-12 cell, with a 2-dot descender. The Visual 102 and Visual 220 form characters via a 7-by-9 dot matrix (with 2-dot descender) in a 10-by-12 cell in 80-column mode, and via a 5-by-7 dot matrix (with 2-dot descender) in a 6-by-12 cell in 132-column mode. For alpha-numerics, the Visual 240 and Visual 241 feature an 8-by-10 dot matrix in a 10-by-10 cell in 80-column mode, and a 5-by-

10 dot matrix in a 6-by-10 cell in 132-column mode. The Visual 300, Visual 330, and Visual 383 use a 7-by-9 dot matrix with 2-dot lowercase descenders. For graphics, the Visual 240 and Visual 241 provide an 800 (horizontal)-by-290 (vertical) pixel resolution in ReGIS mode; in Tektronix 4010/4014 mode, resolution is 768 (horizontal)-by-293 (vertical) pixels. The Visual 500 and 550 provide a 585 (vertical)-by-768 (horizontal) pixel resolution for graphics display. The vertical-to-horizontal dot ratio on these models is 1:1.

All models display the ASCII character set. A line drawing character set is available on all models except the Visual 383. International character sets are available optionally for all models except the Visual 383.

All Visual display terminals feature a tilt (10 degrees forward to 15 degrees backward) and swivel (270 degrees) monitor. Composite video is available on the Visual 102.

KEYBOARD: All models feature a detachable keyboard with a low-profile (DIN standard) design, connected to the monitor with a coiled cord. Standard features of all keyboards include a typewriter-style layout, numeric pad, cursor control keys, edit keys (except the Visual 102), N-key rollover, upper-/lowercase characters, and auto repeat keys.

The Visual 60 and Visual 65 keyboards include a 62-key alpha cluster and 18-key numeric pad. The Visual 65 features 12 user-programmable, nonvolatile function keys. The Visual 220, Visual 240, and Visual 241 keyboards include a 57-key alpha cluster, 18-key numeric pad, 20 function keys, and an 11-key editing cluster. Fifteen function keys are user-programmable (30 with shift) and nonvolatile. Eight (16 with shift) programmable, nonvolatile function keys are found on the Visual 102 and 383 keyboards; 12 programmable, nonvolatile function keys are standard on the Visual 300, 330, 500, and 550 keyboards.

PRICING

Visual Technology display terminals are available for purchase only; lease plans may be available from distributors.

EQUIPMENT PRICES

Models	Purchase Price ($)
Visual 60	595
Visual 65	695
Visual 102	1,095
Visual 220	795
Visual 240	1,695
Visual 241	2,195
Visual 300	995
Visual 330	995
Visual 383	1,695
Visual 500	1,595
Visual 550	1,595 ■

Visual Technology Display Terminals
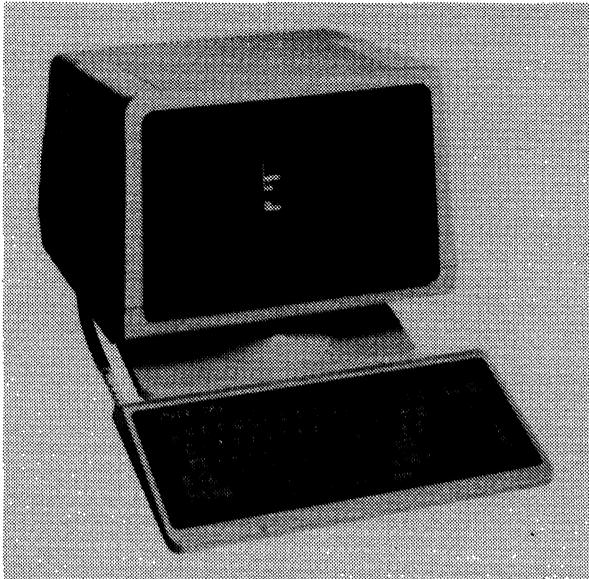
The Visual 383 provides emulation of the Burroughs TD 830 poll/select terminal. Like all of the models in Visual's display terminal product line, the 383 contains a tilt/swivel monitor and detachable keyboard.

Visual Technology is a strong competitor in the general purpose ASCII display terminal market. The company provides a broad product line, ranging from low-end smart editing terminals to fully featured graphics/alphanumerics models.

MODELS: Visual 50, Visual 55, Visual 102, Visual 300, Visual 330, Visual 383, Visual 500, and Visual 550.
DISPLAY: Standard display sizes are 14-inch (Visual 102, 383, 500, and 550) and 12-inch (Visual 50, 55, 300, and 330). Characters are available in white or green, depending on the model selected. All models feature tilt/swivel monitors.
KEYBOARD: All models feature detached, typewriter style keyboards.
COMPETITION: ADDS, DEC, Esprit Systems, Lear Siegler, TeleVideo Systems, and several others.
PRICE: Ranging from $695 to $2,695.

MANAGEMENT SUMMARY

Visual Technology began shipments of its initial display terminal, the Visual 200, in 1979. Since then, the company has grown to become a major contender in the general purpose ASCII display terminal market. Visual provides a complete line of displays, from a low-end smart unit to a Tektronix-compatible graphics model. The company has recently expanded into the microcomputer market with the Visual 1050, introduced in October 1983.

Visual's display terminal product line currently consists of eight models. The Visual 50 and Visual 55 are the low-end models; they are smart units boasting emulation of several popular ASCII terminal models from ADDS, Lear Siegler, Hazeltine (now Esprit Systems), and DEC. The Visual 55 contains some features (character editing, split screen) not found on the Visual 50.

The Visual 300 and Visual 330 are the company's mid-range smart units. Both models contain a wide range of smart terminal features; the Visual 300 is a DEC VT100 emulator that conforms to the ANSI X3.64 standard, while the Visual 330 performs a range of ASCII terminal emulations.

The Visual 102 and Visual 383 are aimed at specific markets. The Visual 102 targets the DEC market, providing VT100/VT102 emulation (including 132-column display capability). The Visual 383 is a Burroughs TD 830 emulator.

The Visual 500 and Visual 550 are the company's high-end graphics terminals. Both units provide Tektronix 4010 and Plot 10 compatibility, coupled with alphanumeric capabili- ▷

CHARACTERISTICS

MODELS

Visual's display terminal product line now consists of eight models:

- **Visual 50**—a low-end smart terminal with a variety of emulations and editing features.

- **Visual 55**—an enhanced version of the Visual 50.

- **Visual 102**—a DEC VT100/VT102 compatible model with optional graphics.

- **Visual 300**—a DEC VT100 compatible, ANSI X3.64 compliant terminal with a wide range of features.

- **Visual 330**—combines the features of the Visual 300 with emulation of several popular ASCII terminals.

- **Visual 383**—a Burroughs TD 830 compatible terminal. ▶

Visual Technology Display Terminals

➤ ties. A screen resolution of 768-by-585 pixels is standard for both models, as are a wide range of graphics functions.

All Visual Technology terminals incorporate an ergonomically designed enclosure that includes a tilt/swivel display and detachable keyboard. The Visual 50, 55, 300, and 330 are equipped with 12-inch display screens; all other models feature a 14-inch screen (which is optionally available for all models except the Visual 55).

COMPETITIVE POSITION

Visual Technology is positioned just below the leaders in the general purpose ASCII display terminal market: TeleVideo, ADDS, Lear Siegler, and Esprit Systems. The company continues to grow and eventually may move into that elite group.

ADVANTAGES AND RESTRICTIONS

Like the four leading vendors mentioned above, Visual Technology provides a broad product line with a variety of features and capabilities. An important move for Visual is its entry into the graphics market with the Visual 500 and 550, which provide an attractive range of graphics features at very reasonable prices. Visual provides emulation for the most popular ASCII terminal models, including extensive DEC emulation. The only thing Visual's product line really lacks is a color model. Visual has followed TeleVideo Systems' lead and entered the microcomputer market.

USER REACTION

In Datapro's 1983 Terminal Users Survey, conducted in conjunction with *Data Communications* magazine, a total of nine responses were received from users of display terminals from Visual Technology. These users represented an installed base of approximately 71 terminals, including Visual 50s, Visual 300s, and several older Visual models including the Visual 100, 200, and 210. These users were asked to rate their terminals in several specific categories. Their ratings are summarized in the following table.

	Excellent	Good	Fair	Poor	WA*
Overall performance	6	3	0	0	3.7
Ease of operation	4	5	0	0	3.4
Display clarity	4	5	0	0	3.4
Keyboard feel & usability	5	4	0	0	3.6
Ergonomics	3	5	1	0	3.2
Hardware reliability	2	5	2	0	3.0
Maintenance service/ technical support	2	5	1	0	3.1

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

When asked, in a separate question, whether or not they would recommend the Visual Technology display terminals to other users, eight of the nine respondents indicated that they would. □

➤ • Visual 500—a graphics terminal with selectable emulation of a variety of popular ASCII terminals.

 • Visual 550—a DEC VT100 compatible, ANSI X3.64 compliant graphics terminal.

Table 1 provides a feature comparison of the Visual Technology display terminal family.

TRANSMISSION SPECIFICATIONS

All models except the Visual 383 feature asynchronous transmission, in half- or full-duplex mode, at rates from 50 to 19,200 bits per second. The Visual 383 permits synchronous or asynchronous transmission, half-duplex only, at rates from 50 to 19,200 bps. All models feature an RS–232–C interface; a 20mA current loop interface is also available on all models except the Visual 383. The Visual 383 also provides a TDI (two-wire direct connect) interface. All models feature an RS–232–C auxiliary port; this port is buffered and features an independent transmission rate on all models except the Visual 50/55. Odd, even, mark, space, and no parity are featured on all models except the Visual 383; odd (synchronous) or even (asynchronous) parity is featured for that model. All models use 7 or 8 bits per character.

DEVICE CONTROL

Parameters for the Visual display terminals are set in a Menu Mode. All models except the Visual 383 transmit data in both character and block modes; the Visual 383 transmits in block mode only. The Visual 383 provides six pages of display memory as standard; eight pages of display memory are optional on the Visual 300. Protected fields are available on all models except the Visual 102. Split screen capability is available on all models except the Visual 50. Smooth scrolling is found on all models except the Visual 383, 500, and 550.

Video attributes including blink, blank, bold, underline, and reverse are selectable on a character-by-character basis for all models. Reverse video is available as a screen attribute. Double-size characters are available on the Visual 102.

Editing functions, including insert/delete line and insert/delete character, are available on all models except the Visual 50, which has insert/delete line only. Other features found on the Visual terminals include self-test, message framing (except the Visual 102), and answer back.

Graphics are standard on the Visual 500 and 550, and optional on the Visual 102. The Visual 500 and 550 are Tektronix 4010 and Plot 10 compatible. Capabilities available include: point plot; vector draw; eight fill styles; nine line styles; incremental plot; alpha graphics; rectangle, circle, arc draw; crosshair mode; and graphics print. Math symbols and double, triple, and quadruple size characters are also available.

COMPONENTS

CRT DISPLAY UNIT: A 12-inch (diagonally measured) display screen is standard on the Visual 50, 55, 300, and 330; all other models are equipped with a 14-inch screen as standard. The 14-inch screen is also available as an option on the Visual 50, 300, and 330. Characters are displayed in white (P4 phosphor) on the Visual 50, 300, and 330, and in green (P31 phosphor) on the Visual 55, 102, and 383. Green (P39 phosphor) is standard on the Visual 500 and 550. Green (P31) characters are optional for the Visual 50, 300, and 330. Characters are formed within a 7-by-11 dot character cell on all models except the Visual 500 and 550; these models form characters within a 10-by-17 dot cell. The Visual 500 and 550 provide a 585 (vertical)-by-768 (horizontal) pixel resolution for graphics display. The vertical-to-horizontal dot ratio on these models is 1:1.

All models display the ASCII character set. A line drawing character set is available on all models except the Visual 383. International character sets are available optionally for all models except the Visual 383.

➤

Visual Technology Display Terminals

TABLE 1. Visual Technology Model/Features Comparison

	Visual 50	Visual 55	Visual 102	Visual 300	Visual 330	Visual 383	Visual 500	Visual 550
Protocol/ Emulations	ADDS Viewpoint, DEC VT52, Hazeltine (Esprit) Esprit, Lear Siegler ADM 3A	ADDS Viewpoint, DEC VT52, Hazeltine (Esprit) Esprit/1500/1510, Lear Siegler ADM 3A, Visual 200/210	DEC VT52/ VT100/VT102	DEC VT100, ANSI X3.64	Data General D200, DEC VT52, Hazeltine (Esprit) 1500, Lear Siegler ADM 3A	Burroughs TD 830	Data General D200, DEC VT52, Hazeltine (Esprit) 1500, Lear Siegler ADM 3A, Tektronix 4010	DEC VT100, ANSI X3.64, Tektronix 4010
Display size	12 in.	12 in.	14 in.	12/14 in.	12/14 in.	14 in.	14 in.	14 in.
Display format	24 x 80	24 x 80	24 x 80/132	24 x 80	24 x 80	24 x 80	33 x 80	33 x 80
Graphics	No	No	Opt.	No	No	No	Yes	Yes
Insert/delete line	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Insert/delete character	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Split screen	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Visual attributes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tilt/Swivel display	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Detachable keyboard	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Function keys	3	12	8	12	12	8	12	12
Interface	RS–232–C; 20mA opt.	RS–232–C; 20mA opt.	RS–232–C; 20mA opt.	RS–232–C, 20mA	RS–232–C, 20mA	RS–232–C/ TDI	RS–232–C, 20mA	RS–232–C, 20mA
Character/block mode	Both	Both	Both	Both	Both	Block only	Both	Both

All Visual display terminals feature a tilt (10 degrees forward to 15 degrees backward) and swivel (270 degrees) monitor. Composite video is available on the Visual 102.

KEYBOARD: All models feature a detachable keyboard, connected to the monitor with a coiled cord. Standard features of the keyboard include a typewriter-style layout, numeric pad, cursor control keys, edit keys (except the Visual 102), N-key rollover, upper-/lowercase characters, and auto repeat keys. Eight programmable function keys are found on the Visual 102 and 383 keyboards; 12 programmable function keys are standard on the Visual 55, 300, 330, 500, and 550 keyboards. The Visual 50 includes three nonprogrammable function keys.

PRICING

Visual Technology display terminals are available for purchase only; lease plans may be available from distributors.

	Purchase Price
Visual 50	$ 695
Visual 55	895
Visual 102	1,095
Visual 300	995
Visual 330	995
Visual 383	1,695
Visual 500	2,495
Visual 550	2,695

OPTIONS

14-inch green (P31) display (Visual 50, 300, 330 only)	75
12-inch green (P31) display (Visual 50, 300, 330 only)	75
8 pages of memory (Visual 300 only)	225
International Character Sets (Visual 50, 55 only)	50
International Character Sets (Visual 102 only)	75
International Character Sets (Visual 300, 330, 500, 550 only) ■	30

Visual Technology Video Display Terminals
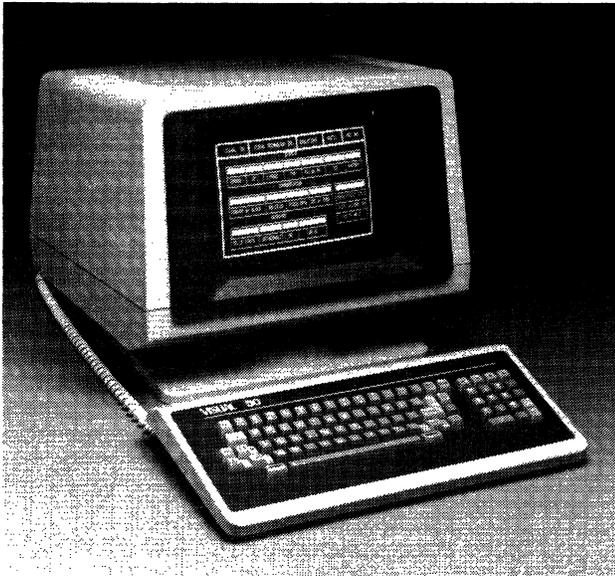
Visual Technology's newest display terminal is the Visual 50. Introduced in June 1982 at the National Computer Conference in Houston, Texas, the Visual 50 carries a quantity-one price tag of $695. The terminal features Visual's new ergonomic styling, including a detachable keyboard and a 12-inch display that can be tilted from 10 degrees to 15 degrees, and swiveled through 270 degrees. Other standard features on this low-priced unit include block mode transmission, editing, line drawing graphics, and menu-selectable emulation of the ADDS Viewpoint, Hazeltine Esprit, Lear Siegler ADM 3A, and DEC VT52.

MANAGEMENT SUMMARY

Since production of its initial model, the Visual 200, began in 1979, Visual Technology has shipped over 40,000 terminals. Approximately 33 percent of these have been shipped to customers overseas. Visual Technology markets its display terminal line to large volume distributors, OEMs, and system integrators. The current product line consists of six standard models: the Visual 50, Visual 100, Visual 110, Visual 200, Visual 300, and Visual 400. In February 1982, Visual introduced two new graphics terminals, the Visual 500 and Visual 550, which are not covered in this report.

Unveiled at the NCC in Houston in June 1982, the low-end Visual 50 is the newest terminal in the Visual product line. The Visual 50 features menu-selectable emulation of the ADDS Viewpoint, Hazeltine Esprit, Lear Siegler ADM 3A, and DEC VT52. Despite a price tag of $695 (quantity one), the Visual 50 boasts advanced features such as block mode transmission, editing capabilities, line drawing graphics, and smooth scrolling. The Visual 50 also incorporates a new, ergonomically improved design, including a new plastic display housing, and a tilt and swivel screen. Other standard features include a 12-inch screen, 24-line by 80-character display format, and a detachable keyboard with separate numeric pad. ▷

A family of ASCII display terminals offering emulation of a variety of competitive models.

Six separate models currently comprise Visual's display terminal line. All models feature a 12-inch (diagonal) non-glare display screen, and a detachable keyboard. A display tilt adjustment is standard on all models, and the new Visual 50 display may also be swiveled. Video attributes are available on all models, and a wide variety of operating features are included, depending on the model selected. Popular terminals emulated by the Visual units include: ADDS Viewpoint and 520; Data General Dasher; DEC VT52 and VT100; Hazeltine Esprit and 1500; and Lear Siegler ADM 3A.

Purchase prices for the Visual display terminals range from $695 to $1,695.

CHARACTERISTICS

VENDOR: Visual Technology Incorporated, 540 Main Street, Tewksbury, MA 01786. Telephone (617) 851-5000.

DATE OF ANNOUNCEMENT: Visual 100—March 1980; Visual 200—August 1979; Visual 400—December 1980; Visual 110—January 1981; Visual 300—September 1981; Visual 50—June 1982.

DATE OF FIRST DELIVERY: Visual 100—March 1980; Visual 200—August 1979; Visual 400—January 1981; Visual 110—January 1981; Visual 300—September 1981; Visual 50—July 1982.

NUMBER DELIVERED TO DATE: Over 40,000 (all models).

SERVICED BY: Visual Technology and distributors.

MODELS

Six models are available as follows:

● **Visual 50**—features menu-selectable emulation of the ADDS Viewpoint, Hazeltine Esprit, Lear Siegler ADM 3A, and DEC VT52. The Visual 50 operates in character and block modes, includes full editing capabilities, and contains Visual's new ergonomic styling.

● **Visual 100**—a DEC VT100 compatible terminal which operates in character mode. An advanced video package is standard.

● **Visual 110**—contains all of the features of the Visual 100 but is Data General Dasher-compatible.

● **Visual 200**—features switch-selectable emulation of the DEC VT52, ADDS 520, Lear Siegler ADM 3A, and Hazeltine 1500. The Visual 200 operates in character mode.

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▷ The Visual 100 is a DEC VT100 compatible terminal. An advanced video package, a feature which is optional on the VT100, is standard on the Visual 100. Functions available with the advanced video package include underline, reverse video, blink, and bold; these functions can be utilized in any combination. The Visual 100 operates in the character mode, and offers a display format of 24 lines by 80 columns or 24 lines by 132 columns. The standard character set includes 95 ASCII characters plus 32 graphics characters. Horizontal split screen, graphics, and independent transmit/receive rates are also featured. A buffered printer interface is available as an option.

The Visual 110 contains all of the features of the Visual 100, while offering compatibility with the Data General Dasher D200 and 6053 terminals.

The Visual 200 offers switch-selectable emulation of the following terminals: the Hazeltine 1500, Lear Siegler ADM 3A, DEC VT52, and ADDS 520. Character mode transmission is standard and a screen capacity of 1920 characters in a 24-line by 80-column format can be accommodated. The keyboard generates a 95-character ASCII set plus a 31-character line drawing set. Fourteen programmable function keys are also included.

Block mode transmission, as well as character mode, is standard on the Visual 300. The terminal is ANSI X3.64 compliant, and contains other standard features such as: full editing and video attributes; split screen; block graphics and a line drawing character set; and 12 non-volatile programmable function keys. A key option on the Visual 300 is an offering of up to eight pages (192 lines) of display memory. Standard display format is 24 lines by 80 characters.

The Visual 400 is the company's "top of the line" standard unit. The Visual 400 contains all of the features of the Visual 100, plus block as well as character mode transmission. In block mode, up to five pages of data can be stored and edited. Also included in the Visual 400 are programmable non-volatile function keys, multiple field definition, split screen, and eight resident national character sets. Display formats of 24 lines by 80 or 132 characters are selectable.

All Visual display terminals feature a 12-inch (diagonally measured) display screen; a 14-inch display is optionally available. In all cases, the display contains a tilt adjustment, and in the case of the Visual 50, a swivel adjustment is also included. (Visual has announced its intention of making the new ergonomic housing of the Visual 50 available for all models.) Characters are displayed in white, with green characters optionally available. All models feature a detached, typewriter-style keyboard equipped with a separate numeric pad.

Datapro's 1982 alphanumeric display terminal survey failed to yield a sufficient number of responses on the Visual displays to include a User Reaction section in this report.□

▷● **Visual 300—an ANSI X3.64 compliant terminal featuring block and character mode transmission. Editing capabilities, split screen, and 12 programmable function keys are standard; up to eight pages of display memory are available as an option.**

● **Visual 400—contains all of the features of the Visual 100 and adds the option of operation in character or block mode. The Visual 400 also adds programmable non-volatile function keys, multiple field definition, extensive editing capabilities, and eight resident national character sets.**

TRANSMISSION SPECIFICATIONS

All models feature asynchronous transmission, in half- or full-duplex modes, at various transmission rates. The Visual 50 features 16 user-selectable rates from 75 to 19,200 bits per second. The Visual 100, Visual 110, and Visual 400 feature 16 selectable rates from 50 to 19,200 bps. The Visual 200 features eight selectable rates from 110 to 19,200 bps, and the Visual 300 features 15 selectable rates from 50 to 19,200 bps. The Visual 100, Visual 110, and Visual 400 feature independent transmit/receive rates. Odd, even, or no parity may be selected. All models feature an RS-232-C or 20mA current loop interface. An independent buffered printer interface is optional on the Visual 100, Visual 110, Visual 300, and Visual 400. An auxiliary port is standard on the Visual 50.

DEVICE CONTROL

The cursor on the Visual 50, Visual 100, Visual 110, and the Visual 400 can be either a blinking block or blinking underline, selectable by the user. The Visual 300 cursor can be selected as a blinking or solid block. Cursor movements include up, down, left, right, and home. Other control sequences recognized include enter/exit graphics mode, reverse line feed, erase commands, identify, and enter/exit alternate keypad mode.

The cursor on the Visual 200 appears as a non-destructive block. Cursor commands include up, down, left, right, home, up scroll, cursor address, and read cursor. Tab commands include tab, back tab, set, clear, and clear all tabs. Other control commands include insert line/character, delete line/character, erase end of line/page/field, and clear line/page.

The Visual 100 and Visual 110 include four function keys which send multi-code sequences that are usually interpreted by an application program. Through the use of these keys, the number of keystrokes necessary for an operator to access commonly used functions is reduced to one. Other keyboard controls include tab, back space, return, line feed, break, and delete.

The Visual 300 and Visual 400 include 12 programmable, non-volatile function keys. These keys may be down-line loaded. The user may define whether data on the screen moves up or down for inserted/deleted lines, and right or left for inserted/deleted characters. The user may also limit the extent of editing functions to the current field, line, area, or page, via software selectable modes. Multiple field definitions on the Visual 400 include numeric only fields, alpha only fields, right justify, must fill, total fill, and protect. Message framing is also programmable.

Video attributes available on the Visual 50 include blink, underline, reverse video, dim, and blank (security non-display). The combination of attributes is selectable for both foreground and background. The Visual 100 and Visual 110 include underline, reverse video, blink, and bold, in any combination. Single and double height and ▶

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width characters are selectable on a line-by-line basis. Blink is available on the Visual 200 on a line-by-line basis. Blink, underline, reverse video, and bold are available in any combination on both the Visual 300 and Visual 400; the Visual 300 also includes blank.

Editing features available on the Visual 200, Visual 300, and Visual 400 include insert/delete line and insert/delete character. Insert/delete line only is available on the Visual 50. Erase features are available on all models. Split screen capability is available on all models except the Visual 50 and Visual 200. Smooth scrolling is featured on all models. One page of display memory is standard on the Visual 300 and Visual 400. The Visual 300 can be optionally configured with up to eight pages of memory, while two or four additional pages may be added to the Visual 400.

COMPONENTS

CRT DISPLAY UNIT: All models feature a 12-inch (diagonally measured) non-glare display screen as standard. A 14-inch screen is available optionally. Characters are displayed in white (P4 phosphor); green (P31 phosphor) characters are optional. The display contains a tilt adjustment of 10 degrees to 15 degrees. In addition, the Visual 50 has a swivel adjustment of 270 degrees.

All models feature a display capacity of 1920 characters, arranged in a 24-line by 80-character format. In addition, the Visual 100, Visual 110, and Visual 400 feature a selectable format of 3168 characters, arranged in 24 lines of 132 characters each. Characters are formed utilizing a 7-by-7 dot matrix with 2-dot lower case descenders on the Visual 100 and Visual 110, and utilizing a 7-by-9 dot matrix with 2-dot lower case descenders on all other models. The 95-character ASCII set is generated, plus 32 graphics characters. Eight national character sets are resident in the Visual 400, including U.S., United Kingdom, Swedish/Finnish, Norwegian/Danish, German, French, Spanish, and Portugese. These character sets are optional for the Visual 300.

KEYBOARD: All models include a detachable solid state typewriter-style keyboard with cursor control keys and a numeric pad. Four program function keys are standard on the Visual 100 and Visual 110. The Visual 300 and Visual 400 contain 12 programmable non-volatile function keys. An audible alarm sounds on receipt of a BEL code for all models.

PRICING

The Visual Technology terminals are available to end users for purchase only; lease plans are available from distributors.

	Purchase Price
Visual 50	$ 695
Visual 100	1,695
Visual 110	1,395
Visual 200	1,205
Visual 300	1,150
Visual 400	1,650 ∎

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The Visual 100 is a DEC VT-100 compatible terminal. An advanced video package, including blink, bold, reverse video, and underline, is standard on the Visual 100 (this feature is optional on the VT-100). A detachable solid state keyboard, with a numeric pad, is included.

MANAGEMENT SUMMARY

Visual Technology's family of video display terminals currently consists of five models: the Visual 100, Visual 200, Visual 210, Visual 400 and the newly announced Visual 110. All of the terminals are Z-80 microprocessor-based, offer a detachable solid state keyboard, an etched, non-glare display screen and smooth scrolling. A varity of emulations, character or block mode operation, and a choice of 80- or 132- column formats are available, depending on which model is selected.

The Visual 100 is a DEC VT-100 compatible terminal. An advanced video package, a feature which is optional on the VT-100, is standard on the Visual 100. Functions available with the advanced video package include underline, reverse video, blink, and bold; these functions can be utilize in any combination. The Visual 100 operates in the character mode, and offers a display format of 24 lines by 80 columns or 24 lines by 132 columns. The standard character set includes 95 ASCII characters plus 32 graphics characters. A buffered printer interface is available as an option.

The Visual 200 offers switch-selectable emulation of the following terminals: the Hazeltine 1500, Lear Siegler ADM-3A, DEC VT-52, and ADDS 520. Character mode transmission is standard and a screen capacity of 1920 characters in a 24-line by 80-column format can be accommodated. The keyboard generates a 95 character ASCII set plus a 31 character line drawing set. Fourteen programmable function keys are also included. The ▷

A family of microprocessor-based display terminals offering a choice of emulations, display formats, and transmission modes.

Five models are currently available. All models feature a 12" diagonal, non-glare display screen with a tilt adjustment. The keyboard is detached, and contains cursor control keys and a dedicated numeric pad. A variety of video and editing features are available, depending on which model is selected.

List prices of the terminals range from $1,195 to $1,695.

CHARACTERISTICS

VENDOR: Visual Technology Incorporated, Railroad Avenue, Dundee Park, Andover, MA 01810. Telephone (617) 475-8056.

DATE OF ANNOUNCEMENT: Visual 100—March 1980; Visual 200 and 210—August 1979; Visual 400—December 1980; Visual 110—January 1981.

DATE OF FIRST DELIVERY: Visual 100—March 1980; Visual 200 and 210—August 1979; Visual 400—January 1981; Visual 110—January 1981.

NUMBER DELIVERED TO DATE: Approximately 9000 (all models).

SERVICED BY: Visual Technology and distributors.

MODELS

Four models are available as follows:

● **Visual 100**—a DEC VT-100 compatible terminal which operates in character mode. An advanced video package is standard.

● **Visual 110**—contains all of the features of the Visual 100 but is Data General Dasher-compatible.

● **Visual 200**—features switch-selectable emulation of the DEC VT-52, ADDS 520, Lear Siegler ADM-3A, and Hazeltine 1500. The Visual 200 operates in character mode.

● **Visual 210**—contains all of the features of the Visual 200 but operates in block mode, and includes programmable function keys.

● **Visual 400**—contains all of the features of the Visual 100 and adds the option of operation in character or block mode. The Visual 400 also adds programmable non-volatile function keys, multiple field definition, extensive editing capabilities, and eight resident national character sets.

TRANSMISSION SPECIFICATIONS

The Visual 100 operates asynchronously in full duplex at any of 16 independent transmit/receive rates from 50 to 19,200 ▶

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▷ Visual 210 contains all of the features of the Visual 200, plus block mode transmission and 14 user-programmable function keys.

The fourth member of the Visual Technology terminal family is the Visual 400, the company's "top of the line" unit. The Visual 400 contains all of the features of the Visual 100, plus block as well as character mode transmission. In block mode, up to five pages of data can be stored and edited. Also included in the Visual 400 are programmable non-volatile function keys, multiple field definition, split screen, and eight resident national character sets.

As this report was going to press, Visual introduced a new model, the Visual 110. This unit provides emulation of the Data General Dasher 6052/6053, 100, and 200 terminals.

All five models in the family feature a 12" CRT with a tilt adjustment of 10° to 15°. Characters can be displayed on the screen in either white or green phosphor. Smooth scrolling is also featured. The detachable keyboards for all models include a dedicated numeric pad and n-key rollover. Self test diagnostics are standard.□

▶ bits per second. Odd, even, or no parity can be selected. The Visual 200 and Visual 210 operate asynchronously in full- or half-duplex at any of eight transmission rates from 110 to 19,200 bits per second. Odd, even, mark, or no parity are selectable. The Visual 400 operates asynchronously in full- or half-duplex at 16 independent transmit/receive rates from 50 to 19,200 bits per second. Odd, even, or no parity can be selected. All models feature an EIA RS-232-C and 20 mA current loop interface. An independent buffered printer interface is optional on the Visual 100, Visual 110, and Visual 400. The 128 character ASCII code is used.

DEVICE CONTROL

The cursor on the Visual 100 and the Visual 400 can be either a blinking block or blinking underline, selectable by the user. Cursor movements include up, down, left, right, and home. Other control sequences recognized include enter/exit graphics mode, reverse line feed, erase commands, identify, and enter/exit alternate keypad mode.

The Visual 100 includes four function keys which send multi-code sequences that are usually interpreted by an application program. Through the use of these keys, the number of keystrokes necessary for an operator to access commonly used functions is reduced to one. Other keyboard controls include tab, back space, return, line feed, break, and delete.

The Visual 400 includes 12 programmable, non-volatile function keys. These keys may be down-line loaded. The user may define whether data on the screen moves up or down for inserted/deleted lines, and right or left for inserted/deleted characters. The user may also limit the extent of editing functions to the current field, line, area, or page, via software selectable modes. Multiple field definitions on the Visual 400 include numeric only fields, alpha only fields, right justify, must fill, total fill, and protect. Message framing is also programmable.

The cursor on the Visual 200 and Visual 210 appears as a non-destructive block. Cursor commands include up, down, left, right, home, up scroll, cursor address, and read cursor. Tab commands include tab, back tab, set, clear, and clear all tabs. Other control commands include insert line/character, delete line/character, erase end of line/page/field, and clear line/page.

The Visual 210 contains 14 programmable function keys which functions may be down-line loaded. Message framing is also programmable.

COMPONENTS

CRT DISPLAY UNIT: All models contain a 12" diagonal non-glare display screen. The console has a tilt adjustment of 10° to 15°. White or green phosphor characters can be selected.

The Visual 200 and Visual 210 can display 1920 characters in a 24-line by 80-character format. Characters are formed utilizing a 7 x 9 dot matrix with 2 dot lower case descenders. A 95 character, upper/lower case ASCII set is generated, plus a 31 character line drawing set.

The Visual 100, Visual 110 and Visual 400 can display 1920 characters in a 24-line by 80-character format, or 3168 characters in a 24-line by 132-character format. Characters are formed utilizing a 7 x 7 dot matrix with 2 dot lower case descenders. An advanced video package, including blink, bold, reverse video, and underline, is standard. A 95 character ASCII set plus a 32 character graphics set is generated. Eight national character sets are resident in the Visual 400, including U.S., United Kingdom, Swedish/Finnish, Norwegian/Danish, German, French, Spanish, and Portugese.

KEYBOARD: All models include a detachable solid state typewriter-style keyboard with cursor control keys and a numeric pad. The Visual 100, 110, and 400 provide sculptured keycaps.

The Visual 200 contains a 79-key keyboard including typamatic repeat and caps lock. The Visual 210 adds 14 programmable function keys. The Visual 100 includes an 83-key keyboard including four program function keys. The Visual 400 adds 12 programmable non-volatile function keys. An audible alarm sounds on receipt of a BEL code for all models.

PRICING

The Visual Technology terminals are available to end users for purchase only; lease plans are available from distributors.

	Purchase Price
Visual 100	$1,695
Visual 110	$1,695
Visual 200	1,195
Visual 210	1,395
Visual 400	1,650■