

Data General Dasher Display Terminals

MANAGEMENT SUMMARY

UPDATE: *This report contains the latest additions to the Data General Dasher terminal product line, including the D220, an 8-color terminal; the D470C, a 16-color terminal; and the D460T, a Tempest accredited version of the D460. Also included is new pricing for existing Dasher models, including pricing for amber screen versions.*

Data General's popular Dasher series of display terminals was introduced in 1976 as the principal interface for the company's Nova line of minicomputers. New models were added to the Dasher product line in 1979 and 1980. In June 1983, Data General unveiled a second generation of Dasher terminals. These models, the D210, D211, D410, and D460, feature the company's ergonomic housing style (which can also be found on DG's Desktop Generation of microcomputers). The high-end models, D410 and D460, also feature enhanced functionality which was not available on the older models. Three new models were added in 1984, including two color terminals, the D220 and D470C, and a Tempest accredited terminal, the D460T. Data General also announced the availability of amber screen versions of the monochrome Dasher terminals.

The D210 and D211 terminals are functionally compatible with the older D100 (6106, 6107) and D200 (6108, 6109) models. Both models feature a 12-inch display with a 24-line by 80-character display format, and visual attributes available on a character-by-character basis. The D211 provides a dedicated printer port and international language support.



The Dasher terminals are designed for use with Data General's Eclipse MV/Family of 32-bit superminicomputers. The Dasher D210 terminal is shown here with the Eclipse MV/8000 II system. Like the other members of the Dasher terminal line, the D210 features a compact design that includes a 12-inch tiltable display screen and a low-profile keyboard.

This report covers the new generation of Data General's popular Dasher display terminal line. The Dasher terminals are designed for use with the company's entire line of Eclipse, Nova, and Commercial Systems small business system computers. Both monochrome and color versions are available. In addition, the new terminals conform to the ANSI X3.64 command format.

MODELS: D210, D211, D220, D410, D460, D470C.

DISPLAY: All models contain a 12-inch (diagonal) display with tilt capability. The monochrome terminals (D210, D211, D410, D460) are available with green or amber phosphor characters. The D220 is an 8-color terminal, while the D470C displays up to 16 colors. The D210, D211, and D220 feature a 24-line by 80-character display format. The D410 and D460 feature selectable formats of 24 lines by 81 characters or 24 lines by 135 characters; the D470C features the 24-line by 81-character format only.

KEYBOARD: All models are equipped with a detachable keyboard with a low-profile design. The keyboard contains 106 keys, including 15 programmable function keys.

COMPETITION: Cybernex, Datamedia, Kimtron, Tandberg Data, and Teleray manufacture terminals with Data General Dasher emulation.

PRICE: Prices for the Dasher terminals range from \$1,195 to \$2,995; the Tempest version of the D460 is priced at \$4,230.

CHARACTERISTICS

VENDOR: Data General Corporation, Information Systems Division, 4400 Computer Drive, Westboro, MA 01581. Telephone (617) 366-8911. In Canada: Data General Corporation, 2155 Leanne Boulevard, Mississauga, Ontario L5K 2K8. Telephone (416) 823-7830.

DATE OF ANNOUNCEMENT: D210, D211, D410, and D460—June 1983; D220—February 1984; D470C—June 1984; D460T—October 1984.

DATE OF FIRST DELIVERY: D210, D211, D410, and D460—June 1983; D220—February 1984; D470C—June 1984; D460T—October 1984.

NUMBER DELIVERED TO DATE: Approximately 85,000 (including older models).

SERVICED BY: Data General.

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▷ The D410 is compatible with existing D200 and D400 terminals. Display formats of 24 lines by 81 characters and 24 lines by 135 characters are available on a 12-inch screen. A full range of editing capabilities, as well as visual attributes, are available. The D410 also provides the user with up to 24 user-definable windows, each with independent editing and scrolling. Horizontal scrolling is possible for documents up to 162 columns wide.

The D460 combines alphanumeric with character-mapped graphics display capability. In addition to the set of 512 fixed characters found on the D410, up to 3,572 user-defined characters or symbols are available on the D460. Data General's Trendview and Present graphics software packages provide support for the D460. In addition to graphics, the D460 contains all of the advanced alphanumeric features found on the D410.

The D220 is an 8-color terminal that is compatible with the D210 and D211 models. Color selection can be controlled by the host computer, or from the keyboard. The user can select up to 64 foreground/background color combinations on a character-by-character basis. The D470C can display up to 16 colors, generated on a character-by-character basis for foreground/background use. Colors can be programmed into the terminal and executed on command, or manipulated from the keyboard. The D470C is compatible with the D410 and D460 models, and features a 648-by-240 pixel screen resolution. Up to 2,016 user-definable characters can be downline-loaded in order to create special character sets, symbols, graphs, and diagrams.

All of the Dasher terminals support the ANSI X3.64 command formats; the D410, D460, and D470C also support the ANSI X3.41 command format. Data General provides software support for all of the new terminals under its Advanced Operating System (AOS), AOS/Virtual Storage (AOS/VS), and AOS/RT32. The Dasher terminals are also supported by the company's Comprehensive Electronic Office (CEO) software.

The new Dasher terminals offer a smaller footprint size than their predecessors, thus occupying less desk space. The 12-inch (diagonal) display is tiltable. All models are also equipped with a new, low-profile design keyboard with tactile feedback.

COMPETITIVE POSITION

The Dasher terminals are designed for use with the Data General Eclipse MV/Family of 32-bit superminicomputers. Although a few companies in the display terminal market provide Dasher emulators (including Cybernex, Datamedia, Kimtron, and Tandberg Data), Data General is not faced with particularly stiff competition in the Dasher-emulation submarket.

ADVANTAGES AND RESTRICTIONS

In addition to Data General software compatibility, the new Dasher terminals also conform to the ANSI X3.64 standard, making them suitable for use in non-Data ▷

▶ MODELS

The Dasher display terminals are standalone, asynchronous units that support the ANSI X3.64 command format. All models feature a 12-inch tiltable display, and a low-profile detachable keyboard. The Dasher family now consists of the following models:

- D210—a basic interactive terminal. Visual attributes, available on a character-by-character basis are standard.
- D211—contains the same features as the D210, plus a serial printer port, multilingual display, and choice of communications interfaces.
- D220—an 8-color terminal. The D220 is compatible with the D210 and D211.
- D410—an enhanced function terminal. Visual attributes, full editing features, an extended character set, and user-definable windowing are standard.
- D460—an alphanumeric and character-mapped graphics terminal. It contains all of the enhanced features found on the D410, plus an additional 3,572 user-defined characters/symbols, and is supported by DG's Trendview and Present graphics software packages. A Tempest-accredited version, the D460T, is also available.
- D470C—a 16-color terminal. Contains the enhanced features found on the D410 and D460, plus 2,016 user-definable characters.

TRANSMISSION SPECIFICATIONS

All Dasher terminals transmit data asynchronously, in full-duplex mode. All models except the D210 can be equipped with either an RS-232-C, RS-422, or 20 ma current loop interface; the D210 is available with an RS-232-C interface only. Interfaces are compatible with Bell 103-, 113-, and 212-type modems. Transmission speeds on the D210, D211, and D220 are selectable at 15 rates ranging from 50 to 19,200 bits per second. Transmission speeds on the D410, D460, and D470C are selectable at 13 rates ranging from 110 to 19,200 bits per second, or a maximum of 60 characters per second. The 7-bit and 8-bit ASCII data formats are used (7-bit only on the D210). Odd, even, mark, or no parity can be selected. One stop bit is used at speeds of 134.5 bps and above, and two stop bits are used for lower speeds.

The D211, D220, D410, D460, and D470C provide a printer interface that supports the attachment of an ASCII-based serial printer. Communications flow between the terminal and the printer utilizes DC1/DC3 protocol. Transmission speeds on the D211 and D220 printer ports are selectable from 110 to 19,200 bps. The printer interface on the D410, D460, and D470C support split rate transmission and reception. Transmission rates are selectable from 110 to 4800 bps, while reception rates are selectable from 110 to 19,200 bps.

HOST COMPUTER SOFTWARE SUPPORT

All Dasher terminals are supported by Data General's Advanced Operating System (AOS), AOS/Virtual Storage (AOS/VS), and AOS/RT32, as well as the full line of Comprehensive Electronic Office (CEO) software. In addition, the D210, D211, and D220 are supported by DG's Disc Operating System (DOS), Realtime Disc Operating System (RDOS), Realtime Operating System (RTOS), Micro Products Operating System (MP/OS), and Micro Products/AOS (MP/AOS). ▶

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General environments. The new models are priced significantly lower than the previous Dasher terminals, in keeping with the general trend in the terminal industry. Despite their lower prices, the new Dasher models (particularly the D410 and D460) provide increased functionality and design benefits over their predecessors. The new D220 and D470C models add color display capability to the Dasher line.

USER REACTION

During the months of November and December 1984, Datapro, in conjunction with *Data Communications* magazine, conducted a mail survey of display terminal, voice/data workstation, and cluster controller users. The 1985 Terminal Users Survey was the result. Responding to this survey were a total of 20 Data General Dasher terminal users. Of these 20 users, nine reported on their experiences with the newer Dasher models; four on the D210, and five on the D410. The D210 users reported on a total of 90 installed units, while the D410 users had an installed base of 694 units. Users were asked to rate their terminals in seven specific categories. The ratings given to the D210 and D410 are combined, and summarized in the following table.

	Excellent	Good	Fair	Poor	WA*
Overall performance	7	2	0	0	3.8
Ease of operation	7	1	1	0	3.7
Display clarity	7	2	0	0	3.8
Keyboard feel & usability	5	3	1	0	3.4
Ergonomics	6	3	0	0	3.7
Hardware reliability	2	6	1	0	3.1
Mfr.'s maintenance service/technical support	5	2	1	1	3.2

*Weighted Average on a scale of 4.0 for Excellent.

When asked whether or not they would recommend the Data General Dasher terminals to other users, all nine respondents answered that they would. □

► The D460 is supported by Data General's Trendview and Present software. Trendview is a graphics display software package which enables the terminal to create, display, and print common business graphics (e.g., pie, bar, and line graphs) directly from tabular data. Present is an information presentation facility which allows the user to call up specific information from the system database and present the data in graphic form.

DEVICE CONTROL

Transmission for all of the Dasher terminals is performed on a character-by-character basis. Cursor controls move the cursor up, down, left, right, and home. On the D210, D211, and D220 the cursor appears in reverse video and is nonblinking. On the D410, D460, and D470C four alternative cursor types may be selected via the keyboard: blinking, underline, reverse video, and blinking reverse video.

Four visual attributes—blink, underline, dim, and reverse video—are available on all models, on a character-by-character basis. The D410, D460, and D470C provide the following editing features: erase screen, erase window, erase to end-of-line, insert/delete character, insert line, and insert line between margins. Protected text and erase unprotected text commands are also available on the D410, D460, and D470C.

Three vertical scroll rates—fast smooth, slow smooth, and jump—may be controlled by the host or by local function keys on the D410, D460, and D470C. Horizontal scrolling of up to 162 columns is allowed. An LED-indicated hold function allows the user to freeze the display by halting data flow from the host.

On the D410 and D460, up to 24 independent windows can be defined by the user. Each window provides a separate work area of up to 24 lines and 162 columns, which can be scrolled through and edited independently. Using the windows, normal (81 columns) and compressed (162 columns) data may be displayed simultaneously. This feature is not available on other models. However, on the D211, characters from multiple language sets may be displayed simultaneously on the screen.

The D460 provides memory to store up to 3,572 downline-loadable, user-defined symbols to create special character sets, symbols, graphs, and diagrams. The D470C provides memory for 2,016 downline-loadable, user-defined symbols.

The D220 can display up to eight colors, selected from 64 foreground/background color combinations on a character-by-character basis. Color selection can be controlled by the host computer or from the keyboard. The D470C can display up to 16 colors. The terminal can be programmed to execute color features on command, or colors can be selected from the keyboard.

COMPONENTS

D210, D211, D410, & D460 CRT DISPLAY UNIT: A 12-inch (diagonally measured), tiltable display monitor is standard for all models. The D210 and D211 feature a display capacity of 1920 characters, arranged in 24 lines of 80 characters each. The D410 and D460 provide two selectable display modes: normal (24 lines by 81 characters) and compressed (24 lines by 135 characters). Characters on the D210 and D211 are formed by 7-by-11 pixels in a 10-by-12 cell. Characters on the D410 and D460 are formed using 7-by-11 pixels in a 10-by-12 cell (normal mode) or by 7-by-11 pixels in a 12-by-12 cell (compressed mode). Character phosphor is P31 yellow-green; amber phosphor screens are also available for all models. A 96-character ASCII set is standard on the D210 and D211, with a 96-character foreign language extension also standard on the D211. The D410 and D460 provide a 512-character set, that includes a 96-character ASCII set, 68 foreign language characters, extended math symbols, forms ruling set, word processing symbols, superscripts, subscripts, and Greek symbols. In addition, the D460 can be loaded from the host with up to 38 92-character sets defined by the user, for a total of 3,572 terminal-resident, application-unique graphics characters/symbols.

D220 CRT DISPLAY UNIT: Contains a 12-inch (diagonal), tiltable display monitor. The D220 features a display capacity of 1,920 characters, arranged in a 24-line by 80-character format. Characters are formed by 7-by-11 pixels in a 10-by-12 cell. Up to 8 colors may be displayed, selected from 64 foreground/background colors on a character-by-character basis. A 96-character ASCII set is standard.

D470C CRT DISPLAY UNIT: Contains a 12-inch (diagonal), tiltable display monitor. The D470C features a display capacity of 1944 characters, arranged in a 24-line by 81-character format. Screen resolution is 648-by-240 pixels. Up to 16 colors may be displayed, selected from 64 foreground/background colors on a character-by-character basis. The 470C has the ability to downline load 2,016 user-defined characters/symbols for application-unique graphics characters/symbols. ►

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► **KEYBOARD:** All models are equipped with a detachable, low-profile keyboard. Tactile feedback, sculpted keytops, low-fatigue keyswitches, and N-key rollover are standard features. The keyboard contains a total of 106 keys, including a standard typewriter-style main array, a 14-key numeric section, a 12-key screen management keypad, and 15 programmable function keys. Five local function keys are also available.

National keyboards available for the Dasher terminals include: U.S., U.K., French, German, Italian, Katakana (Japanese), Swedish/Finnish, Danish/Norwegian, Spanish, Swiss/German, Swiss/French, Canadian Bilingual (English legends), and Canadian Bilingual (French legends).

PRICING

The Data General Dasher display terminals are available for purchase only; lease and rental arrangements are available through third parties and terminal resellers only. Quantity discounts are available; end-user discounts at the 500-unit level are 25 percent, while OEM discounts at the 500-unit level are 30 percent.

Data General offers two separate maintenance arrangements: the On Call Service Contract, and the Factory Service Contract, which involves return of the faulty equipment to a designated repair location.

EQUIPMENT PRICES

		Purchase Price (\$)	Monthly On-Call Svc. (\$)
6168	Dasher D210 w/keyboard	1,145	13
6168A	Dasher D210 w/keyboard; amber screen	1,220	13
6169	Dasher D211 w/keyboard	1,195	15
6169A	Dasher D211 w/keyboard; amber screen	1,270	15
6166	Dasher D410 w/keyboard	1,785	17
6166A	Dasher D410 w/keyboard; amber screen	1,860	17
6167	Dasher D460 w/keyboard	1,985	19
6167A	Dasher D460 w/keyboard; amber screen	2,060	19
6177	Dasher D460T w/keyboard; Tempest version	4,230	—
6177A	Dasher D460T w/keyboard; Tempest version; amber screen	4,230	—
6284	Dasher D220 w/keyboard; 8-color display	2,145	28
6308	Dasher D470C w/keyboard; 16-color display	2,995	30
	Modem cable	65	— ■

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MANAGEMENT SUMMARY

UPDATE: Since our last revision, Data General has discontinued the D210 and D211 display terminals and replaced them with the D214 and D215. Replacing the D410 and D460 display terminals are the D411 and D461. The D220 and D470C are still being manufactured by Data General. Specifications and pricing information on the new models, as well as existing models, are included in this report.

Since the introduction of Data General's Dasher display terminals in 1976, this product line has experienced many changes. In 1979 and 1980, new models were added, and in June 1983, with the push for ergonomic enhancements in the spotlight, Data General unveiled a second generation of Dasher terminals. These models (the D210, D211, D410, and D460) featured the company's ergonomic housing style with the high-end models, the D410 and D460, also featuring enhanced functionality. Three new models were added in 1984, including two color terminals, the D220 and D470C, and a Tempest accredited terminal, the D460T. Data General also announced the availability of amber screen versions of the monochrome Dasher terminals. The most recent changes to this popular line of display terminals took place in 1976. The D210, D211, D410, and D460 were replaced by the D214, D215, D411, and D461, respectively. These new models have been enhanced with more advanced functionality than their predecessors.

The D214 and D215 terminals are functionally compatible with the older D210 and D211 models. They provide upward compatibility with the Dasher D200 terminal family, which eases the assimilation process of these new



The Dasher D220 is an asynchronous, color, alphanumeric display terminal. Fully compatible with earlier Dasher models, the D220 provides users with a palette of eight colors and advanced word and data processing capabilities in a compact design.

Data General Corporation's Dasher display terminal line currently consists of six models. All Dasher models offer industry-standard asynchronous communications interfaces, with Data General and ANSI X3.64 compatibility.

MODELS: D214, D215, D220, D411, D461, and D470C.

DISPLAY: All models contain a 12-inch (diagonal) display with tilt capability. The monochrome terminals (D214, D215, D411, and D461) are available with green or amber phosphor characters. The D220 is an 8-color terminal, while the D470C displays up to 16 colors. The D214, D215, and D220 feature a 24-line by 80-character display format. The D411 and D461 feature selectable formats of 24 lines by 81 characters or 24 lines by 135 characters; the D470C features the 24-line by 81-character format only.

KEYBOARD: All models are equipped with a detachable keyboard with a low-profile design. The keyboard contains 106 keys, including 15 programmable function keys.

COMPETITION: Cybernex, Datamedia, Kimtron, and Teleray manufacture terminals with Data General Dasher emulation.

PRICE: Prices for the Dasher terminals range from \$795 to \$1,600.

CHARACTERISTICS

VENDOR: Data General Corporation, Information Systems Division, 4400 Computer Drive, Westboro, Massachusetts 01581. Telephone (617) 366-8911. In Canada: Data General Corporation, 2155 Leanne Boulevard, Mississauga, Ontario L5K 2K8. Telephone (416) 823-7830.

DATE OF ANNOUNCEMENT: D220—February 1984; D470C—June 1984; D214, D215, D411, and D461—February 1986.

DATE OF FIRST DELIVERY: D220—February 1984; D470C—June 1984; D214, D215, D411, and D461—February 1986.

NUMBER DELIVERED TO DATE: Not available.

SERVICED BY: Data General.

MODELS

The Dasher display terminals are standalone, asynchronous units that support the ANSI X3.64 command format. All models feature a 12-inch tilttable display, and a low-profile detachable keyboard. The Dasher family now consists of the following models:

- D214/D215—general purpose, alphanumeric display terminals, designed for use across the entire range of Data General systems.

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▷ workstations into existing Data General customer application environments. Both models feature a 12-inch display with a 24-line by 80-character display format, and visual attributes available on a character-by-character basis. Each character displayed on the screen can be underscored, dimmed, made to blink, or displayed in reverse video independently of all other characters. The D215 offers a selective print capability for the user to print only the nondimmed characters on the screen. In addition, the D215 offers international language support.

The D411 and D461 terminals are compatible with existing D200 and D400 terminals. Display formats of 24 lines by 81 characters and 24 lines by 135 characters are available on a 12-inch screen. A full range of editing capabilities, as well as visual attributes, are available. In addition to the horizontal scrolling capability that eases working with wide documents, the D411 and D461 also feature smooth vertical scrolling. The "hold" function key enables the user to keep the display from changing by holding data flow from the host computer; a light on the keyboard indicates its operating. International character sets are supported on both models.

The D411 also provides the user with up to 24 user-definable windows of up to 24 rows each without overlap. Each window can be up to 208 characters wide, with 81 (standard mode) or 135 (compressed mode) characters displayed at a time. Each window provides a separate terminal screen that receives and processes the full complement of terminal commands.

In addition to the alphanumeric capability, the D461 also features character-mapped graphics display capability. The graphics cursor, represented by a cross on the screen, can be moved smoothly to any bit location on the screen. The D461 workstation provides total access to personal and presentation graphics packages such as Data General's Trendview, CEO Drawing Board, and CEO Wordview software. In addition to the set of 512 fixed characters found on the D411, up to 3,572 user-defined characters or symbols are available on the D461. In addition to graphics, the D461 contains all of the advanced alphanumeric features found on the D411.

The D220 is an 8-color terminal that is compatible with the D214 and D215 models. Color selection can be controlled by the host computer or from the keyboard. The user can select up to 64 foreground/background color combinations on a character-by-character basis. The D470C can display up to 16 colors, generated on a character-by-character basis for foreground/background use. Colors can be programmed into the terminal and executed on command, or manipulated from the keyboard. The D470C is compatible with the D411 and D461 models, and features a 648-by-240 pixel screen resolution. Up to 2,016 user-definable characters can be downline loaded in order to create special character sets, symbols, graphs, and diagrams.

All of the Dasher terminals support the ANSI X3.64 command formats; the D411, D461, and D470C also support ▷

- ▶ D220—an eight-color terminal, fully compatible with earlier Dasher models. The D220 provides advanced word and data processing capability.
- ▶ D411/D461—data entry, word processing, and applications development workstations. The D461 supports business graphics. These terminals combine Dasher and industry-standard compatibility in a compact, ergonomic design.
- ▶ D470C—a 16-color workstation, offering medium-resolution color graphics capability. Programming and data input are simplified through advanced editing and screen manipulation facilities.

TRANSMISSION SPECIFICATIONS

All Dasher terminals transmit data asynchronously, in full-duplex mode. All models except the D214 can be equipped with either an RS-232-C, RS-422, or 20 ma current loop interface; the D214 is available with an RS-232-C interface only. Interfaces are compatible with Bell 103-, 113-, and 212-type modems. Transmission speeds on the D214, D215, and D220 are selectable at 15 rates ranging from 50 to 19,200 bits per second. Transmission speeds on the D411, D461, and D470C are selectable at 13 rates ranging from 110 to 19,200 bits per second, or a maximum of 60 characters per second. The 7-bit and 8-bit ASCII data formats are used (7-bit only on the D214). Odd, even, mark, or no parity can be selected. One stop bit is used at speeds of 134.5 bps and above, and two stop bits are used for lower speeds.

The D215, D220, D411, D461, and D470C provide a printer interface that supports the attachment of an ASCII-based serial printer. The communications flow between the terminal and the printer utilizes DC1/DC3 protocol. Transmission speeds on the D215 and D220 printer ports are selectable from 110 to 19,200 bps. The printer interface on the D411, D461, and D470C support split-rate transmission and reception. Transmission rates are selectable from 110 to 4800 bps, while reception rates are selectable from 110 to 19,200 bps.

HOST COMPUTER SOFTWARE SUPPORT

All Dasher terminals are supported by Data General's Advanced Operating System (AOS), AOS/Virtual Storage (AOS/VS), and AOS/RT32, as well as the full line of Comprehensive Electronic Office (CEO) software. In addition, the D214, D215, and D220 are supported by DG's Disc Operating System (DOS), Realtime Disc Operating System (RDOS), Realtime Operating System (RTOS), Micro Products Operating System (MP/OS), and Micro Products/AOS (MP/AOS).

The D461 is supported by Data General's Trendview, CEO Drawing Board, and CEO Wordview software. Trendview is a graphics display software package which enables the terminal to create, display, and print common business graphics (e.g., pie, bar, and line graphs) directly from tabular data. Present is an information presentation facility which allows the user to call up specific information from the system database and present the data in graphics form.

DEVICE CONTROL

Transmission for all of the Dasher terminals is performed on a character-by-character basis. Cursor controls move the cursor up, down, left, right, and home. On the D214, D215, and D220, the cursor appears in reverse video and is nonblinking. On the D411, D461, and D470C, four alternative cursor types may be selected via the keyboard: blinking, underline, reverse video, and blinking reverse video. ▶

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▷ the ANSI X3.41 command format. Data General provides software support for all of the new terminals under its Advanced Operating System (AOS), AOS/Virtual Storage (AOS/VS), and AOS/RT32. The Dasher terminals are also supported by the company's Comprehensive Electronic Office (CEO) software.

The new Dasher terminals offer a smaller footprint size than their predecessors, thus occupying less desk space. The 12-inch (diagonal) display is tiltable. All models are also equipped with a low-profile, detachable keyboard with tactile feedback.

COMPETITIVE POSITION

The Dasher terminals are designed for use with the Data General Eclipse MV/Family of 32-bit superminicomputers. Although a few companies in the display terminal market provide Dasher emulators (including Cybernex, Datamedia, and Kimtron), Data General is not faced with particularly stiff competition in the Dasher emulation submarket.

ADVANTAGES AND RESTRICTIONS

In addition to Data General software compatibility, the new Dasher terminals also conform to the ANSI X3.64 standard, making them suitable for use in non-Data General environments. The new models are priced significantly lower than the previous Dasher terminals, in keeping with the general trend in the terminal industry. Despite their lower prices, the new Dasher models (particularly the D411 and D461) provide increased functionality and design benefits over their predecessors. The D220 and D470C models offer color display capability for the Dasher line.

USER REACTION

In Datapro's 1986 Terminal Users Survey, conducted in conjunction with *Data Communications* magazine, a total of 21 responses were received from users of Data General terminals. These responses represented an installed base of 2,706 units. Users were asked to rate their terminals in seven specific categories. These ratings are summarized in the following table.

	Excellent	Good	Fair	Poor	WA*
Overall performance	7	13	1	0	3.3
Ease of operation	11	9	1	0	3.5
Display clarity	7	13	1	0	3.3
Keyboard feel & usability	8	11	2	0	3.3
Ergonomics	8	9	4	0	3.2
Hardware reliability	4	16	0	1	3.1
Mfr.'s maintenance service/technical support	5	13	2	1	3.0

*Weighted Average on a scale of 4.0 for Excellent.

When asked whether or not they would recommend the Data General Dasher terminals to other users, 19 respondents answered that they would, 1 said they would not, and 1 was undecided. □

▶ Four visual attributes—blink, underline, dim, and reverse video—are available on all models, on a character-by-character basis. The D411, D461, and D470C provide the following editing features: erase screen, erase window, erase to end-of-line, insert/delete character, insert line, and insert line between margins. Protected text and erase unprotected text commands are also available on the D411, D461, and D470C.

Three vertical scroll rates—fast smooth, slow smooth, and jump—may be controlled by the host or by local function keys on the D411, D461, and D470C. Horizontal scrolling of up to 162 columns is allowed. An LED-indicated hold function allows the user to freeze the display by halting data flow from the host.

On the D411 and D461, up to 24 independent windows can be defined by the user. Each window provides a separate work area of up to 24 lines and 135 columns, which can be scrolled through and edited independently. Using the windows, normal (81 columns) and compressed (135 columns) data may be displayed simultaneously. This feature is not available on other models. However, on the D215, characters from multiple language sets may be displayed simultaneously on the screen.

The D461 provides memory to store up to 3,572 downline-loadable, user-defined symbols to create special character sets, symbols, graphs, and diagrams. The D470C provides memory for 2,016 downline-loadable, user-defined symbols.

The D220 can display up to 8 colors, selected from 64 foreground/background color combinations on a character-by-character basis. Color selection can be controlled by the host computer or from the keyboard. The D470C can display up to 16 colors. The terminal can be programmed to execute color features on command, or colors can be selected from the keyboard.

COMPONENTS

D214, D215, D411, and D461 CRT DISPLAY UNITS: A 12-inch (diagonally measured), tiltable display monitor is standard for all models. The D214 and D215 feature a display capacity of 1,920 characters, arranged in 24 lines of 80 characters each. The D411 and D461 provide two selectable display modes: normal (24 lines by 81 characters) and compressed (24 lines by 135 characters). Characters on the D214 and D215 are formed by 7-by-9 pixels in a 10-by-12 cell. Characters on the D411 and D461 are formed using 7-by-9 pixels in a 10-by-12 cell (normal mode) or by 7-by-9 pixels in a 9-by-12 cell (compressed mode). Character phosphor is P31 yellow-green; amber phosphor screens are also available for all models. A 128-character ASCII set is standard on the D214 and D215, with a 96-character foreign language extension also standard on the D215. The D411 and D461 provide a 512-character set that includes a 96-character ASCII set, 68 foreign language characters, extended math symbols, forms ruling set, word processing symbols, superscripts, subscripts, and Greek symbols. In addition, the D461 can be loaded from the host with up to 38, 92-character sets defined by the user, for a total of 3,572 terminal-resident, application-unique graphics characters/symbols.

D220 CRT DISPLAY UNIT: Contains a 12-inch (diagonal), tiltable display monitor. The D220 features a display capacity of 1,920 characters, arranged in a 24-line by 80-character format. Characters are formed by 7-by-11 pixels in a 10-by-12 cell. Up to 8 colors may be displayed, selected from 64 foreground/background colors on a character-by-character basis. A 96-character ASCII set is standard.

D470C CRT DISPLAY UNIT: Contains a 12-inch (diagonal), tiltable display monitor. The D470C features a display ▶

Data General Dasher Display Terminals

► capacity of 1,944 characters, arranged in a 24-line by 81-character format. Screen resolution is 648-by-240 pixels. Up to 16 colors may be displayed, selected from 64 foreground/background colors on a character-by-character basis. The 470C has the ability to downline load 2,016 user-defined characters/symbols for application-unique graphics characters/symbols.

KEYBOARD: All models are equipped with a detachable, low-profile keyboard. Tactile feedback, sculpted keytops, low-fatigue keyswitches, and multikey rollover are standard features. The keyboard contains a total of 106 keys, including a standard typewriter-style main array, a 14-key numeric section, a 12-key screen management keypad, and 15 programmable function keys. Five local function keys are also available.

National keyboards available for the Dasher terminals include U.S., U.K., French, German, Italian, Japanese, Swedish/Finnish, Danish/Norwegian, Spanish, Swiss/German, Swiss/French, Canadian Bilingual (English legends), and Canadian Bilingual (French legends).

PRICING

The Data General Dasher display terminals are available for purchase only; lease and rental arrangements are available through third parties and terminal resellers only.

Quantity discounts are available; end-user discounts at the 500-unit level are 25 percent, while OEM discounts at the 500-unit level are 30 percent.

Data General offers two separate maintenance arrangements: the On-Call Service Contract, and the Factory Service Contract, which involves return of the faulty equipment to a designated repair location.

EQUIPMENT PRICES

<u>Model</u>	<u>Purchase Price (\$)</u>
D214	795
D215	895
D411	1,195
D461	1,495
D220	2,145
D470C	2,295 ■

Data General Dasher Display Terminals



Data General's new generation of Dasher display terminals incorporate the company's latest ergonomic design. The 12-inch display monitor is tiltable and has a smaller footprint size than its predecessors. The terminal's keyboard is detached, features a low-profile design, and provides tactile feedback.

MANAGEMENT SUMMARY

Data General's popular Dasher series of display terminals was introduced in 1976 as the principal interface for the company's Nova line of minicomputers. New models were added to the Dasher product line in 1979 and 1980. In June 1983, Data General unveiled a second generation of Dasher terminals. These new models, the D210, D211, D410, and D460, feature the company's ergonomic housing style (which can also be found on DG's new Desktop Generation of microcomputers). The high-end models, D410 and D460, also feature enhanced functionality which was not available on the older models.

The D210 and D211 terminals are functionally compatible with the older D100 (6106, 6107) and D200 (6108, 6109) models. Both models feature a 12-inch display with a 24-line by 80-character display format, and visual attributes available on a character-by-character basis. The D211 provides a dedicated printer port and international language support.

The D410 is compatible with existing D200 and D400 terminals. Display formats of 24 lines by 81 characters and 24 lines by 135 characters are available on a 12-inch screen. A full range of editing capabilities, as well as visual attributes, are available. The D410 also provides the user with up to 24 user-definable windows, each with independent editing and scrolling. Horizontal scrolling is possible for documents up to 162 columns wide.

The D460 combines alphanumeric with character-mapped graphics display capability. In addition to the set of 512 fixed characters found on the D410, up to 3,572 user- ➤

A new generation of Data General's popular Dasher display terminal line.

The new models include the D210 and D211, which are basic interactive terminals; the D410, an enhanced function terminal; and the D460, an alphanumeric and character-mapped graphics terminal. All models feature DG's new ergonomic display design, which includes a 12-inch tiltable display, reduced footprint size, and detached, low-profile keyboard. The Dasher terminals are designed for use with the company's entire line of Eclipse, Nova, and Commercial Systems small business system computers. In addition, the new terminals conform to the ANSI X3.64 command format.

Prices for the Dasher terminals range from \$995 to \$1,785 in single quantities.

CHARACTERISTICS

VENDOR: Data General Corporation, Information Systems Division, 4400 Computer Drive, Westboro, MA 01581. Telephone (617) 366-8911. In Canada: Data General Corporation, 2155 Leanne Boulevard, Mississauga, Ontario L5K 2K8. Telephone (416) 823-7830.

DATE OF ANNOUNCEMENT: June 1983.

DATE OF FIRST DELIVERY: June 1983.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: Data General.

MODELS

The Dasher display terminals are standalone, asynchronous units that support the ANSI X3.41/X3.64 command formats. All models feature a 12-inch tiltable display, and a low-profile detachable keyboard. The Dasher family now consists of the following models:

- **D210**—a basic interactive terminal. Visual attributes, available on a character-by-character basis are standard.
- **D211**—contains the same features as the D210, plus a serial printer port, multilingual display, and choice of communications interfaces.
- **D410**—an enhanced function terminal. Visual attributes, full editing features, an extended character set, and user-definable windowing are standard.
- **D460**—an alphanumeric and character-mapped graphics terminal. It contains all of the enhanced features found on the D410, plus an additional 3,572 user-defined characters/symbols, and is supported by DG's Trendview and Present graphics software packages. ➤

Data General Dasher Display Terminals

▷ defined characters or symbols are available on the D460. Data General's Trendview and Present graphics software packages both provide support for the D460. In addition to graphics, the D460 contains all of the advanced alphanumeric features found on the D410.

All of the new Dasher terminals support the ANSI X3.41/X3.64 command formats. Data General provides software support for all of the new terminals under its Advanced Operating System (AOS), AOS/Virtual Storage (AOS/VS), and AOS/RT32. The Dasher terminals are also supported by the company's Comprehensive Electronic Office (CEO) software.

The new Dasher terminals offer a smaller footprint size than their predecessors, thus occupying less desk space. The 12-inch (diagonal) display is tiltable. All models are also equipped with a new, low-profile design keyboard with tactile feedback.

COMPETITIVE POSITION

The Dasher terminals are designed for use with all Data General computer systems, including the Nova, micro-Nova, Eclipse, Eclipse/MV, and Commercial Systems minicomputers. Although a few companies in the display terminal market provide Dasher emulators, Data General is not faced with particularly stiff competition in the Dasher emulation submarket.

ADVANTAGES AND RESTRICTIONS

In addition to Data General software compatibility, the new Dasher terminals also conform to the ANSI X3.64 standard, making them suitable for use in non-Data General environments. The new models are priced significantly lower than the previous Dasher terminals, in keeping with the general trend in the terminal industry. Despite their lower prices, the new Dasher models (particularly the D410 and D460) provide increased functionality and design benefits over their predecessors. □

TRANSMISSION SPECIFICATIONS

All Dasher terminals transmit data asynchronously, in full-duplex mode. All models except the D210 can be equipped with either an RS-232-C, RS-422, or 20mA current loop interface; the D210 is available with an RS-232-C interface only. Interfaces are compatible with Bell 103-, 113-, and 212-type modems. Transmission speeds on the D210 and D211 are selectable at 15 rates ranging from 50 to 19,200 bits per second. Transmission speeds on the D410 and D460 are selectable at 13 rates ranging from 110 to 19,200 bits per second, or a maximum of 60 characters per second. The 7-bit and 8-bit ASCII data formats are used (7-bit only on the D210). Odd, even, mark, or no parity can be selected. One stop bit is used at speeds of 134.5 bps and above, and two stop bits are used for lower speeds.

The D211, D410, and D460 provide a printer interface that supports the attachment of an ASCII-based serial printer. Communications flow between the terminal and the printer utilizes DC1/DC3 protocol. Transmission speeds on the D211 printer port are selectable from 110 to 19,200 bps. The printer interface on the D410 and D460 support split rate

transmission and reception. Transmission rates are selectable from 110 to 4800 bps, while reception rates are selectable from 110 to 19,200 bps.

HOST COMPUTER SOFTWARE SUPPORT

All Dasher terminals are supported by Data General's Advanced Operating System (AOS), AOS/Virtual Storage (AOS/VS), and AOS/RT32, as well as the full line of Comprehensive Electronic Office (CEO) software. In addition, the D210 and D211 are supported by DG's Disc Operating System (DOS), Real-time Disc Operating System (RDOS), Real-time Operating System (RTOS), Micro Products Operating System (MP/OS), and Micro Products/AOS (MP/AOS).

The D460 is supported by Data General's Trendview and Present software. Trendview is a graphics display software package which enables the terminal to create, display, and print common business graphics (e.g., pie, bar, and line graphs) directly from tabular data. Present is an information presentation facility which allows the user to call up specific information from the system database and present the data in graphic form.

DEVICE CONTROL

Transmission for all of the Dasher terminals is performed on a character-by-character basis. Cursor controls move the cursor up, down, left, right, and home. On the D210 and D211, the cursor appears in reverse video and is non-blinking. On the D410 and D460, four alternative cursor types may be selected via the keyboard: blinking, underline, reverse video, and blinking reverse video.

Four visual attributes—blink, underline, dim, and reverse video—are available on all models, on a character-by-character basis. The D410 and D460 provide the following editing features: erase screen, erase window, erase to end-of-line, insert/delete character, insert line, and insert line between margins. Protected text and erase unprotected text commands are also available on the D410 and D460.

Three vertical scroll rates—fast smooth, slow smooth, and jump—may be controlled by the host or by local function keys on the D410 and D460. Horizontal scrolling of up to 162 columns is allowed. An LED-indicated hold function allows the user to freeze the display by halting data flow from the host.

On the D410 and D460, up to 24 independent windows can be defined by the user. Each window provides a separate work area of up to 24 lines and 162 columns, which can be scrolled through and edited independently. Using the windows, normal (81 columns) and compressed (162 columns) data may be displayed simultaneously. This feature is not available on the D210 and D211. However, on the D211, characters from multiple language sets may be displayed simultaneously on the screen.

COMPONENTS

CRT DISPLAY UNIT: A 12-inch (diagonally measured), tiltable display monitor is standard for all models. The D210 and D211 feature a display capacity of 1920 characters, arranged in 24 lines of 80 characters each. The D410 and D460 provide two selectable display modes: normal (24 lines by 81 characters) and compressed (24 lines by 135 characters). Characters on the D210 and D211 are formed by 7-by-11 pixels in a 10-by-12 cell. Characters on the D410 and D460 are formed using 7-by-11 pixels in a 10-by-12 cell (normal mode) or by 7-by-11 pixels in a 12-by-12 cell (compressed mode). Character phosphor is P31 yellow. ▶

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► green. A 96-character ASCII set is standard on the D210 and D211, with a 96-character foreign language extension also standard on the D211. The D410 and D460 provide a 512-character set, which includes a 96-character ASCII set, 68 foreign language characters, extended math symbols, forms ruling set, word processing symbols, superscripts, subscripts, and Greek symbols. In addition, the D460 can be loaded from the host with up to 38 92-character sets defined by the user, for a total of 3,572 terminal-resident, application-unique graphics characters/symbols.

KEYBOARD: All models are equipped with a detachable, low-profile keyboard. Tactile feedback, sculpted keytops, low-fatigue keyswitches, and N-key rollover are standard features. The keyboard contains a total of 106 keys, including a standard typewriter-style main array, a 14-key numeric section, a 12-key screen management keypad, and 15 programmable function keys. Five local function keys are also available.

National keyboards available for the Dasher terminals include: U.S., U.K., French, German, Italian, Katakana (Japanese), Swedish/Finnish, Danish/Norwegian, Spanish, Swiss/German, Swiss/French, Canadian Bilingual (English legends), and Canadian Bilingual (French legends).

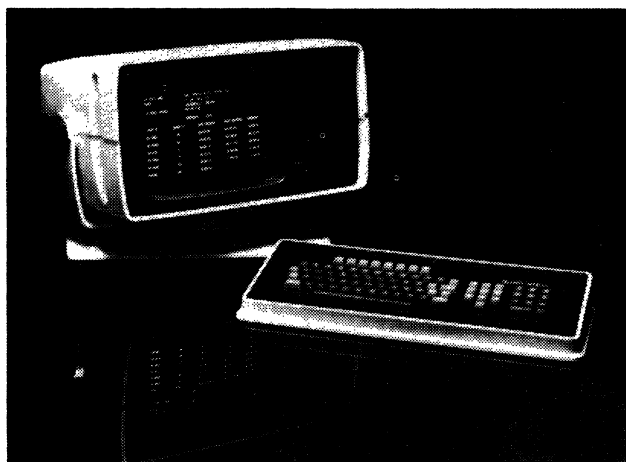
PRICING

The Data General Dasher display terminals are available for purchase only; lease and rental arrangements are available through third parties and terminal resellers only. Quantity discounts are available.

Data General offers two separate maintenance arrangements: the On Call Service Contract, and the Factory Service Contract, which involves return of the faulty equipment to a designated repair location.

	<u>Purchase Price</u>	<u>Monthly On Call Service</u>
D210 (6168) w/keyboard	\$ 995	\$13
D211 (6169) w/keyboard	1,195	15
D410 (6166) w/keyboard	1,635	17
D460 (6167) w/keyboard	1,785	19
Modem cable	65	—

Data General Dasher Display Terminals



Data General's Dasher family of display terminals is designed for operator comfort. The video monitor is pedestal-mounted, and can be moved vertically or horizontally. The keyboard is detached, and can be positioned anywhere up to four feet from the monitor.

MANAGEMENT SUMMARY

The Data General Dasher line of display terminals came into existence in 1976 with the introduction of the Dasher D1 (Model 6052) and the Dasher D2 (Model 6053). These units were made to replace the Teletype Model 33 ASR teleprinter, which at the time was the principal man/machine interface with Data General's Nova series of minicomputers. The Dasher family was enhanced in 1979 with the addition of the Dasher D3 (Model 6093), a unit with advanced features. The family was expanded again in early 1980 with the D100 (Models 6106 and 6107), and the D200 (Models 6108 and 6109) terminals, which are currently the low-end models in the family. All of the Dasher terminals have software support for interactive operation on Data General's Eclipse, Nova, microNova, and Commercial Systems minicomputers.

The Dasher display terminals are a fine example of human engineering. The monitor can swivel from right to left and also be aimed upward or downward. The separate keyboard can be located anywhere within four feet of the monitor and contains both numeric and functional keypads in addition to typewriter style alphabetic keys. All models feature a 1920 character screen and selectable data transmission rates. An RS-232-C interface is standard but a 20 mA current loop interface is available. An interface to the Dasher series of teleprinters is standard on the 6093 and optional on the 6052, 6053, 6106, 6107, 6108, and 6109.

The D100 and D200 terminals differ from each other with respect to the keyboard. The D100 keyboard consists of a typewriter-style main keyboard and a 14-key cursor/numeric keypad. The D200 keyboard consists of a typewriter-style main keyboard, a 12-key screen

A family of operator-oriented ASCII display terminals.

All models feature a 12" diagonal display with a tilt and swivel adjustment. The Dasher keyboards are detached and include a numeric data entry keypad. Standard features include a screen capacity of 1920 characters, direct cursor positioning and sensing, and selectable transmission rates up to 19,200 bps. Options include a printer interface and international character sets.

The Dasher terminals are available for purchase only. Prices range from \$1,750 to \$2,590 in single quantities; volume discounts are available.

CHARACTERISTICS

VENDOR: Data General Corporation, Route 9, Westboro, Massachusetts 01581. Telephone (617) 366-8911.

DATE OF ANNOUNCEMENT: 6052/6053—October 1976; 6093—March 1979; 6106/6107/6108/6109—December 1979.

DATE OF FIRST DELIVERY: 6052/6053—October 1976; 6093—June 1976; 6106/6107/6108/6109—February 1980.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: Data General.

MODELS

The Dasher display terminals are stand-alone, Teletype-compatible display terminals with detachable keyboards that can be located up to four feet from the monitor. The pedestal-mounted display monitor can be rotated in a horizontal plane and tilted in a vertical plane for operator convenience and to eliminate screen glare.

- Model 6106 (D100)—a member of the D100 series. A basic interactive terminal.
- Model 6107 (D100)—a member of the D100 series. Contains all of the features of the 6106 plus a printer interface and split speed option.
- Model 6108 (D200)—a member of the D200 series. An interactive terminal containing all of the features of the 6106 but with additional function and screen management keys.
- Model 6109 (D200)—a member of the D200 series. Contains all of the features of the 6108 plus a printer interface and split speed option.
- Model 6052 (D1)—an interactive terminal; features programmable character blink and 11 user-defined function keys.
- Model 6053 (D2)—an interactive terminal containing all of the features of the 6052 plus additional character

Data General Dasher Display Terminals

▷ management keygroup, a 14-key numeric keypad, and a 15-key user function keygroup. Model 6106 is the basic D100 terminal, while Model 6107 is the D100 with a printer interface and split speed (independent transmit and receive speeds) option. Model 6108 is the basic D200 terminal; Model 6109 adds the printer interface and split speed option.

The Dasher Model 6052 features a typewriter-style keyboard with an 11-key numeric keypad, a 10-key cursor control/edit function keygroup, and eight user-defined function keys. Programmable character blink is standard. The Model 6053 keyboard has three additional user-defined function keys and adds repeat and break keys to the cursor control/edit function keygroup. Character highlighting features include programmable brightness, underscore, and blink. The Model 6093 keyboard features a 14-key numeric keypad, 18 user-defined function keys, and a 13-key cursor control/edit function keygroup. The user can select video attributes including brightness, blink, block/fill, reverse video, and underscore in any combination. The 6093 can transmit in character or block mode, and features allow the operator to move, insert, or delete single characters, words, or blocks of data. The 6093 is also equipped with an auxiliary RS-232-C port for interface to a slave printer.

Data General also manufactures the Dasher TP1 and TP2 teleprinters, which are suitable for use with the Dasher display printer interface option.

USER REACTION

Datapro contacted four users of the Data General Dasher terminals in August 1981. Those contacted reported on a total of 237 units, which were installed for an average of over one year. The results are as follows:

	Excellent	Good	Fair	Poor	WA*
Overall performance	1	1	2	0	2.8
Ease of Operation	3	1	0	0	3.8
Display Clarity	3	1	0	0	3.8
Keyboard feel & usability	1	0	3	0	2.5
Hardware reliability	1	1	2	0	2.8
Maintenance service	3	1	0	0	3.8
Technical support	2	2	0	0	3.5

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

The Dasher terminal users expressed a general satisfaction with the product. Two of the users cited the terminal's excellent display clarity as a strength, with one suggesting the unit's 7 x 9 matrix pattern as the reason.

Other attributes mentioned were the unit's cost, its appearance ("It's attractive looking for an office environment") and the keyboard layout.

The major weakness of the Dasher terminals, according to those contacted, concerned keyboard feel. Two of the users felt the terminal was lacking in this regard; one stated, "It (the terminal) just doesn't feel right." ▷

▶ highlighting features (programmable brightness and underscore), and three additional function keys.

- Model 6093 (D3)—a terminal featuring interactive or buffered operation. Contains all of the features of the 6053 plus additional character highlighting block/fill, reverse video), and 18 user-defined function keys.

TRANSMISSION SPECIFICATIONS

All Dasher terminals perform transmission asynchronously in full-duplex mode. Transmission speeds for the D100 (6106, 6107) and D200 (6108, 6109) terminals are selectable at 15 rates from 50 to 19,200 bps. For the 6052 and 6053, there are 10 operator selectable rates from 110 to 19,200 bps. For the 6053, there are 11 selectable transmission rates up to 19,200 bps; there are 10 selectable receive rates, also up to 19,200 bps. The D100 and D200 models use the 7-bit ASCII code; all other models use the 11-bit ASCII code at 110 bps, and the 10-bit ASCII code at all other speeds. Odd, even, or mark parity is switch-selectable. Either an RS-232-C or 20 mA interface is provided.

Models 6107 and 6109 are equipped with an auxiliary RS-232-C printer interface with split speed capability. When split speed is used, the operator can select independent transmit (110 to 4800 bps) and receive (50 to 19,200 bps) rates. Models 6052 and 6053 are also available with an RS-232-C printer interface, with transmission speeds from 110 to 1200 bps. An auxiliary RS-232-C printer interface, with speeds from 110 to 2400 bps, is standard on Model 6093.

DEVICE CONTROL

Transmission is performed on a character-by-character basis as each key is depressed (Model 6093 also features buffered operation). The terminal responds to keyed or received control codes by executing the specified function. Line and Local modes are provided.

Cursor addressing and sensing are standard features. Cursor controls include Up, Down, Left, Right, Return, and New Line. Return positions the cursor at the beginning of the line occupied by the cursor. New Line positions the cursor at the beginning of the next line. Cursor control functions feature wraparound.

The Roll function, when enabled, moves all lines up by one line when a New Line function is executed with the cursor on the bottom line; the top line is rolled off the screen and is lost, while the bottom line is left blank with the cursor located at the beginning of that line.

Other functions include Blink, Dim, Underscore, Bell, line and screen erasure, Tab, and Print. Line erasure clears all data from the cursor position to the end of the line to blanks. Screen erasure clears all data on the screen to blanks and positions the cursor at Home. The Dim function displays data at half intensity between Start and End Dim control characters. The Blink function blinks displayed data between Start and End Blink control characters. The Underscore function underscores displayed data between Start and End Underscore control characters. No function is performed by Tab except that the code is transmitted when keyed. The Print function disables the keyboard and prints the screen contents from the beginning of the line occupied by the cursor to the end of the screen.

SOFTWARE

The Dasher display terminals are supported under all Data General operating systems, including the Advanced Operating System (AOS), the Real Time Disc Operating System (RDOS), and the diskette-based Disc Operating System (DOS). Data General also supports the 6053 as a ▶

Data General Dasher Display Terminals

➤ One user felt the terminal didn't tilt very easily, and another stated that option selection with the Dasher model was difficult. □

▶ data entry terminal under its Interactive Data Entry/Access (Idea) system. High-level language support includes COBOL, FORTRAN IV, Fortran 5, RPG II, Extended BASIC, and ALGOL.

COMPONENTS

CRT DISPLAY UNIT: A 12-inch (diagonal measurement) CRT with a display arrangement of 24 lines of 80 characters each for a total display capacity of 1920 characters. Models 6106, 6107, 6108, and 6109 provide a character set of 128 ASCII symbols including upper and lower case alphanumeric; each character is formed within a 7 x 11 dot matrix. Model 6052 provides a character set of 64 ASCII symbols including upper case alphanumerics only; each character is formed within a 5-by-7 dot matrix. Model 6053 provides a character set of 96 ASCII symbols including upper and lower case alphabetic; each character is formed via a 5-by-8 dot matrix. Data is displayed in white (P4 phosphor). The cursor is displayed as a blinking underscore. Model 6053 features highlighting, including blinking and underscoring of selected characters and full or half intensity. Model 6093 is identical to Model 6053 except that upper case alphabetic characters are formed via a 5 x 7 dot matrix and lower case are formed in a 5 x 8 dot matrix.

6106 & 6107 (D100) KEYBOARD: A typewriter-style detached keyboard. Consists of a main keypad and a 14-key combined cursor and numeric keypad. The keyboard can generate 96 upper and lower case ASCII symbols, plus 30 control characters and 35 special user function sequences. A typematic repeat feature is standard on all code-generating keys.

6108 & 6109 (D200) KEYBOARD: A typewriter-style detached keyboard. Consists of a main keyboard, a 12-key screen management keygroup, a 14-key numeric keypad, and a 15-key user function keygroup. The keyboard can generate 96 upper and lower case ASCII symbols, plus 30 control characters and 75 special user function sequences. The typematic repeat feature is also standard.

6052 KEYBOARD: A 52-key, typewriter-style detached keyboard. A 10-key function keypad and an 11-key numeric keypad (including decimal point) are located to the right of the main keygroup. A row of 8 user-function keys are located over the main keygroup. The keyboard can generate any of 64 upper case ASCII characters plus 30 control codes for a total of 96 character codes. Key functions within the

main keygroup include: Break, Escape, Carriage Return, New Line, Rub Out, Repeat, Space, Shift, and Control Shift. The function keypad includes cursor controls for the four cursor directions and Home, Print, Tab, Page, and End of Line Erase.

6053 KEYBOARD: Same as the 6052 keyboard, but with the following exceptions: a 12-key function keypad, a row of 11 user-function keys, and the capability to generate 96 upper and lower case ASCII character codes plus 30 control codes for a total of 126 character codes. Key functions within the main keygroup include: Delete, Escape, New Line, Carriage Return, Alpha Lock, Space, Shift, and Control Shift. The extended function keypad includes Repeat and Break functions. The user-function keys generate a two-character sequence: the user function header code followed by the user-defined code.

6093 KEYBOARD: A sculptured, typewriter-style detached keyboard containing a 14 key numeric pad plus a 13 key cursor and function keypad. A total of 18 user defined function keys are integrated into the keyboard. All keys are electronically debounced and provide N-key rollover. The keyboard generates 96 upper and lower case ASCII characters.

PRINTER: The Data General TP1 and TP2 RO teleprinters provide serial impact dot matrix printing at speeds up to 180 characters per second. For details see Report C27-304-101 in the Teleprinters section of this volume.

PRICING

The Dasher display terminals are available for purchase only. The third party leases are negotiable. Quantity discounts are available. Data General offers two separate maintenance arrangements: the On Call Service contract and the Factory Service Contract, which involves return of the faulty equipment to a designated repair location. In either case, all parts and labor are included at no additional cost. International character sets including France, Sweden, Germany, and the United Kingdom are available at no extra charge.

	<u>Purchase Price</u>
6106 (D100)	\$1,750
6107 (D100)	2,150
6108 (D200)	1,950
6109 (D200)	2,350
6052 (D1)	1,990
6053 (D2)	2,290
6093 (D3)	2,590
Printer interface (6052, 6053)	400■

Data General Video Terminals Models 6052, 6053 and 6093



A family of low-cost Teletype-compatible keyboard/display terminals.

Standard features include selectable transmission rates up to 19,200 bps, a 1920 character screen, cursor addressing and sensing, display highlighting, numeric pad and user definable program function keys. Options include international character sets and on two models, a printer interface.

The terminals are available for purchase only and are priced from \$1,990 to \$2,590 for a single unit. Quantity discounts are available.

MANAGEMENT SUMMARY

The Data General family of Teletype compatible video terminals was announced only shortly after the company announced the Dasher series of teleprinter terminals. Prior to the introduction of these units, the principal man/machine interface to the Nova series of computers was the trusty but outmoded Model 33 ASR of Teletype. Model 6093 was added to the line in March 1979.

The display terminals are a fine example of human engineering. The monitor can swivel from right to left and also be aimed upward or downward. The separate keyboard can be located anywhere within four feet of the monitor and contains both numeric and functional keypads in addition to typewriter style alphabetic keys. All models feature a 1920 character screen and selectable data transmission rates. An RS 232 interface is standard but a 20 mA current loop interface is available. An interface to the Dasher series of teleprinters is standard on the 6093 and optional on the 6052 and 6053.

Data General makes the terminals for purchase only. Quantity discounts are available.

USER REACTION

Datapro spoke to four users of the 6052 and 6053 during May 1979. These users had a total of 17 terminals, 10 of which were connected to Nova processors and seven were connected to an Eclipse processor. The terminals had been installed for periods ranging from four months to 16 months. Ratings supplied by these users are summarized below.

	Excellent	Good	Fair	Poor	WA*
Overall performance	3	1	0	0	3.8
Ease of operation	4	0	0	0	4.0
Display clarity	1	3	0	0	3.3

CHARACTERISTICS

VENDOR: Data General Corporation, 15 Turnpike Road, Westboro, Massachusetts 01581. Telephone (617) 366-8911.

DATE OF ANNOUNCEMENT: 6052/6053, November 1976; 6093, March 1979.

DATE OF FIRST DELIVERY: January 1977 (6052/6053), March 1979 (6093).

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: Data General Corporation.

MODELS

Models 6052 and 6053 Video Terminals are stand-alone, Teletype-compatible display terminals with detachable keyboards that can be located up to four feet from the monitor. The pedestal-mounted display monitor can be rotated in a horizontal plane and tilted in a vertical plane for operator convenience and to eliminate screen glare. The 6052 is a basic version of the 6053. The terminals are available with a printer interface. The 6093 has all of the features of the 6053 plus a different matrix configuration for displaying upper case characters, additional program function keys on the keyboard, an integrated printer interface, and interactive and buffered operation.

TRANSMISSION SPECIFICATIONS

Transmission is performed asynchronously in the full-duplex mode. Transmission speeds are switch-selectable at 110, 150, 300, 600, 1200, 1800, 2400, 4800, 9600, and 19,200 bits/second via a 10-position switch. The 10- or 11-unit, 8-level ASCII code is used. Odd or even parity or marking (eighth bit always 1) is switch selectable. Each character includes one start bit and one or two (110 bps) stop bits. Either an RS-232C or 20 mA dc current loop interface is provided.

DEVICE CONTROL

Transmission is performed on a character-by-character basis as each key is depressed. The terminal responds to keyed or received control codes by executing the specified function. Line and Local modes are provided.

Data General Video Terminals Models 6052, 6053 and 6093

➤	Excellent	Good	Fair	Poor	WA*
Keyboard feel and usability	2	2	0	0	3.5
Hardware reliability	2	2	0	0	3.5
Maintenance service	2	1	0	0	3.8

*Weighted Average on a scale of 4.0 for Excellent.

All of these users expressed a high level of satisfaction with these terminals and two users expected to add more to their systems. One user whose terminals are in a brightly lit area, would like a contrast adjustment in addition to the brightness control. Another user who had replaced fixed keyboard terminals with the Data General units, remarked how convenient it was to be able to move the keyboard and the monitor into the most comfortable keying position and viewing angle. He felt that this feature alone had added from five to ten percent additional productivity. □

- **Cursor addressing and sensing are standard features.** Cursor controls include Up, Down, Left, Right, Return, and New Line. Return positions the cursor at the beginning of the line occupied by the cursor. New Line positions the cursor at the beginning of the next line. Cursor control functions feature wraparound.

The Roll function, when enabled, moves all lines up by one line when a New Line function is executed with the cursor on the bottom line; the top line is rolled off the screen and is lost, while the bottom line is left blank with the cursor located at the beginning of that line.

Other functions include Blink, Dim, Underscore, Bell, line and screen erasure, Tab, and Print. Line erasure clears all data from the cursor position to the end of the line to blanks. Screen erasure clears all data on the screen to blanks and positions the cursor at Home. The Dim function displays data at half intensity between Start and End Dim control characters. The Blink function blinks displayed data between Start and End Blink control characters. The Underscore function underscores displayed data between Start and End Underscore control characters. No function is performed by Tab except that the code is transmitted when keyed. The Print function disables the keyboard and prints the screen contents from the beginning of the line occupied by the cursor to the end of the screen.

SOFTWARE

The 6052, 6053 and 6093 Video Terminals are supported under all Data General operating systems, including the Advanced Operating System (AOS), the Real Time Disc Operating System (RDOS), and the diskette-based Disc Operating System (DOS). Data General also supports the 6053 as a data entry terminal under its Interactive Data Entry/Access (Idea) system. High-level language support includes COBOL, FORTRAN IV, Fortran 5, RPG II, Extended BASIC, and ALGOL.

COMPONENTS

CRT DISPLAY UNIT: A 12-inch (diagonal measurement) CRT with a viewing area 6 inches high by 9 inches wide. The display arrangement is 24 lines of 80 characters each for a

total display capacity of 1920 characters. Model 6052 provides a character set of 64 ASCII symbols including upper case alphanumerics only; each character is formed within a 5-by-7 dot matrix. Model 6053 provides a character set of 96 ASCII symbols including upper and lower case alphabetic; each character is formed via a 5-by-8 dot matrix. Data is displayed in white. The cursor is displayed as a blinking underscore. Model 6053 features highlighting, including blinking and underscoring of selected characters and full or half intensity. Model 6093 is identical to Model 6053 except that upper case alphabetic characters are formed via a 5 x 7 dot matrix and lower case are formed in a 5 x 8 dot matrix.

6052 KEYBOARD: A 52-key, typewriter-style detachable keyboard. A 10-key function keypad and an 11-key numeric keypad (including decimal point) are located to the right of the main keygroup. A row of 8 user-function keys are located over the main keygroup. The keyboard can generate any of 64 upper case ASCII characters plus 30 control codes for a total of 96 character codes. Key functions within the main keygroup include: Break, Escape, Carriage Return, New Line, Rub Out, Repeat, Space, Shift, and Control Shift. The function keypad includes cursor controls for the four cursor directions and Home, Print, Tab, Page, and End of Line Erase.

6053 KEYBOARD: Same as the 6052 keyboard, but with the following exceptions: a 12-key function keypad, a row of 11 user-function keys, and the capability to generate 96 upper and lower case ASCII character codes plus 30 control codes for a total of 126 character codes. Key functions within the main keygroup include: Delete, Escape, New Line, Carriage Return, Alpha Lock, Space, Shift, and Control Shift. The extended function keypad includes Repeat and Break functions. The user-function keys generate a two-character sequence: the user function header code followed by the user-defined code.

6093 KEYBOARD: A sculptured typewriter style keyboard capable of generating 96 ASCII characters, a 14 key numeric pad plus a 13 key cursor and function keypad. A total of 18 user defined function keys are integrated into the keyboard. All keys are electronically debounced and provide N-key rollover.

PRINTER: The Data General TP1 and TP2 RO teleprinters provide serial impact dot matrix printing at speeds up to 180 characters per second. For details see Report C27-304-101 in the Teleprinters section of this volume.

PRICING

The 6052, 6053 and 6093 Video Terminals are available for purchase only. Third party leases are negotiable. Quantity discounts are available. Data General offers two separate maintenance arrangements: the On Call Service contract and the Factory Service Contract, which involves return of the faulty equipment to a designated repair location. In either case, all parts and labor are included at no additional cost.

Model 6052 is priced at \$1,990; Model 6053 is priced at \$2,290. Both prices are for unit quantities. An optional printer interface is priced at \$400. Unit price of the 6093 which includes the printer interface, is \$2,590. International character sets including France, Sweden, Germany, and the United Kingdom are available at no extra charge. ■