Programmer's Manual

VuePoint™ II Touch Terminal

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The Innovators of Flat Panel Technology

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1.0 Preface

The GENERAL DIGITAL CORPORATION Vuepoint™ line of touch-input terminals includes the Vuepoint I™, an end-user terminal and the VuePoint II™, for the OEM designer. Both are compact, flexible and offer the user many operator-oriented features. Extensive firmware control capability and display page buffering provide for efficient host computer software development and quick system response. The touch input feature, the physical dimensions of the unit and the low voltage requirements make the VuePoint ideal for many environments or applications where the more classical computer peripherals are unsuitable.

This manual describes the operation and features of the VuePoint. The VuePoint I and VuePoint II are software compatible, with the exception of several commands particular to VuePoint II. If additional technical assistance is needed, contact:

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2.1 Display Area

The display area contains 480 positions where alphanumeric or special characters can be displayed. These positions are arranged in an array of 12 rows, 40 columns. The rows are numbered from '0' at the top to '11 at the bottom. The columns are numbered '0' to '39' from left to right.

2.2 Touch Sensitive Regions

Infrared light sensors are positioned along each row and along every other column (starting at the leftmost column) to provide up to 240 touch-sensitive positions on the screen. User software generated commands can selectively enable all or any desired subset of these positions to be touch sensitive.

2.3 Indicator Lights

On the front, lower frame margins of the VuePoint II are two indicator lights:

1. Power on light: Indicates power to the unit is on.
2. Touch enabled: Indicates VuePoint is enabled to receive a touch response.

The VuePoint II has connections for the Touch Enable Light, should the OEM designer wish to include them. Please refer to the VuePoint II Installation Manual (P/N 01-009) for details.

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3.1 Pages

VuePoint consists of a single viewing screen and multiple storage buffers called “pages”. Each page contains information about its particular characteristics, the contents to be displayed, and their attributes.

A particular page can be selected to be displayed on the screen. This is called the “DISPLAY PAGE”. A particular page can be selected to be worked on, called the “WORKING PAGE”. When VuePoint receives data and commands, the selected WORKING PAGE is modified. Only when the page designated as the DISPLAY PAGE is the same as the WORKING PAGE do these modifications affect the currently displayed screen contents.

The data and commands transmitted to VuePoint can control the position and appearance of data in each page, and also enable the VuePoint to transmit data back to the host in the form of a response to touch.

3.2 Page Selection Commands

Page Selection commands enable the user to reference the pages of VuePoint. The total number of pages the VuePoint has available is determined by the hardware configuration. The user selects and controls which page data should be entered into the WORKING PAGE, and which page should be displayed on the screen, the DISPLAY PAGE. The data transmitted from the host computer is displayed as it is received by VuePoint if the selected WORKING PAGE is the same as the selected DISPLAY PAGE.

Pages of data may be created without being displayed by setting the WORKING PAGE to be a different page than the designated DISPLAY PAGE. A desired page may be displayed at any time by selecting the DISPLAY PAGE to be equal to that particular page number.

Another command which deals with page selection is the Copy Page command. This command allows the user to copy an entire page with all its attributes from any desired page into the presently selected WORKING PAGE. This allows blocks of displayed data that might be used several times with minor modifications to be programmed only once, then copied and modified with a single command for an unlimited number of times. The Merge Page command is similar to the Copy Page command, but copies displayable characters excluding spaces from the specified page into corresponding and unoccupied locations on the WORKING PAGE.

3.3 Attribute Selection Commands

Every position on each page has several attributes that can be established for it. These attributes include those displayable such as blink, intensity and character set, and non-displayable such as protected field and touch response sensitivity. The attributes can be established by two different methods.

A Set Character Attribute command will assign the chosen attribute to all characters and locations that are transmitted to that selected WORKING PAGE until another Set Character command is issued or the character attributes are reset on that WORKING PAGE. If a new WORKING PAGE is selected, the characters transmitted to that new page will have the attributes which have been established on that new page.

A Modify Character Attribute command will modify the existing character attributes for the locations specified on the selected WORKING PAGE. With this command a field length and the type of modification are specified whereas with the Set Character Attribute command the field length is not specified because the particular attributes will be assigned to all subsequent characters received on that particular WORKING PAGE.

3.4 Page Mode Commands

There are several commands that are used to set up the mode of operation of the page presently selected as the WORKING PAGE. Two commands pertain to the touch input system and will have meaning only when that page has been selected as the displayed page and the response system has been enabled. The Set Response command allows the host computer to select the type of response it will receive. The alternatives are the ASCII representation of the screen content at the touched location, or the Row/Column position of the touched location. The host computer may also choose to receive a response (of either type) only when a sensitized screen location of the DISPLAY PAGE has been touched. This can eliminate overhead work in the host computer as nonsense responses will be eliminated.

The location of the data entered on the selected WORKING PAGE is determined by a controllable cursor. Each page has its own specific cursor independent of any other page cursor. A command which positions the cursor only applies to the cursor that is on the selected WORKING PAGE.

A page may be set to operate in the Right-to-Left Data Entry Mode. This mode may be used to display changing messages or to enter columns of right-justified numbers. All other attributes or operating modes are valid while this mode is in effect. For example, tabs may be set, protected fields will be honored and attributes may be assigned. It is important to remember that the cursor defines the entry point of all characters transmitted to that WORKING PAGE and the characters will shift left up to the specified field length while the cursor remains stationary. The cursor will not move until it is positioned using a cursor positioning command or the Right-to-Left Mode is cancelled.

A page is set to operate in the Scroll Mode by a select Scroll Mode command. Scroll Mode causes page data to shift up one row and positions the cursor at the first position of the last row after the cursor has reached the end of the page. Character attributes are shifted with the characters in this mode.

Erasing on a selected WORKING PAGE will clear any character from this page area and also set all character attributes to defaults for cleared locations. The erase will not affect any location that has been assigned as a protected field. To erase these locations they must first be unprotected by modifying the protected field attribute and then they may be erased in normal fashion.

3.5 Device Control Commands

These commands do not address any of the pages but control how certain aspects of the hardware operate. A Clear Screen command does not clear or erase any of the data on the DISPLAY PAGE or WORKING PAGE. Only the screen itself is blanked and may be re-displayed using a DISPLAY PAGE Selection command. All response attributes of the DISPLAY PAGE remain in effect while the display is cleared.

Disabling the screen causes the screen not to accept any new updates until a new DISPLAY PAGE or Display Next Page command is issued and that page is displayed. Any new data transmitted to the WORKING PAGE during a Disable will be incorporated in the page buffer but will not be reflected on the screen during the disabled period.

Response Enable and Disable commands instruct the touch input hardware to allow responses in the mode that has been selected for the presently displayed page. Only one touch response is accepted per issuance of the Enable command.

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The commands to VuePoint fall into the following categories:

a) Page Selection Commands

b) Set Character Attributes

c) Modify Character Attribute Commands

d) Page Mode Control Commands

e) Additional Commands

f) Speech Expansion

g) Barcode Expansion

h) Printer Expansion

i) Device Control Commands

j) Cursor Control Commands

There are two general command formats, single byte commands and multibyte commands. All multibyte commands are prefaced with a special character referred to as Ej>£. This character may be an ASCII ESC (decimal 27) or any character selected by the user on hardware switches (VuePoint I) or screen-selected-options (VuePoint II set up mode). The second character in an escape command sequence is an ASCII letter. NOTE: Upper and lower case letters are not interchangeable .

4.1 Page Selection Commands

There are six page selection commands which select the WORKING PAGE and DISPLAY PAGE, copy and/or merge the WORKING PAGE with a specific DISPLAY PAGE, display next page and perform bank selection for expansion memory options. Each page has its own cursor and set of attributes. When a page is selected as the WORKING PAGE, the cursor position and the tab sets and attributes are the same as they were when the page was last in use. Initially, all page attributes are automatically set to the default condition (see Reset command).

When a page is selected for display, the page is immediately displayed on the screen.

Command:	**SELECT WORKING PAGE**
Format:	ESC W pp (4 bytes)
Usage:	VuePoint I and II
Description:	The page represented by the 2 ASCII characters 'pp' is selected as the current WORKING PAGE. Received data will be stored in the buffer for this page until a new WORKING PAGE is selected.
Example:	The 4 byte ASCII character string 'ESC W 03' selects page 3; notice the low pages require a leading 0.

Command: **SELECT DISPLAY PAGE**

Format: ESC 0 pp (4 bytes)

Usage: VuePoint I and II

Description: The page represented by the 2 ASCII characters 'pp' is selected as the DISPLAY displayed.

NOTE: If WORKING PAGE = DISPLAY PAGE, the data received from the host computer is displayed as it is received by the VuePoint.

Command: **COPY PAGE**

Format: ESC C pp (4 bytes)

Usage: VuePoint I and II

Description: The page designated by the 2 ASCII characters 'pp' is compiled into the present WORKING PAGE.

Command: **MERGE PAGE**

Format: ESC m pp (4 bytes)

Usage: VuePoint II

Description: This command merges the page designated by the two ASCII characters 'pp1 with the present WORKING PAGE. Merging is defined as copying displayable characters, excluding spaces (ASCII 20 Hex), with their blink and intensity attributes, to available positions in the WORKING PAGE.

A position is available if a space character is located at that specific position at the time the merge command is executed. Otherwise, the existing WORKING PAGE character will remain unchanged by the merge command.

NOTE: The merge command only merges the display portion of the page, but does not alter other page specific attributes.

Command: **DISPLAY NEXT PAGE**

Format: ESC N (2 bytes)

Usage: VuePoint I and II

Description: The number of the present DISPLAY PAGE is incremented by 1 per the number of pages available. This becomes the new DISPLAY PAGE. If prior to the incrementing by 1, the WORKING PAGE was the same as the DISPLAY PAGE, then the WORKING PAGE is also set to the new DISPLAY PAGE.

Command: **SELECT USER BANK**

Format: ESC Q d (3 bytes)

Usage: VuePoint II (128 Display Page Option Only)

Description: The VuePoint II can access a maximum of 64 pages of expansion memory at one time. For options over this amount, bank selection must be performed.

d=ASCII 0 selects User Bank 0

Memory Map: 3 Standard Pages

4 and/or 12 On-Board Pages (optional)

First 64 Pages of Expansion Memory

d=ASCII 1 selects User Bank 1

Memory Map: 3 Standard Pages

4 and/or 12 On-board Pages (optional)

Second 64 Pages of Expansion Memory

NOTE: Performing the SELECT USER BANK command sets both DISPLAY and WORKING PAGES to 0.

4.2 Set Character Attributes

These commands set the attributes which the data that follows is to possess. These attributes are associated with appearance on screen, character set used, behavior to touch response, and protection against over-write. The attribute is assigned to all received data which is inserted on the present WORKING PAGE until the attribute is changed by either another Set command, or a Reset command.

Command: **BLINK RATE AND VISIBILITY**

Format: ESC S B d (4 bytes)

Usage: VuePoint I and II

Description: This command causes all future characters sent to this page to possess the blink attribute specified by 'd'.

d=ASCII	0	blink off (i.e., no blink)
d=ASCII	1	low rate blink
d=ASCII	2	high rate blink
d=ASCII	3	invisible character

Command: **INTENSITY**

Format: ESC S I d (4 bytes)

Usage: VuePoint I and II

Description: This command causes all future characters sent to this page to have the intensity attributes specified by ‘d1.

d=ASCII	0	normal intensity
d=ASCII	1	low intensity

Command: **PROTECTION**

Format: ESC S P d (4 bytes)

Usage: VuePoint I and II

Description: This command is used to protect further incoming data to this page against overwrite and clear.

d=ASCII 0 data is unprotected

d=ASCII 1 data is protected

Command: **SENSITIVITY**

Format: ESC S S d (4 bytes)

Usage: VuePoint I and II

Description: The characters that follow can be made touch sensitive or insensitive.

d=ASCII	0	characters are not sensitive
d=ASCII	1	characters are sensitive

Command: **CHARACTER-SET**

Format: ESC S C d (4 bytes)

Usage: VuePoint I and II

Description: All subsequent data sent to the present WORKING PAGE will be from the character set designated by the ASCII digit 'd'.

d=ASCII	0	Standard Set
d=ASCII	1	Alternate Set

The standard GENERAL DIGITAL CORPORATION character set is supplied on all VuePoint terminals unless a special character set was ordered.

Standard Set: The first 32 ASCII codes (00 - IF HEX) are for control purposes and do not generate display characters.

The next 95 codes (20 - 7E HEX) are letters and symbols which have been found useful in different applications. The code 7F HEX is a RUBOUT control code and does not generate a displayable character.

Alternate Set: The alternate character set is included automatically on VuePoint II, and is an option for VuePoint I. It is identical to the standard set from 00 to 5F HEX, then generates standard ASCII lower case letters for the codes 60 - 7F. See Appendix B.

NOTE: Custom character sets are available from GENERAL DIGITAL CORPORATION. The user must specify the 5x7 dot array for desired character requirements.

4.3 Modify Character Attribute Commands

The following commands are used to modify the attributes of a block of positions on the current row of the WORKING PAGE. These commands have the general format (6 bytes):

ESC M x d ww where:

x is an ASCII letter describing the attribute,

d is an ASCII digit which sets the new value of the attribute, and,

ww are 2 ASCII digits which tell the size of the block involved .

The block starts at the present cursor position and extends to the right (i.e., along increasing column number) until either the row end (column 39) is reached or ww positions are modified. The character in the positions are not changed, only attributes are modified. Note: When the character set is modified the display character at that position may change but the stored code representing that character remains unchanged.

Command: **BLINK AND VISIBILITY**

Format: ESC M B d ww (6 bytes)

Usage: VuePoint I and II

Description: The block of positions as defined by the present position of the cursor and ww has its blink attribute set according to 'd1 value.

d=ASCII	0	blink off
d=ASCII	1	low rate blink
d=ASCII	2	high rate blink
d=ASCII	3	invisible character

Command: **INTENSITY**

Format: ESC M I d ww (6 bytes)

Usage: VuePoint I and II

Description: The block of positions as defined by the cursor position and ww will have its intensity attribute set according to the value of 'd'.

d=ASCII	0	normal intensity
d=ASCII	1	low intensity

Command: **PROTECTION**

Format: ESC M P d ww (6 bytes)

Usage: VuePoint I and II

Description: The protection attribute of the positions in the block is set according to the 'd' value.

d=ASCII	0	position unprotected
d=ASCII	1	position is protected

Command: **SENSITIVITY**

Format: ESC M S d ww (6 bytes)

Usage: VuePoint I and II

Description: The touch sensitivity attribute of the positions in the block is set according to the 'd' value.

d=ASCII	0	not sensitized
d=ASCII	1	sensitized

4.4 Page Mode Control Commands

These commands set the mode of the present WORKING PAGE with respect to:

a) Touch inputs

b) Cursor behavior at line end

c) Erasing of data and character attributes

d) Resetting of page modes

e) Right to Left Data Entry

f) Setting of tab locations

Command: **SET RESPONSE**

Format: ESC R d (3 bytes)

Usage: VuePoint II (Firmware Ver. 04 or Greater)

Description: This command sets the mode of response to the touch input for the present WORKING PAGE. This command has been modified to allow an additional mode of response. This mode provides the host system with a relative touch number, 000 to 239, followed by a carriage return upon a valid touch entry. Touch numbers are assigned in a left to right, top to bottom format.

NOTE: The modes described in the "VuePoint Programmers Manual" have not been altered, use of the additional mode is described below.

ASCII 4 full screen response: relative touch number

ASCII 5 sensitized character response: relative touch number

There are two types of messages the VuePoint can send back to the host in response to a touch input:

a) The row/column position of the touch input represented as 5 ASCII bytes:

ROW ROW COL COL CR

Example: A touch at row 3, column 8 would return 0308CR.

b) The character in the DISPLAY PAGE buffer at the position touched is sent back followed by a carriage return.

The following 'd' values select the combinations:

d=ASCII	0	full screen response: row/col message
d=ASCII	1	sensitized character response: row/col message
d=ASCII	2	full screen response: screen echo message
d=ASCII	3	sensitized char. response: screen echo message

Command: **SET TOUCH**

Format: ESC T d (3 bytes)

Usage: VuePoint I and II

Description: This command sets the mode of touch operation for the present page. There are two touch operation modes: push button and keyboard.

The difference between these two modes becomes apparent when a finger is present when the TOUCH ENABLE command is received. If no finger is present when the ENABLE command is received, then both modes will accept the first touch to occur as the input.

In the push button mode, when the TOUCH ENABLE is received, the presence of a finger is considered to be the response.

In the keyboard mode, when the TOUCH ENABLE is received, the finger must first be removed before the succeeding touch will be detected.

d=ASCII	0	sets push button mode
d=ASCII	1	sets keyboard mode

Command: **RESET**

Format: ESC X d (3 bytes)

Usage: VuePoint I and II

Description: This command resets the attributes of the WORKING PAGE for character insertion, cursor control, and touch response to the default conditions.

When d=ASCII 0 the present WORKING PAGE attributes are reset to the following:

Data Entry Mode: Normal (not right to left)

Cursor Control: Auto Advance; Auto Line Feed

Cursor Positions: Home

Touch Response: Full Screen Sensitivity, Row/Col Response

Mode of Page Operation: BLOCK Mode

Cursor Display: Disabled

Mode of Touch: Push button

When d=ASCII 1 the default conditions for all SET commands are invoked and the following attributes result:

Intensity: full intensity

Blink: no blink, displayed character

Character Set: Character Set 0

Protection: Unprotected

Touch Sensitivity: Non-Sensitive

Command: **ERASE**

Format: ESC E d (3 bytes)

Usage: VuePoint I and II

Description: 'p' is an ASCII digit which specifies which unprotected positions of the WORKING PAGE should be erased:

d=ASCII	0	all positions of page
d=ASCII	1	from cursor to end
d=ASCII	2	from cursor to end (row 11, col 39)
d=ASCII	3	from home to cursor

This command erases unprotected characters from the WORKING PAGE. The erase command does not affect tab settings. If the WORKING PAGE is also the DISPLAY PAGE the erase command acts as screen clear also.

Command: **SET TABS**

Format: ESC Y d (3 bytes)

Usage: Vuepoint I and II

Description:

d=ASCII	0	clear tab where cursor positioned
d=ASCII	1	set tab where cursor positioned
d=ASCII	2	clear tabs in column where cursor is placed for every row
d=ASCII	3	set tabs in column where cursor is placed for every row
d=ASCII	4	clear all tabs on page

Command: **CURSOR ADVANCE AT END OF LINE**

Format: ESC Ad (3 bytes)

Usage: VuePoint I and II

Description: The behavior of the cursor when reaching the physical end of a row (column 39) or when a carriage return is received, is controlled by this command. At line end (column 39) if Auto Advance is active, the cursor will position itself at the beginning of the next row after inserting a character into column 39. If Auto Advance is not active, characters arriving after column 39 will be lost until the cursor is repositioned.

If Auto Line Feed is active, upon receipt of carriage return, the VuePoint will automatically generate a line feed to the next row; otherwise, the cursor is positioned to column 0 of the present row. Any attempt to go beyond row 11 will result in lost characters.

The following values for 'd' determine the cursor response to end of line and carriage return conditions:

d=ASCII	0	no auto advance; no auto line feed
d=ASCII	1	auto advance; no auto line feed
d=ASCII	2	no auto advance; auto line feed
d=ASCII	3	auto advance; auto line feed

Command: **RIGHT TO_LEFT DATA ENTRY**

Format: ESC L ww (4 bytes)

Usage: VuePoint I and II

Description: ww are 2 ASCII digits which specify the maximum width of the field. The rightmost position of the field is the current position of the cursor. The leftmost column position of that field is computed by:

Leftmost column of field = MAX (0, C-W+1) where C is present column position of cursor, and W is width specified by ww.

The right to left data entry mode is canceled either by a reset command or by another right to left data entry command with ww equal to ASCII 00 (2 bytes).

Repositioning the cursor does not change the data entry mode. While in the right to left mode cursor repositioning defines a new field where right to left entry is to take place.

Command: **SCROLL**

Format: ESC B d (3 bytes)

Usage: VuePoint I and II

Description: This command sets the scroll mode for the present WORKING PAGE. There are two modes: BLOCK and SCROLL. When the cursor is positioned at the last position (11th row, 39th column) and data is to be inserted, the following action occurs:

a) In the BLOCK mode, the cursor is repositioned to row 0, column 0 or to the next unprotected location.

b) In the SCROLL mode, all rows (characters and attributes) move up one row, the character from row 0 being lost. The characters of row 11 are nulled. Tab sets are retained. The cursor is positioned to column 0, row 11.

The mode is selected by the choice of d:

d=ASCII	0	mode is BLOCK
d=ASCII	1	mode is SCROLL

Command: **40-CHARACTER LINE ENTRY**

Format: ESC J dd bb (6 bytes)

Usage: VuePoint II (firmware ver. 04 or greater)

Description: This command allows a text string of 40 characters to be entered into the WORKING PAGE starting at the current cursor position. The 40 character line of text can be selected from any one of the 12 lines of any page available in the unit.

dd = the page number in ASCII from which the text string is to copied from.

bb = the line number in ASCII, 00 --> 11, of the selected page from which the text string is to be copied from.

4.5 Additional Commands

Command: **INPUT DEVICE CONTROL**

Format: ESC I d (3 bytes)

Usage: VuePoint I and II*

Description: This command either enables or disables from the keyboard port. When the input device has been enabled, data that is presented to the keyboard port will be transmitted to the host system by the VuePoint.

d=ASCII	1	Input Device Enable
d=ASCII	0	Input Device Disable

Command: **PRINT PAGE**

Format: ESC 0 ww (4 bytes)

Usage: VuePoint I and II*

Description: ww are 2 ASCII digits which specify the page buffer which is to be printed. (Note: The lower numbered pages require a leading zero.) The VuePoint will begin to transmit the selected page buffer to the printer port when this command is received and the printing device is ready to receive data. Display data and other commands will be processed by the VuePoint during the printing process. The printer output will reflect the current state of the selected page buffer, so care should be taken not to modify the selected buffer before the print operation is completed.

*NOTE: Input Device Control and Print Page are valid on the VuePoint II only if the Keyboard/Printer option is installed.

Command: **PROM PROGRAM**

Format: ESC p d (3 bytes)

Usage: VuePoint II (EPROM Page Option Only)

Description: This command sends a page of display in the current WORKING PAGE (IK byte) to the VuePoint II's host computer in Intel HEX Format.

d=ASCH (0 to F) is a number (hexadecimal) used to offset the address field of the HEX formatted data. This allows pages to be concatenated in the same file.

Intel HEX Format: :BBHHLLOODDDDDDDDDDDDDDDDCC

where BB	= number of bytes in line of data (normally 10 HEX)
HHLL	= PROM address of data
HH	= 'd1 * 04 HEX - high order address byte
LL	= low order address byte
00	= zeroes
DD...	= bytes of data (normally 16)
CC	= checksum [two's complement of sum of previous bytes on line (including BB, HH and LL)].

All characters transmitted are ASCII coded.

NOTE: Many PROM Programmers expect an end-of-file record such as tOOOOOOOOOO. This should be inserted manually after the last page of data has been sent, if required.

Command: **BELL ENABLE/DISABLE**

Format: ESC G d (3 bytes)

Usage: VuePoint II

Description: This command enables or disables the bell which is normally activated in response to a touch input or CTRL G function. The bell is enabled after the power-on initialization procedure.

d=ASCII	0	disables bell (will not sound response to either touch or CTRL G)
d=ASCII	1	enables bell

Command: **SAVE/ERASE BATTERY-BACKED MEMORY**

Format: ESC w d (3 bytes)

Usage: VuePoint II (Battery Backup Page Option Only)

Description: Since the VuePoint II automatically clears all display pages during its power-up initialization routines, users wishing to save display data in battery-backed RAM must set a protect flag in the WORKING PAGE of each page of data they wish to save.

d=ASCII	0	allows a battery-backed page to be erased on power-up.
d=ASCII	1	saves data in a battery-backed page

Command: **POWER FAIL STATUS/RESET**

Format: ESC F d (3 bytes)

Usage: VuePoint II (firmware ver. 04 or greater)

Description: The VuePoint II can provide a status code which informs the host whether or not a power failure has occurred causing a power-on initialization procedure. See POWER-ON RESET (ESC Z).

d = ASCII 1 - requests a status code response from the VuePoint. A negative status indicates that the power-on initialization has occurred; a positive status shows that the status code has been reset (ESC F2).

Positive Status - ACK CR (ASCII Code 06 OD - Hex)

Negative Status - NAK CR (ASCII Code 15 OD - Hex)

d = ASCII 2 - resets the power fail status code to the positive status format. The code will remain in this state until a power-on initialization occurs.

d = ASCII 3 - requests the same status code as above, however, the response format has been changed to allow for host system flexibility.

Positive Status - 1 CR (ASCII Code 31 OD - Hex)

Negative Status - 0 CR (ASCII Code Hex)

NOTE: A response will only occur if no other VuePoint responses (touch) are in the process of transmission. Otherwise, the command will be ignored.

Command: **POWER-ON RESET**

Format: ESC Z (2 bytes)

Usage: VuePoint I and II

Description: This command provides a full power-on firmware reset. When ESC Z is issued, the VuePoint will begin its initialization procedure which includes clearing of RAM pages (except for protected Battery-Backed pages), initialization of all pages and VuePoint specific modes, as well as installed hardware.

Command: **ENTER SELF-DIAGNOSTICS MODE**

Format: ESC d b (3 bytes)

Usage: VuePoint II (firmware ver. 04 or greater)

Description: This command allows the host system to initiate the same self-test diagnostics that can be selected from the power-on set-up menu. "b" is an ASCII number used to select the specific test, display the test menu, or exit the test mode. Once in the diagnostic mode, the host system is required only to send the ASCII number as described below.

When a test is selected, it functions in a similar mode as when selected from set-up. However, when the test is completed a status code is returned to the host system. This code indicates whether the test passed or failed.

If the test passed, a 1 (ASCII CODE 31 Hex) is sent, otherwise an 0 (ASCII CODE 30 Hex) is sent indicating test failure. After the test is complete, the test menu is displayed, and the VuePoint waits for the next test selection.

The following describes numbers:

b = 0	Display Test Menu	(returns no status code)
b = 1	CPU Test	(returns 0 or 1)
b = 2	Page Test	(returns 0 or 1)
b = 3	Display Dot Test	(returns 1 only)
b = 4	Standard Set	(returns 1 only)
b = 5	Alternate Set	(returns 1 only)
b = 6	Touch Test	(returns 0 or 1)
b = 7	Exit Test Mode	

NOTE: When the test mode is exited, the VuePoint performs a power-on reset, see ESC Z command.

Command: **EXTENDED PROM PROGRAM**

Format: ESC q dd (4 bytes)

Usage: VuePoint II (firmware ver. 04 or greater)

Description: This command sends the data of the current WORKING PAGE (1K byte) to the host in Intel Hex format.

This command is similar to the ESC p d command, except that the address offset has been extended to allow larger numbers of EPROM pages to be generated.

The "dd" field accepts ASCII numbers (0 to 9) and letters (A to F) to form Hex numbers. The address field offset is computed by "dd" * 04 Hex. This provides 1K Hex boundaries for each EPROM page.

4.6 Speech Expansion

Command: **LOAD SPEECH BUFFER**

Format: ESC s dddd (6 bytes)

Usage: VuePoint II (Speech Option Only)

Description: This command is used to load the 16-bit starting address of a word into the speech address buffer. The speech address buffer can hold up to 16 words of addresses, where each address is represented by "dddd". This address provides the start of a single word or phrase in an on-board vocabulary data table used by the speech processor. "dddd" uses ASCII numbers (0 to 9) and letters (A to F) to form Hex numbers.

If more than 16 addresses are loaded into the buffer, the additional addresses will be ignored.

Once the speech processor has been enabled (ESC t0), the host system must wait until speech processing has been completed before an additional series of addresses can be loaded into the speech address buffer. This buffer is cleared upon completion of the speech operation.

See supplied speech vocabulary table for actual 16-bit addresses (see the VuePoint II User's Manual).

Command: **ENABLE SPEECH PROCESSOR**

Format: ESC t0 (3 bytes)

Usage: VuePoint II (Speech Option Only)

Description: This command is used to initiate the speech synthesis process. When this command is received, the VuePoint begins to load the 16-bit starting addresses into the speech synthesizer device. When the synthesizer has completed a word, the VuePoint loads the next address from the buffer to the device.

This process is repeated until all the addresses loaded into the buffer have been passed on to the speech synthesizer for processing (up to 16).

Command: **SPEECH STATUS**

Format: ESC t1 (3 bytes)

Usage: VuePoint II (Speech Option Only)

Description: This command provides the current status of the speech process.

When the VuePoint II is in the process of loading addresses into the speech synthesizer, the above command will cause the VuePoint II to send back a BUSY status, 0 (ASCII CODE 31 Hex) followed by a carriage return (OD Hex).

When the VuePoint II has loaded the last starting address from the buffer to the speech processor, the command will return a READY status, 1 (ASCII CODE 31 Hex) followed by a carriage return (OD Hex).

NOTE: A response will only occur if no other VuePoint responses (touch) are in the process of transmission. Otherwise, the command will be ignored.

4.7 Barcode Expansion

Command: **BARCODE ENTRY**

Format: ESC b d (3 bytes)

Usage: VuePoint II (Barcode Reader Option Only)

Description: This command provides barcode reader control as well as a means of retrieving barcode data from the VuePoint II.

d = ASCII 0 - Return Barcode and Read Status

Uses the format: TLL (cr), where T is the barcode type, Code-39 (0 - ASCII Code 30 Hex) or Interleaved 2-of-5 (1 - ASCII Code 31 Hex), and LL is the decimal length of the latest barcode entry in ASCII. CR is a carriage return (ASCII Code OD Hex). If TLL = 000, then no barcode data is available.

d = ASCII 1 - Return Barcode Data

If available, the current barcode data is sent (up to 32 characters) followed by a carriage return (OD Hex). If data is not available, the command is ignored.

d = ASCII 2 - Disable Barcode Entry

This command disables the barcode reader operation of the VuePoint II.

d = ASCII 3 - Enable Barcode Entry

Allows the barcode reader to process input data. If valid barcode data has been found, the barcode operation is disabled automatically, and the VuePoint will generate a “beep”.

d = ASCII 4 - Disable Auto Response Mode (default)

Barcode data can only be retrieved by polling (ESC bl).

d = ASCII 5 - Enable Auto Response Mode

Barcode data will immediately be transmitted to the host system when data is received. Data can also be retrieved by polling, if needed.

4.8 Printer Expansion

Command: **DIRECT PRINTER OUTPUT**

Format: ESC u d s (3 bytes)

Usage: VuePoint II (Keyboard/Printer Interface and firmware ver. 04 or greater)

Description: This command allows the user to send 7-bit ASCII control or data characters directly through the Parallel or Serial Keyboard/Printer Interface.This can be used to send information such as printer setup, page formatting, or text data to the printer. The “d” field can accept any single ASCII code (00 - 7F hex). This command can be used whenever the VuePoint II is not in the process of transmitting page data to the printer.

4.9 Device Control Commands

All device control commands are a single byte, and are used by both VuePoint I and VuePoint II.

Command: **BELL**

Format: BEL (dec 7)

Description: The audible tone is generated.

Command: **CLEAR SCREEN**

Format: DC4 (dec 20)

Description: The display screen is blanked. This command does not affect the DISPLAY PAGE buffer.

Command: **DISABLE SCREEN**

Format: DC2 (dec 18)

Description: The VuePoint will not add more to the screen until a Select Display Page or Display Next Page command is given. This allows the WORKING PAGE to be the DISPLAY PAGE without exposing updates to the DISPLAY PAGE.

Command: **RESPONSE ENABLE**

Format: DC1 (dec 17)

Description: Enables the touch panel for input of one response only. The type of response, keyboard or push button, is set by the MODE command. If no MODE SET command was given, then the mode is push button.

Command: **RESPONSE DISABLE**

Format: DC3 (dec 19)

Description: Disables touch response.

4.10 Cursor Control Commands

The following commands, used by both VuePoint I and II, affect the cursor on the WORKING PAGE. Data insertion and attribute modification are performed with respect to the position of the cursor. For normal data insertion, the data is inserted into the WORKING PAGE buffer where the cursor is pointing. The cursor is then advanced along the row to the next unprotected column position.

When in a right to left data entry mode, the cursor is positioned at the right end of a field. When data is received by VuePoint, all non-protected characters in the field are shifted left to the closest non-protected position. The leftmost non-protected character of the field is lost. The received character is inserted into the rightmost unprotected position in the field. Right to left data entry does not advance the cursor. The cursor remains fixed until a cursor positioning command is given or the data entry mode is changed.

Command: **HOME CURSOR**

Format: ESC H (2 bytes)

Description: Position cursor to row 0, column 0

Command: **CURSOR DISPLAY**

Format: ESC K d (3 bytes)

Description:

d=ASCII	0	do not display cursor
d=ASCII	1	display cursor

NOTE 1: The cursor that appears on the screen is the cursor associated with the DISPLAY PAGE, not necessarily that of the current WORKING PAGE.

NOTE 2: On power-up, cursor display is set to default, which is controlled by a switch (VuePoint I) or by setup mode (VuePoint II).

Command: **POSITION CURSOR**

Format: ESC P rr cc (6 bytes)

Description: The cursor position is reset to the row specified by rr and column specified by cc.

Example: ESC P 03 29: repositions cursor to row 3 (4th row from top of screen) and column 27.

4.11 Other Cursor Commands

NAME	ASCII SYMBOL	DEC VALUE	DESCRIPTION
CARRIAGE RETURN	CR	13	Returns cursor to column 0. If auto line feed is active, cursor advances to next row.
DOWN CURSOR	LF	10	Increases row position of cursor by 1. If at row 11 (last row), the cursor is placed in row 0.
LEFT CURSOR	BS	8	Decreases column position by 1. If cursor is at left end (column 0), then the cursor is placed in column 39.
UP CURSOR	VT	11	Decreases row position of cursor. If on top line (row 0), cursor is placed in row 11.
RIGHT CURSOR	FF	12	Increase column position of cursor by 1. If at column 39, then cursor is placed at column 0.
TAB	HT	9	Advance cursor to next position where tab is set or to end or row. The cursor will advance to the column 0 position of the next row if auto advance is enabled.
RUBOUT	DEL	127	When data is entered in the normal mode (i.e., left to right) and the RUBOUT command is received, the cursor is moved left to the first non-protected character encountered. The character at this position is erased. If the left motion of the cursor moves beyond column 0 (the left edge of screen), the cursor is positioned to the previous row and col 39, and the search for unprotected characters is continued. The search stops if no unprotected characters are found by the time the cursor is positioned at HOME (row 0, col 0). The character at column 39 will be erased by a RUBOUT command if the cursor has been incremented to that position and an unprotected character has been placed there with auto advance disabled. When data entry is in the right to left mode and the RUBOUT command is received, the following occurs: a) All unprotected characters in the field are shifted right, with the rightmost unprotected character being lost. b) The leftmost unprotected character position in the field is erased. c) There is no repositioning of the cursor.

5.0 Command Summary

i)	Device Control	Dec Value	Command Sequence	Keyboard Function	Page No.
	BELL	7		CTRL G	30
	CLEAR SCREEN	20		CTRL T	30
	DISABLE SCREEN	18		CTRL R	30
	RESPONSE ENABLE	17		CTRL Q	31
	RESPONSE DISABLE	19		CTRL S	31
j)	**Cursor Control**				
	HOME CURSOR		ESC H		31
	CURSOR DISPLAY		ESC K d		31
	POSITION CURSOR		ESC P rr cc		32
	CARRIAGE RETURN	13		CTRL M	33
	DOWN CURSOR	10		CTRL J	33
	LEFT CURSOR	8		CTRL H	33
	UP CURSOR	11		CTRL K	33
	RIGHT CURSOR	12		CTRL L	33
	TAB	9		CTRL I	33
	RUBOUT	127		DEL	33

PAGE ATTRIBUTES

VuePad

Standard Character Set

MSD / LSD	0	1	2	3	4	5	6	7
0	–	–	(SP)	0	@	P	↓	▯
1	–	(DC1)	!	1	A	Q	→	▯
2	–	(DC2)	"	2	B	R	|	▯
3	–	(DC3)	#	3	C	S	¬	▯
4	–	(DC4)	$	4	D	T	¢	▯
5	–	(NAK)	%	5	E	U	◇	▯
6	(ACK)	–	&	6	F	V	▒	▯
7	(BEL)	–	'	7	G	W	▒	▯
8	(BS)	–	(	8	H	X	▚	▮
9	(HT)	–	)	9	I	Y	▞	BLANK
A	(LF)	–	*	:	J	Z	☰	|
B	(VT)	(ESC)	+	;	K	[	≡	‖
C	(FF)	–	,	<	L	\	=	‖
D	(CR)	–	–	=	M	]	|	‖
E	–	–	.	>	N	↑	=	‖
F	–	–	/	0	O	←	|	(DEL)

Alternate Character Set

	6	7
	'	p
	a	q
	b	r
	c	s
	d	t
	e	u
	f	v
	g	w
	h	x
	i	y
	j	z
	k	{
	l	|
	m	}
	n	~
	o	(DEL)

NOTE 1: ▯ IS USED AS A "PUSH BUTTON". EACH ONE APPEARS AS A BOX. BUT IN ECHO MODE RETURNS A DIFFERENT CHARACTER WHEN TOUCHED.

NOTE 2: CODES 78–7E ARE USED FOR CONTINUOUS, FINE RESOLUTION BAR GRAPHS. CONSTRUCT THE BULK OF THE BAR WITH SOLID BLOCKS (78 OR 7E) AND FILL OUT THE LAST POSITION WITH 1–4 LINES (7A–7D).