



HV Series Technical Reference Manual



HV Series Technical Reference Manual

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EMI Standards

- EN55022:1998 (CISPR22, Class A) Information Technology

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- EN50082-1: 1997, General Immunity Part 1

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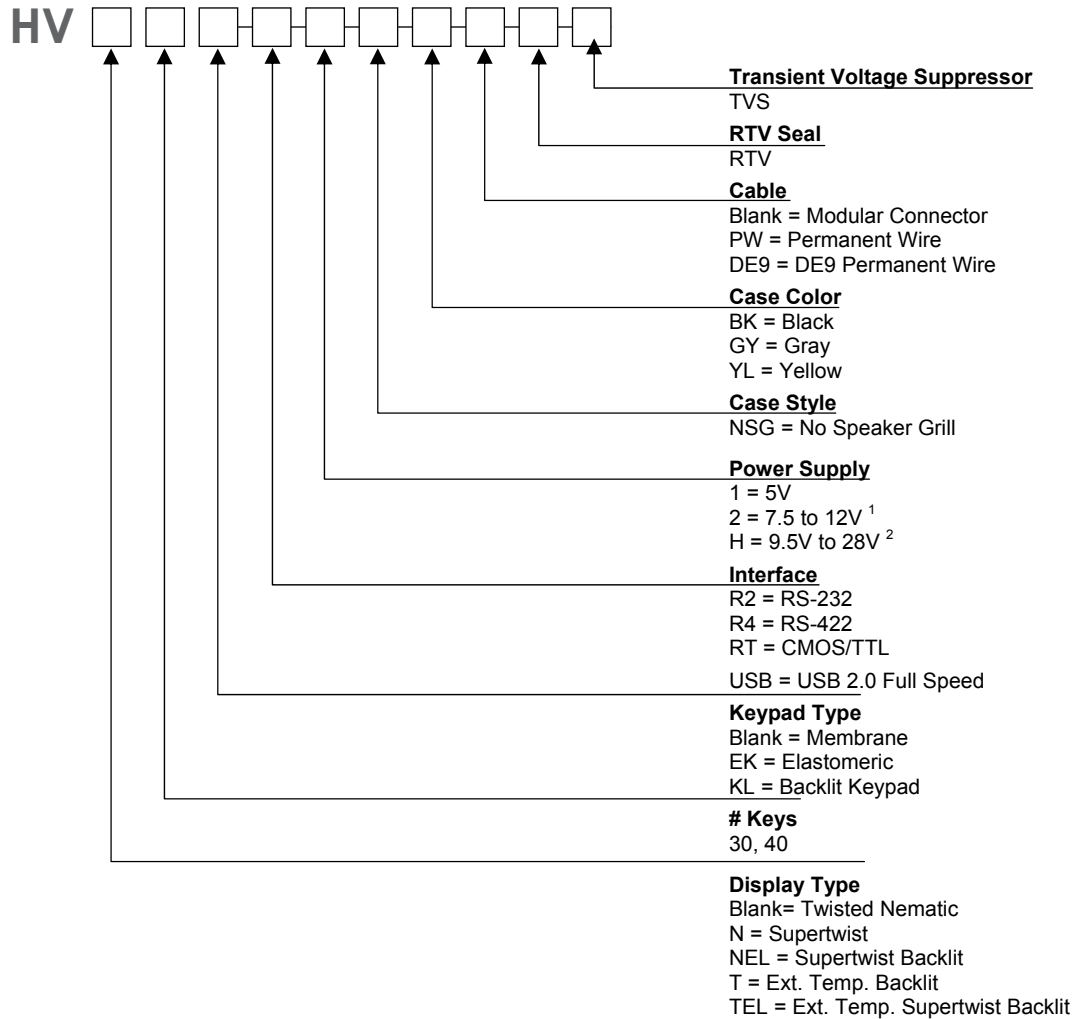


Electrostatic discharge (static electricity) can have unpredictable adverse effects on any electronic device. Although the design of the HV Series incorporates extensive ESD-related precautions, ESD can still cause problems. It is good practice to discharge static by touching a grounded metal object before inserting cards or connecting devices.

Product Selection Guide

The HV Series is a line of ASCII terminals for use with computers, properly equipped instruments and industrial machinery.

Standard configuration includes a membrane keypad, twisted nematic liquid crystal display and modular interface connection, but other configurations are available. A suffix applied to the model number identifies the configuration as shown below:



1. A linear regulator (7805A) with a minimum input of 7.5 V and a maximum voltage of 28.0 V that dissipates one watt of power thereby limiting maximum permissible input voltage according to current draw of terminal.
2. A switching type voltage regulator with a minimum input of 9.5 V and a maximum voltage of 28.0 V. Since input voltage is not dependent on the terminal's current draw, it is suitable for all options.

Power Requirements

Power Supply Options

Depending on the current draw requirements, the terminal may require the use of different power supplies. Use the configuration number listed below (see previous page) to determine the correct power supply:

- "-1" – requires connection to a 5-volt $\pm 5\%$ regulated power source.
- "-2" – requires connection to a power source between 7.5 and 12 VDC that can source adequate current. However, depending on a unit's total current draw, an input of up to 28 VDC may be applied. See chart on next page.
- "-H" – requires connection to a power source between 9.5 and 28 VDC that can source adequate current. However, input voltage is not dependent on a terminal's current draw and may be used with all terminal options.

Calculating Total Current Draw

The table below summarizes the current draw requirements for HV Series terminals in various configurations (measured at its interface connector). Values listed are approximate due to variations in individual components – actual values may vary.

<i>Current Draw for Basic Configuration</i>		
Configuration	Description	Draw
HVR2	Base Unit with RS-232	35 mA
HVR4	Base Unit with RS-422	33 mA*
<i>Current Draw for Options</i>		
NL	LED Supertwist Backlit	Add 185 mA
NEL/TEL	Supertwist Backlit/Extended Temperature Backlit	Add 45 mA
KL	Backlit Keypad	Add 80 mA
<i>Operational Current Requirements</i>		
	Handshake Low	Add 3 mA
	Handshake Floating (not connected)	Add 1 mA

Note: Worse case measurement, based on 4000 feet of cable, terminated with a 120-Ohm resistor.

Note: For the HV Series USB configuration, the host must supply 5 volts with a maximum current draw of 500mA, as specified in the USB standard.

To calculate the total current draw for your terminal configuration:

1. Read the model number on the back of your terminal.
2. Using the model number and the table above, add the current draw for each option to that of the base unit.

Example 1 – HVNEL30R2:

RS-232 Option	35 mA
<u>Supertwist Backlit Display</u>	<u>45 mA</u>
Calculated Total Current	80 mA

Example 2 – HVNL30KLR2:

RS-232 Option	35 mA
LED Supertwist Backlit	185 mA
<u>Backlit Keypad</u>	<u>80 mA</u>
Calculated Total Current	300 mA

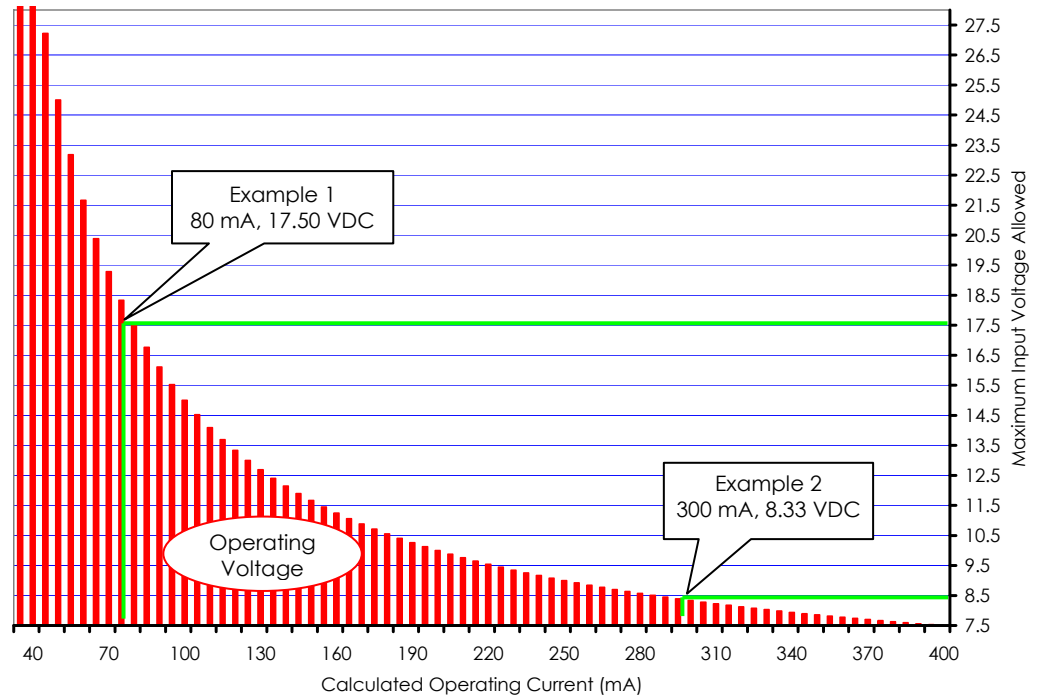
Determining the Maximum Input Voltage Allowed

The maximum input voltage allowed is based on a unit's current draw.

To determine the maximum input voltage allowed based on current:

1. Calculate the maximum current draw using the table on the previous page.
2. On the following chart, locate the Calculated Total Current on the **Calculated Operating Current** axis of the chart, and then move to the top of **Operating Voltage** range.
3. Look at the corresponding **Maximum Input Voltage Allowed** where the intersection occurs to find the maximum useable voltage for your terminal configuration.

Restricted Input Voltage vs. Current Draw



Using Example 1 and the chart above, the 80 mA drawn by the HVNEL30R2 intersects with 17.50 volts. If the maximum supply voltage to the terminal is greater than 17.50 VDC, it requires a -H power supply configuration.

Using Example 2 and the chart above, the 300 mA drawn by the HVNL30KLR2 intersects with 8.33 volts. If the maximum supply voltage to the terminal is greater than 8.33 VDC, it requires a -H power supply configuration.

To clarify, if your system is supplying 12.00 VDC, the power is acceptable for the HVNEL30R2 (Example 1), but not for the HVNL30KLR2 (Example 2). Applying 12.00 VDC to the HVNL30KLR2 (Example 2) will **damage** it.

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Chapter 1: Overview

About this Manual

Intended for developers familiar with operator interface applications, this manual describes the advanced features, operations and interface capabilities of Two Technologies' HV Series terminals. It is not for use by end-users.

Unless otherwise stated, the operational characteristics described herein correspond to factory default configurations and settings as shipped from Two Technologies.

Because HV Series terminals are highly customizable products with several optional configurations and special keypad layouts, this manual only describes standard features and operation. For custom configurations and special options, consult the appropriate supplemental manual or addendum.

It is beyond the scope of this manual to provide operating system tutorials or information about commercial or customized HV Series application programs and connected equipment. This information should be available in the manuals that accompany those products.

Wherever used herein, the term "HV Series" applies to all models (except as noted).

Symbols and Conventions

Unless otherwise noted, this manual uses the following format conventions to distinguish elements of text:

- New terms used in this manual initially appear in *Italics*, for example: *host*.
- Names of keys as shown on a keypad appear in **bold type**, for example: **CTRL**.
- Names of parameter values appear in **uppercase letters**, for example: **ENABLE**.
- **Esc** represents the ASCII escape character in **Escape commands**, for example: **Esc [4n**.
- A lowercase **"h"** appearing after a number denotes a **hexadecimal value**, for example: **1Bh**.

Related Manuals

- HV ANSI Series Technical Reference Manual, Document Number MAN0340.

About Two Technologies

Two Technologies has been producing rugged hand held and panel mount terminals and computers for over fifteen years. By implementing state of the art design and manufacturing techniques, we revolutionized hand held terminals and computers inside and out. Today, Two Technologies offers over a dozen cost-effective solutions serving virtually every market.

About the HV Series

Specifically designed for industrial applications, HV Series terminals are rugged with fully functional ASCII capability and selectable operating parameters.

You can change nearly every aspect of its operation from display mode to function key definitions via menu selections or direct host control using Private mode escape sequences. (ANSI compatibility is also available; refer to the HV Series ANSI Technical Reference Manual for additional information).

HV Series Features

Two Technologies offers the HV Series with the following features. You can find additional information regarding specifications in [Appendix A](#).

Display

HV Series terminals come with a standard 80-character monochrome liquid crystal display that features the standard U. S. ASCII character set as dark characters on a light background. Cursor and view angle settings for the display can be menu or host-controlled.

Backlit and extended temperature displays, as well as optional character sets, such as Latin 1 or European are also available. HV Series terminals also give you the ability to create up to three custom characters not supported in the display's font table.

Keypad

Securely framed and clamped into place, the keypad surface provides excellent splash resistance and prevents curling or peeling of the keypad overlay. Standard keypad layouts include 30 (6 rows x 5 columns) and 40 (6 rows x 5 columns) keys available with standard or custom graphics. Keypads can be made from your choice of elastomeric or membrane material.

Options for 40-key HV Series terminals include up to five LEDs (across the top row) a backlit keypad. Custom keypad layouts are also available.

Switches and Indicators

You can program up to five function keys (keyboard dependent) with up to 20 characters each and store this information in non-volatile memory.

Five host-controlled LED indicators (located within each key on the top row) are available as an option on HV Series terminals ordered with ANSI compatibility.

Interface Options

Interface options include USB, RS-232, RS-422 and CMOS/TTL protocols. Communication (up to 9,600 bps standard, higher speeds available on a custom basis) with a host device is through a modular 6-pin connector, a permanent RS-232 wire connection, or a permanent USB wire connection.

Durability

Like all Two Technologies' products, the HV Series terminal is remarkably rugged. The case consists of Bayblend ABS polycarbonate blend, one of the most durable, chemical-resistant materials available on the market today.



Chapter 2: Operation

Controls and Indicators

Figure 2-1 describes the components and indicators found on the front of a HV series terminal as shown in Table 2-1.

Figure 2-1: HV Series Controls and Indicators

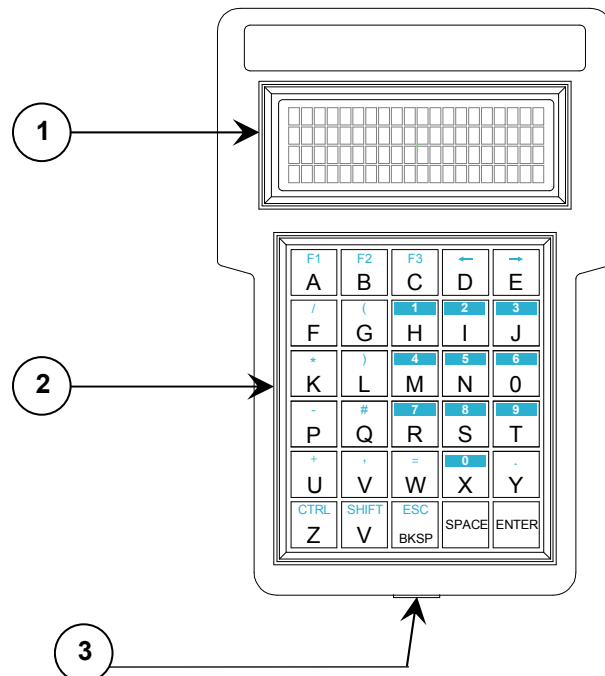


Table 2-1: HV Series Controls and Indicators

<i>Item</i>	<i>Control/Feature</i>	<i>Description</i>
1	Display	Standard 4 line x 20 character liquid crystal display
2	Keypad	Standard 30-key keypad (40-key keypad also available)
3	Modular Interface Connector	Supplies communication and power

Figure 2-2: HV Series Controls and Indicators

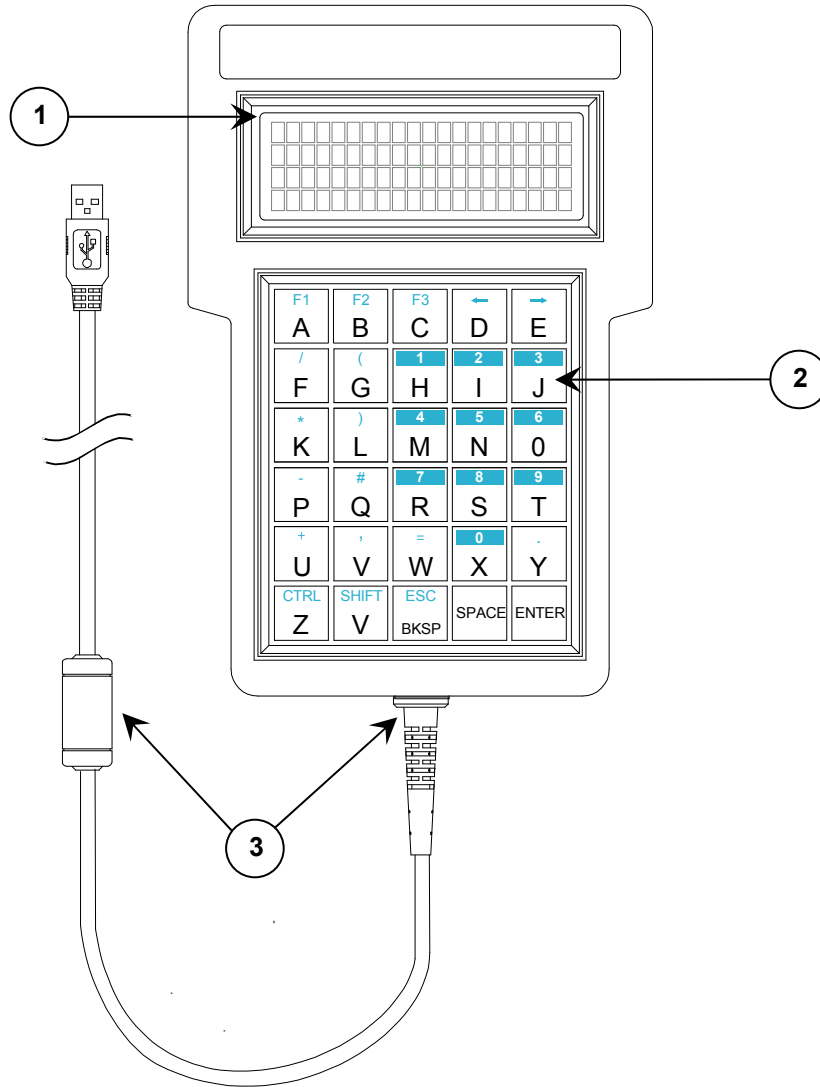


Table 2-2: HV Series USB Controls and Indicators

<i>Item</i>	<i>Control/Feature</i>	<i>Description</i>
1	Display	Standard 4 line x 20 character liquid crystal display
2	Keypad	Standard 30-key keypad (40-key keypad also available)
3	Permanent USB Cable	Supplies communication and power

Cable and Power Connections

Internal Communication Devices

The following table lists the internal interface devices used in HV Series terminals.

Table 2-3: Interface Devices

<i>Interface</i>	<i>Manufacturer</i>	<i>Device</i>
RS-232	Linear Technology	LT1281
RS-422	Linear Technology	LTC490
USB	Silicon Labs	CP2102EK

Signal and Pin Assignments

Permanent RS-232 Wire Connection

Table 2-4 describes the signal and pin assignments for HV Series terminals that have a permanent wire connection.

Table 2-4: Permanent Wire Connection Signal and Pin Assignments

<i>Pin</i>	<i>Color</i>	<i>Signal</i>
1	Blue	Common
2	Green	RXD (to terminal)
3	Yellow	TXD (from terminal)
4	Red	DTR (from terminal)
5	Black	DSR (to terminal)
6	White	+ Supply (to terminal)

Permanent USB Connection

The permanent USB cable is USB 2.0 Full Speed compliant. The cable is 3 meters long and ends in a standard series “A” plug. Its pins are listed in the table below.

Table 2-5: Permanent USB Connection Signal and Pin Assignments

<i>Pin</i>	<i>Color</i>	<i>Name</i>	<i>Signal</i>
1	Red	VCC	+5V
2	White	D-	Data -
3	Green	D+	Data+
4	Black	GND	Ground

Note: To use the USB connection, you must first install the Silicon Labs USB communications driver on the Windows® based host equipment. This can be downloaded from the following link: <http://www.2t.com/drivers/CP210x.zip>. Installation instructions are included in the .zip.

Modular Interface Connector

Figure 2-3 depicts the standard six-pin modular interface connector found on the HV Series terminal.

Table 2-6 describes its signal and pin assignments.

Warning: Use the six-pin modular receptacle for compatible serial devices only. Despite its physical similarity to modular telephone connectors, it is not compatible with telephone lines or signals. Connecting the terminal to a telephone line will damage it and void the warranty.

Figure 2-3: Modular Interface Connector

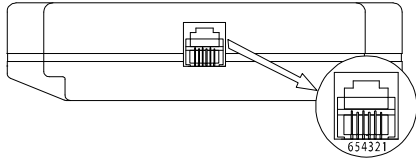


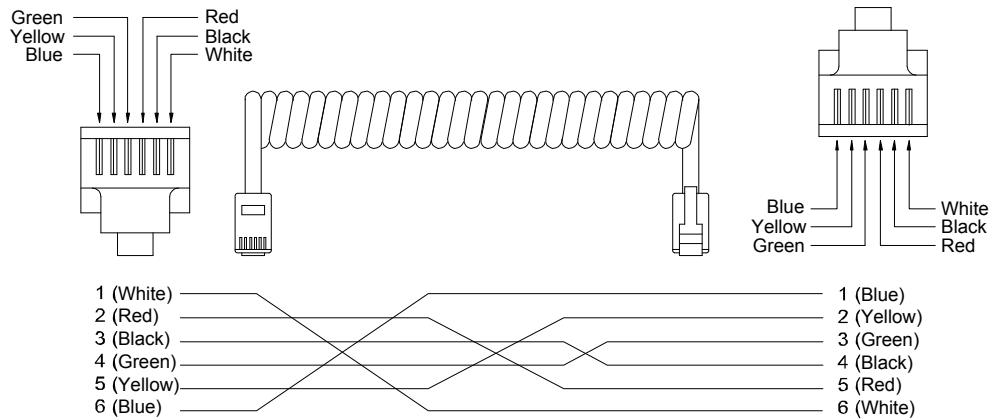
Table 2-6: Modular Interface Connector Signal and Pin Assignments

<i>Pin</i>	<i>RS-232/CMOS/TTL</i>	<i>RS-422</i>
1	+ Supply to terminal	+ Supply to terminal
2	Handshake-In to terminal	+ Data-In to terminal
3	Handshake-Out from terminal	+ Data-Out from terminal
4	Data-In to terminal	- Data-In to terminal
5	Data-Out from terminal	- Data-Out from terminal
6	Common	Common

Standard Accessory Cables

Standard modular cables (1210-7 and 1210-15) that mate with the terminal's modular interface connector and Two Technologies' PCAT wired adapter are available as optional accessories. These cables will reverse the signal output from the terminal (see illustration below). Non-reversing modular cables (1210-7-NR and 1210-15-NR) are also available.

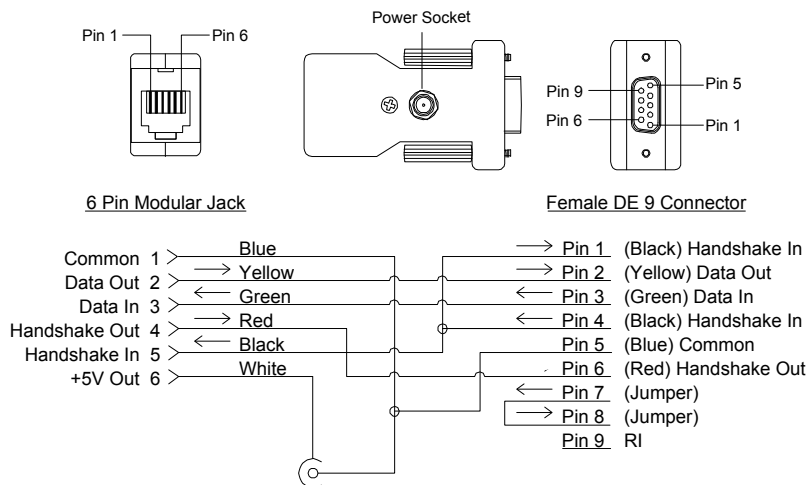
Figure 2-4: 1210 Series Modular Cable



PCAT Wired Adapter

The PCAT modular connector enables connection to a host device as well as supplying a connection for a power supply.

Figure 2-5: PCAT Modular Connector



Note: Pin descriptions assume connection through a Two Technologies' 1210 series modular cable to the terminal's modular connector.

Connecting the Terminal

To connect the terminal to a host device using Two Technologies parts:

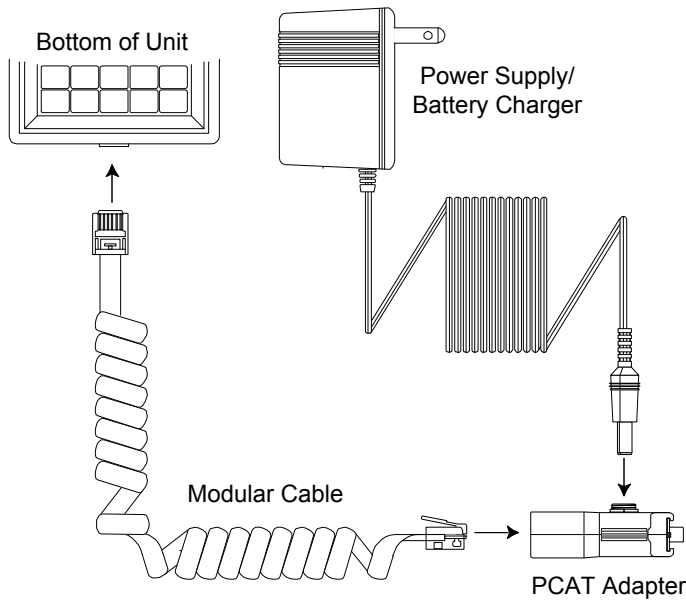
1. Plug one end of a [1210 modular cable](#) into the modular connector on the bottom of the terminal. Plug the other end into the [PCAT adaptor](#).
2. Plug the PCAT adaptor into the host device.

Supplying Power

There are two types of HV Series terminals: a model with a modular jack, and a model with a USB connection. It is important to note that the USB model receives power from the USB port of the host, and that no additional supplies or other components are required. However, the model with the modular jack does require external power. The following shows how to supply power to a model with a modular jack using Two Technologies parts:

1. Plug one end of a [1210 modular cable](#) into the modular connector on the bottom of the terminal. Plug the other end into the [PCAT adaptor](#).

Figure 2-6: Cable Connections



2. Using a Two Technologies' power supply (such as a Two Technologies 1226-1 linear power supply for units with a -2 power supply configuration), plug the power supply connector into the PCAT adapter and then plug the power supply into a 120 VAC 60 Hz power outlet.
3. The terminal should turn on and a blinking cursor should appear on the display. If the terminal does not turn on, refer to the [Troubleshooting](#) section of this manual for help.

Display Operation

HV Series displays consist of a 20 character by 4-line liquid crystal display. Many of its characteristics are user-selectable, including the display of control characters, escape characters and cursor.

Displayable Characters

If a character, either received by the terminal or echoed locally from the keypad, is in the viewable ASCII range (20h to 7Eh), that character will appear at the current cursor location. ASCII control characters (00h to 1Fh) will only appear when enabled. Non-ASCII characters (80h to FFh) can also appear at the current cursor location if the number of data bits transmitted per character is set to eight. For information on selecting display and communication parameters, see [Chapter 3](#).

Cursor Positioning

The cursor moves from left to right as the terminal displays characters.

Whenever a character appears in the rightmost or last position of the top three rows, the terminal will either display the cursor in the first position on the next line (AUTO LINE WRAP enabled) or alternate the display of the cursor and the last character in that last position.

Whenever a character appears in the last position on the bottom row, the terminal will always alternate the display of a character and the cursor. The next character will appear in the first position of a new bottom row and the top column will “scroll off.” For information on selecting display parameters, see [Chapter 3](#).

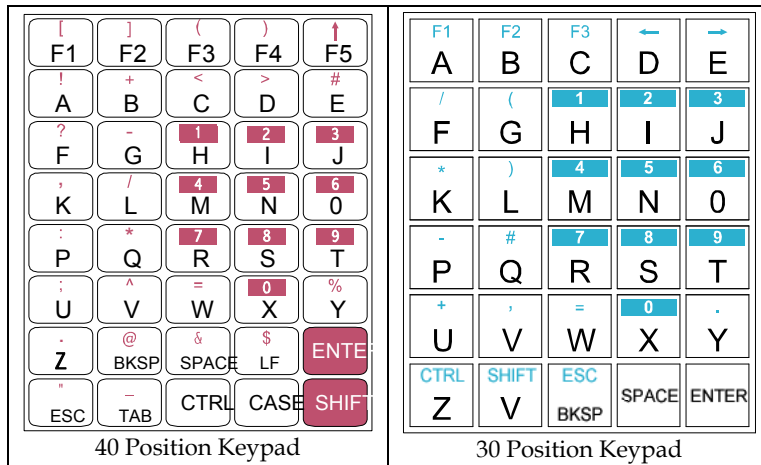
Keypad Operation

Standard HV series configurations feature either a 30- or 40-key keypad with tactile feedback.

40-key keypads consist of uppercase letters, digits 0 through 9, punctuation marks, symbols, function keys and keys for Backspace (**BKSP**), Space (**SPACE**), Line Feed (**LF**), Enter (**ENTER**), Escape (**ESC**), Tab (**TAB**), Control (**CTRL**), and Shift (**SHIFT**). In addition, a Case (**CASE**) key allows you to toggle between upper and lowercase letters.

30-key keypads consist of uppercase letters, digits 0 through 9, punctuation marks, symbols, function keys and keys for Control (**CTRL**), Shift (**SHIFT**), Escape (**ESC**), Backspace (**BKSP**), Space (**SPACE**) and Enter (**ENTER**).

Figure 2-7: Standard Keypads



Keypad Modes

HV Series terminals use several keypad modes to produce the entire character set. A unique cursor shape identifies each keypad mode.

Table 2-7: Keypad Designators

<i>Cursor Type</i>	<i>Designation</i>
	Keypad is in Normal or Reduced Command mode
	Keypad is in Shift mode
	Keypad is in Control mode
	Keypad is in Setup mode
	Keypad is in Case mode (40-key keypads only)

Normal Mode

Normal mode is the default state of an HV Series terminal when power is applied. In this mode, the bottom keypad legends are active.

Shift Mode

To enter Shift mode, press **SHIFT**. When you press another key, the terminal will generate the top keypad legend associated with that key and then return the keypad to Normal mode.

To lock the keypad into Shift mode, press **SHIFT** twice. To return to Normal mode, press **SHIFT** a third time.

Control Mode

In addition to displaying visible alphanumeric and punctuation characters, HV series terminals keys can also generate ASCII control characters (see [Appendix B](#)).

To enter Control mode on HV Series terminals with 40-key keypads, press **CTRL**. To enter Control mode on HV Series terminals with 30-key keypads, press **SHIFT** and then **CTRL**.

In either case, the terminal will generate the control character associated (if any) with that key and return the keypad to Normal mode. For example, entering Control mode and pressing **G** will generate a beep.

Setup Mode

Setup mode enables you to change the terminal's parameters (see [Chapter 3, Manual Configuration](#)).

To enter Setup mode on HV Series terminals with 40-key keypads, press **CTRL**, **SHIFT** and **SPACE**. To enter Setup mode on HV Series terminals with 30-key keypads, press **SHIFT**, **CTRL**, **SHIFT** and then **SPACE**.

Case Mode

Available on HV Series terminals with 40-key keypads, Case mode enable you to generate lowercase characters. To enter Case mode, press **CASE**. When you press a key with an alphabetic legend, the terminal will generate the lowercase version and then return the keypad to Normal mode.

To lock the keypad into Case mode, press the **CASE** twice. To return to Normal mode, press **CASE** a third time.

Reduced Command Mode

In addition to the previously described keypad modes, you can also place the keypad into Reduced Command mode. While in this mode, each key press will generate a single unique ASCII character as shown in the table below.

For information on how to enable/disable Reduced Command mode, see [Simplified Keypad](#).

Figure 2-8: Reduced Command Keypads

F1	F2	F3	F4	F5	F1	F2	F3	←	^U
A	B	C	D	E	/	(	1	2	3
F	G	H	I	J	*	)	4	5	6
K	L	M	N	0	-	#	7	8	9
P	Q	R	S	T	+	,	=	0	.
U	V	W	X	Y	Z	A	BKSP	SPACE	ENTER
Z	BKSP	SPACE	ELF	ENTE					
		1	2	3					

Reduced 40 Position Keypad Reduced 30 Position Keypad

Programmable Function Keys

HV Series terminals with a 30-key keypads have four programmable function keys (F1, F2, F3 and **←**), HV Series terminals with 40-key keypads have five function keys (F1, F2, F3, F4 and F5). You can program each key to accept up to 20 printing or non-printing characters. During normal operation, pressing any of these keys will generate the defined character or string. For information on how to program function keys, see [Chapter 4](#).

Special Keys

HV Series terminals with a 30-key keypad and a backlight display, pressing **E** toggles the backlight on and off. This key has no effect on 30-key keypad non-backlit units and is not available on 40-key keypad units.

Operating Modes

HV Series terminals have several operating modes. In its default mode, the terminal will display characters, respond to commands sent by a connecting device, and send characters to the connecting device as keys are pressed. Other modes, described later in this manual, enable you to [set operating parameters](#) and [program function key definitions](#).

Host Control

The design of HV Series terminals allows a connecting device (or “*host*”) to control its functions through the transmission of a string of special characters.

Referred to as “*Escape commands*” (because each character string begins with the ASCII escape character), these character strings enable the host to move the cursor, sound an alert, program the function keys and set any of the operating parameters.

Chapter 3: Manual Configuration

Introduction

A comprehensive set of user-settable operating parameters and programmable function keys makes the HV Series terminal suitable for diverse applications. Each settable parameter and programmable function key has a default value. These values are stored in the terminal's permanent memory.

This chapter describes each operating parameter in detail, as well as how to set the parameters and load the default values. For information on how to program function keys, see [Chapter 4](#).

Communication Parameters

The following section describes the communication parameters that you can program in a HV Series terminal.

Baud Rate

This parameter sets the number of bits per second transmitted. Typically, HV Series terminals will send characters as fast as the baud rate allows and will emit a beep whenever transmission is falling behind character generation. The data rate can be set to: 110, 150, 300, 600, 1200, 2400, 4800 or 9600 baud. The default value is 1200.

Note: Using a Key Repeat Rate of MAX at slower baud rates (110, 150 or 300) may cause the keypad output to overrun the transmission rate.

Parity

This parameter determines the type of error checking performed on incoming characters to ensure accuracy. Allowable settings are EVEN, ODD, MARK, SPACE and NONE. The default value is EVEN.

When set to EVEN, ODD, MARK or SPACE, the terminal will perform the corresponding check on incoming data. When set to NONE, the terminal will not generate a parity bit.

To enable/disable parity checking, see [Display Serial Errors](#).

Data and Stop Bits

This parameter sets the number of data bits transmitted per character and stop bits. Allowable settings are 7:1, 7:2, 8:1 and 8:2. The default value is 7:1.

The first digit refers to the number of data bits; the second digit refers to the number of stop bits. When receiving and displaying characters from 80h to FFh, you must select eight data bits.

Display Serial Errors

This parameter enables/disables the terminal's ability to perform error checking on incoming characters. Allowable settings are YES and NO. The default value is NO.

With this parameter enabled, the terminal will alternately flash the parity error symbol with the errant character (if viewable) when a parity bit occurs or the framing error symbol when a framing error occurs.

Figure 3-1: Parity Error Symbol



Figure 3-2: Framing Error Symbol



Audible Serial Errors

This parameter enables/disables the terminal's ability to generate an audible sound when a parity bit or framing error occurs (provided you also have the Display Serial Errors parameter enabled). Allowable settings are YES and NO. The default value is NO.

XON/XOFF Support

This parameter enables/disables XON/XOFF flow control support. Allowable settings are YES and NO. The default value is NO.

With this parameter set to YES and the Display Control Character parameter disabled, the terminal will display the XOFF symbol whenever it receives an XOFF character (13h) from the host. The terminal will then store the next 16 keypad-generated characters in a transmit buffer (the XOFF symbol will fill in) until it receives an XON character (11h) from the host. In which case, the terminal will return to its normal state and transmit the contents of the buffer to the host

Should it exceed the transmit buffer capacity before it receives an XON character, the terminal will ignore any subsequent key presses and generate a beep instead.

Figure 3-3: XOFF Symbol



Display Parameters

Display Control Characters

This parameter enables/disables the terminal's ability to display the viewable ASCII equivalents of control characters (00h through 1Fh, except 1Bh). Allowable settings are FLASHING, WITH ^ (Caret) and NO. The default value is NO.

When set to FLASHING, the ASCII equivalent of the control character will blink instead of executing the command. For example, a CTRL+J (0Ah) will display the letter "J" rather than execute a line feed.

When set to WITH ^, the ASCII equivalent of the control character is preceded by a caret symbol instead of executing the command. For example, a CTRL+J (0Ah) will display "^J" rather than execute a line feed.

Display Escape Characters

This parameter enables/disables the terminal's ability to display the viewable ASCII equivalent of the Escape character (1Bh). Allowable settings are FLASHING, WITH ^ (Caret) and NO. The default value is NO.

When set to FLASHING, the terminal will display a blinking left bracket when sent the ASCII escape character by a host system.

When set to WITH ^, the terminal will display a caret symbol followed by a left bracket when sent the ASCII escape character by a host system.

Cursor Visible

This parameter enables/disables the terminal's ability to display the cursor after power is applied and exiting the Setup menu. Allowable settings are YES and NO. The default value is YES.

Auto Line Wrap

This parameter determines the cursor position whenever a character appears in the last position of the first three rows. Allowable settings are YES and NO. The default value is NO

When set to YES, the cursor will appear in the first position of the next row whenever a character appears in the last position of the first three rows.

When set to NO, the cursor will alternately appear with character when that character appears in the last position of the first three rows.

New Line on Carriage Return

This parameter determines the position of the cursor whenever the terminal echoes or receives a carriage return command (0Dh). Allowable settings are YES and NO. The default value is YES.

When set to YES, the cursor will appear in the first position of the next row whenever the terminal echoes or receives a carriage return command.

When set to No, the cursor will appear in the first position of the same row whenever the terminal echoes or receives a carriage return command.

Display Self-Test

This parameter determines if the terminal will perform a display and beep test when power is applied. At the end of the test, the terminal will display the terminal's revision identifier string. Allowable settings are YES and NO. The default value is YES

Backlight Control

For terminal equipped with backlit displays, this parameter turns the backlight on or off. Allowable settings are YES and NO. The default value is NO.

Display Size

This parameter determines the amount of characters displayed by the terminal. Allowable settings are 80 CHARACTER (20 columns x 4 rows), 64 CHARACTER (16 columns x 4 rows) and 32 CHARACTER (16 columns x 2 rows). The default value is 80 CHARACTER.

Keypad Parameters

Local Echo

This parameter enables/disables the terminal's ability to display (echo) keypad entries on the screen. When set to NO (the default value), only characters received by the terminal will display. Allowable settings are YES and NO. The default value is NO.

Key Repeat

This parameter determines the repeat keypad character rate while the key remains pressed. Allowable settings are SLOW, FAST, MAX and OFF. The default value is SLOW.

When set to SLOW, holding down a key will immediately generate a character, then after a half-second delay, the terminal will generate seven characters per second until the key is released.

When set to FAST, holding down a key will generate ten characters per second until the key is released.

When set to MAX, holding down a key will generate 40 characters per second until the key is released.

When set to OFF, holding a down key will just generate one character regardless of how long the key is depressed.

Audible Keys

This parameter enables/disables the terminal's ability to emit a beep for each character generated by a key press or key repeat. Allowable settings are YES and NO. The default value is NO.

Simplified Keypad

This parameter enables/disables Reduced Command mode. While in this mode, each key press will generate a single unique ASCII character as shown in [Figure 2-1](#).

Note: Once you enable Reduced Command mode, you can only disable it by reloading the default values or sending an Escape P command from the host system.

Function Key Programming

This parameter enables you to program the terminal's function keys (up to four function keys on 30-keypads and up to five function keys on 40-key keypads). You can program each function key with up to 20 printing or nonprinting characters. For information on how to program function keys, see [Chapter 4](#).

Parameter Menu Summary

[Table 3-1](#) lists the allowable settings and default values available through the Parameter menu.

Table 3-1: Parameter Menu Summary

<i>Menu</i>	<i>Parameter</i>	<i>Options (Default In Bold)</i>
Communication	Baud Rate	110, 150, 300, 600, 1200 , 2400, 4800, 9600
	Parity	EVEN , ODD, MARK, SPACE, NONE
	Data and Stop Bits	7:1 , 7:2, 8:1, 8:2
	Display Serial Errors	YES, NO
	Audible Serial Errors	YES, NO
	XON/XOFF Support	YES, NO
Display	Display Control Characters	FLASHING, WITH ^, NO
	Display Escape Characters	FLASHING, WITH ^, NO
	Cursor Visible	YES , NO
	Auto Line Wrap	YES, NO
	New Line on Carriage Return	YES , NO
	Display Self Test	YES , NO
	Backlight Control ¹	YES, NO
	Display Size	80 CHARACTER , 64 CHARACTER, 32 CHARACTER
Keypad	Local Echo	YES, NO
	Key Repeat	SLOW , FAST, MAX, OFF
	Audible Keys	YES, NO
	Simplified Keypad	YES, NO
	Function Key Programming	See Chapter 4

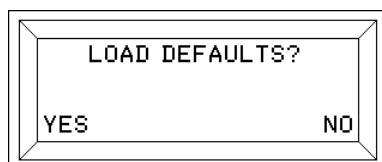
1. Only available on units with backlit display.

Loading Default Parameters

The following procedure describes how to load the factory default settings using a 30 or 40-key HV Series terminal, other keypad configurations may work differently.

To load the factory default settings:

1. Remove power from the terminal.
2. Simultaneously hold **CTRL**, **SHIFT** and **F1**, and then reapply power. The terminal will display the following:



3. When using a 30-key keypad, press either **A** (YES) to reload the default value or **E** (NO) to leave the parameters unchanged. When using a 40-key keypad, substitute **F1** for A and **F5** for B.

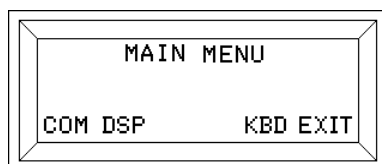
Changing Parameter Settings

The following procedure describes how to change parameter settings on a HV Series terminal using a standard 30-key or 40-key keypad, other keypad configurations may work differently.

Note: You can also change or disable access to the parameter settings by issuing Escape commands from the host. See [Chapter 5](#) for more information.

To change the parameters settings:

1. Press **SHIFT**, **CTRL**, **SHIFT** and **SPACE**. The terminal will display the following prompt:



2. Press one of the keys directly underneath a menu item (shown below in parentheses) to either access a group of parameters or exit the menu.

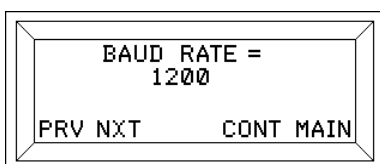
If using a 30-key keypad:

- Press **A** (COM) to access the first communication parameter
- Press **B** (DSP) to access the first display parameter
- Press **D** (KBD) to access the first keyboard parameter
- Press **E** (EXIT) to exit the main menu

If using a 40-key keypad, substitute **F1** for A, **F2** for B, **F4** for D and **F5** for E.

3. Once you access the first parameter in a particular group, you can change the value for that parameter, continue on to the next parameter or return to the main menu.

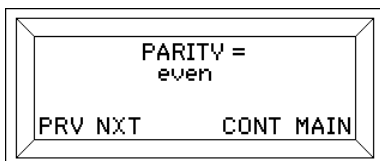
For example, if you first access the communications parameter, the terminal will display the following prompt:



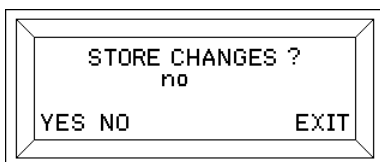
To change the current parameter value using a 30-key keypad, press **A** (PRV) or **B** (NXT). If using a 40-key keypad, substitute **F1** for A and **F2** for B.

Note: Some parameters will display "YES" and "NO" instead of "PRV" and "NXT."

4. To access the next communications parameter using a 30-key keypad, press **D** (CONT). If using a 40-key keypad, press **F4** instead. In either case, the terminal will display the next communications parameter, for example:



5. To return to the main menu using a 30-key keypad, press **E** (MAIN). If using a 40-key keypad, press **F5** instead.
6. In either case, when you exit the main menu, the terminal will display the following prompt:



7. To save any changes in EEPROM using a 30-key keypad, press **A** (YES). If using a 40-key keypad, press **F1** instead.
8. To ignore any changes using a 30-key keypad, press **B** (NO). If using a 40-key keypad, press **F2** instead.

Selecting NO will still store any changes temporarily until the next power on/off cycle. In which case, the settings will return to their previous values.

9. To exit the main menu using a 30-key keypad, press **E** (EXIT). If using a 40-key keypad, press **F5** instead.

Note: If you enable Reduced Command mode, you can only disable it by reloading the default values or sending and Escape P command from the host system.

Chapter 4: Function Key Programming

Introduction

You can program up to four function keys on 30-keypads and up to five function keys on 40-key keypads with up to 20 printing or nonprinting characters. All function key data is stored in EEPROM.

Programming Function Keys

The following procedure describes how to program function keys on a HV Series terminal using a standard 30-key or 40-key keypad, other keypad configurations may work differently.

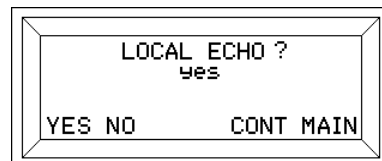
Notes: You can also program function keys by issuing Escape commands from the host, see [Chapter 5](#) for more information.

To program a function key:

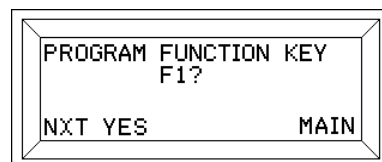
1. Press **SHIFT**, **CTRL**, **SHIFT** and **SPACE**. The terminal will display the following prompt:



2. If using a 30-key keypad, press **D** (KBD) to access the first keyboard parameter. If using a 40-key keypad, press **F4** instead.



3. Press the key underneath "CONT" (If using a 30-key keypad, press **D**. If using a 40-key keypad, press **F4** instead) until the terminal displays the following prompt:



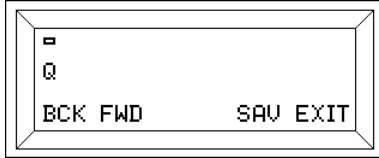
4. To program the F1 key using a 30-key keypad, press **B** (YES). If using a 40-key keypad, press **F2** instead.

To program the next function key using a 30-key keypad, press **A** (NXT). If using a 40-key keypad, press **F1** instead.

Note: Some keypad configuration may allow you to access more function keys than indicated by the keypad configuration. In which case, you will be able to program these additional functions key, but not access them.

To return to the main menu, press **E** (MAIN). If using a 40-key keypad, press **F5** instead.

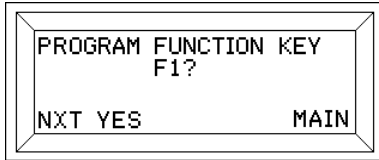
5. When programming a function key, the terminal will display:



6. By default, the keypad enters Shift mode. If needed, use the SHIFT and/or CTRL key to enter uppercase letters or control commands. You can type up to twenty characters. Control characters will flash when entered.

As you enter the character string, you can move the cursor back and forth for editing purposes. If using a 30-key keypad, press **A** (BCK) to move the cursor back and **B** (FWD) to move the cursor forward. If using a 40-key keypad, substitute **F1** for A and **F2** for B.

7. To save your entry to EEPROM using a 30-key keypad, press **D** (SAV). If using a 40-key keypad, press **F4** instead. After you save the data, the terminal will display the following prompt:



8. You can now program the F1 key, program the next function key or return to the main menu.

Chapter 5: Host Commands

Introduction

The HV Series will respond to certain command strings issue from a host device to control some of its functionality. These commands can start with an Escape character or Control character.

For example, sending an Esc A (1Bh, 41h) will move the cursor down one row, while sending a Ctrl M (0Dh) will issue a carriage return.

Escape Commands

This section describes the Escape commands that a host device can issue to control the HV Series' functionality. A summary of Escape commands appears at the end of this section.

You must set the "DISP ESC CHARS" parameter to NO to have the terminal process Escape commands. When it detects an Escape character, the terminal will examine the next character it receives to determine if Escape command is valid. If the string constitutes a valid Escape command, the terminal will perform the appropriate action. If the string is invalid, the terminal will ignore the escape character and display the remainder of the characters.

If you set the "LOCAL ECHO" parameter to YES, the terminal will transmit Escape commands to the host and execute the commands locally when entered from the keypad.

If you set the "LOCAL ECHO" parameter to No, the terminal will transmit Escape commands to the host but not execute the commands locally eliminating the possibility of incoming escape sequences being interrupted by echoed keypad entries and vice versa

You cannot buffer sound commands. To produce properly spaced chain sounds, the host must delay a short time between issuing sound commands.

Note: Do not use spaces between characters in Control or Escape commands. Any spacing shown for Escape commands in this chapter is for clarity only unless otherwise noted.

Cursor Up

Syntax Esc A

Notes Moves the cursor up one row, except when the cursor appears on the top row.

Cursor Down

Syntax Esc B

Notes Moves the cursor down one row, except when the cursor appears on the bottom row.

Cursor Right

Syntax Esc C

Notes Moves the cursor one position to the right, except when the cursor appears in the last (rightmost) position.

Cursor Left

Syntax Esc D

Notes Moves the cursor one position to the left, except when the cursor appears in the first (leftmost) position.

Define Graphic Character

Syntax Esc E *g* < *r1*> < *r2*> < *r3*> < *r4*> < *r5*> < *r6*> < *r7*>

Notes HV Series terminals enables you to create three user-definable graphic characters using the above syntax, where *g* is the number (1, 2 or 3) of the graphic character and *r1* through *r7* represent the binary values (a logical 1 turns a pixel on, a logical 0 turns a pixel off) for each row in a 5 x 7-pixel matrix. Bits 5, 6 and 7 do not affect graphic definition and can be either a logical 1 or 0.

Graphic characters sent to the terminal are only stored temporarily in memory and will be lost if you remove power.

After creating a graphic character, you must send/echo the appropriate Control command (CTRL A, B or C) to display it. Once displayed, subsequent changes to the graphic character (i.e., another Esc E command) will immediately change the appearance of the graphic character.

Example The following command would define the graphic character 2 as a trident:

Esc E 2 ^D ^D ^D ^D ^_ ^U ^U

Rows	Bits							Values		
	7	6	5	4	3	2	1	0	ASCII	Hex
R1	0	0	0	0	0	1	0	0	^D	04
R2	0	0	0	0	0	1	0	0	^D	04
R3	0	0	0	0	0	1	0	0	^D	04
R4	0	0	0	1	1	1	1	1	^D	1F
R5	0	0	0	1	0	1	0	1	^_	15
R6	0	0	0	1	0	1	0	1	^U	15
R7	0	0	0	1	0	1	0	1	^U	15

Legend: Bit on, Bit off, Bit ignored

Cursor Home Bottom

Syntax Esc H

Notes Move the cursor to the first (leftmost) position on the bottom row, except when the cursor appears in that position.

Erase Cursor to End of Display

Syntax Esc J

Notes Erases all characters (including the character at the cursor location) from the current position to the end of the display, but does not alter the cursor position

Erase Cursor to End of Line

Syntax Esc K

Notes Erases all characters (including the character at the cursor location) from the current position to the end of the row, but does not alter the cursor position

Cursor Home Top

Syntax Esc L

Notes Move the cursor to the first (leftmost) position on the top row, except when the cursor appears in that position.

Send Operating Parameters

Syntax Esc P *s1 s2 s3 s4 s5 s6 s7 s8 s9 s10*

This command enables the host to send parameter settings (*s1* through *s10* as described in [Chapter 3](#)) to a HV terminal via serial interface. Changes made by this command are automatically stored in EEPROM (provided the command string received is valid). If the command string received is valid, the characters sent will display on the screen rather than change any parameter settings.

After receiving a valid command string, the terminal will require a half-second to save the changes to EEPROM before it is ready to receive additional incoming data. During this time, the terminal will ignore any incoming data (on units equipped with an RS-232 serial interface, the terminal will hold the RTS line until it is ready to receive additional incoming data).

Allowed Values

<i>s1</i>	<i>s2</i>
Baud Rate	Data/Stop Bits
1 = 9600	0 = 7 Data, 1 Stop
2 = 4800	1 = 7 Data, 2 Stop
3 = 2400	2 = 8 Data, 1 Stop
4 = 1200	3 = 8 Data, 2 Stop
5 = 600	
6 = 300	
7 = 150	
8 = 110	

<i>s3</i>	<i>s4</i>	
Echo	Simplified Keypad/Key Repeat/Key Click	
0 = No	0 = No/Off/No	8 = Yes/Off/No
8 = Yes	1 = No/Slow/No	9 = Yes/Slow/No
	2 = No/Fast/No	A = Yes/Fast/No
	3 = No/Max/No	B = Yes/Max/No
	4 = No/Off/Yes	C = Yes/Off/Yes
	5 = No/Slow/Yes	D = Yes/Slow/Yes
	6 = No/Fast/Yes	E = Yes/Fast/Yes
	7 = No/Max/Yes	F = Yes/Max/Yes

<i>s5</i>	<i>s6</i>
Show Ctrl Char/Backlight/New Line	Show Esc Char/Show Cursor/ Line Wrap
0 = No/No/Yes	0 = No/Yes/Yes
1 = No/Yes/Yes	1 = No/No/Yes
2 = Flashing/No/Yes	2 = Flashing/Yes/Yes
3 = Flashing/Yes/Yes	3 = Flashing/No/Yes
4 = No/No/No	4 = No/Yes/No
5 = No/Yes/No	5 = No/No/No
6 = Flashing/No/No	6 = Flashing/Yes/No
7 = Flashing/Yes/No	7 = Flashing/No/No
8 = With ^/No/Yes	8 = With ^/Yes/Yes
9 = With ^/Yes/Yes	9 = With ^/No/Yes
C = With ^/No/No	C = With ^/Yes/No
D = With ^/Yes/No	D = With ^/No/No

<i>s7</i>	<i>s8</i>
Self Test	Reserved
0 = Yes	0
1 = No	

<i>s9</i>	<i>s10</i>
Parity	XON-XOFF/Sound Serial Error/Show Serial Error
0 = Space	0 = No/No/No
1 = None	1 = No/Yes/No
4 = Mark	2 = No/No/Yes
8 = Even	3 = No/Yes/Yes
C = Odd	4 = Yes/No/No
	5 = Yes/Yes/No
	6 = Yes/No/Yes
	7 = Yes/Yes/Yes

Example ESC P 1 0 0 1 4 0 0 0 8 0
1 = s1 (Baud Rate: 9600)
0 = s2 (Data, Stop Bits: 7, 1)
0 = s3 (Local Echo: No)
1 = s4 (Reduced Command Keypad: No, Key Repeat: Slow, Key Click: No)
4 = s5 (Display Control Characters: No, Backlight: No, New Line on CR: No)
0 = s6 (Display Esc Characters: No, Display Cursor: Yes, Auto Line Wrap: Yes)
0 = s7 (Display Self-Test: Yes)
0 = s8 (Reserved)
8 = s9 (Parity: Even)
0 = s10 (Support XON/XOFF: No, Audible Serial Errors: No, Display Serial Errors: No)

Backlight On

Syntax Esc Q

Notes For units equipped with a backlight, turns the backlight on.

Backlight Off

Syntax Esc R

Notes For units equipped with a backlight, turns the backlight off.

Cursor Position

Syntax Esc Y *Pr Pc*

Notes Moves the cursor to a specified location where *Pr* is the ASCII character equivalent of the row numbers and *Pc* is the ASCII character equivalent of the column numbers shown below.

Row (<i>Pr</i>)	ASCII	Column (<i>Pc</i>)	ASCII	Column (<i>Pc</i>)	ASCII
1	SP	1	SP	11	*
2	!	2	!	12	+
3	"	3	"	13	,
4	#	4	#	14	-
		5	\$	15	.
		6	%	16	/
		7	&	17	0
		8	'	18	1
		9	(	19	2
		10	)	20	3

Examples Esc Y !) will send the cursor to Row 2, Column 10

Esc Y #0 will send the cursor to Row 4, Column 17

Esc Y !+ will send the cursor to Row 2, Column 12

Return Terminal Identifier String

Syntax Esc Z

Notes This command sends the following identifier string to the host:

HV2001 X CCCC

Where HV2001 indicates the model number and CCCC is the four-byte hexadecimal checksum of the terminal's program memory. When using this command to identify the terminal type, do not include the checksum as it may change.

Define Function Keys

Syntax	<code>Esc n x data</code>																																												
Notes	<p>This command enables you to define a string of characters for a function key, where <i>n</i> is the number of the function key, <i>x</i> is an ASCII value (see table below) that represents the number of characters in the string and <i>data</i> is the contents of the string.</p> <table border="1"> <thead> <tr> <th>ASCII Value</th> <th>Number</th> <th>ASCII Value</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>B</td> <td>11</td> </tr> <tr> <td>2</td> <td>2</td> <td>C</td> <td>12</td> </tr> <tr> <td>3</td> <td>3</td> <td>D</td> <td>13</td> </tr> <tr> <td>4</td> <td>4</td> <td>E</td> <td>14</td> </tr> <tr> <td>5</td> <td>5</td> <td>F</td> <td>15</td> </tr> <tr> <td>6</td> <td>6</td> <td>0</td> <td>16</td> </tr> <tr> <td>7</td> <td>7</td> <td>G</td> <td>17</td> </tr> <tr> <td>8</td> <td>8</td> <td>H</td> <td>18</td> </tr> <tr> <td>9</td> <td>9</td> <td>I</td> <td>19</td> </tr> <tr> <td>A</td> <td>10</td> <td>J</td> <td>20</td> </tr> </tbody> </table>	ASCII Value	Number	ASCII Value	Number	1	1	B	11	2	2	C	12	3	3	D	13	4	4	E	14	5	5	F	15	6	6	0	16	7	7	G	17	8	8	H	18	9	9	I	19	A	10	J	20
ASCII Value	Number	ASCII Value	Number																																										
1	1	B	11																																										
2	2	C	12																																										
3	3	D	13																																										
4	4	E	14																																										
5	5	F	15																																										
6	6	0	16																																										
7	7	G	17																																										
8	8	H	18																																										
9	9	I	19																																										
A	10	J	20																																										
Example	<p>The following command will program the F1 key with the eleven character string: "F1 KEY TEST"</p> <pre>Esc 1 B F1 KEY TEST</pre>																																												

Reset Terminal and Perform Self-Test

Syntax `Esc b`

Notes This command resets the terminal (i.e., a warm boot) and performs a self-test on the display and beeper. At the end of the test, the terminal will display the terminal's revision identifier string.

Load factory Values and Perform Self-Test

Syntax `Esc dflt`

Notes This command resets the terminal with its [factory default values](#) and performs a self-test on the display and beeper. While loading the default values, the terminal will display "Using rom defaults." At the end of the test, the terminal will display the terminal's revision identifier string.

Generate Audible Tone

Syntax `Esc f duration tone`

Notes This command generates an audible tone on the terminal, where *duration* is the ASCII equivalent of the decimal value for the number of 15-millisecond increments (e.g., A = 65, B = 66, etc.) and *tone* is ASCII equivalent of a decimal value that represents the pitch (the larger the number, the lower the pitch). For a list of decimal values and their ASCII equivalents, see [Appendix B](#).

Example The following command will generate an audible tone with a pitch value of 49 for a length of 1200 milliseconds.

```
Esc f P 1
```

Where

P = 1200 milliseconds (80 x 15) and 1 = 49

Store Audible Tone

Syntax Esc t *duration tone*

Notes This command stores an audible tone in the terminal's memory until it receives another Esc t command from the host or you reset the terminal's factory defaults. To generate the tone, the host must issue an Esc g command.

In this command syntax, *duration* is the ASCII equivalent of the number of 15-millisecond increments (e.g., A = 65, B = 66, etc.) and *tone* is ASCII equivalent of a decimal value that represents the pitch (the larger the number, the lower the pitch). For a list of decimal values and their ASCII equivalents, see [Appendix B](#).

Example The following command will store an audible tone with a pitch value of 80 for a length of 495 milliseconds in the terminal's memory.

```
Esc t ! P
```

Where ! = 495 (33 x 15 milliseconds) and P = 40

Generate Stored Audible Tone

Syntax Esc g

Notes This command executes the audible tone defined by the last ESC t command issued by the host and currently stored in the terminal's memory.

Hide Cursor

Syntax Esc i

Notes This command will make the cursor invisible, but not change the cursor position.

Show Cursor

Syntax Esc v

Notes This command will make the cursor visible, but not change the cursor position.

Prevent Parameter Menu Changes

Syntax Esc l

Notes This command prevents a user from permanently storing any changes made to the terminal's parameter settings. The changes made by the user are temporary and will be lost on the next reset or removal of power. While in this mode, the terminal will briefly display "Store Changes menu disabled" any time a user exits the Parameter menu.

This mode will remain in effect, until the terminal receives an Esc u command from the host or you reset the terminal's factory defaults.

Enable Parameter Menu Changes

Syntax Esc u

Notes This command enables a user to permanently storing any changes made to the terminal's parameter settings after the host sent an Esc l to prevent permanently storing the changes.

Escape Command Summary

The following table is a summary of the available host commands.

Table 5-1: Escape Command Summary

Cursor Up	Esc A
Cursor Down	Esc B
Cursor Right	Esc C
Cursor Left	Esc D
Define Graphic Character	Esc E <i>g</i> < <i>r1</i> > < <i>r2</i> > < <i>r3</i> > < <i>r4</i> > < <i>r5</i> > < <i>r6</i> > < <i>r7</i> >
Cursor Home Bottom	Esc H
Erase Cursor to End of Display	Esc J
Erase Cursor to End of Line	Esc K
Cursor Home Top	Esc L
Send Operating Parameters	Esc P <i>s1 s2 s3 s4 s5 s6 s7 s8 s9 s10</i>
Backlight On	Esc Q
Backlight Off	Esc R
Cursor Position	Esc Y <i>Pr Pc</i>
Return Terminal Identifier String	Esc Z
Define Function Keys	Esc <i>n x data</i>
Reset Terminal and Perform Self-Test	Esc b
Load factory Values and Perform Self-Test	Esc dflt
Generate Audible Tone	Esc <i>f duration tone</i>
Store Audible Tone	Esc <i>t duration tone</i>
Generate Stored Audible Tone	Esc g
Hide Cursor	Esc i
Show Cursor	Esc v
Prevent Parameter Menu Changes	Esc l
Enable Parameter Menu Changes	Esc u

Control Code Commands

The host can control some of terminal's functionality by sending it commands that start with the certain ASCII control characters (00h to 1Fh). However, you must first set the Display Control Characters parameter to NO for this processing to take place. You can also enter control character string using terminal's keypad by setting the Local Echo parameter to YES.

Once it validates the control character string, the terminal will take the appropriate action. For example, sending a Ctrl G will sound the bell on the terminal. If the control character string is not a valid command, the terminal will simply ignore it.

Display Graphic Character

Syntax CTRL A, CTRL B or CTRL C

Notes This command enables you to display the three user-definable graphic characters created using the [Esc E](#) command, where one of the following uppercase letters represents the number of the graphic character: A = 1, B = 2 or C = 3.

Note: Graphic characters sent to the terminal and subsequently display are only stored temporarily in memory and will be lost if you remove power.

Send ENQ

Syntax CTRL E

Notes This command causes the terminal to respond with an ACK.

Sound Bell

Syntax CTRL G

Notes This command causes the terminal to generate an audible tone for approximately 150 milliseconds.

Cursor Left

Syntax CTRL H

Notes This command moves the cursor one position to the left, except when the cursor appears in the first (leftmost) position.

Cursor Right

Syntax CTRL I

Notes This command moves the cursor one position to the right, except when the cursor appears in the last (rightmost) position.

Line Feed

Syntax CTRL J

Notes This command moves the cursor to the first position (rightmost) of the next row. If the cursor is on the bottom row, the display will scroll and the cursor will appear at the beginning of the new row

Form Feed

Syntax CTRL L

Notes This command will clear the display and place the cursor in the first (rightmost) position on the top row.

Carriage Return

Syntax CTRL M

Notes If the New Line On CR parameter is set to No, this command will move the cursor to the first (rightmost) position of the current row.

If the New Line On CR parameter is set to Yes, this command will move the cursor to the first (rightmost) position of the current row.

X-ON

Syntax CTRL Q

Notes Removes the XOFF character flow constraint to inhibit keypad operation when the Support XON/XOFF parameter is set to YES. See [XON/XOFF Support](#) for additional information.

X-OFF

Syntax CTRL S

Notes Prevents serial transmission to the unit, until the host sends an XON character (11h) when the Support XON/XOFF parameter is set to YES. See [XON/XOFF Support](#) for additional information.

Disable Flashing Characters

Syntax CTRL X

Notes This command disables subsequently received viewable characters to flash on and off.

Enable Flashing Characters

Syntax CTRL Z

Notes This command enables subsequently received viewable characters to flash on and off.

Begin Escape Sequence

Syntax CTRL [

Notes This command will process any subsequently characters as a control string

Control Code Command Summary

Table 5-2: Control Codes

<i>Description</i>	<i>Command</i>	<i>Description</i>	<i>Command</i>
Display Graphic Character 1	Ctrl A	Form Feed	Ctrl L
Display Graphic Character 2	Ctrl B	Carriage Return	Ctrl M
Display Graphic Character 3	Ctrl C	X-ON	Ctrl Q
Send ENQ	Ctrl E	X-OFF	Ctrl S
Sounds Bell	Ctrl G	Disable Flashing Characters	Ctrl X
Cursor Left	Ctrl H	Enable Flashing Characters	Ctrl Z
Cursor Right	Ctrl I	Begin Escape Sequence	Ctrl [
Line Feed	Ctrl J		

Chapter 6: Troubleshooting

Cursor does not appear on display

Possible Cause: No power to terminal (host supplied)

Solution: Verify proper voltage to terminal

Possible Cause: No power to terminal (adapter supplied)

Solution: Verify wall plug is functional and wiring of adapter (if wired as kit)

Possible Cause: Reversed polarity, improper wiring or wrong cable type

Solution: Check cable and connector wiring

Possible Cause: Cursor not enabled

Solution: Re-enable the cursor by sending an Esc v (or by changing the CURSOR parameter setting)

Terminal resets or locks-up

Possible Cause: Low voltage output

Solution: Verify proper voltage to terminal

Possible Cause: Cable resistance too high or wire gauge too small

Solution: Cable should be 26 AWG or larger

Possible Cause: Handshaking between host and terminal

Solution: When using handshaking, verify that the wiring between the host and terminal is correct, that you have the HANDSHAKE parameter enabled and that the handshake line from the host is asserted

When not using handshaking, make sure you have the HANDSHAKE parameter disabled

Terminal does not perform self-test

Possible Cause: Self-test parameter disabled

Solution: Change SELF TEST parameter to ENABLE

Terminal not receiving or displaying correct characters

Possible Cause: Parity settings incorrect

Solution: Change PARITY parameter to correct setting

Possible Cause: Data bits incorrect

Solution: Change DATA BITS parameter to correct setting

Possible Cause: Incorrect BAUD rate

Solution: Change BAUD parameter to correct setting

Possible Cause: Handshaking between host and terminal

Solution: When using handshaking, verify that the wiring between the host and terminal is correct, that you have the HANDSHAKE parameter enabled and that the handshake line from the host is asserted

When not using handshaking, make sure you have the HANDSHAKE parameter disabled

Possible Cause: Reversed polarity, improper wiring or wrong cable type

Solution: Check cable and connector wiring

Terminal displays PE character

Possible Cause: Incorrect parity setting

Solution: Change the PARITY setting on the terminal to match the host or vice versa

Possible Cause: Handshaking between host and terminal

Solution: When using handshaking, verify that the wiring between the host and terminal is correct, that you have the HANDSHAKE parameter enabled and that the handshake line from the host is asserted

When not using handshaking, make sure you have the HANDSHAKE parameter disabled

Terminal generates continuous sound while pressing key

Possible Cause: Handshaking between host and terminal

Solution: When using handshaking, verify that the wiring between the host and terminal is correct, that you have the HANDSHAKE parameter enabled and that the handshake line from the host is asserted

When not using handshaking, make sure you have the HANDSHAKE parameter disabled

Terminal displays double characters

Possible Cause: Echo turned on

Solution: Disable ECHO parameter

Cannot access parameter mode or function key programming

Possible Cause: Menu lock-out enabled

Solution: Remove power, simultaneously hold **CTRL**, **SHIFT** and **F3**, and reapply power

Possible Cause: Handshaking between host and terminal

Solution: When using handshaking, verify that the wiring between the host and terminal is correct, that you have the HANDSHAKE parameter enabled and that the handshake line from the host is asserted

When not using handshaking, make sure you have the HANDSHAKE parameter disabled

Terminal losing characters

Possible Cause: Handshaking between host and terminal

Solution: When using handshaking, verify that the wiring between the host and terminal is correct, that you have the HANDSHAKE parameter enabled and that the handshake line from the host is asserted

When not using handshaking, make sure you have the HANDSHAKE parameter disabled

Function keys not sending correct values

Possible Cause: Key accidentally reprogrammed

Solution: Reprogram function key

Possible Cause: EEPROM corrupted by line disturbance

Solution: Restore factory defaults and then reprogram parameters and function keys

Possible Cause: Terminal reset to factory defaults after repair

Solution: Reprogram function keys

Appendix A: Specifications

Display

- ▶ Reflective/Transreflective Liquid Crystal Display
- ▶ 4 Row x 20 Character Display Format
- ▶ US ASCII Character Set (5 x 7 pixels)
- ▶ Dark Characters on Light Background (except VFD)
- ▶ Options: Supertwist, Supertwist Backlit and Extended Temperature Supertwist Backlit

Keys & Switches

- ▶ Type: Membrane or Elastomeric
- ▶ Standard Layouts: 40-key, 30-key (membrane only)
- ▶ Feedback: Tactile and Audible
- ▶ Programmability: Up to five function keys (depending on keypad)
- ▶ Optional Backlit and Backlit Phosphorescent Keypads Available
- Storage temperature: -20°C to + 70°C • Operating temperature: 0 to + 50°C • Humidity: 90% (non-condensing)

Power

- ▶ Voltage: 5 VDC +/- 5%, 7.5-12 VDC* Linear Regulator or 9.5-28 VDC Switching Regulator
- ▶ Current: typical 45-50 mA (Some options will require additional current)

*Maximum voltage depends on current draw.

Interface

- ▶ Type: RS-232, RS-422 or CMOS/LSTTL level
- ▶ Handshaking: 2 Lines (DTR, DTS) for RS-232, CMOS/LSTTL
- ▶ Data Rates: 110 to 9,600 (19.2K, 57.6K available on a custom basis)
- ▶ Parity Range: Even, Odd, Mark, Space and Ignore
- ▶ Control Bits: 1 Start and 1-2 Stop Bits
- ▶ Interface Connector: 6 Pin Female Modular Connector
- ▶ Optional permanent or custom cable configurations Available

Environmental

- ▶ Storage Temperature: -20°C to +70°C
- ▶ Operating Temperature:
 - Standard: 0° to + 50°C
 - Extended Temperature: -20°C to +70°C
- ▶ Humidity: 90% (Non-condensing)

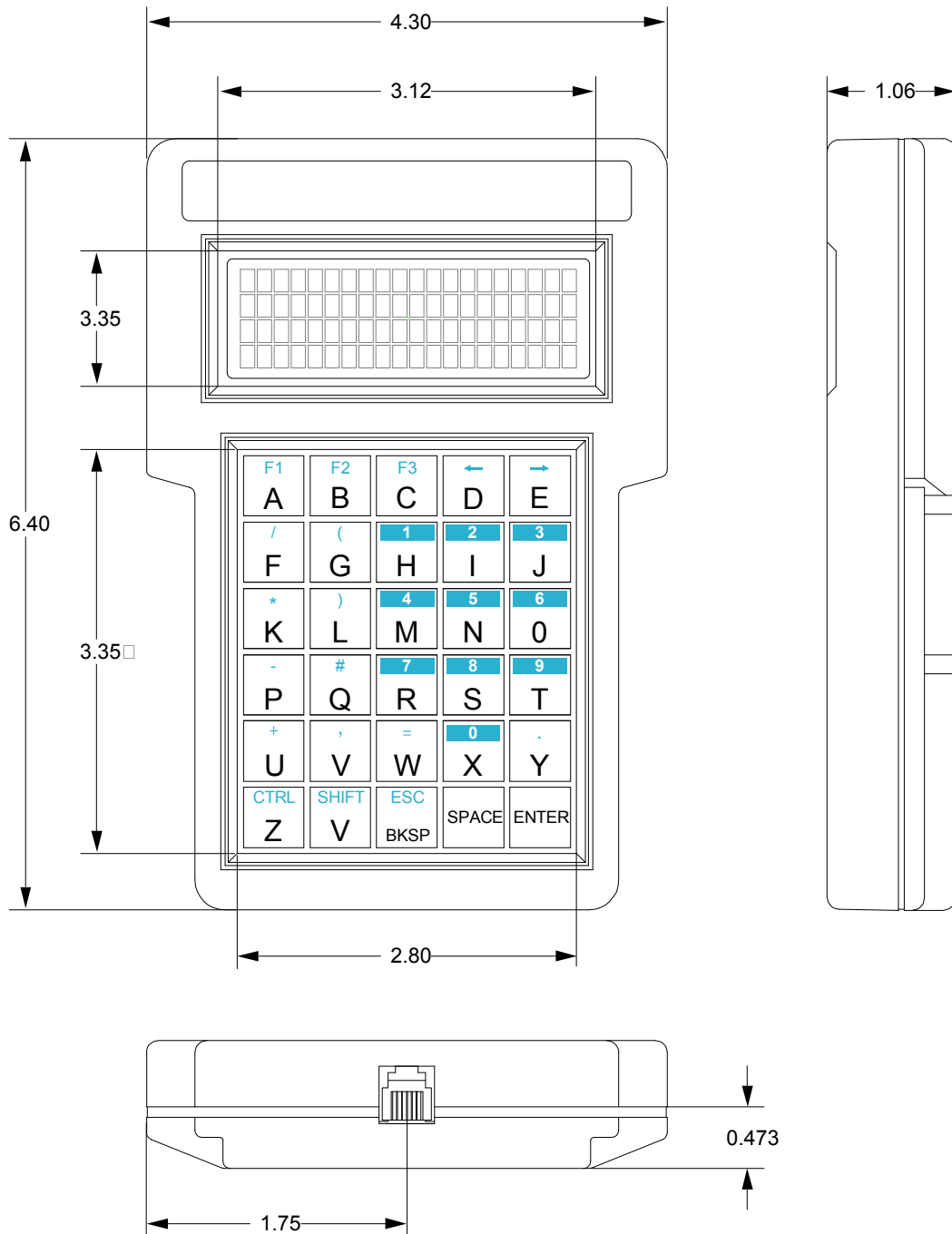
Physical

- ▶ Height: 6.4 inches (162.6 mm)
- ▶ Width: 4.30 inches (109.2 mm)
- ▶ Depth: 1.06 inches (26.9 mm)
- ▶ Weight: 10 ounces (283 grams)

Case: Bayblend (ABS Polycarbonate Blend)

Specifications are subject to change without notice

Figure 6-1: HV Series Case Dimensions



Appendix B: ASCII Character Set

Introduction

The following table contains the HV Series ASCII character set and corresponding Decimal, Hex and Binary conversion codes as well as the keystroke entry for QWERTY style PC keyboards:

Table B-1: ASCII Character Set and Conversion Codes

ASCII	Decimal	HEX	Binary	PC Key	ASCII	Decimal	HEX	Binary	PC Key
NUL	0	00	00000000	CTRL 1	RS	30	1E	00011110	CTRL =
SOH	1	01	00000001	CTRL A	US	31	1F	00011111	CTRL -
STX	2	02	00000010	CTRL B	Space	32	20	00100000	Space
ETX	3	03	00000011	CTRL C	!	33	21	00100001	!
EOT	4	04	00000100	CTRL D	"	34	22	00100010	"
ENQ	5	05	00000101	CTRL E	#	35	23	00100011	#
ACK	6	06	00000110	CTRL F	\$	36	24	00100100	\$
BEL	7	07	00000111	CTRL G	%	37	25	00100101	%
BS	8	08	00001000	CTRL H	&	38	26	00100110	&
HT	9	09	00001001	CTRL I	'	39	27	00100111	'
LF	10	0A	00001010	CTRL J	(	40	28	00101000	(
VT	11	0B	00001011	CTRL K	)	41	29	00101001)
FF	12	0C	00001100	CTRL L	*	42	2A	00101010	*
CR	13	0D	00001101	CTRL M	+	43	2B	00101011	+
SO	14	0E	00001110	CTRL N	,	44	2C	00101100	,
SI	15	0F	00001111	CTRL O	-	45	2D	00101101	-
DLE	16	10	00010000	CTRL P	.	46	2E	00101110	.
DC1	17	11	00010001	CTRL Q	/	47	2F	00101111	/
DC2	18	12	00010010	CTRL R	0	48	30	00110000	0
DC3	19	13	00010011	CTRL S	1	49	31	00110001	1
DC4	20	14	00010100	CTRL T	2	50	32	00110010	2
NAK	21	15	00010101	CTRL U	3	51	33	00110011	3
SYNC	22	16	00010110	CTRL V	4	52	34	00110100	4
ETB	23	17	00010111	CTRL W	5	53	35	00110101	5
CAN	24	18	00011000	CTRL X	6	54	36	00110110	6
EM	25	19	00011001	CTRL Y	7	55	37	00110111	7
SUB	26	1A	00011010	CTRL Z	8	56	38	00111000	8
ESC	27	1B	00011011	ESC	9	57	39	00111001	9
FS	28	1C	00011100	CTRL<	:	58	3A	00111010	:
GS	29	1D	00011101	CTRL	;	59	3B	00111011	;
<	60	3C	00111100	<	V	86	56	01010110	V
=	61	3D	00111101	=	W	87	57	01010111	W
>	62	3E	00111110	>	X	88	58	01011000	X
?	63	3F	00111111	?	Y	89	59	01011001	Y
@	64	40	01000000	@	Z	90	5A	01011010	Z

A	65	41	01000001	A	[	91	5B	01011011	[
B	66	42	01000010	B	\	92	5C	01011100	\
C	67	43	01000011	C	]	93	5D	01011101]
D	68	44	01000100	D	^	94	5E	01011110	^
E	69	45	01000101	E	_	95	5F	01011111	_
F	70	46	01000110	F	`	96	60	01100000	`
G	71	47	01000111	G	a	97	61	01100001	a
H	72	48	01001000	H	b	98	62	01100010	b
I	73	49	01001001	I	c	99	63	01100011	c
J	74	4A	01001010	J	d	100	64	01100100	d
K	75	4B	01001011	K	e	101	65	01100101	e
L	76	4C	01001100	L	f	102	66	01100110	f
M	77	4D	01001101	M	g	103	67	01100111	g
N	78	4E	01001110	N	h	104	68	01101000	h
O	79	4F	01001111	O	i	105	69	01101001	i
P	80	50	01010000	P	j	106	6A	01101010	j
A	65	41	01000001	A	k	107	6B	01101011	k
B	66	42	01000010	B	l	108	6C	01101100	l
C	67	43	01000011	C	m	109	6D	01101101	m
D	68	44	01000100	D	n	110	6E	01101110	n
E	69	45	01000101	E	o	111	6F	01101111	o
F	70	46	01000110	F	p	112	70	01110000	p
G	71	47	01000111	G	q	113	71	01110001	q
H	72	48	01001000	H	r	114	72	01110010	r
I	73	49	01001001	I	s	115	73	01110011	s
J	74	4A	01001010	J	t	116	74	01110100	t
K	75	4B	01001011	K	u	117	75	01110101	u
L	76	4C	01001100	L	v	118	76	01110110	v
M	77	4D	01001101	M	w	119	77	01110111	w
N	78	4E	01001110	N	x	120	78	01111000	x
O	79	4F	01001111	O	y	121	79	01111001	y
P	80	50	01010000	P	z	122	7A	01111010	z
Q	81	51	01010001	Q	{	123	7B	01111011	{
R	82	52	01010010	R	|	124	7C	01111100	|
S	83	53	01010011	S	}	125	7D	01111101	}
T	84	54	01010100	T	→	126	7E	01111110	
U	85	55	01010101	U	Delete	127	7F	01111111	Delete

Appendix C: Font Tables

Standard Display Font Table

The following table contains the Standard font characters displayed by HV Series terminals:

Table C-1: Standard Display Font Table

HEX	2X	3X	4X	5X	6X	7X	8X	9X	AX	BX	CX	DX	EX	FX
X0		0	1	2	3	4	5			6	7	8	9	*
X1	!	1	A	0	a	9			.	7	+	4	8	0
X2	"	2	B	R	b	n			T	7	W	X	a	B
X3	#	3	C	S	c	s	N		J	7	7	E	e	*
X4	\$	4	D	T	t	E			V	T	K	P	W	a
X5	%	5	E	U	u	U			.	7	*	l	c	U
X6	&	6	F	V	f	v	F		7	0	2	B	a	Z
X7	'	7	G	W	w	W			7	+	X	7	0	n
X8	(	8	H	X	h	X	*		4	0	*	U	J	X
X9	)	9	I	Y	y	Y			5	7	J	U	7	U
XA	*	*	J	Z	z	Z			5	0	n	V	7	7
XB	+	+	K	L	k	L			7	7	b	0	*	n
XC	,	<	L	N	l	l			6	0	0	0	0	n
XD	-	=	M	I	m	I			2	X	7	0	8	7
XE	.	>	N	O	n	*			3	0	7	7	n	7
XF	/	?	O		a				4	0	7	7	a	

Latin1 Display Font Table

The following table contains the Latin1 font characters displayed by HV Series terminals:

Table C-2: Latin1 Display Font Table

HEX	2X	3X	4X	5X	6X	7X	8X	9X	AX	BX	CX	DX	EX	FX
X0		0	1	2	3	4				8	9	A	B	C
X1	.	l	A	Q	a	m	n		i	h	n	R	a	n
X2	u	2	B	R	b	r	F		e	Z	R	O	a	o
X3	H	3	C	S	c	s	N		l	S	N	O	a	o
X4	\$	4	D	T	e	t	R		o	Z	R	A	a	a
X5	Z	5	E	U	u	u	u		Y	W	N	O	a	a
X6	&	6	F	V	v	v	R		i	W	e	O	a	o
X7	7	7	G	W	w	w	E		S	P	S	X	S	+
X8	8	8	H	X	x	x	T		.	.	e	O	a	o
X9	9	9	I	Y	y	y			0	l	k	O	a	u
XA	*	*	J	Z	z	z			S	S	E	O	a	u
XB	+	+	K	L	k	l			S	S	E	O	a	u
XC	,	,	L	M	m	m			T	N	Y	O	a	u
XD	-	-	N	I	n	i			S	N	Y	O	a	u
XE	.	.	N	n	n	r			0	N	I	P	r	r
XF	/	/	O	L	o				T	C	I	I	r	u

European Display Font Table

The following table contains the European font characters displayed by HV Series terminals:

Table C-3: European Display Font Table

HEX	2X	3X	4X	5X	6X	7X	8X	9X	AX	BX	CX	DX	EX	FX
X0		0	1	2	3	4	5	6	7	8	9	A	B	C
X1	:	;	;	;	;	;	;	;	;	;	;	;	;	;
X2	"	2	B	R	b	r	F	E	I	U	D	'	K	E
X3	#	3	C	S	c	s	N	E	I	T	B	!	K	*
X4	\$	4	D	T	e	t	R	A	I	V	G	!	K	*
X5	%	5	E	U	u	U	M	E	I	W	B	'	K	*
X6	&	6	F	V	v	V	H	E	N	J	K	+	O	Z
X7	'	7	A	W	a	w	B	A	A	A	A	*	a	r
X8	(	8	H	K	h	k	X	T	A	N	A	A	*	t
X9	)	9	I	V	i	v	O	A	S	*	O	I	a	u
XA	*	*	J	Z	j	z	Z	A	S	*	E	N	I	H
XB	+	;	K	E	k	e	S	A	V	*	A	X	M	T
XC	,	<	L	N	l	n	A	A	Z	M	O	O	E	M
XD	-	=	N	I	n	i	S	A	S	N	S	O	O	M
XE	.	>	N	n	n	n	S	A	S	N	O	O	M	E
XF	/	?	O		a		Z	A	E	N	E	E	M	

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