Qume®
A Subsidiary of ITT

QVT 109™

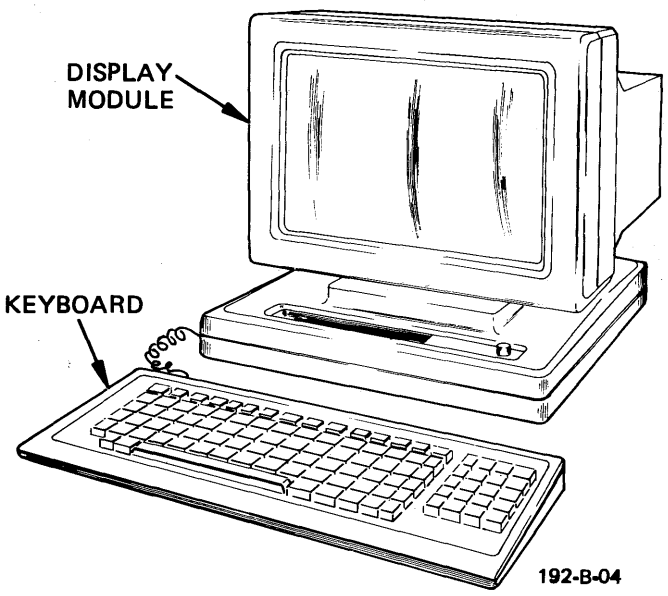
Operator Manual

FCC WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed, maintained, and used in accordance with instructions contained in Qume manuals, may cause interference with radio communications. This equipment has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commerical environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

WARNING

Reorder Number 35063
September 1984



The QVT-109 Video Display Terminal

PREFACE

This manual will teach you to use the the QVT-109 video display terminal efficiently and skillfully. Although your application may be unique, we encourage you to read this manual to gain a general understanding of the QVT-109's capabilities. This knowledge will enable you to use the terminal to its full potential. The keyboard and display module, the terminal's two major components, are illustrated above.

This manual is organized as follows:

SECTION 1, **PRODUCT DESCRIPTION**, outlines the terminal's specifications.

SECTION 2, **INSTALLATION**, describes how to unpack and install your QVT-109 terminal.

SECTION 3, **OPERATION**, is perhaps the most important section because it describes the power on procedure, set-up, and general operator functions.

SECTION 4, **PROGRAMMER INFORMATION**, provides a technical description of the terminal's command set.

SECTION 5, **OPERATOR CARE SECTION,** offers helpful tips for maintaining the terminal in good working order.

A **Glossary** and **Appendix** provide additional reference information. An **Index** concludes the manual with a topical listing of keywords and their page references.

RECORD THE SERIAL NUMBER AND MODEL NUMBER OF YOUR KEYBOARD AND DISPLAY MODULE

The serial number and model number for both the keyboard and display module are located on the bottom outside cover of each component.

KEYBOARD		DISPLAY MODULE	
Model Number		Model Number	
Serial Number		Serial Number	

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PRODUCT DESCRIPTION

INTRODUCTION

This section tabulates the specifications of the QVT-109 video display terminal.

Screen / Video Display

Screen Module	- 14-inch diagonal screen that features tilt and swivel for individual operator comfort. - Standard non-glare green or amber screen.
Display Format	- 24-lines by 80-character columns. - 25th Status/Set-up line. - Smooth or jump scroll
Character Formation	- 7 x 9 matrix in a 9 x 12 cell.
Video Attributes	- Non-embedded video attributes: Blink, Blank, Underline, Normal/Reverse video, and Half Intensity.
Cursor Type	- Blink/Steady, Block/Underline, or Invisible.
Fields	- Protected and Unprotected Fields.

Keyboard

Keyboard	- Detached, low-profile, capacitive keyboard with 3-position adjustable feet for enhanced individual operator comfort. - Alphanumeric typewriter character set. - 19 Programmable function keys (38 with Shift); up to 256 characters dynamically allocated to a single function key. - Numeric key pad. - 5 cursor positioning keys. - Defeatable audible key click and character auto repeat. - N-key rollover. - Keyboard lock enable/disable.
Character Set	- 96 ASCII character set. - 32 control characters. - 15 graphics (line drawing) symbols. - 4 additional character sets provided via status line selection (United Kingdom, German, Spanish, and French)

Features

Emulations	- In addition to its own native command set, the QVT-109 emulates the ADDS viewpoint A2.
Editing	- Cursor position/movement keys: Up, Down, Left, Right, Home. - Character/Line Insert and Delete. - Delete to End of Line/Screen. - Tabbing: Tab, Back Tab, Field Tab.
Rear Panel (Screen Module Pedestal) Features	- Power On/Off switch. - Line fuse: Standard 2 amp - 250 Vac. - AUX - Auxiliary (printer) interface connector; conforms to RS-232C DCE. - EIA - Host computer (RS-232/423 DTE) interface connector; RS422 and 20mA current loop options available.
Screen Intensity	- Adjustable screen intensity from potentiometer on right front corner of the display module pedestal.
Keyboard Connection	- Keyboard quick connect/disconnect from telephone style connector on left side corner of the display module pedestal.
Screen-Saver	- Automatic video disable after 15 minutes of inactivity with no loss of data. Depressing any key will return the video display. This feature can be disabled.
Set-up Mode	- Menu style (25th status line) set-up feature with memory storage capability.

Communications

Interface	- Compatible with the EIA RS-232-C and RS-423 interface standards; optional RS-422 and 20mA current loop interfaces also available via plug-in printed circuit boards. - Fully buffered bidirectional printer (AUX) port
Protocol	- X-ON/X-OFF with DTR, X-ON/X-OFF only, or DTR only.
Modes	- Full or Half Duplex. - Character/Line/Block Data Transmission.
Baud Rate	- HOST and AUX ports can be individually configured for different rates: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, and 19200.
Parity	- Odd, Even, Mark, Space, or None.
Data Word Size	- 7 or 8 data bits.

Power Requirements

Power Requirements	- 95 to 125 Vac, 0.30 A - 200 to 264 Vac, 0.15 A - 50/60 Hz, 35 W

Physical

Dimensions	- Screen Module: 14 3/4 inches high, 13 1/2 inches wide, 12 1/2 inches deep. - Keyboard: 1.5 inches high, 18 inches wide, 8 inches deep.
Weight	- Display Module: 19 pounds, 2 oz. - Keyboard: 3 pounds, 10oz.
Operating Temperature	- 0 to 40 degrees Centigrade (32 to 104 degrees Fahrenheit).
Relative Humidity	- 10 to 90% (non-condensing).

Options

Options	- 20-mA current loop communications interface (active or passive). - RS-422 interface

INSTALLATION

INTRODUCTION

This section describes receiving/inspection and installation of the QVT-109 video display terminal.

RECEIVING / INSPECTION

Each terminal is packaged in an individual carton for protection during shipment.

Before opening the carton, inspect it for any signs of damage. If damage is observed, have the delivery agent note the damage on the shipping document. Note: Some shippers may wish to be present when the carton is opened, if external damage is apparent.

Unpack and inspect the terminal as follows. Refer to Figure 2-1.

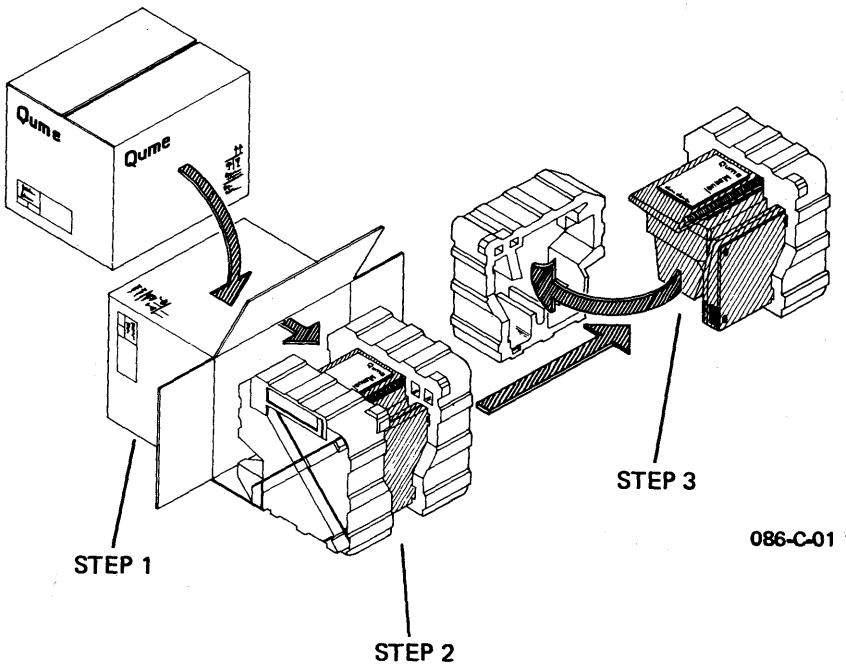


Figure 2-1. Unpacking the Terminal

1. Open the carton and place it on its side on a table top or flat surface.
2. Slide the terminal from the carton.
3. Remove the Styrofoam packing buns, taking care that neither the keyboard nor the display module are jostled or fall.

4. Remove the plastic bags that wrap each component. Retain all packaging materials for possible reshipment.

5. Inspect both the display module and the keyboard for scratches, loose parts, and damage from rough handling. Note any evidence of such damage on the invoice, and file a claim with the carrier immediately if the condition of either component so warrants.

6. If damage that might impair the proper operation of the terminal is detected, contact your service representative for advice and instructions.

7. If the terminal will not be used for some time, it is advisable to replace the plastic shipping bags for dust protection.

8. When repacking the terminal for shipment or for long storage periods, use only the original packaging materials.

INSTALLATION

Select a suitable site in which to install your terminal. A good site offers a clean, well-lighted environment, with a stable platform to support the terminal at a comfortable height. Install the terminal as follows:

1. Verify that the Power Switch on the rear panel of the display module pedestal is in the OFF position. The rear panel of the display module pedestal is illustrated in Figure 2-2.

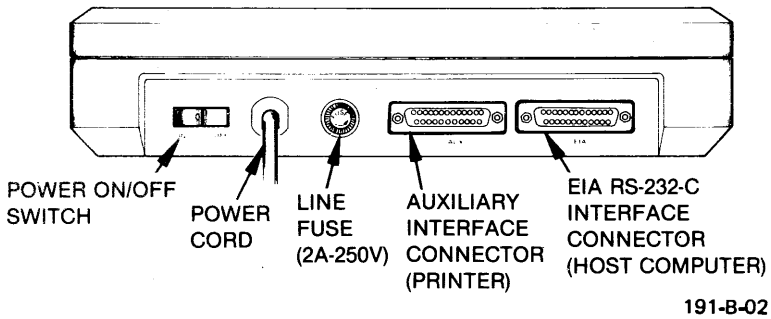


Figure 2-2. The Rear Panel of the Display Module Pedestal

2. Connect the communications cable between the host computer and the connector labeled "EIA" on the rear panel of the display module pedestal. If necessary, refer to Appendix A for a pinout description of this connector, and to Appendix B for information concerning optional interface jumper placement.

3. If a printer is to be used, connect the printer to the connector labeled "AUX" on the rear panel of the display module pedestal. If necessary, refer to Appendix A for a pinout description of this connector.

4. Connect the power cord from the display module to a grounded AC outlet.

5. Connect the coiled keyboard cable to the connector on the left front corner of the display module pedestal (refer to Figure 2-3).

6. Adjust the height of the keyboard to a comfortable elevation.

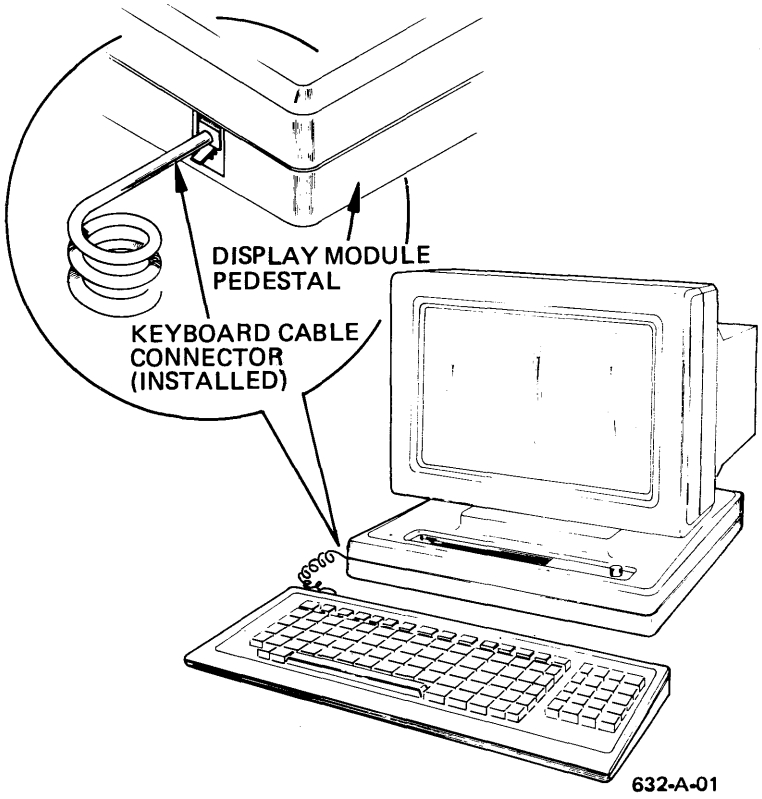


Figure 2-3. Keyboard Cable Connection to the Display Module

OPERATION

INTRODUCTION

This section will teach you how to operate the QVT-109 video terminal. Subjects discussed include turning on the terminal, adjusting screen intensity, using the keyboard, and performing general operator functions such as editing, printing, and sending the screen display.

POWERING ON THE TERMINAL

To power On the terminal, follow these steps:

- o Verify that the terminal is properly installed. Check to see that:
  - The Power Switch on the rear panel of the display module is in the OFF position;
  - The power cord is plugged into a grounded AC outlet;
  - The host computer cable is connected to the EIA Connector;
  - If a printer is to be used, it is connected to the AUX Connector;
  - The keyboard cable is connected to its connector on the left front corner of the screen module.
- o Move the Power Switch to the ON position and observe that the following things occur:
  - The margin bell or beeper sounds after about two seconds;
  - In about ten seconds the cursor appears at its Home position. Note: It may be necessary to adjust the screen intensity by rotating the knob on the right corner of the display module to make the display visible. Refer to Figure 3-1;
  - If an error code is displayed on the screen, refer to the Appendix C for further details and contact your service representative;
  - If the terminal appears not to be operating, verify that the power source is satisfactory, and that the fuse installed on the rear panel is a good fuse.

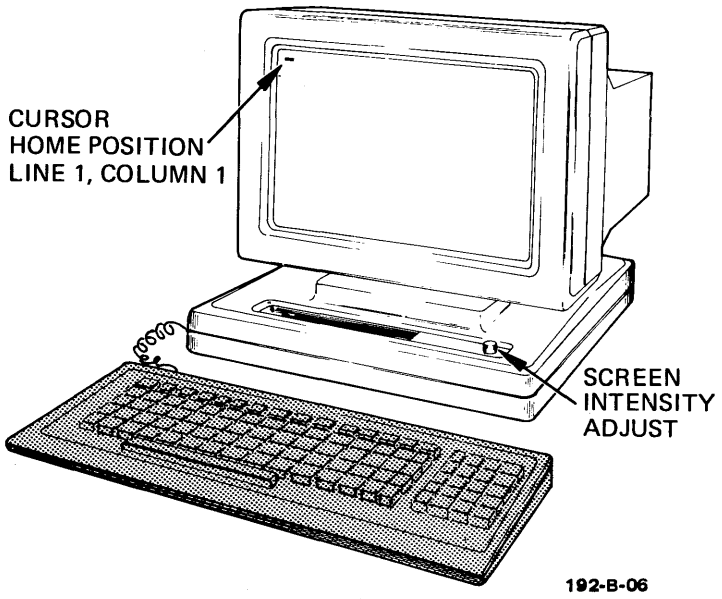


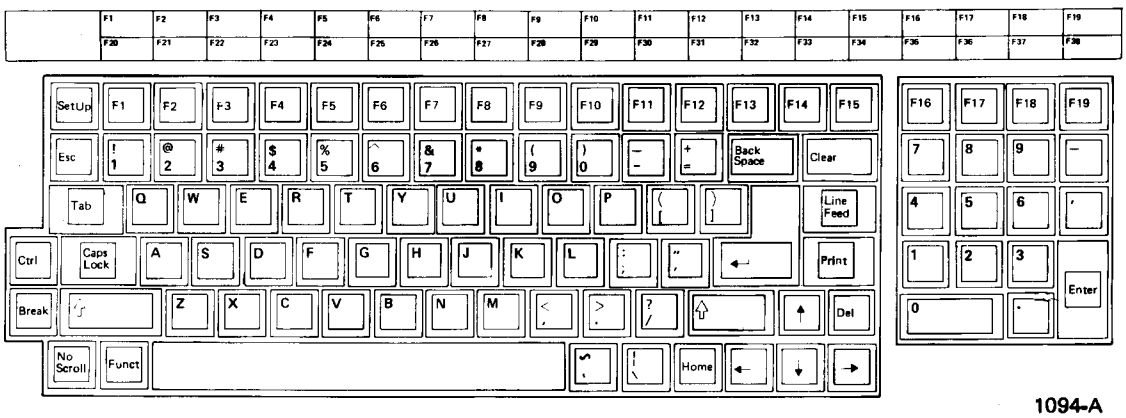
Figure 3-1. The Screen Display After Powering On the Terminal

USING THE TERMINAL

Although using a video display terminal is in many ways similar to using a typewriter, a video terminal has much greater capability. The ease with which data can be entered, edited, or formatted on the display screen before it is printed or sent to the host computer is, no doubt, the most beneficial feature. As a sound knowledge of keyboard operation is critical to these operations, we invite you to carefully study the following paragraphs dedicated to keyboard usage.

THE KEYBOARD

The keys of the keyboard can be divided into three functional groups known as the Typewriter Character Keys, Special Function Keys, and the Numeric Key Pad. Each of these functional groups is described below.



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TYPEWRITER CHARACTER KEYS

The Typewriter Character Keys function like those of an ordinary office typewriter. When these keys are depressed, they generate the codes necessary to make the characters display on the screen. Upper-case characters may be produced using the Shift key (the two keys with thick UP arrows), or by enabling the Caps Lock key. If desired, you can use the status line to turn on the key click function. When the key click feature is on, you'll hear a soft click each time you press a key, just as you would hear on an ordinary typewriter. A description of the status line and its functions appears later in this section.

The Return key is the large key with the left arrow that lies just left of the Line Feed and Print keys. Pressing the Return key causes a Carriage Return and returns the cursor to the left margin.

An Auto Repeat feature allows a key to be automatically repeated at a rate of approximately 30 characters per second whenever a key is held down for longer than a couple of seconds. The Auto Repeat feature affects most keys, except some of the special function keys such as ESC, HOME, and NO SCROLL. Note that the Auto Repeat feature can be turned off via the status line.

SPECIAL FUNCTION KEYS

The Special Function Keys are used to modify the operation of the terminal. They allow you to perform each of the following functions:

Selectively configure the terminal according to application;
Alter the programming;
Move the cursor around the screen;
Edit the display;
Enable the print and send functions.

Each of the special function keys is described below. For more detailed information, refer to the **Programmer Information Section.**

Setup

As a safeguard, the Setup key must always be used in combination with the Ctrl (Control) and Shift keys. This key allows you to enter and exit the status line. The status line is the bottom or 25th line on the screen. It allows you to select from a variety of terminal configuration options. Refer to The Status Line and Set-up paragraph for a complete description of the status line and the use of the Setup key.

Esc (Escape)

The Escape key is used to momentarily leave (escape) an application program to use one of the terminal's special feature or command functions. The Escape key is used in combination with the typewriter character keys to specify a command sequence. Press the Escape key and release it before pressing the second key in the command. Refer to the **Programmer Information Section** for a complete description of all OVT-109 escape sequences.

Ctrl (Control)

The Control key functions like the Escape key in that it enables a special feature or function. However, to issue a control command you must press the Control key and the appropriate typewriter character key simultaneously. (similar in action to the Shift key). In this manual we use a hyphen to separate keys that must be pressed at the same time. Refer to the **Programmer Information Section** for a complete description of all OVT-109 control code sequences.

Caps Lock

The Caps Lock key enables the shift function, displaying all alpha keys as upper-case characters. Note that the Caps Lock key does not affect the number keys. You must press the Shift key to access the upper characters on the number keys. The Caps Lock key is an On/Off function key. When the Caps Lock function is active, the small light on the key is on.

No Scroll

The No Scroll key is an On/Off function key. When pressed, it signals the host computer to stop the scrolling of the screen display. Pressing the No Scroll key a second time reenables scrolling of the screen.

Print

The Print key is used by itself or in combination with other keys to provide four print options: (1) To print all data on the screen, simply depress the Print key. (2) To print all data from the Home position (top left-hand corner of the screen, i.e., line 1, column 1) to the present cursor position, use the Print key in conjunction with the Shift key. This is known as a Shift-Print function. (3) To print all data from the present cursor position to the end of the screen, use the Print key with the Control key. (For data to print as it is positioned on the display screen, whenever the Print key is used, all null codes are converted to space codes.) (4) The fourth option allows you to print only the line that the cursor is on. Use the Control-Shift-Print combination to perform this function.

Cursor Position Keys: Arrow Up, Down, Left, Right, Home, Backspace

The cursor position keys are used to move the cursor about the screen. The arrow keys are repeat keys and move the cursor in the direction the arrow is pointing on the key cap. The Home key returns the cursor to the Home position, or location line 1, column 1 on the display screen. The Backspace key functions the same as the left arrow key.

Clear

Pressing the Shift key with the Clear key clears the screen of data and returns the cursor to the Home position.

Break

Pressing the Break key transmits a 200- to 250-millisecond space pulse to the computer. As a safeguard, the Break key must be used in combination with the Shift key.

Del (Delete)

Pressing the Delete key issues an ASCII delete (DEL) character to the host computer.

Line Feed
Shift/Line Feed

Pressing the Line Feed key issues an ASCII line feed (LF) command to the host computer and causes the cursor to move down one line in the same column on the screen. Using the Line Feed key in combination with the Shift key causes the cursor to be moved upward in the same column. Visually on the display screen, the cursor moves as it does when using the Up and Down Cursor Position keys.

Program Function Keys: F1 - F38

Each of the Program Function keys transmits to the host computer a special default code. You can, however, program the function keys to send any code or sequence of characters that you desire. You may use a Program Function key by itself or in conjunction with the Shift key to generate a total of 38 individual functions. A total of 380 characters can be assigned to the 38 function keys and up to 256 characters can be assigned to any individual key. For instructions on how to program a Function Key refer to the **Programmer Information Section.**

Funct

The Funct key transmits a user-selected character(s) bracketed by a start of header (SOH) code and a Carriage Return (CR) code. Note that while the characters assigned to a function key (F1 - F38) can be saved for future use, the characters assigned to the Funct key can be used only once.

NUMERIC KEY PAD

The Numeric Key Pad allows you to enter numbers in calculator fasnion. Each number key in the Numeric Key Pad generates the same characters as the number keys in the Typewriter Character Set. Pressing the Enter key causes a carriage return and moves the cursor to the left margin just as the Return key does.

THE STATUS LINE AND SET-UP

The Status Line is the last line (or 25th line) on the display screen. This last line can be changed seven times to view and, if required. to change the terminal's operating parameters. We call this process reconfiguring the terminal. You may need to change some of these parameters such as baud rate or emulation before the QVT-109 can successfully communicate with your host computer. Other parameters, though less critical to the terminal's operation, allow you to choose options such as key click and margin bell to match your individual working style. Each of the seven status lines is divided into a series of fields whose contents can be selected from the keyboard and, in some cases, by command code from the host computer.

Normally, when the Status Line is displayed, it appears in reverse video. The Status Line can, however, be blanked so that it doesn't appear on the screen. In fact, whenever you enter the smooth scroll or no handshake mode the Status Line automatically disappears from the screen.

CHANGING THE STATUS LINE

To move the cursor into the status line, press the Ctrl-Shift-Setup keys simultaneously. Once the cursor is in the Main Status Line, you can move it to any field or advanced it into any of the remaining six status lines by pressing the cursor position arrow keys. For example, pressing the Down Cursor Arrow key advances the cursor into the next status line, the Up Cursor Arrow key returns the cursor to the previous status line, and the Left and Right Cursor Arrow keys move the cursor left or right from field to field within a status line. To change a field from its default value, move the cursor into that field; then simply depress the Space Bar to select an alternate value for the field.

Once you have changed the configuration of the status line, press Shift-S to write the new values into memory. These values are then saved even after the terminal is turned off (all except the PROTECT MODE OFF/ON, KEYBOARD ON/LOCK, AUXILIARY PORT OFF/ON, MONITOR MODE OFF/ON, GRAPHICS MODE OFF/ON, and the TRANSPARENT MODE OFF/ON fields which always assume their default values when the power is cycled). Use the Shift-D combination to return all the status lines to their default values; Use a Shift-R combination to recall the previous "saved" status of the seven status lines. Whenever a Shift-S, Shift-R, or Shift-D function is performed, the cursor will exit the set-up sequence and return to its last position on the display. If you don't want to use Shift-S, Shift-R, or Shift-D, simply depress the Setup key a second time and the cursor will exit the status line; if you do not save the new configuration selections, however, they will only stay in effect until the power is turned off.

During a set-up sequence, only the following keys and key combinations are functional: Setup, Cursor Position keys, Space Bar, Shift-S, Shift-R, and Shift-D. The Typewriter Character keys, and the Esc and Ctrl keys are functional only to enter the HERE IS message and to program the Program Function keys. Pressing the zero key displays an "H" pattern used during video alignment procedures.

After configuring the terminal for operation with your host system, write down the operating parameters that you have selected. This will save you time in the future if you ever have to reselect these operating parameters.

STATUS LINE DESCRIPTION

Table 3-1 describes the default and possible values of each field within the six status lines. Note: Some status line selections are available by command code, and in the following table these are identified by an asterisk (*). Refer to the **Programmer Information Section** for the proper command code to use with the selected emulation (OVT-109 or ADDS VP).

Table 3-1. Status Line Default and Possible Values Description

Main Status Line

Default	Possible	Description
ON LINE	LOCAL	On Line Mode/Local Mode. On Line Mode configures the terminal for communication with the host computer; Local Mode isolates the terminal from the host.
CHAR MODE	LINE MODE BLCK MODE	Character Mode/Line Mode/Block Mode. Character Mode (also known as Conversational Mode) enables the terminal to transmit data to the host computer as it is entered on the keyboard. Line Mode enables the terminal to transmit the line in which the cursor is located when the Enter key is pressed. Block Mode enables the terminal to transmit the entire screen display when the Enter key is pressed.
FDX	HDX	Full Duplex/Half Duplex Transmission Mode. This field configures the transmission mode of the terminal. In Full Duplex Mode, data entered on the keyboard is transmitted to the host computer only; data must be echoed back to the terminal for screen display. In HDX (Half Duplex) Mode, data entered on the keyboard is transmitted to the host computer and is also internally echoed for screen display.
PROT OFF	PROT ON	Protect Mode Off/On*. Protect Mode is a feature that allows all data displayed in half intensity to be protected from accidental overwriting or erasure. This feature can be selectively enabled or disabled.
KB ON	KB LOCK	Keyboard On/Lock*. Keyboard lock disables the keyboard as a data entry device until: (1) a Keyboard Unlock command is received from the host computer, (2) a set-up sequence is entered, or (3) the Shift and Break keys are pressed.
AUX OFF	AUX ON	Auxiliary Off/On*. This feature selectively disables or enables the bidirectional AUX port or printer interface.
MON OFF	MON ON	Monitor Mode Off/On*. Monitor Mode is a feature that enables the display of all control codes and escape sequences in addition to the alphanumeric character set. Commands are not executed when Monitor Mode is selected. For proper operation, the Line Wrap feature should also be enabled.
GRAPH OFF	GRAPH ON	Graphics Off/On*. Graphics Mode is a special applications feature that reconfigures the terminal for 15 line drawing symbols. For a complete tabulation, refer to the **Programmer Information Section.** With the Graphics Mode disabled, the complete alphanumeric character set is available.

Table 3-1. Status Line Default and Possible Values Description (Cont)

Set 1 Status Line

Default	Possible	Description
SCROLL JUMP	SMOOTH	Jump/Smooth Scroll. This field selects jump or smooth scroll. When smooth scroll is selected, the status line is automatically disabled.
REPEAT ON	REPEAT OFF	Auto Key Repeat On/Off. This field is used to enable or disable the auto repeat key feature. When enabled, if a key is pressed and held down approximately 2 seconds, that character will repeat at a rate of approximately 30 characters per second.
CLICK OFF	CLICK ON	Key Click Off/On. The Click On/Off feature enables or disables the audible click sound of the keys being pressed.
MARGIN BELL ON	OFF	The Margin Bell On/Off. This field enables or disables the right margin alarm feature. When enabled, a "beep" sound will be emitted when the cursor passes through column 73.
E.O.M. NUL	ETX EOT CR	End of Message Terminator*. This field allows you to select the type of ASCII code identifier that signifies to the host computer the conclusion of a transmission. Four E.O.M. terminators are available: NUL (Null, Ctrl-@); EOT (End of Transmission, Ctrl-D); ETX (End of Text, Ctrl-C); or CR (Carriage Return, Ctrl-M).
COMPOSE OFF	ON	Disables or enables the terminal's compose feature. The compose feature allows you to create a variety of diacritical signs. These small signs, frequently used by German, French, and Spanish characters, are placed above a character to indicate that the marked character has a different phonetic value.

Table 3-1. Status Line Default and Possible Values Description (Cont)

Set 2 Status Line

Default	Possible	Description
LINE WRAP		
ON	OFF	Line Wrap On/Off. This field is used to select the line wrap feature which moves the cursor from the 80th column of a given line to the first unprotected position of the next line when the active position is shifted one column to the right. ON enables the line wrap feature; OFF disables the feature. When line wrap is disabled, the cursor will not move beyond the 80th column position and all data at this position will be subsequently overwritten.
LINE FEED		
ON	OFF	Line Feed Off/On. With Line Feed On, pressing the Return key will cause a carriage return with a line feed; with Line Feed Off selected, pressing the Return key will cause a carriage return without a line feed.
SCROLL		
ON	OFF	Scroll On/Off*. This field enables or disables automatic scrolling of the screen display.
DISPLAY PE		
ON	OFF	Display Parity Error Off/On. This field enables or disables the display a symbol (‡) to indicate that a transmission parity error has occurred.
STD VID	REV VID	Standard Video/Reverse Video. This field allows you to select the type of video display you want. If Standard Video is selected the screen will display as light characters on a dark background; if Reverse Video is selected, the screen display will appear as dark characters on a light background.
X-ON & DTR	X-ON ONLY DTR ONLY NONE	Protocol. Use this field to match the handshaking protocol used by your host computer. The default selection X-ON & DTR allows both X-ON/X-OFF (Transmit On/Transmit OFF) and DTR (Data Terminal Ready) protocol. Three other selections are available: X-ON ONLY (only X-ON/X-OFF); DTR ONLY (only Data Terminal Ready); NONE (allows higher thruput but must be used with the status line and smooth scroll disabled or with a low baud rate. For maximum data thru-put the compose feature should also be disabled. Note that all handshake options will function in the ADDS mode.

Table 3-1. Status Line Default and Possible Values Description (Cont)

Set 3 Status Line (Host)

Default	Possible	Description
DATA BIT 7	8	Data Word Length. Use this field to configure the length of ASCII encoded characters for either 7 or 8 bits. An eighth bit may be selected for parity.
BIT8 1	0	Bit 8 - Mark/Space. Use this field to set the eighth bit, or parity bit to logic level 0 or logic level 1 (i.e., space or mark).
PARITY OFF	ON	Parity Check Off/On. Use this field to configure the terminal to check (On) or ignore (Off) the parity bit of incoming data; this field adds parity to transmitted data when ON is selected.
PARITY BIT EVEN	ODD	Parity Bit Odd/Even. This field configures the terminal for odd or even parity.
STOP BIT 1	2	Stop Bit Select. This field selects the number of stop bits following a data word: 1 (one) or 2 (two).
BAUD RATE 9600	15-Possible	This field allows you to select transmission baud rate for both the EIA and AUX ports. In addition to the default baud rate of 9600, fifteen possible baud rates are available: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, and 19200.

Table 3-1. Status Line Default and Possible Values Description (Cont)

Set 4 Status Line (AUX)

Default	Possible	Description
DATA BIT 7	8	Data Word Length. Use this field to configure the length of ASCII encoded characters for either 7 or 8 bits. An eighth bit may be selected for parity.
BIT 8 0	1	Bit 8 - Mark/Space. Use this field to set the eighth bit, or parity bit to logic level 0 or logic level 1 (i.e., space or mark).
PARITY OFF	ON	Parity Check Off/On. This field configures the terminal to check (On) or ignore (Off) the parity bit of incoming data; it also adds parity to transmitted data when ON is selected.
PARITY BIT EVEN	ODD	Parity Bit Odd/Even. This field configures the terminal for odd or even parity.
STOP BIT 1	2	Stop Bit Select. This field selects the number of stop bits following a data word: 1 (one) or 2 (two).
BAUD RATE 9600	15-Possible	This field allows you to select transmission baud rate for both the EIA and AUX ports. In addition to the default baud rate of 9600, fifteen possible baud rates are available: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, and 19200.

Table 3-1. Status Line Default and Possible Values Description (Cont)

Set 5 Status Line

Default	Possible	Description
CURSOR UL	BLOCK	Cursor Type. This field allows you to select either an Underline or Block type cursor.
CURSOR BLINK	STEADY	Cursor Attribute. This field allows you to select the cursor attribute: Blinking or Steady (always On).
HERE IS:		Here Is Message. The Here Is field is a special purpose field that allows you to enter a message that specifically identifies a terminal to the host computer when an ASCII enquiry code (ENQ, Ctrl-E) is received. In the Here Is field, the first and last characters used must be the same, since these characters act as message delimiters (delimiters are not transmitted or displayed). Use a cursor key to exit this field before performing a Save function (Shift-S).
TIME OFF	TIME ON	Screen-Saver Feature. This field allows you to enable or disable the automatic screen-saver feature. After approximately 15 minutes of inactivity (no host or operator input) the display is automatically disabled to preserve the screen phosphor, although the screen RAM contents are held intact. When data from the host is received or any key is pressed, all screen contents are again displayed without loss of data.
FREQ 60	FREQ 50	Refresh Rate. This field selects the screen refresh rate which should be set to eliminate screen flicker.

Table 3-1. Status Line Default and Possible Values Description (Cont)

Set 6 Status Line

Default	Possible	Description
XPARENT OFF	ON	Transparent Mode Off/On*. Transparent Mode is a feature that configures the terminal to bypass all data received from the host computer to the AUX (printer) port. Such data does not display when Transparent Mode is selected.
KB TYPE: US	UK GM SP FR	Keyboard Type: US/UNITED KINGDOM/GERMAN/SPANISH/FRENCH This field allows a choice of keyboard type (character set).
STATUS LINE OFF	ON	Status Line Blank/Status Line Display*. This field enables or disables the continuous display of the Status Line (25th line). When ON is selected, the status line will display on the screen (assuming that jump scroll is also selected). When OFF is chosen, the status line is not visible on the screen.
EMULATION OVT109	ADDS	Emulation. This field selects the emulation command set: OVT109 identifies the terminal's native command set; ADDS, the ADDS VIEWPOINT™ command set.
F1: A@M	F2: thru Shift-F19	Program Function Key Codes. This field indicates the code sequence (default or programmed) for each of the thirty-eight Program Function keys. With the cursor in this field, pressing an F key will cause its contents to be displayed. 380 bytes total memory are dynamically allocated among the 38 function keys. Up to 256 characters can be allocated to any one function key. Refer to the **Programmer Information Section** for further information.

Table 3-2. Data Format Selection

Data can be encoded in any one of the following format combinations. Make the appropriate selection from the Set 3 or Set 4 Status Lines to yield the Desired Data Format.

Desired Data Format				Set 3/4 Status Lines Selection				
7 Bit ASCII	Bit 8	Parity	Stop Bits	Data Bit 8/7	Bit 8 0/1	Parity Off/On	Parity Bit Odd/Even	Stop Bit 1/2
7	None	Odd	1	7	*	On	Odd	1
7	None	Odd	2	7	*	On	Odd	2
7	None	Even	1	7	*	On	Even	1
7	None	Even	2	7	*	On	Even	2
7	Mark	None	1	7	1	Off	*	1
7	Mark	None	2	7	1	Off	*	2
7	Mark	Odd	1	8	1	On	Odd	*
7	Mark	Even	1	8	1	On	Even	*
7	Space	None	1	8	0	Off	*	1
7	Space	None	2	8	0	Off	*	2
7	Space	Odd	1	8	0	On	Odd	*
7	Space	Even	1	8	0	On	Even	*

* = Don't Care.

GENERAL OPERATOR FUNCTIONS

Once you have reconfigured the terminal so that it successfully communicates with your host computer system, you're ready to begin working. If this is your first experience using a video terminal, we suggest that you review the following general operator functions before moving on to Section 4.

ENTERING DATA FROM THE KEYBOARD

To practice entering (keyboarding) data on the terminal, follow these steps:

- Enter the status line (Ctrl-Shift-Setup) and place the terminal in Local Mode.

- Type several lines of data while observing how the characters are displayed on the screen. Note how the cursor "wraps around" to the left margin of the next line after each preceding line is completed; it is not necessary to use the Return key as with many typewriters. Line Wrap is a selectable feature available from the Set 2 Status Line.

- Press and hold down a character key and notice how the character automatically repeats on the screen. Key Repeat is a selectable feature available from the Set 1 Status Line.

- Next, move the cursor about the screen with the cursor arrow keys and notice how the cursor always moves in the direction that the arrow on the key is pointing.

- Press the Home key and observe that the cursor immediately returns to its Home position on the display screen, i.e., Line 1, Column 1.

- To erase the screen or clear it of all data, press the Shift and Clear keys simultaneously. When the screen is cleared, the cursor returns to the Home position.

EDITING THE SCREEN DISPLAY

Often you will want to change, or edit, data on the display screen for the purpose of correcting mistakes, entering a revision, etc. Perhaps the most used editing features are Character Overstrike, Character Insert/Character Delete, and Line Insert/Line Delete. These features are described below and require the use of an Escape sequence (except Character Overstrike). Refer to the **Programmer Information Section**, or to the Command Set Summary in Appendix F for specific applications information about the various editing commands.

Character Overstrike

Character overstrike is a feature that allows you to position the cursor under a character, key a new character, and have the new character display in place of the original character.

Character Insert / Character Delete

To insert a character, move the cursor to the position where you want the new character and enter an ESC O command. Insert the new chartacter in the blank space that appears above the cursor. When a character is inserted, all data from the cursor to the end of the line will move one character position to the right (any data in column 80 will be lost). To delete a character, move the cursor under the character you want deleted, and enter an ESC W command. The character will be blanked from the display screen and all data that was formerly to its right will move one space to the left to fill the vacated space. A blank space will be inserted at column 80.

Line Insert / Line Delete

To insert a line, move the cursor to the position where you want the new line. Enter an ESC E command and observe that all data from the present cursor line and below is scrolled downward one line. A blank line will appear above the former cursor line with the cursor located in column one. Within the blank line, you can now enter new data. To delete a line, move the cursor to the line to be deleted and enter an ESC R command. That line will be blanked from the display screen, and the data below will scroll upward to fill the line that was deleted.

PRINTING THE SCREEN DISPLAY

Four print options are available to print the data displayed on the screen. You can elect to print the entire screen, to print from the top of the screen to the cursor, to print from the cursor to the bottom of the screen, or to print only the line that the cursor is on. These print options are described below.

Printing the Entire Screen

To print the entire screen, simply depress the Print key or issue an ESC P command. For data to print as it is displayed on the screen, whenever the Print key is used all null codes are automatically converted to space codes.

Printing from the Top of the Screen to the Cursor

To print from the top of the screen to the cursor position, simultaneously press the Shift and Print keys or issue an ESC N command.

Printing from the Cursor to the Bottom of the Screen

To print from the cursor position to the bottom of the screen, simultaneously press the Control and Print keys or issue an ESC O command.

Printing the Line that the Cursor is On

To print only the line where the cursor is located, simultaneously press the Control, Print, and Shift keys or issue an ESC M command.

TRANSMITTING (SENDING) THE SCREEN DISPLAY TO THE HOST COMPUTER

When the terminal is configured to use the QVT-109 command set, data may be transmitted to the host computer by pressing the Enter key or by issuing a specific send command to transmit a select line or page of data (Line or Block Mode). Refer to the **Programmer Information Section** for further information.

Send Line

You can send a given line of data to the host system in three ways. First, if the terminal is configured to use the QVT-109 command set and is in Line Mode, press the Enter key. This causes the terminal to send only the unprotected data on a given cursor line. Secondly, issuing an ESC 4 command causes only full intensity data on a given cursor line to be transmitted; thirdly, issuing an ESC 6 command will cause all data (protected and unprotected) on the given cursor line to be transmitted to the host.

Send Page

You can send a given page or screen of data to the host system in one of three ways. First, you can use the Enter key, if the terminal is configured to use the QVT-109 command set and is in Block Mode. This causes the terminal to send only unprotected screen data. Secondly, by issuing an ESC 5 command, only full intensity data on a given display page will be transmitted. Finally, issuing an ESC 7 command will cause all data (protected and unprotected) on a given display page to be transmitted to the host.

OTHER FUNCTION CODES

Refer to the **Programmer Information Section** for a functional tabulation and description of all commands according to emulation. This information is also presented in abbreviated format in the Command Set Summary, Appendix F.

PROGRAMMER INFORMATION

INTRODUCTION

This section describes the command set of the QVT-109 video terminal and explains in more detail those topics introduced in the preceding section. This section assumes that you are already familiar with the proper operation of the terminal.

Refer to the Appendix for the following information as necessary:

- US ASCII And French, German, Spanish Code Sets (Appendix D),
- Control Codes (Appendix E),
- Command Set Summary (Appendix F).

MONITOR MODE

Monitor Mode enables the terminal to display all code sequences as they are entered along with alphanumeric characters. Table 4-1 shows how the various control codes display when monitor mode is on in the QVT-109 mode. For example, a CR control code (Carriage Return) displays as C_R. In ADDS mode the control codes display in identical fashion except that they are underlined. Note that command codes are not executed when Monitor Mode is active. Also, for proper Monitor Mode operation, enable the Line Wrap feature.

Monitor Mode is controlled by the following code sequences:

Monitor Mode Enable	QVT-109	ADDS VP
	ESC U Ctrl-1	Ctrl-1

Issuing this command configures the terminal to display all host computer and keyboard entries (alphanumeric and control characters). In this mode, the terminal does not execute the displayed control codes. For proper operation, enable the Line Wrap feature. Keyboard entries are sent to the host computer only if the the terminal is On Line.

Monitor Mode Disable	QVT-109	ADDS VP
	ESC X ESC u Ctrl-2	Ctrl-2

Issuing this command disables the Monitor Mode; control characters are not displayed. Only the alphanumeric character set displays. Control codes are executed.

Display Select Control Character	QVT-109	ADDS-VP
	ESC F N	

This command may be used to display a select control character. In the command sequence, "N" specifies the ASCII code for the control character to be displayed.

Table 4-1. Monitor Mode Code Sequence Visualization

CODE	ASCII COMMAND	HEX	SCREEN VISUALIZATION MONITOR MODE ON
Ctrl-@	Null	00	
Ctrl-A	SOH	01	S_H
Ctrl-B	STX	02	S_X
Ctrl-C	ETX	03	E_X
Ctrl-D	EOT	04	E_T
Ctrl-E	ENQ	05	E_Q
Ctrl-F	AK	06	A_K
Ctrl-G	BEL	07	B_L
Ctrl-H	BS	08	B_S
Ctrl-I	HT	09	H_T
Ctrl-J	LF	0A	L_F
Ctrl-K	VT	0B	V_T
Ctrl-L	FF	0C	F_F
Ctrl-M	CR	0D	C_R
Ctrl-N	SO	0E	S_O
Ctrl-O	SI	0F	S_I
Ctrl-P	DLE	10	D_L
Ctrl-Q	DC1	11	D_1
Ctrl-R	DC2	12	D_2
Ctrl-S	DC3	13	D_3
Ctrl-T	DC4	14	D_4
Ctrl-U	NAK	15	N_K
Ctrl-V	SYN	16	S_Y
Ctrl-W	ETB	17	E_B
Ctrl-X	CAN	18	C_N
Ctrl-Y	EM	19	E_M
Ctrl-Z	SUB	1A	S_B
ESC	ESC	1B	E_C
Ctrl-\ or Ctrl-Shift-L	FS	1C	F_S
Ctrl-] or Ctrl-Shift-M	GS	1D	G_S
Ctrl-^ or Ctrl-Shift-N	RS	1E	R_S
Ctrl-_ or Ctrl-Shift-O	US	1F	U_S

PROGRAM FUNCTION KEYS

Program Function Keys: F1-F19

Each of the nineteen Program Function keys transmits to the host computer a user-selected ASCII character or sequence of characters bracketed by a Ctrl-A (SOH) code and a Carriage Return (CR) code. A Program Function key may be used by itself or with the Shift key to generate a total of 38 codes. Each function key may be programmed from the keyboard to include up to 255 ASCII characters. Function key default values are listed in Table 4-2. Note that with the exception of the F1 through F3 and Sh-F1 through Sh-F3 function keys, default values are the same for OVT-109 and ADDS modes.

Table 4-2. Function Key Default Values

KEY	DEFAULT CODE VALUE (109 MODE)	DEFAULT CODE VALUE (ADDS MODE)
F1	Ctrl-A @ CR	Ctrl-B 1 CR
F2	Ctrl-A A CR	Ctrl-B 2 CR
F3	Ctrl-A B CR	Ctrl-B 3 CR
F4	Ctrl-A C CR	Ctrl-A C CR
F5	Ctrl-A D CR	Ctrl-A D CR
F6	Ctrl-A E CR	Ctrl-A E CR
F7	Ctrl-A F CR	Ctrl-A F CR
F8	Ctrl-A G CR	Ctrl-A G CR
F9	Ctrl-A H CR	Ctrl-A H CR
F10	Ctrl-A I CR	Ctrl-A I CR
F11	Ctrl-A J CR	Ctrl-A J CR
F12	Ctrl-A K CR	Ctrl-A K CR
F13	Ctrl-A L CR	Ctrl-A L CR
F14	Ctrl-A M CR	Ctrl-A M CR
F15	Ctrl-A N CR	Ctrl-A N CR
F16	Ctrl-A O CR	Ctrl-A O CR
F17	Ctrl-A P CR	Ctrl-A P CR
F18	Ctrl-A Q CR	Ctrl-A O CR
F19	Ctrl-A R CR	Ctrl-A R CR
Sh-F1	Ctrl-A ' CR	Ctrl-B ! CR
Sh-F2	Ctrl-A a CR	Ctrl-B " CR
Sh-F3	Ctrl-A b CR	Ctrl-B # CR
Sh-F4	Ctrl-A c CR	Ctrl-A c CR
Sh-F5	Ctrl-A d CR	Ctrl-A d CR
Sh-F6	Ctrl-A e CR	Ctrl-A e CR
Sh-F7	Ctrl-A f CR	Ctrl-A f CR
Sh-F8	Ctrl-A g CR	Ctrl-A g CR
Sh-F9	Ctrl-A h CR	Ctrl-A h CR
Sh-F10	Ctrl-A i CR	Ctrl-A i CR
Sh-F11	Ctrl-A j CR	Ctrl-A j CR
Sh-F12	Ctrl-A k CR	Ctrl-A k CR
Sh-F13	Ctrl-A l CR	Ctrl-A l CR
Sh-F14	Ctrl-A m CR	Ctrl-A m CR
Sh-F15	Ctrl-A n CR	Ctrl-A n CR
Sh-F16	Ctrl-A o CR	Ctrl-A o CR
Sh-F17	Ctrl-A p CR	Ctrl-A p CR
Sh-F18	Ctrl-A q CR	Ctrl-A q CR
Sh-F19	Ctrl-A r CR	Ctrl-A r CR

Both the QVT-109 and the ADDS emulations allow you to program a Function Key from the keyboard. Use the following instructions:

- Enter Set-up Mode (Ctrl/Shift/Setup) and move the cursor into the last field of the Set 6 Status Line.
- Press the Function key to be programmed; F1 through Shift/F19.
- Enter a start delimiter (any character that is not used in the data string that is to be the contents of that Function key). Note that delimiters do not display.
- Enter the desired data string. You can select a maximum of 255 ASCII characters.
- Enter the trailing delimiter (the trailing delimiter must be the same character as that used for the start delimiter).
- Repeat the above steps to program the contents of any of the remaining Programmable Function keys.
- To "save" the programmed contents of the Program Function key(s), first exit the cursor from the field, then issue a Shift-S.

When you examine the contents of any programmed Function Key from the status line, you'll only see the first 20 characters. You can, however, use the Shift key in combination with the right or left arrow keys to move through the entire field. This feature allows you to display all characters assigned to a particular Function Key.

Another useful feature to remember when programming the Function Keys is the ESC > command:

Request Unused Function Key Buffer Size	QVT-109
	ESC >

When you use this command, the terminal responds with ESC < nnn, where nnn is a three digit decimal number that represents the number of unused characters in the Function Key storage buffer.

In QVT-109 mode the function keys can also be programmed from the host by issuing the following command:

Programming A Function Key From The Host	QVT-109
	ESC K @,...,j Delimiter (Data) Delimiter

Use the following table to determine the actual values that should follow the ESC K sequence:

@,...,j	Function key identifier - Use Table 4-2 to select the function key identifier (@ through r) for the Function Key you wish to program.
Delimiter	Start delimiter - Use any character that is not a part of the sequence that you are assigning to the Function Key.
Data	Desired data string - Assign a maximum of 255 characters to the Function Key.
Delimiter	End delimiter - Use the same character that you used as the start delimiter.

Remember that the function keys share 380 bytes of dynamically allocated memory. When you program multiple function keys from the host at the same time, it is possible to use up all available memory. When this happens, any subsequent function key program commands will be discarded.

From the host, a function key can also be programmed with its default value by sending ESC K and two consecutive delimiters. The command ESC K Z causes all function keys to return to their default values.

CURSOR CONTROL

Cursor control may be as simple as moving the cursor about the screen (Home, Right, Left, Up, Down, etc.), assigning the cursor to a discrete location (cursor addressing), or inquiring of the terminal the active position of the cursor (read cursor). Each of these cursor control functions is described as follows:

Cursor Movement

Cursor Home	QVT-109	ADDS-VP
	Ctrl-^	Ctrl-A

Pressing the Home key or issuing a Cursor Home command causes the cursor to exit its current position and relocate at the Home position on the display screen.

Cursor Right	QVT-109	ADDS-VP
	Ctrl-L	Ctrl-F

To move the cursor one character position to the right, press the Cursor Right Arrow key, the Shift and Backspace keys (QVT-109 mode only), or issue a Cursor Right command. If the Key Repeat feature is enabled, the cursor will advance until the key is released or transmission of the command stopped. The cursor will line wrap regardless of the Line Wrap selection on the Status Line, and advance through any protected fields encountered.

Cursor Left	QVT-109	ADDS-VP
	Ctrl-H	Ctrl-U

To move the cursor one position to the left, press the Cursor Left Arrow Key, the Backspace key, or issue a Cursor Left command. If the Key Repeat feature is enabled, the cursor will advance until the key is released or transmission of the command stopped. The cursor will line wrap regardless of the Line Wrap selection on the Status Line, and advance through any protected fields encountered.

Cursor Up	QVT-109	ADDS-VP
	Ctrl-K	Ctrl-Z

To move the cursor up in the same column, pressing the Cursor Up Arrow Key, the Shift and Linefeed keys, or issue a Cursor Up command. If the Key Repeat feature is enabled, the cursor will advance upward and scroll within a given column, until the key is released or transmission of the command stopped. The cursor will advance through any protected fields encountered.

Cursor Down	QVT-109	ADDS-VP
	Ctrl-J	Ctrl-J

To move the cursor one line down in the same column, pressing the Cursor Down Arrow Key, the Linefeed key (QVT-109 only), or issue a Cursor Down command. If the Key Repeat feature is enabled, the cursor will advance downward and scroll within a given column, until the key is released or the transmission of the command stopped. The cursor will advance through any protected fields encountered.

Carriage Return	QVT-109	ADDS-VP
	Ctrl-M	Ctrl-M

Press the Carriage Return key, press the Enter key, or issue a Carriage Return command (when not in On-line, FDX, and Character modes) to return the cursor to the beginning of the current line. If Line Feed is enabled, the cursor will advance to column 1 of the next line. If Auto Scroll is enabled, the display will scroll up one line and the cursor will wrap to column 1 of line 24 when line 24 is completed. If Auto Scroll is disabled, the cursor will return to Home and the display will be overwritten when line 24 is completed.

New Line	QVT-109	ADDS-VP
	Ctrl- _	

A New Line command advances the cursor to column 1 of the following line. If the cursor is on the 24th line when a New Line command is issued and if the Auto Scroll feature is enabled, the screen will scroll upward one line and the cursor will advance to column 1 of the new 24th line. If the Auto Scroll feature is disabled, the cursor will move to the Home position and the display will be overwritten.

Backspace	QVT-109	ADDS-VP
		Ctrl-H

This command relocates the cursor one character position to the left.

Cursor Addressing/Cursor Reading

Cursor addressing/reading offers the capability of assigning the cursor to specific line and column coordinates on the display screen, or enquiring of the terminal the coordinates of the cursor's location. Refer to the Cursor Coordinate Codes listed in Table 4-3.

Address Cursor	QVT-109	ADDS-VP
	ESC = Line # Col #	ESC Y Line # Col #

This command assigns the cursor to specific line and column coordinates on the current display page. In the escape sequences, "#" equals the ASCII line and column equivalent values. Refer to Table 4-3, Cursor Coordinate Codes for the desired codes.

Read Cursor Address	QVT-109	ADDS-VP
	ESC ?	

This command causes the terminal to output the cursor address coordinates to the host computer in the format: Line, Column, Carriage Return. Refer to the appropriate Cursor Coordinate Codes table for the emulation in use.

Load Cursor Line	QVT-109	ADDS-VP
	ESC [Line #	Ctrl-K Line #

This command assigns the cursor to a specific line within the current cursor column. Use Table 4-3 to identify the code for the desired line. See Vertical Cursor Addressing for the equivalent ADDS-VP command.

Table 4-3. Cursor Coordinate Codes

Code Sequence: ESC = Line # Col #

LINE		COLUMN					
Line #	Character	Col #	Character	Col #	Character	Col #	Character
1	Space	1	Space	28	;	55	V
2	!	2	!	29	<	56	W
3	"	3	"	30	=	57	X
4	#	4	#	31	>	58	Y
5	$	5	$	32	?	59	Z
6	%	6	%	33	@	60	[
7	&	7	&	34	A	61	\
8	'	8	'	35	B	62	]
9	(	9	(	36	C	63	^
10	)	10	)	37	D	64	-
11	*	11	*	38	E	65	`
12	+	12	+	39	F	66	a
13	,	13	,	40	G	67	b
14	-	14	-	41	H	68	c
15	.	15	.	42	I	69	d
16	/	16	/	43	J	70	e
17	0	17	0	44	K	71	f
18	1	18	1	45	L	72	g
19	2	19	2	46	M	73	h
20	3	20	3	47	N	74	i
21	4	21	4	48	O	75	j
22	5	22	5	49	P	76	k
23	6	23	6	50	Q	77	l
24	7	24	7	51	R	78	m
		25	8	52	S	79	n
		26	9	53	T	80	o
		27	:	54	U		

Load Cursor Column	QVT-109	ADDS-VP
	ESC] Col #	Ctrl-P Col #

Issuing this command assigns the cursor to a specific column within the current cursor line. Use Table 4-3 to identify the code for the desired column. See Horizontal Cursor Addresssing for the equivalent ADDS-VP command.

Vertical Cursor Addressing	QVT-109	ADDS-VP
		Ctrl-K,r

This command determines on which of the 24 available lines the cursor should be positioned, using the five least significant of the next received character (in binary) to define the line. This command does not affect the cursor's horizontal position.

Horizontal Cursor Addressing	QVT-109	ADDS-VP
		Ctrl-P,c

This command defines the cursor's horizontal position, using the seven bits of the following received character to define the cursor's horizontal position. The character's three most significant bits indicate which group of ten positions (0-9, 10-19, ..., 70-79) is addressed. The four least significant bits make up a BCD number (0-9) which selects one of the ten positions within any one group. Note that this command does not affect vertical positioning of the cursor. The following tables show how horizontal cursor position is determined:

Group	**Most Significant Three Bits**
0 - 9	0 0 0
10 - 19	0 0 1
20 - 29	0 1 0
30 - 39	0 1 1
40 - 49	1 0 0
50 - 59	1 0 1
60 - 69	1 1 0
70 - 79	1 1 1

Position In Group	**Least Significant Four Bits**
0	0 0 0 0
1	0 0 0 1
2	0 0 1 0
3	0 0 1 1
4	0 1 0 0
5	0 1 0 1
6	0 1 1 0
7	0 1 1 1
8	1 0 0 0
9	1 0 0 1

Use Table 4-4 to quickly identify the ASCII characters required for all vertical and horizontal cursor positioning.

Table 4-4. Vertical And Horizontal Cursor Addressing Charts

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
@	A	B	C	D	E	F	G	H	I	P	Q	R	S	T	U	V	W	X	Y	S	!	"	#	$	%	&	'	(	)	0	1	2	3	4	5	6	7	8	9	@	A	B	C	D	E	F	G	H	I
CONTROL										P																																								

P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	DEL

For Horizontal Cursor Addressing use the CTRL-P c command. To select the position of the cursor (columns 1—80), substitute the corresponding character from the above table for "c". For example, the command CTRL-P 9 places the cursor at position 40 in the middle of the screen. Note that for the first twenty positions both the Control key and the designated character must be pressed.

1	@
2	A
3	B
4	C
5	D
6	E
7	F
8	G
9	H
10	I
11	J
12	K
13	L
14	M
15	N
16	O
17	P
18	Q
19	R
20	S
21	T
22	U
23	V
24	W

For Vertical Cursor Addressing use the CTRL-K r command to position the cursor in the desired row. For example, the command CTRL-K W places the cursor in row 24.

TAB CONTROL

As a default condition, typewriter tabs are preset at every 8th character position. The following commands how you can delete default tab stops and replace them with any desired tab arrangement. Note that a tab stop does not occupy a character position in the display. Also note that the ADDS emulation does not support tab functions.

Column Tab	QVT-109	ADDS-VP
	Ctrl-I	

Pressing a Tab key or issuing a Tab command advances the cursor to the next tab stop. If no tabs stops are present, the tabbing feature has no effect. This command only works when Protect Mode is disabled. With Protect Mode enabled, the cursor will move to the beginning of the current or previous unprotected field.

Back Tab	QVT-109	ADDS-VP
	ESC I	

Pressing the Shift and Tab keys or issuing a Back Tab command moves the cursor back to the previous tab stop on the current line, or to column 1 if the cursor is at the first tab stop on a line. If Protect Mode is enabled, the cursor moves to the beginning of the current or previous unprotected field.

Field Tab	QVT-109	ADDS-VP
	Ctrl-I	

With the Protect Mode enabled, the cursor moves as defined for Column Tab. Pressing the Tab key or issuing a Field Tab command causes the cursor to move to the first unprotected character following a protected field. If Protect Mode is not active, a field tab has no effect.

Set Tab	QVT-109	ADDS-VP
	ESC 1	

The Set Tab command sets a column tab at the cursor position. Tab stop locations can be "saved" by entering Set-up Mode and depressing Shift-S.

Clear Tab	QVT-109	ADDS-VP
	ESC 2	

The Clear Tab command deletes any tab stop from the column in which the cursor is located. Protect Mode has no effect.

Clear All Tabs	QVT-109	ADDS-VP
	ESC 3	

The Clear All Tabs command deletes all tabs stops from screen memory.

EDITING FUNCTIONS

The following editing functions are available by code sequence.

Character Insert	QVT-109	ADDS-VP
	ESC Q	

The Character Insert command moves all data from the cursor on a given line, one column to the right (any data moved beyond the 80th column is lost). A space character is inserted at the cursor position. Characters can only be inserted into unprotected areas.

Character Delete	QVT-109	ADDS-VP
	ESC W	

The Character Delete command deletes the character at the cursor position. All data that was formerly to the right of the cursor is moved one character position to the left and a space character is entered at column 80. Characters can only be deleted from unprotected areas.

Line Insert	QVT-109	ADDS-VP
	ESC E	

The Line Insert command inserts a line of space characters on the present cursor line and relocates the cursor to column 1. The former cursor line and any data below it is moved downward one line; any data moved beyond the 24th line is lost. Protect Mode has no effect.

Line Delete	QVT-109	ADDS-VP
	ESC R	

The Line Delete command deletes the present cursor line. All data below the former cursor line is moved upward one line and the cursor is relocated to column 1. The 24th line is filled with space characters. Protect Mode has no effect.

Clear Line to Spaces	QVT-109	ADDS-VP
	ESC T	ESC K

A Clear Line to Spaces command replaces all characters with space characters, from the cursor position to the end of the line. Protect Mode has no effect.

Clear Line to Nulls	QVT-109	ADDS-VP
	ESC t	

A Clear Line to Nulls command replaces all characters with nulls from the cursor position to the end of the line. Protect Mode has no effect.

Clear Screen to Spaces	QVT-109	ADDS-VP
	ESC Y	ESC k

A Clear Screen to Spaces command replaces all characters with space characters from the cursor position to the end of the screen. Protect Mode has no effect.

Clear Screen to Nulls	QVT-109	ADDS-VP
	ESC y	

A Clear Screen to Nulls command replaces all characters with nulls from the cursor position to the end of the screen. Protect Mode has no effect.

Clear All To Nulls	QVT-109	ADDS-VP
	ESC * 0	

This command clears all data to nulls and homes the cursor.

Clear Unprotected to Nulls	QVT-109	ADDS-VP
	ESC * 2	

The Clear Screen to Nulls command clears all screen data to nulls and homes the cursor.

Clear Unprotected Area to Spaces	QVT-109	ADDS-VP
	ESC * 3	

This command clears all data to space characters and homes the cursor.

Clear Screen	QVT-109	ADDS-VP
	Ctrl-Z	Ctrl-L
	ESC * 1	
	ESC +	

Pressing the Shift and Clear keys or issuing a Clear Screen command clears all screen data, protected and unprotected, to space characters and homes the cursor.

SEND FUNCTION

Data may be transmitted to the host computer by either pressing the Enter key or by issuing a specific send command to transmit a select string of data. Each of these send options is described below. See also "Transmission Modes" later in this section, and "Transmitting (Sending) the Screen Display to the Host Computer" in the section entitled **Operation.**

Send Line (unprotected)	QVT-109	ADDS-VP
	ESC 4	

This command transmits all unprotected data in a given cursor line to the host computer.

Send Page (unprotected)	QVT-109	ADDS-VP
	ESC 5	

This command transmits all unprotected data on the display screen to the host computer.

Send Line (All)	QVT-109	ADDS-VP
	ESC 6	

This command transmits all data on a given cursor line to the host computer.

Send Page (All)	QVT-109	ADDS-VP
	ESC 7	

This command transmits all data on the display screen to the host computer.

Send ID Message	QVT-109	ADDS-VP
	Ctrl-E	

This command transmits the HERE IS Message entered on the Status Line to the host computer.

Program Send Delimiter	OVT-109	ADDS-VP
	ESC x N	

This command specifies the End of Message character that terminates each data transmission. In the code sequence, "N" equals the ASCII code for the delimiter desired. Possible values may be a NUL, ETX, EOT, or a CR.

PRINT FUNCTION

Data is output from the terminal to the printer via the AUX (Auxiliary) Port. The AUX Port on the OVT-109 is capable of supporting bidirectional communications. The OVT-109 honors X-ON/X-OFF and/or DTR protocol, and complies with the EIA RS-232-C standard. Current loop and RS-422 option boards are also available. The various print functions and their command sequences are described below.

Print from Top of Screen to Cursor	OVT-109	ADDS-VP
	ESC N	

Pressing the Shift and Print keys or issuing a Print from Top of Screen to Cursor command causes the terminal to transmit all screen data from the Home position to the cursor, to the printer.

Print from Cursor to End of Screen	OVT-109	ADDS-VP
	ESC O	

Pressing the Ctrl and Print keys or issuing a Print from Cursor to End of Screen command causes the terminal to transmit all screen data from the cursor position to the end of the screen, to the printer.

Print Entire Screen	OVT-109	ADDS-VP
	ESC P	

Pressing the Print key or issuing a Print Entire Screen command causes the terminal to transmit all screen data to the printer.

Print Line	OVT-109	ADDS-VP
	ESC M	

Pressing the Ctrl-Shift-Print keys or issuing a Print Line command causes the terminal to print only the line in which the cursor is located.

Transparent Mode Enable	QVT-109	ADDS-VP
	Ctrl-R	ESC 3

A Transparent Mode Enable command causes the terminal to bypasses all data received (including control characters) and outputs it via the Auxiliary Port. No screen updating can occur while Transparent Print Mode is enabled.

Transparent Mode Disable	QVT-109	ADDS-VP
	Ctrl-T	ESC 4

A Transparent Mode Disable command disables the Transparent Print Mode after all data remaining in the Auxiliary Port buffer has been output.

AUX Port Enable	QVT-109	ADDS-VP
	ESC @	Ctrl-R

An AUX Port Enable command functionally connects the AUX Port to the EIA Port to enable the terminal to output all data received from either the host or the keyboard, to the peripheral (printer) connected to the AUX Port. The QVT-109 is equipped with a bidirectional AUX Port.

AUX Port Disable	QVT-109	ADDS-VP
	ESC A	Ctrl-T

An AUX Port Disable command functionally disconnects the EIA and AUX Ports.

VIDEO ATTRIBUTES

Video attributes affect all or part of a given display. Such attributes are nonembedded (i.e., they do not occupy a character position on the screen). In the QVT-109 emulation, all characters following an attribute will exhibit the characteristics of that attribute until a new attribute is specified.

In the ADDS-VP emulation, video attributes affect only tagged characters. Every tagged character on the screen must display the same attribute at the same time.

Set Tag Bit (SO)	QVT-109	ADDS-VP
		Ctrl-N

This command displays all subsequently received characters with a video attribute, when such a video attribute command is issued.

Reset Tag Bit (SI)	QVT-109	ADDS-VP
		Ctrl-O

This command resets the "tag" bit and causes all the characters that follow to be displayed normally.

Screen Attributes

Reverse Video	QVT-109	ADDS-VP
	ESC n 0	

This command changes the screen display to dark characters on a light background.

Normal Video	QVT-109	ADDS-VP
	ESC n 1	

This command cause the screen to display as the normal power on video display of light characters on a dark background.

Cursor Visible/Invisible	QVT-109	ADDS-VP
	ESC .0	Ctrl-X(vis) Ctrl-W(invis

The Cursor Visible/Invisible command is an On/Off feature that allows the cursor to be selectively displayed or blanked from screen display. In the ADDS emulation Ctrl-X enables the cursor while Ctrl-W disables the cursor.

Cursor Blinking/Block	QVT-109	ADDS-VP
	ESC .1	

This command displays the cursor as a blinking block.

Cursor Steady Block	QVT-109	ADDS-VP
	ESC .2	

This command displays the cursor as a steady block.

Cursor Blinking Underline	QVT-109	ADDS-VP
	ESC .3	

This command displays the cursor as a blinking underline.

Cursor Steady Underline	QVT-109	ADDS-VP
	ESC .4	

This command displays the cursor as a steady underline.

Character Attributes

Blank	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G 1	ESC 0 D	ESC G !	

Blank is a video attribute that is visualized as a space character(s). This command suppresses or blanks from the screen display all character positions from the cursor to the end of a field or line.

Blink	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G 2	ESC 0 B	ESC G "	ESC 0 C

Blink is a video attribute that causes all character positions displaying data from the cursor position to the end of a field or line to blink at the same time.

Invisible/Blink	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G 3		ESC G #	

Invisible/Blink combines the characteristics of the Blank and Blink video attributes. All data entered from the cursor position to the end of a field or line is suppressed or blanked from the video display. The blink attribute is not apparent.

Reverse Video	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G 4	ESC 0 P	ESC G $	ESC 0 Q

Reverse Video is a field/line attribute that causes all character positions displaying data from the cursor position to the end of the field or line to be visualized as dark characters on a light background; the opposite of the default power On video display condition.

Invisible/Reverse	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G 5		ESC G %	

Invisible/Reverse combines the characteristics of the Blank and Reverse Video attributes. When this combination attribute is selected, it is visualized as a blank, reverse video field or line originating from the cursor position.

Reverse/Blink	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G 6	ESC 0 R	ESC G &	ESC 0 S

Reverse/Blink combines the characteristics of the Blink and Reverse Video attributes. When selected, this combination attribute is visualized as a reverse video field or line originating from the cursor position. Data entered after this attribute blinks synchronously.

Invisible/Reverse/Blink	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G 7		ESC G '	

Invisible/Reverse/Blink combines the characteristics of the Blank, Reverse Video, and Blink attributes. When selected, this combination attribute is visualized as a reverse video field or line originating from the cursor position. Data entered after this attribute is blanked from screen display; the blink attribute is not apparent.

Underline	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G 8	ESC 0 _	ESC G (	ESC 0 a

Underline is a video attribute that causes all character positions from the cursor to the end of a field or line to display as underlined.

Invisible/Underline	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G 9		ESC G)	

Invisible/Underline combines the Blank and Underline video attributes. When this combination attribute is selected, it is visualized as an underlined field or line originating from the cursor position. Data entered after this attribute is blanked from screen display.

Normal Video	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G 0	ESC 0 @	ESC G sp	ESC 0 A

Normal Video is a field/line attribute that causes all character positions displaying data from the cursor position to the end of the field or line to be visualized as light characters on a dark background; the opposite of the Reverse Video field/line attribute.

Blink/Underline	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G :	ESC 0 b	ESC G *	ESC 0 c

Blink/Underline combines the Blink and Underline video attributes. When this combination attribute is selected, it is visualized as an underlined field or line originating from the cursor position. Data entered after this attribute blinks synchronously.

Invisible/Blink/Underline	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G ;		ESC G +	

Invisible/Blink/Underline combines the Blank, Blink, and Underline video attributes. When selected, this combination attribute is visualized as an underlined field or line originating from the cursor position. Data entered after this attribute is blanked from the screen display; the underline attribute is not apparent since it defines the bottom edge of the reverse video area.

Invisible/Reverse/ Underline	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G =		ESC G -	

Invisible/Reverse/Underline combines the Blank, Reverse Video, and Underline video attributes. When selected, this combination attribute is visualized as a reverse video field or line originating from the cursor position. Data entered after this attribute is blanked from screen display; the underline attribute is not apparent since it defines the bottom edge of the reverse video area.

Reverse/Underline	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G <		ESC G ,	

Reverse/Underline combines the Reverse and Underline video attributes. When selected, this combination attribute is visualized as a reverse video field or line originating from the cursor position. Data entered after this attribute displays in reverse video; the underline attribute is not apparent since it defines the bottom edge of the reverse video field.

Reverse/Blink/Underline	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G >		ESC G .	

Reverse/Blink/Underline combines the Reverse Video, Blink, and Underline video attributes. When selected, this combination attribute is visualized as a reverse video field or line originating from the cursor position. Data entered after this attribute blinks synchronously; the underline attribute is not apparent since it defines the bottom edge of the reverse video field.

Invisible, Reverse, Underline, Blink	FULL INTENSITY		HALF INTENSITY	
	QVT-109	ADDS-VP	QVT-109	ADDS-VP
	ESC G ?		ESC G /	

Invisible/Reverse/Blink/Underline combines the Blank, Reverse Video, Blink, and Underline video attributes. When selected, this combination attribute is visualized as a reverse video field or line originating from the cursor position. Data entered after this attribute is blanked from screen display; the underline and blink attributes are not apparent.

PROTECT MODE

Protect Mode is a feature that allows selected areas of the display to be protected from accidental overwriting. This feature allows you to create forms on the screen that have fixed headings and corresponding areas of space for data entry. Once you create a form, you can protect it from any accidental changes that an operator might introduce. The commands that control Protect Mode are described below.

Protect Mode Enable	QVT-109	ADDS-VP
	ESC &	

This command causes the terminal to interpret all half intensity fields, including any attributes within these fields, as protected areas within which data can not be overwritten. Attempting to enter data into a protected area will sound the alarm, the first character entered will be lost, and the cursor will be moved to the first unprotected character position beyond the protected area; here, the second character and any subsequent characters will display.

Protect Mode Disable	QVT-109	ADDS-VP
	ESC '	

This command disables the Protect Mode feature. The protect mode must be disabled before you turn on the write protect mode.

WRITE Protect Mode On	QVT-109	ADDS-VP
	ESC)	

This commmand marks data that is to be write protected.

WRITE Protect Mode Off	QVT-109	ADDS-VP
	ESC (	

This commands turns the write protect mode off, indicating the end of a write-protected field.

Follow these steps when write protecting data:

1. Before beginning, make sure the protect mode is disabled (ESC ')
2. Locate the cursor at the beginning of the first protected area.
3. Turn the write protect mode on by issuing the ESC) command.

4. Enter any desired visual attributes and the information you want protected.

5. After making any necessary corrections, turn the write protect mode off by issuing the ESC (command.

6. Repeat the preceding five steps for any other areas you wish protected.

7. When you have completed the process, protect the entire form by turning on the protect mode (ESC &). Note that when you turn on the protect mode, the cursor moves to the first unprotected character position. If the entire screen is write protected, the QVT-109 ignores any attempt to turn on the protect mode.

While protect mode is on, the Tab key or a tab command moves the cursor to the first unprotected position following a write-protected position. Also, with protect mode enabled, you cannot locate the cursor within a write-protected area.

TRANSMISSION MODES

You can select the desired Transmission Mode from either the status line or by command code sequence. See also "Send Function" earlier in this section, and the paragraph "Transmitting (Sending) the Screen Display to the Host Computer" in the section entitled **Operation.**

Block Mode Enable	QVT-109	ADDS-VP
	ESC B	

Block Mode configures the terminal for page-by-page data transmission. When you press the Enter key in Block Mode, only unprotected data will be transmitted to the host computer (blank areas are transmitted as spaces; no end of line message is transmitted). A Block Mode transmission is a 1,920 character string (maximum) that is terminated by the End of Message code selected on the Status Line. The Function keys do not operate in this mode.

Character Mode Enable	QVT-109	ADDS-VP
	ESC C	

Character Mode configures the terminal for conversational or character-by-character data transmission. Each character keyed from the keyboard is immediately transmitted to the host.

Line Mode Enable	QVT-109	ADDS-VP
	ESC D	

Line Mode configures the terminal for line-by-line data transmission. In Line Mode, only unprotected data on a given cursor line will be transmitted to the host computer when the Enter key is depressed (blank areas are transmitted as spaces). A Line Mode transmission is terminated by the End of Message code selected on the Status Line. The Program Function keys do not operate in the mode.

GRAPHICS MODE

Graphics Mode is a special applications feature that reconfigures the terminal for 15 line drawing symbols (refer to Table 4-5). The following command sequences control the Graphics Mode.

Graphics Mode Enable	OVT-109	ADDS-VP
	ESC $	

This command configures the terminal for Graphics Mode by redefining the A through O alphabetic keys for a special set of line drawing characters. For proper operation, disengage the Caps Lock key.

Graphics Mode Disable	OVT-109	ADDS-VP
	ESC %	

This command exits the Graphics Mode; keys A through O function as alphabetic character keys.

Table 4-5. Special Graphics Mode Characters

Key	Graphics Character
a	⎿
b	⌠
c	␦
d	⌡
e	└
f	┌
g	┐
h	┘
i	┼
j	⎸
k	⎺
l	┤
m	├
n	┬
o	┴

MISCELLANEOUS PROGRAM FUNCTIONS

Keyboard Lock/Unlock

Keyboard Disable	OVT-109	ADDS-VP
	ESC #	ESC 5 or Ctrl-D

This command disables the keyboard except for the Setup, Print, Break, Ctrl, and Shift keys. This feature is also available as a status line selection. You can manually override the command by performing a reset; i.e., depressing the Ctrl/Shift/Setup-Setup keys or the Shift and Break keys.

Keyboard Enable	OVT-109	ADDS-VP
	ESC "	ESC 6 or Ctrl-B

This command restores the action of the keyboard and can only be issued from the host computer. Locally, the keyboard can be restored by depressing the Ctrl/Shift/Setup-Setup keys or the Shift and Break keys.

Auto Scroll Enable/Disable

Auto Scroll Enable/ Disable	OVT-109	ADDS-VP
	ESC H	

The Scroll Enable/Disable feature is an On/Off feature that can be used to control the automatic scrolling of the screen display.

Jump/Smooth Scroll

Jump Scroll	OVT-109	ADDS-VP
	ESC j	

This command selects the terminal's default setting of jump scroll. Jump scroll must be selected before the status line or user line can be displayed.

Smooth Scroll	OVT-109	ADDS-VP
	ESC s	

This command enables the terminal's smooth scroll feature. Note that the status line is automatically turned off and the user line cannot be displayed whenever smooth scroll is selected.

Ring Bell

Ring Bell	QVT-109	ADDS-VP
	Ctrl-G	Ctrl-G

This command sounds the audible alarm.

Status Line Display/Blank

Display Status Line	QVT-109	ADDS-VP
	ESC }	ESC }

This command displays the status line on the 25th line. Note that this command is only effective when Jump Scroll is selected. The status line can also be displayed via the keyboard by pressing the Shift, Ctrl, and Set-up keys simultaneously.

Blank Status Line	QVT-109	ADDS-VP
	ESC {	ESC {

This command blanks the display of the status line on the 25th line. You can also blank the status line via the keyboard by simply pressing the Set-up key.

Self-Test Display/Blank

Self-Test Display	QVT-109	ADDS-VP
	ESC V	

This command display the terminal's entire complement of control codes, graphics characters, and video attributes as a visual self-test.

Self-Test Blank	QVT-109	ADDS-VP
	Shift-Break/ Shift-Clear	

Depressing the Shift and Break keys followed by the Shift and Clear keys causes the terminal to clear the current display page to space characters and to home the cursor.

User Line

Load User Line	OVT-109	ADDS-VP
	ESC f (data) CR	

Issuing this command from either the keyboard or the host permits a 79-character string of data to be entered on the 25th line. This command loads the desired contents into memory. User line data is not "savable."

Display User Line	OVT-109	ADDS-VP
	ESC g	

Issuing this command from either the keyboard or the host causes the terminal to display the contents of the user line on the 25th line. The user line can only be displayed if jump scroll mode is selected.

Disable User Line	OVT-109	ADDS-VP
	ESC h	

Issuing this command from either the keyboard or the host blanks the user line from display on the 25th line. If the status line has not been previously blanked, blanking the user line will cause the status line to redisplay.

Compose

Compose	OVT-109	ADDS-VP
	(accent) BS (letter)	(accent) BS (letter)

The Compose feature allows you to create a variety of diacritical signs from the keyboard or from the host. A diacritic is a small mark placed near or above a character. These signs indicate that the marked character has a different phonetic value. Diacritics are frequently used by the French, German, and Spanish languages.

The accent character can be any of the following characters: " ' , ^ ` ~

After entering the accent character, issue a Backspace and one of the following characters: a e i o u n c A E I O U N C.

There are, then, four different ways of producing a diacritical character. As an example, the letter u in the German language set can be produced in four ways:

1. By hitting the u character on the keyboard.
2. By receiving the ASCII code for u.
3. By using the Compose command from the keyboard.
4. By issuing the Compose command from the host.

Note that methods one and two produce a character which produces one ASCII code when sent to the host or to a printer. Methods three and four produce three ASCII codes when sent to the host or printer. Also note that thru-put is increased when Compose is turned off from the status line.

"H" Video Alignment Pattern Display/Blank

"H" Pattern Display	QVT-109	ADDS-VP
	Ctrl/Shift/Setup-0	

Depressing the Ctrl/Shift/Setup keys followed by the Zero key causes the terminal to display a 24 line by 80 column "H" video alignment pattern. Centered within this display is a series of numbers that identifies the terminal's firmware revision level.

"H" Pattern Blank	QVT-109	ADDS-VP
	Shift/Clear	

Depressing the Shift and Clear keys causes the terminal to clear the "H" pattern display to space characters and home the cursor.

OPERATOR CARE

Operator care of the OVT-109 is limited to keeping both the display module and keyboard clean and free of dust. Occasionally use a soft brush or vacuum cleaner to remove any accumulated dust.

Use a commercially available cleaning kit for care of the display screen and more stubborn cleaning requirements. Before cleaning the display screen always power OFF the terminal.

In some environments, it may be beneficial to protect the terminal with a dust cover when it is not in use.

GLOSSARY

INTRODUCTION

This glossary of terms is provided to better your understanding of some of the technical terminology used in this manual.

ASCII

Acronym for the American Standard Code for Information Interchange. A standardized code for the transmission of data, composed of 128 characters (upper- and lower-case letters, numbers, punctuation marks, symbols, and control characters) represented in 7-bit binary format.

Baud Rate

The rate of data transmission. Usually, one baud represents a transmission rate of one binary bit of data per second.

Break

A communications interrupt signal used to immediately halt communications.

Command

A special code, or series of codes, that causes the terminal or host computer to perform a specific electronic or mechanical action. Commands are generated in conjunction with the Control or Escape keys. Such commands are non-printable, e.g., setting a tab.

Cursor

A highlighted area (underline or block) that is used on the display screen to indicate the next character position.

Data

A general term used to describe that which is transmitted. Data is both ASCII encoded alphanumeric characters and command instructions.

Del (Delete)

An ASCII code used to delete or cancel transmitted data.

EIA RS-232-C

The Electronic Industries Association that sets forth standards for electronic and electrical devices. Your terminal complies with the EIA RS-232-C Standard for communicating devices.

Emulation

The act of imitating a device as if it were that device. Your terminal emulates one other video terminal (ADDS Viewpoint) in addition to its own performance criteria.

Handshaking

A communications method that controls the flow of data transmission. This is necessary when the speed of data handling varies between the devices within the system. Three methods of handshaking are available for use with your terminal: X-ON/X-OFF (Transmit On/Transmit Off) with DTR (Data Terminal Ready), X-ON/X-OFF only, or DTR only.

Home

Home is that position on the display screen identified as Line 1, Column 1.

Host or Host Computer

The computer that controls the system of which the terminal is a part.

Interface (AUX and EIA)

The communications channel through which data flows; both the physical connectors and the signal lines.

Nul (Null)

An ASCII code that is used as a fill character in some communications formats (a nothing character).

Parity

A method of checking for errors in data communications.

Reverse Video

That condition of the video screen in which data is displayed as dark characters on a light background. Reverse video is the opposite of normal or standard video.

Screen

Literally the word "screen" is synonymous with "display screen" and "video display," but in actual usage is often used interchangeably with "page."

Scroll

As all 24 lines of the display screen are filled with data, the screen is said to "scroll" when the first line disappears, and the display moves up one line to vacate the bottom line for new data. If this feature is disabled, as the 24th line is completed, the cursor will move to line 1, column 1 and the display will be overwritten as subsequent data is entered.

Terminal

An electronic communicating device that is generally considered to have the capability to transmit and receive data. Some terminals are used as receive only devices.

Toggle

To select a function, or enable or disable a function, by depressing a key. In this terminal, the fields in the status lines are toggled by the space bar.

Wraparound

An automatic carriage return, line feed operation. The action of the cursor as it reaches the end of a line and then automatically goes to the beginning of the next line.

APPENDIX

The following appendices are provided for reference.

Appendix	Title
A	EIA Connector Pinout Descriptions
B	AUX Connector Pinout Descriptions
C	Error Codes Summary
D	US ASCII Code Chart
E	Control Code Keystrokes
F	Command Set Summary

Appendix A. EIA Connector Pinout Descriptions

Pin No.	Signal Description	Signal Direction	Designation
1	Protective Ground	----	AA
2	Transmitted Data	From Terminal	BA
3	Received Data	To Terminal	BB
4	Request to Send	From Terminal	CA
5	Clear to Send	To Terminal	CB
6	Data Set Ready	To Terminal	CC
7	Signal Ground	----	AB
8	Data Carrier Detect	To Terminal	CF
15	Current Loop - RXD (+) RS422 Receive -	----	
17	Current Loop - TXD (-) RS422 Transmit +	----	
20	Data Terminal Ready	From Terminal	CD
24	Current Loop - RXD (-) RS422 Transmit +	----	
25	Current Loop - TXD (+) RS422 Transmit -	----	

Notes:

1. In full duplex mode the RTS signal is always SPACE.
2. In half duplex mode the RTS signal becomes SPACE while sending data. When not sending data, RTS becomes MARK.
3. Under default conditions, the RS-232-C is active and the current loop is disconnected.
4. When no external connection is made, Data Set Ready (pin 6), Data Carrier Detect (pin 8), and Data Terminal Ready (pin 20) are held in the MARK state.

Appendix B. AUX Connector Pinout Description

Pin No.	Signal Description	Signal Direction	Designation
1	Protective Ground	----	AA
2	Transmitted Data	To Terminal	BA
3	Received Data	From Terminal	BB
4	Request to Send	From Terminal	CA
5	Clear to Send	To Terminal	CB
6	Data Set Ready	To Terminal	CC
7	Signal Ground	----	AB
8	Carrier Detect	To Terminal	CF
20	Data Terminal Ready	From Terminal	CD
11	Secondary Break Indicator (ADDS mode only)	From Terminal	

Appendix C. Error Codes Summary

When the terminal is powered On, a self-test is automatically performed. If a non-fatal error is detected, an error code will be displayed on the screen. For example, if the letter "D" is displayed, this signifies that an error exists in the video RAM circuit.

Error Code Character Displayed	Fault Detected Item			
	SROM	SRAM	VRAM	KBD
A	*			
B		*		
C	*	*		
D			*	
E	*		*	
F		*	*	
G	*	*	*	
H				*
I	*			*
J		*		*
K	*	*		*
L			*	*
M	*		*	*
N		*	*	*
O	*	*	*	*

Legend: SROM = System ROM (Read Only Memory)
SRAM = System RAM (Random Access Memory)
VRAM = Video RAM
KBD = Keyboard

Appendix D. ASCII Code Charts

US ASCII CODE CHART

Bits b_4	b_3	b_2	b_1	Columns / Hilera	0 (000)	1 (001)	2 (010)	3 (011)	4 (100)	5 (101)	6 (110)	7 (111)
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z
1	0	1	1	B	VT	ESC	+	;	K	[	k	{
1	1	0	0	C	FF	FS	,	<	L	\	l	|
1	1	0	1	D	CR	GS	-	=	M	]	m	}
1	1	1	0	E	SO	RS	.	>	N	^	n	~
1	1	1	1	F	SI	US	/	?	O	_	o	DEL

733-A

32 ASCII CONTROL CODES

96 ASCII CHARACTER SET

Notes: • Hexadecimal = ASCII Column + Row. A = 41 Hex

• Example: ASCII Encoded Letter A = Bits: P 7 6 5 4 3 2 1
* 1 0 0 0 0 0 1
(* = Parity Bit)

FRENCH /US CODE SET

FRENCH/US

b7 b6 b5 / Bits b4 b3 b2 b1 / Columna / Hilera	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
	0	1	2	3	4	5	6	7
0 0 0 0 0	NUL	DLE	SP	0	à/@	P	‵	p
0 0 0 1 1	SOH	DC1	!	1	A	Q	a	q
0 0 1 0 2	STX	DC2	"	2	B	R	b	r
0 0 1 1 3	ETX	DC3	£/#	3	C	S	c	s
0 1 0 0 4	EOT	DC4	$	4	D	T	d	t
0 1 0 1 5	ENQ	NAK	%	5	E	U	e	u
0 1 1 0 6	ACK	SYN	&	6	F	V	f	v
0 1 1 1 7	BEL	ETB	’	7	G	W	g	w
1 0 0 0 8	BS	CAN	(	8	H	X	h	x
1 0 0 1 9	HT	EM	)	9	I	Y	i	y
1 0 1 0 A	LF	SUB	*	:	J	Z	j	z
1 0 1 1 B	VT	ESC	+	;	K	°/[	k	é/{
1 1 0 0 C	FF	FS	,	<	L	ç/\	l	ù/|
1 1 0 1 D	CR	GS	-	=	M	§/]	m	è/}
1 1 1 0 E	SO	RS	.	>	N	^	n	¨/~
1 1 1 1 F	SI	US	/	?	O	_	o	DEL

HEXADECIMAL = COLUMN + ROW

731-A

GERMAN/US CODE SET

GERMAN/US

Bits b7 b6 b5					0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b4	b3	b2	b1	Columna / Hilera	0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	§/@	P	`	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#/#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z
1	0	1	1	B	VT	ESC	+	;	K	Ä/[	k	ä/{
1	1	0	0	C	FF	FS	,	<	L	Ö/\	l	ö/|
1	1	0	1	D	CR	GS	-	=	M	Ü/]	m	ü/}
1	1	1	0	E	SO	RS	.	>	N	^	n	ß/~
1	1	1	1	F	SI	US	/	?	O	_	o	DEL

HEXADECIMAL = COLUMN + ROW

732-A

SPANISH/US CODE SET

SPANISH/US

Bits b_7 b_6 b_5 / b_4 b_3 b_2 b_1	Columna / Hilera	000	001	010	011	100	101	110	111
		0	1	2	3	4	5	6	7
0 0 0 0	0	NUL	DLE	SP	0	§/@	P	`	p
0 0 0 1	1	SOH	DC1	!	1	A	Q	a	q
0 0 1 0	2	STX	DC2	"	2	B	R	b	r
0 0 1 1	3	ETX	DC3	£/#	3	C	S	c	s
0 1 0 0	4	EOT	DC4	$	4	D	T	d	t
0 1 0 1	5	ENQ	NAK	%	5	E	U	e	u
0 1 1 0	6	ACK	SYN	&	6	F	V	f	v
0 1 1 1	7	BEL	ETB	'	7	G	W	g	w
1 0 0 0	8	BS	CAN	(	8	H	X	h	x
1 0 0 1	9	HT	EM	)	9	I	Y	i	y
1 0 1 0	A	LF	SUB	*	:	J	Z	j	z
1 0 1 1	B	VT	ESC	+	;	K	¡/[	k	°/{
1 1 0 0	C	FF	FS	,	<	L	Ñ/\	l	ñ/|
1 1 0 1	D	CR	GS	-	=	M	¿/]	m	ç/}
1 1 1 0	E	SO	RS	.	>	N	^	n	~/~
1 1 1 1	F	SI	US	/	?	O	_	o	DEL

HEXADECIMAL = COLUMN + ROW

730-A

Appendix E. Control Code Keystrokes

The following table lists the keystrokes necessary for generating control codes. Control codes can be issued from the keyboard by depressing the Control Key simultaneously with another key.

CODE	ASCII COMMAND	HEX	SCREEN VISUALIZATION MONITOR MODE ON
Ctrl-@	Null	00	
Ctrl-A	SOH	01	S_H
Ctrl-B	STX	02	S_X
Ctrl-C	ETX	03	E_X
Ctrl-D	EOT	04	E_T
Ctrl-E	ENQ	05	E_O
Ctrl-F	AK	06	A_K
Ctrl-G	BEL	07	B_L
Ctrl-H	BS	08	B_S
Ctrl-I	HT	09	H_T
Ctrl-J	LF	0A	L_F
Ctrl-K	VT	0B	V_T
Ctrl-L	FF	0C	F_F
Ctrl-M	CR	0D	C_R
Ctrl-N	SO	0E	S_O
Ctrl-O	SI	0F	S_I
Ctrl-P	DLE	10	D_L
Ctrl-Q	DC1	11	D_1
Ctrl-R	DC2	12	D_2
Ctrl-S	DC3	13	D_3
Ctrl-T	DC4	14	D_4
Ctrl-U	NAK	15	N_K
Ctrl-V	SYN	16	S_Y
Ctrl-W	ETB	17	E_B
Ctrl-X	CAN	18	C_N
Ctrl-Y	EM	19	E_M
Ctrl-Z	SUB	1A	S_B
ESC	ESC	1B	E_C
Ctrl-\ or Ctrl-Shift-L	FS	1C	F_S
Ctrl-] or Ctrl-Shift-M	GS	1D	G_S
Ctrl-^ or Ctrl-Shift-N	RS	1E	R_S
Ctrl-_ or Ctrl-Shift-O	US	1F	U_S

Appendix F. Command Set Summary

FUNCTION	COMMAND / KEY	
	OVT-109	ADDS-VP
CURSOR		
Home	Ctrl-^ HOME	Ctrl-A HOME
Right	Ctrl-L RIGHT ARROW SHIFT/BS	Ctrl-F RIGHT ARROW
Left	Ctrl-H LEFT ARROW BACKSPACE	Ctrl-U LEFT ARROW BACKSPACE
Up	Ctrl-K UP ARROW SHIFT/LF	Ctrl-Z UP ARROW SHIFT/LF
Down	Ctrl-J DOWN ARROW LINEFEED	Ctrl-J DOWN ARROW LINEFEED
Return	Ctrl-M RETURN ENTER	Ctrl-M RETURN ENTER
New Line	Ctrl-_	
Backspace		Ctrl-H
TAB CONTROL		
Set Tab	ESC 1	
Clear Tab	ESC 2	
Clear All Tabs	ESC 3	
Column Tab	Ctrl-I TAB	
Field Tab	Ctrl-I |Prtct.| TAB |Mode Only|	
Back Tab	ESC I SHIFT/TAB	

Appendix F. Command Set Summary (Cont)

FUNCTION	COMMAND / KEY	
	QVT-109	ADDS-VP
EDITING FUNCTIONS		
Character Insert	ESC Q	
Character Delete	ESC W	
Line Insert	ESC E	
Line Delete	ESC R	
Clear from cursor to end of line with spaces	ESC T	ESC K
Clear from cursor to end of line with nulls	ESC t	
Clear from cursor to end of screen with spaces	ESC Y	ESC k
Clear from cursor to end of screen with nulls	ESC y	
Clear all to nulls	ESC * 0	
Clear all to spaces	ESC * 1	
Clear unprotected to nulls	ESC * 2	
Clear unprotected to spaces	ESC * 3	
Clear Screen	Ctrl-Z ESC + SHIFT/CLEAR	Ctrl-L

Appendix F. Command Set Summary (Cont)

FUNCTION	COMMAND / KEY	
	OVT-109	ADDS-VP
VIDEO ATTRIBUTES		
Set Tag Bit		Ctrl-N
Reset Tag Bit		Ctrl-O
Screen Attributes:		
Cursor Visible/ Invisible	ESC .0	Ctrl-X Ctrl-W
Cursor Blinking Block	ESC .1	
Cursor Steady Block	ESC .2	
Cursor Blinking Underline	ESC .3	
Cursor Steady Underline	ESC .4	
Reverse Video	ESC n 0	
Normal Video	ESC n 1	
Character Attributes:		
Normal video:		
Full Intensity	ESC G 0	ESC 0 @
Half Intensity	ESC G sp	ESC 0 A
Invisible normal video:		
Full Intensity	ESC G 1	ESC 0 D
Half Intensity	ESC G !	
Blink:		
Full Intensity	ESC G 2	ESC 0 B
Half Intensity	ESC G "	ESC 0 C
Invisible Blink:		
Full Intensity	ESC G 3	
Half Intensity	ESC G #	
Reverse Current Background:		
Full Intensity	ESC G 4	ESC 0 P
Half Intensity	ESC G $	ESC 0 0
Invisible Reverse:		
Full Intensity	ESC G 5	
Half Intensity	ESC G %	
Reverse and Blink:		
Full Intensity	ESC G 6	ESC 0 R
Half Intensity	ESC G &	ESC 0 S
Invisible reverse and Blink:		
Full Intensity	ESC G 7	
Half Intensity	ESC G '	
Underline:		
Full Intensity	ESC G 8	ESC 0 '
Half Intensity	ESC G (	ESC 0 a

Appendix F. Command Set Summary (Cont)

Invisible underline:		
Full Intensity	ESC G 9	
Half Intensity	ESC G)	
Underline and Blink:		
Full Intensity	ESC G :	ESC 0 b
Half Intensity	ESC G *	ESC 0 c
Invisible underline and Blink:		
Full Intensity	ESC G ;	
Half Intensity	ESC G +	
Reverse and Underline:		
Full Intensity	ESC G <	
Half Intensity	ESC G ,	
Invisible Reverse and Underline:		
Full Intensity	ESC G =	
Half Intensity	ESC G -	
Reverse, Underline,and Blink:		
Full Intensity	ESC G >	
Half Intensity	ESC G .	
Invisible Reverse, Underline, and Blink:		
Full Intensity	ESC G ?	
Half Intensity	ESC G /	

Appendix F. Command Set Summary (Cont)

FUNCTION	COMMAND / KEY	
	OVT-109	ADDS-VP
PROGRAM FUNCTIONS		
Keyboard Disable	ESC #	ESC 5 or CTRL-D
Keyboard Enable	ESC " CTRL-SHIFT-BREAK SHIFT/BREAK	ESC 6 or CTRL-B or CTRL-BREAK
Address Cursor	ESC = Line # Col #	ESC Y Line # Col #
Read Cursor Address	ESC ?	
Load Cursor Line	ESC [Line #	CTRL-K Line #
Load Cursor Column	ESC] Col #	CTRL-P Col #
Transparent Mode Enable	Ctrl-R	ESC 3
Transparent Mode Disable	Ctrl-T	ESC 4
AUX Port Enable	ESC @	CTRL-R
AUX Port Disable	ESC A	CTRL-T
Graphics Mode Enable	ESC $	
Graphics Mode Disable	ESC %	
Monitor Mode Enable	ESC U Ctrl-1	CTRL-1
Monitor Mode Disable	ESC X or ESC u CTRL-2	CTRL-2
Protect Mode Enable	ESC &	
Protect Mode Disable	ESC '	
Write Protect Mode On	ESC)	
Write Protect Mode Off	ESC (	
Auto Scroll Enable/ Disable	ESC H	
Jump Scroll	ESC j	
Smooth Scroll	ESC s	
Character Mode Enable	ESC C	
Line Mode Enable	ESC D	
Block Mode Enable	ESC B	
Program Send Delimiter	ESC x N	
Display Select Control Character	ESC F N	ESC F N
Ring Bell	Ctrl-G	Ctrl-G
Load User Line	ESC f (data) CR	
Display User line	ESC g	
Disable User Line	ESC h	
Compose	(accent) BS (letter)	(accent) BS (letter)
Request Unused Function Key Buffer Size	ESC >	
Program F Keys (OVT-109 only)	ESC K @,...,j Delimiter (Data) Delimiter	

Appendix F. Command Set Summary (Cont)

FUNCTION	COMMAND / KEY	
	OVT-109	ADDS-VP
PRINT FUNCTIONS		
Print from top of screen to cursor	ESC N SHIFT/PRINT	 SHIFT/PRINT
Print from cursor to end of screen	ESC O CTRL/PRINT	 CTRL/PRINT
Print Entire Screen	ESC P PRINT	 PRINT
Print Line	ESC M CTRL-SHIFT-PRINT	 CTRL-SHIFT-PRINT
SEND FUNCTIONS		
Send Line (Full Intensity Only)	ESC 4	
Send Page (Full Intensity Only)	ESC 5	
Send Line (All)	ESC 6	
Send Page (All)	ESC 7	
Send ID Message	Ctrl-E	
MISCELLANEOUS		
Self-Test: Enable	ESC V	
Self-Test: Disable	SHIFT-BREAK/ SHIFT-CLEAR	
Status Line: Display	ESC }	
Status Line: Blank	ESC {	
"H" Pattern: Display	CTRL/SHIFT/ SETUP-O	CTRL/SHIFT SETUP-O
"H" Pattern: Blank	SHIFT/CLEAR	SHIFT/CLEAR

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