VT50 VIDEO TERMINAL USERS MANUAL

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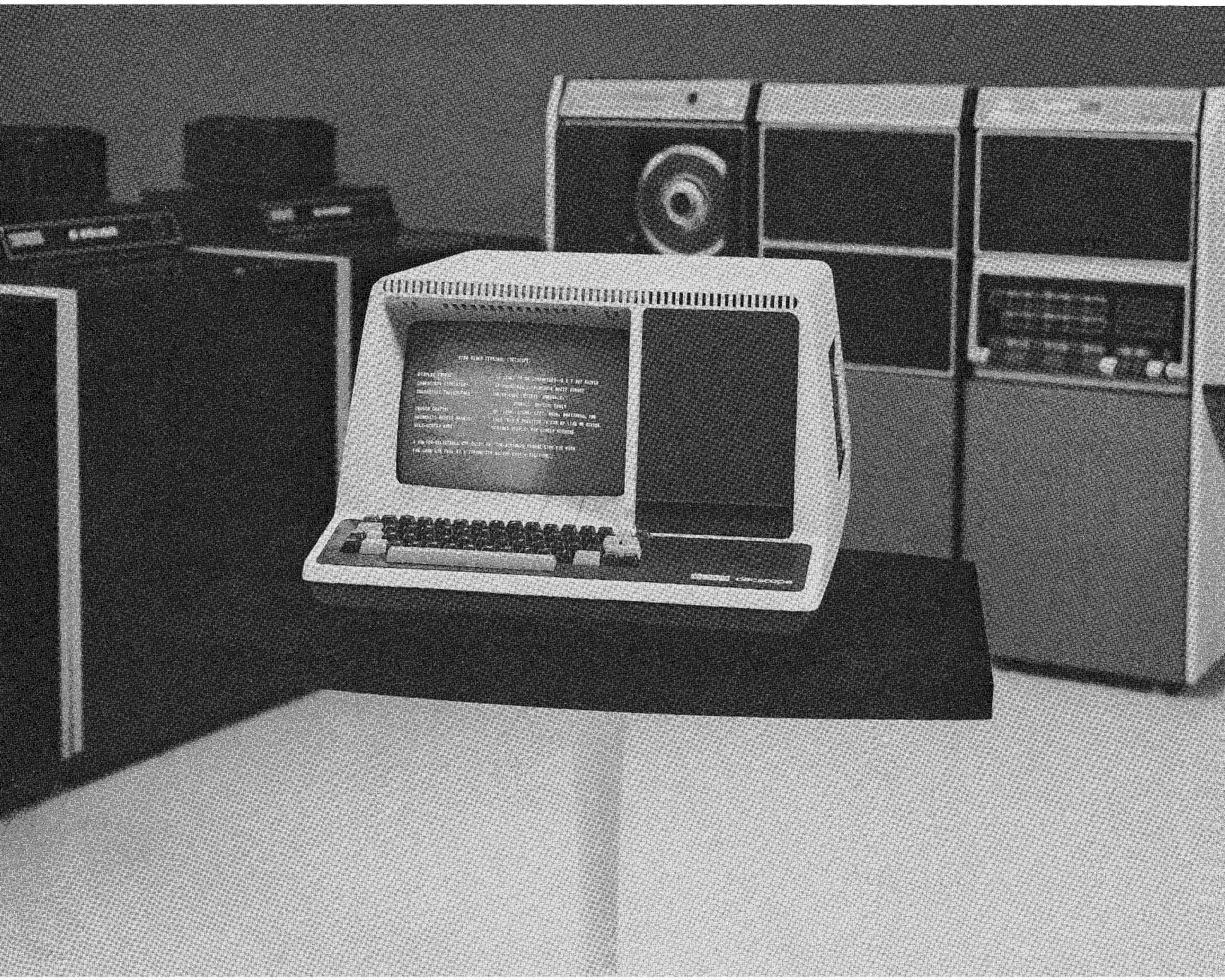

VT50 VIDEO TERMINAL

This document is a comprehensive guide to writing programs that interface with the VT50 Video Terminal. The first section gives the novice user step-by-step instructions on terminal operation. If you are already familiar with the operation of video display terminals, skim through this first segment and start at section two. The second section describes the various ways of using the VT50 for transmitting data to and receiving data from other computer devices.

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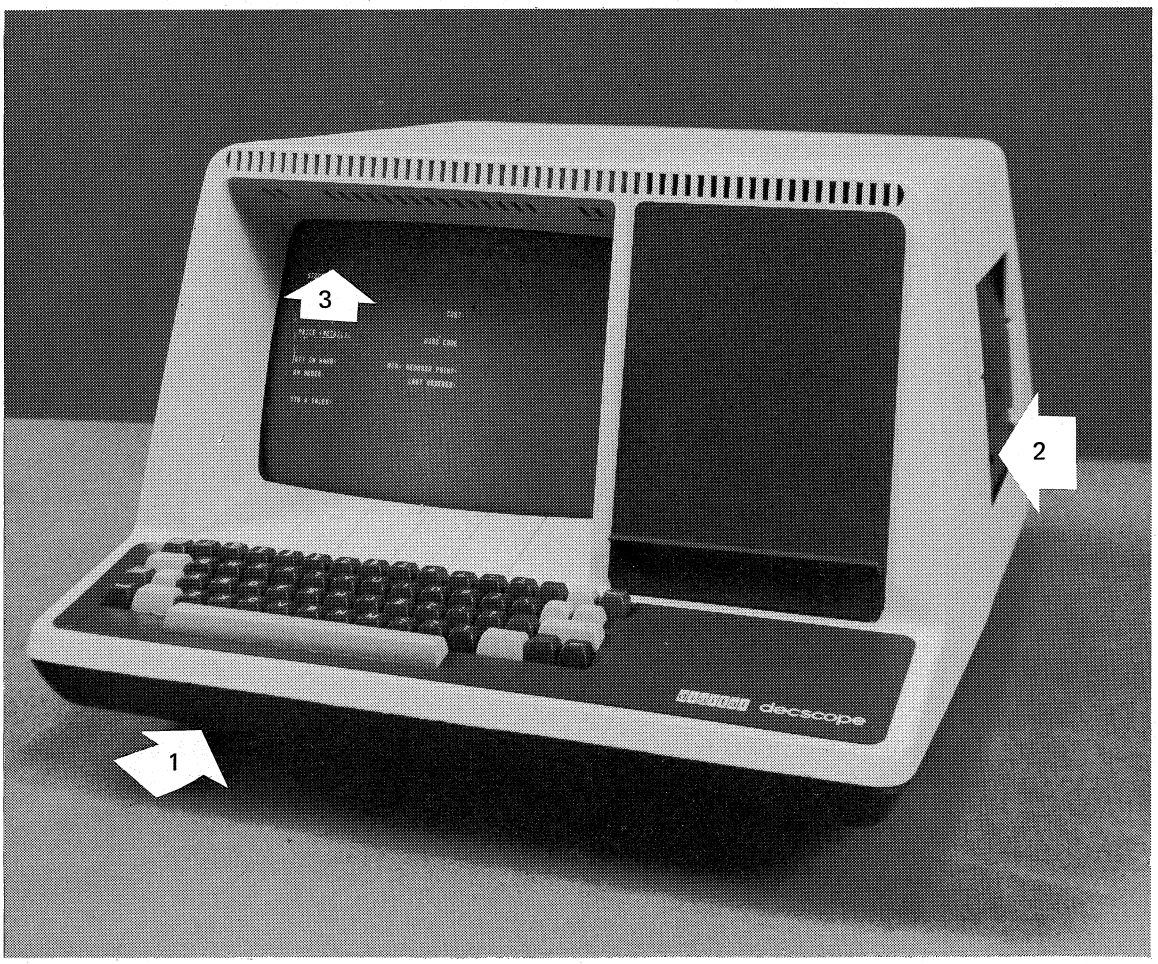


1. Adjust the Controls on the Underside of the Unit

Access to the controls on the underside is gained by tipping the unit up on its rear. The unit should not be tilted forward, since this will apply stress to the controls which may damage the unit.

A label on the underside of the unit contains a condensed form of this information, and a diagram which shows the relative location of each of the controls.

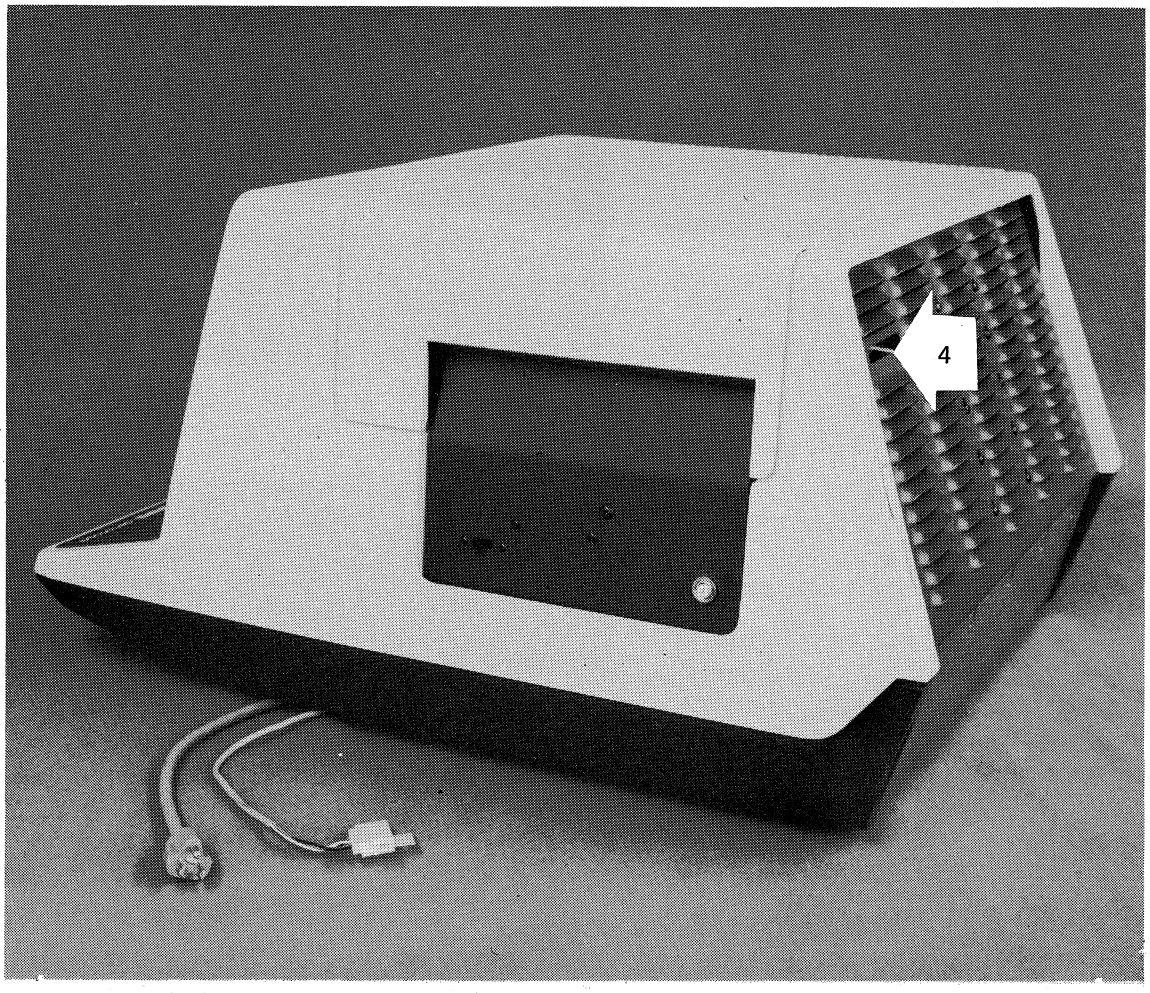
The two rotary switches govern the mode and rate of data transmission. To test out the VT50, switch it "off-line" by rotating switch S1 (the one on the right) to its most counterclockwise position, position 1, with a screwdriver or coin. Now rotate the switch on the left, S2, counterclockwise all the way and then clockwise two positions, to position C. Both switches should be as shown in the diagram on the label. In this setting, the VT50 cannot communicate with a computer. Instead, information goes from the keyboard directly to the screen. Now set the VT50 back down on its feet.

2. Plug the Unit in and Apply Power

There are two cords coming from the underside of the unit: an input-output cable, which is not used in the VT50 test, and a power cord, which should be plugged into an outlet at this time. The On/Off Switch is on the right side of the unit. Turn the unit on by sliding this switch toward the keyboard.

3. Wait for the Cursor

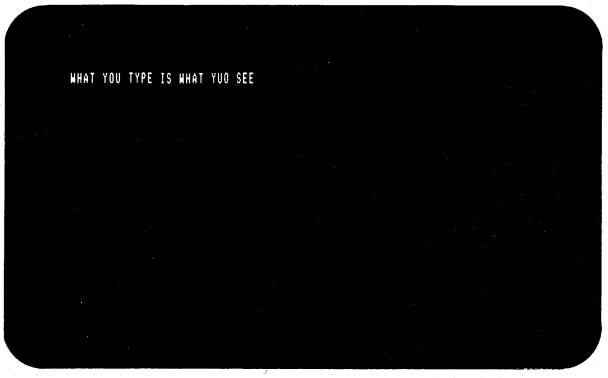
After approximately one minute, you should see a flashing underline, called the cursor, at the upper left corner of the screen. The terminal uses the cursor to tell you where on the screen you are typing.



4. Adjust the intensity control for the best image on the screen. This control works like the brightness control on a television set.

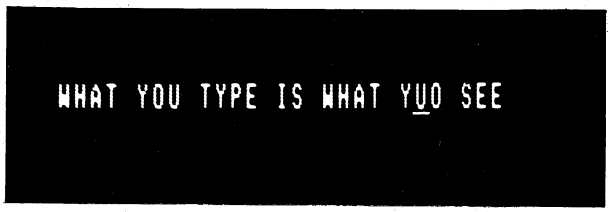
Read the following page and then go back and perform the actions indicated.

Slowly type the short line of text "WHAT YOU TYPE IS WHAT YUO SEE" (your screen should look like the screen shown in the photo). As you type, each letter is displayed on the screen directly above the cursor. After typing a letter, the cursor moves right one character position.

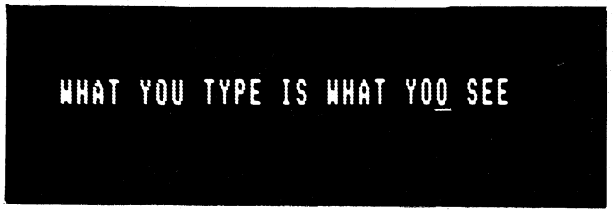


In our example the "U" and "O" are incorrectly transposed. In order to correct this error:

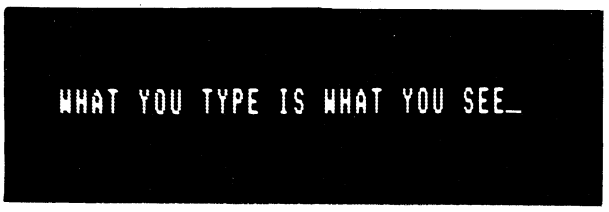
1. Use the BACKSPACE key to move the cursor back, until it is positioned directly under the "U" in "YUO".



2. Type the letter "O" which changes the incorrect "U" to an "O". Note that the cursor then moves one position to the right.



3. Type the remaining characters in their correct order.



Use the BACKSPACE key to move the cursor to the left margin and type the line displayed in the photo. As you type, watch the new characters replace characters on the screen. If you make an error, use the BACKSPACE key to reverse the cursor and correct the mistake.

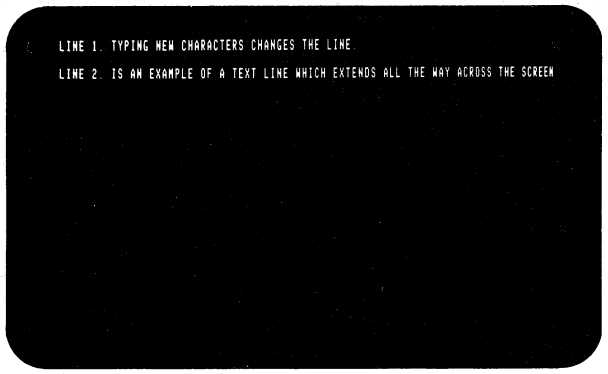
The BACKSPACE key is one of the VT50's cursor control keys. Some others are labeled RETURN, LF, and TAB. Type the RETURN key to move the cursor to the left margin.

Now type the LF (Line Feed) key. This moves the cursor down one line.

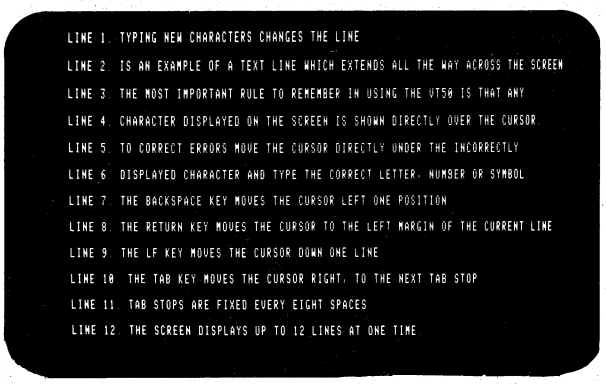
With the cursor positioned at the extreme left margin of the second line, type the TAB key. This moves the cursor to the next TAB stop. TAB stops are fixed at every eight spaces on the screen until the 72nd character position. After that TAB moves the cursor one position to the right.

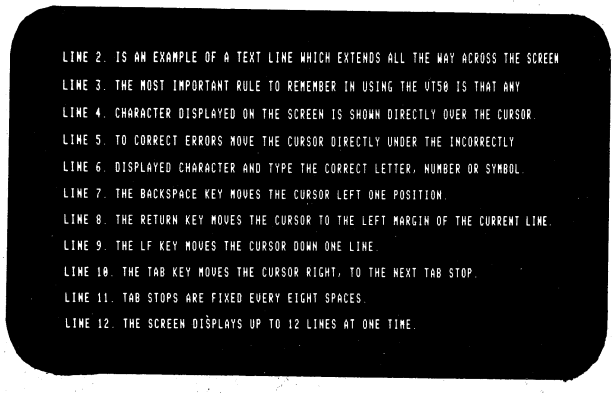
Use the RETURN key to move the cursor back to the extreme left margin and type the second line as shown in the photo. If you make an error, use the RETURN key to go back and start again or the BACKSPACE key to return to the location of the error.

A buzzer sounds when you type the 73rd character. This buzzer alerts you to the fact that there is space for only seven more characters on the line. When the cursor is positioned at the extreme right margin, it can only be moved by a cursor control. (Like a typewriter, the VT50 requires a specified carriage return key.) If you do not use a cursor control at the right margin, typing a new letter, number, or symbol changes the presently displayed character. Type several characters and watch as the last character in the sentence changes.

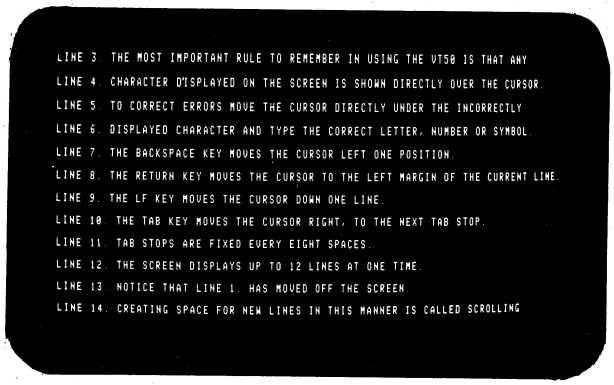


Type the RETURN and LF keys to start a new line. Continue to type lines until your terminal's screen displays twelve lines of text similar to those shown in the photo.





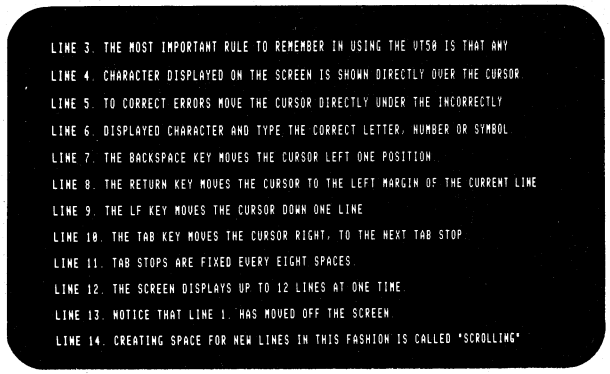
When twelve lines are displayed, the screen is full (top to bottom). To make space for a new line, type the LF key. Notice that this causes the top line to move off the screen while all other lines move up. Creating space for new lines in this fashion is called "scrolling".



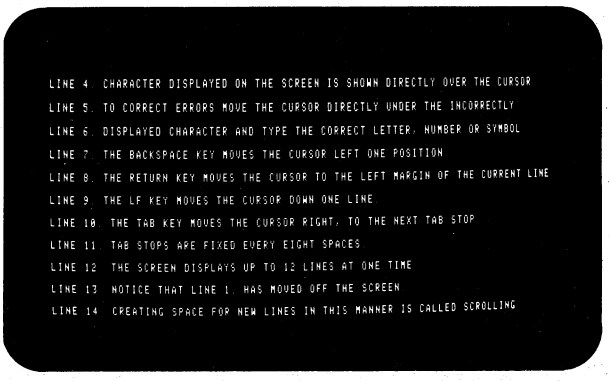
Move the cursor to the left margin with the RETURN key and type lines 13 and 14, shown in the photo. Upon completing this exercise, you will have also moved the second line off the screen in order to accommodate the 14th line.

Test the Advanced Features of the VT50

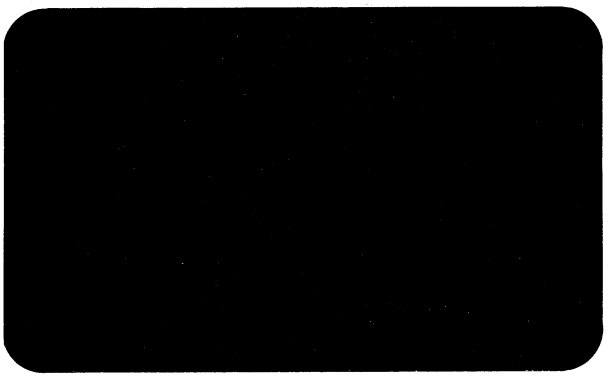
Type the ESC (Escape) key. Then type the H key. Notice that the cursor has moved to its "home" position at the top left of the screen. ESC H was a command to the terminal to move the cursor home. Since it began when you typed ESC, it is known as an Escape Sequence. Even though you went on to type H, a new H did not appear on the screen because the H was part of the Escape Sequence. The first character you type after ESC is always treated as a command rather than a character to be displayed on the screen.



Now type ESC K. Notice that the top line has been erased. ESC K is an Escape Sequence which erases all the characters from the cursor position to the end of the same line.



Next, type ESC J. ESC J erases all the information on the screen starting at the cursor position and ending at the end of the screen. If the cursor had not been on the top line, the information above the cursor would still be displayed.



The CTRL (control) key is used to form commands, but it works differently from the ESC key. You form a "Control Code" by typing a key **while holding down the CTRL key.** The command CTRL G, for instance, makes the buzzer sound. Hold the CTRL key down and type G. This is the same buzzer that sounds when what you type is approaching the right margin.

Attach the VT50 to a computer.

Use the input-output cable to attach the unit to the device to which it is to communicate. Three things have to be considered:

(1) Care must be taken to ensure that the input-output plug is plugged into a working input-output port of the other device, rather than into a power line of some sort.

(2) Switch S1 must be adjusted to put the VT50 on-line. Switches S1 and S2 must be adjusted to match the transmission speed of the host.

(3) In "Full Duplex with Local Copy" mode, the information you type in is sent to the host and direct to itself so that you see it on the screen. Responses from the computer also go to the screen.

If Switch S1 is not set to select Local Copy, the information you type in goes out to the host only; it is the responsibility of the computer to send it back to the screen ("echo" it) so you can see what you typed.

So, whether the VT50 acts the same way it has in this test depends on what the computer is programmed to do with the information you send it.

Before using the terminal in a working environment, you should discuss with your programmer what action he has instructed the computer to take when you send specified messages, and what you can expect to see on the screen. The following table can be filled in for future reference.

Command	Action Taken
SCROLL	in Hold Screen Mode, allows one new line of data from the host to be displayed
shift SCROLL	in Hold Screen Mode, allows one new page of data from the host to be displayed
	puts terminal into Hold Screen Mode
	takes terminal out of Hold Screen Mode
BREAK	
ESCAPE	
RETURN	
TAB	
BACKSPACE	
LF	

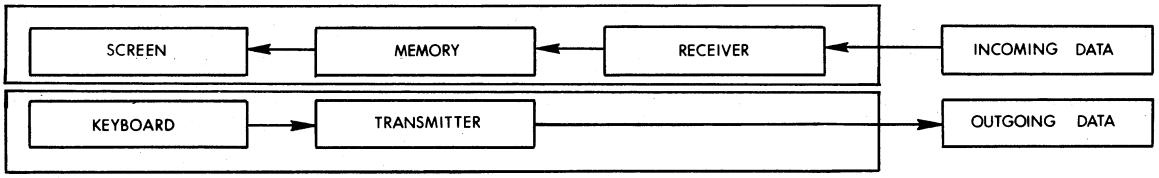
Command	Action Taken

Command	Action Taken

SECTION 2

INSIDE THE VT50

A simple way of viewing the VT50 is as though it consists of two separate devices housed in one cabinet.



This view is supported by the fact that only two lines are attached to the back of the terminal. Data entered at the keyboard is sent on one line, and data coming in is received through the other line.

Transmitting Characters and Commands

The only way an operator can transmit data to a host computer is by typing keys on the keyboard. The 7-bit ASCII equivalent of the key's label is transmitted the instant a key is depressed.

The following tables describe the 7-bit ASCII codes transmitted by typing keys on the terminal's keyboard.

Typing the key labeled	Transmits the following 7-bit ASCII code
A	101
B	102
C	103
D	104
E	105
F	106
G	107
H	110
I	111
J	112
K	113
L	114
M	115
N	116
O	117
P	120
Q	121
R	122
S	123

Typing the key labeled	Transmits the following 7-bit ASCII code
T	124
U	125
V	126
W	127
X	130
Y	131
Z	132
BACKSPACE	010
TAB	011
LF	012
RETURN	015
ESC	033
SPACE BAR	040
\	134
DELETE	177
BREAK	Does not transmit an ASCII code. Acts as a forceable interrupt (see page 19).

The keys listed above are uneffected by the SHIFT key. For example, typing both the "A" key and holding down the SHIFT key and typing "A" transmit ASCII 101.

The following keys are effected by the "SHIFT" key.

Typing the key labeled . . .	Unshifted transmits the 7-bit ASCII code	With the SHIFT key held down transmits the 7-bit ASCII code
1	061	041 (!)
2	062	100 (@)
3	063	043 (#)
4	064	044 ($)
5	065	045 (%)
6	066	136 (^)
7	067	046 (&)
8	070	052 (*)
9	071	050 (()
0	060	051 ())
–	055	137 (–)
=	075	053 (+)
[	133	135 (])
;	073	072 (:)
'	047	042 (")
,	054	074 (<)
.	056	076 (>)
/	057	077 (?)

Holding down the CTRL key affects the ASCII signal transmitted by the next key typed. It forces bits 7 and 6 to 0. For example, holding down the CTRL key and typing the letter G (107) forces 107 to be converted to 007 (BEL). The one exception is holding down the CTRL key and typing the BREAK key. This reinitializes the terminal (see page 23).

The scroll key does not transmit any signal outside of the terminal. It is used to direct internal terminal activities.

Typing the key labeled . . .	Unshifted directs the terminal to . . .	With the SHIFT key held down, directs the terminal to . . .
Scroll	Display (scroll) one new line when the terminal is in Hold-Screen Mode (see page 23.)	Display (scroll) 12 lines when the terminal is in Hold-Screen Mode (see page 23).

Receiving Characters and Commands

Data received at the terminal is routed to an internal memory. Here it is determined whether that data input is a displayable character or a command. Displayable characters are stored and appear on the screen; commands are performed immediately.

An understanding of internal memory use – as a sorting point for input going to the screen, input going to the copier, or commands – is useful in understanding how to use the VT50 as an input/output device.

The internal memory is organized into two sections:

- A main section used by the screen – 80 characters wide by 12 lines deep.
- A secondary section used for internal housekeeping – 16 characters wide by 4 lines deep.

The dimensions of the main memory section and the display capacity of the screen are identical. Correspondingly, a direct positional relationship exists between each character location in memory and each character position on the screen. For example, if the number "5" is the first character displayed on the first line of the screen, the first character in the first line of the main memory contains the 7-bit ASCII code equivalent to the digit 5. Only 7-bit ASCII codes for displayable characters can be written into the main section of memory.

In the secondary portion of memory, one housekeeping function is the monitoring of all inputs. If the input is a displayable character, it goes to main memory; if it is a command, the specified action is performed.

The Cursor and Memory

The screen position of the cursor is directly related to the character poistion addressed in memory. For example, if the cursor is under the first position of the first line on the screen, the next displayable character received is stored in the first character location in the top line of memory.

After a character is stored, the memory's addressing pointer is automatically incremented so the next displayable character is stored in the second position of the first line in memory. This incrementing is shown on the screen when the cursor moves right one character position. Cursor control commands are directives to the memory address pointer to store the next displayable character in a specified location of main memory.

Character Processing

As each ASCII character is received at the terminal, it is monitored to determine whether it is a displayable letter, number, or symbol (octal 040 through 176), or a control code (octal 000 through 037). Displayable characters are stored in memory to be scanned and displayed on the screen. ASCII code for both upper and lower case letters can be stored, but lower case letters are converted to upper case before they are displayed.

The algorithm for translating lower case input to upper case display is "if bit number 7 is 1, then force bit number 6 to 0." For example, a lower case "b" is received and stored in the terminal's memory as 1 100 010 (octal 142). Between the memory and the screen, octal 142 is converted to octal 102 (1 000 010) — the ASCII code for an upper case "B." This conversion algorithm means special care must be taken if octal codes 140, 173, 174, 175, or 176 are transmitted to the VT50, because these codes generate the @, [, /,], and — symbols, respectively.

Octal Code	ASC II Character	Translation	Displayed as:
140	`		@
173	{		[
174	|		\
175	}		]
176	~		^

If the terminal receives octal 177, it is treated as a no-op (or filler) character. This feature makes the VT50 compatible with application software written to interface with slower mechanical devices. For example, it takes a mechanically designed terminal much longer to effect a TAB operation than the internal clocking of a host computer. In order to preclude the condition of data backing up until mechanical functions are completed, some software programs use filler characters to take up the slack time.

An octal 177 is transmitted if you type the DELETE key. If you want the key to direct a previously typed character to be deleted on the screen, the host system software must translate the incoming 177 into a sequence such as "BACKSPACE, SPACE, BACKSPACE," which is echoed to the terminal. This operation is often used with existing software.

Commands and Escape Sequences

In 7-bit ASCII, codes 000 through 037 are defined as control codes (commands). The following six controls codes are recognized by the VT50:

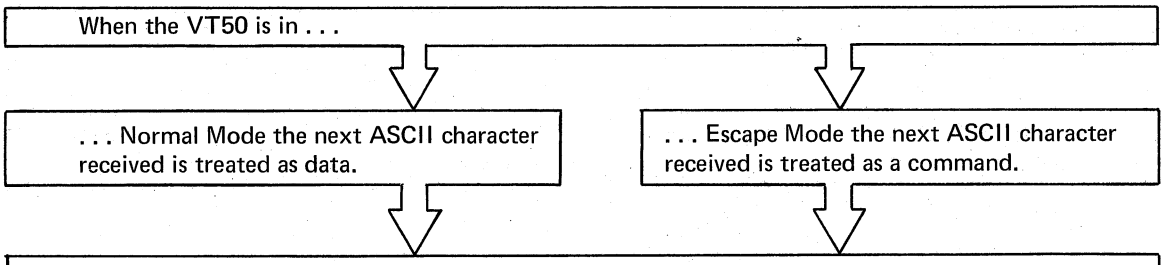
Octal Code	Action Taken
007	Rings the buzzer.
010	Backspaces the cursor.
011	(Horizontal Tab) Moves the cursor to the next TAB stop. TAB stops are set every eight spaces to the 72nd character position. After the 72nd position, TAB moves the cursor one position to the right.
012	(Line Feed) Moves the cursor down one line.
015	Carriage return.
033	Puts the terminal in Escape Mode if the terminal is currently in normal mode. If the terminal is in Escape mode, receipt of 033 puts it back in normal mode.

A command protocol is built around the Escape code (033) to implement those commands needed by the VT50 but not found in 7-bit ASCII. Upon receiving the Escape code 033, the terminal is set to Escape mode and treats the next character received as a command. Commands created in this manner are called Escape Sequences. The VT50 recognizes the following Escape Sequences:

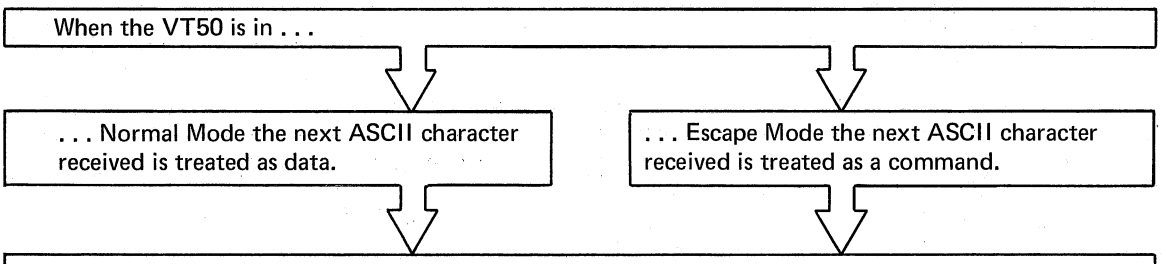
ESC (033) Followed By:

Octal Code	Char	Action Taken
033	ESC	Sets the terminal in Normal mode if the terminal is in Normal mode before the first 033 is received. Sets the terminal in Escape mode if the terminal is in Escape mode before the first 033 is received. The first 033 changes the mode, the second 033 changes it back.
101	A	Moves cursor up one line.
103	C	Moves cursor right one position.
110	H	Moves cursor to the Home position.
112	J	Erases from cursor position to end of screen.
113	K	Erases line from cursor to right margin.
132	Z	Requests the terminal to identify itself. The terminal will respond with ESC / A (033 057 101)
133	[	Enables Hold Screen Mode.
134	\	Disables Hold Screen Mode.

The following table will be useful when writing programs that interface with the VT50. It details the processing of each 7-bit ASCII character received at the terminal.



Octal Code	Char	Action Taken	Resulting Mode	Action Taken	Resulting Mode
000	NUL	None	Normal	None	Escape
001	SOH	None	Normal	None	Escape
002	STX	None	Normal	None	Escape
003	ETX	None	Normal	None	Escape
004	EOT	None	Normal	None	Escape
005	ENQ	None	Normal	None	Escape
006	ACK	None	Normal	None	Escape
007	BELL	Rings Bell.	Normal	Rings Bell.	Escape
010	BS	Backspaces Cursor.	Normal	Backspaces Cursor.	Escape
011	HT	Horizontal Tab Moves cursor to the next tab stop. Tab stops are set every eight spaces to the 72nd character position. After the 72nd position, TAB moves the cursor to the right one position.	Normal	Horizontal Tab Moves cursor to the next tab stop. Tab stops are set every eight spaces to the 72nd character position. After the 72nd position, TAB moves the cursor to the right one position.	Escape
012	LF	Moves Cursor down one line and scrolls if required.	Normal	Moves Cursor down one line and scrolls if required.	Escape
013	VT	None	Normal	None	Escape
014	FF	None	Normal	None	Escape
015	CR	Moves Cursor to left margin of current line.	Normal	Moves Cursor to left margin of current line.	Escape
016	SO	None	Normal	None	Escape
017	SI	None	Normal	None	Escape
020	DLE	None	Normal	None	Escape
021	DC1	None	Normal	None	Escape
022	DC2	None	Normal	None	Escape
023	DC3	None	Normal	None	Escape
024	DC4	None	Normal	None	Escape
025	NAK	None	Normal	None	Escape
026	SYN	None	Normal	None	Escape
027	ETB	None	Normal	None	Escape



Octal Code	Char	Action Taken	Resulting Mode	Action Taken	Resulting Mode
030	CAN	None	Normal	None	Escape
031	EM	None	Normal	None	Escape
032	SUB	None	Normal	None	Escape
033	ESC	Sets terminal in Escape Mode.	Escape	Sets terminal in Normal Mode.	Normal
034	FS	None	Normal	None	Escape
035	GS	None	Normal	None	Escape
036	RS	None	Normal	None	Escape
037	US	None	Normal	None	Escape
040	Space	Displayed	Normal	None	Normal
041	!	Displayed	Normal	None	Normal
042	"	Displayed	Normal	None	Normal
043	#	Displayed	Normal	None	Normal
044	$	Displayed	Normal	None	Normal
045	%	Displayed	Normal	None	Normal
046	&	Displayed	Normal	None	Normal
047	'	Displayed	Normal	None	Normal
050	(	Displayed	Normal	None	Normal
051	)	Displayed	Normal	None	Normal
052	*	Displayed	Normal	None	Normal
053	+	Displayed	Normal	None	Normal
054	,	Displayed	Normal	None	Normal
055	–	Displayed	Normal	None	Normal
056	.	Displayed	Normal	None	Normal
057	/	Displayed	Normal	None	Normal
060	0	Displayed	Normal	None	Normal
061	1	Displayed	Normal	None	Normal
062	2	Displayed	Normal	None	Normal
063	3	Displayed	Normal	None	Normal
064	4	Displayed	Normal	None	Normal
065	5	Displayed	Normal	None	Normal
066	6	Displayed	Normal	None	Normal
067	7	Displayed	Normal	None	Normal
070	8	Displayed	Normal	None	Normal
071	9	Displayed	Normal	None	Normal
072	:	Displayed	Normal	None	Normal
073	;	Displayed	Normal	None	Normal

When the VT50 is in . . .

. . . Normal Mode the next ASCII character received is treated as data.	. . . Escape Mode the next ASCII character received is treated as a command.

Octal Code	Char	Action Taken	Resulting Mode	Action Taken	Resulting Mode
074	<	Displayed	Normal	None	Normal
075	=	Displayed	Normal	None	Normal
076	>	Displayed	Normal	None	Normal
077	?	Displayed	Normal	None	Normal
100	@	Displayed	Normal	None	Normal
101	A	Displayed	Normal	Moves Cursor up one line.	Normal
102	B	Displayed	Normal	None	Normal
103	C	Displayed	Normal	Moves Cursor right one position.	Normal
104	D	Displayed	Normal	None	Normal
105	E	Displayed	Normal	None	Normal
106	F	Displayed	Normal	None	Normal
107	G	Displayed	Normal	None	Normal
110	H	Displayed	Normal	Moves Cursor to home position.	Normal
111	I	Displayed	Normal	None	Normal
112	J	Displayed	Normal	Erases line from Cursor to bottom of screen.	Normal
113	K	Displayed	Normal	Erases screen from Cursor to right margin.	Normal
114	L	Displayed	Normal	None	Normal
115	M	Displayed	Normal	None	Normal
116	N	Displayed	Normal	None	Normal
117	O	Displayed	Normal	None	Normal
120	P	Displayed	Normal	None	Normal
121	Q	Displayed	Normal	None	Normal
122	R	Displayed	Normal	None	Normal
123	S	Displayed	Normal	None	Normal
124	T	Displayed	Normal	None	Normal
125	U	Displayed	Normal	None	Normal
126	V	Displayed	Normal	None	Normal
127	W	Displayed	Normal	None	Normal
130	X	Displayed	Normal	None	Normal
131	Y	Displayed	Normal	None	Normal
132	Z	Displayed	Normal	Transmits ESC / A to host.	Normal
133	[	Displayed	Normal	Enables Hold Screen Mode. (See page 23.)	Normal

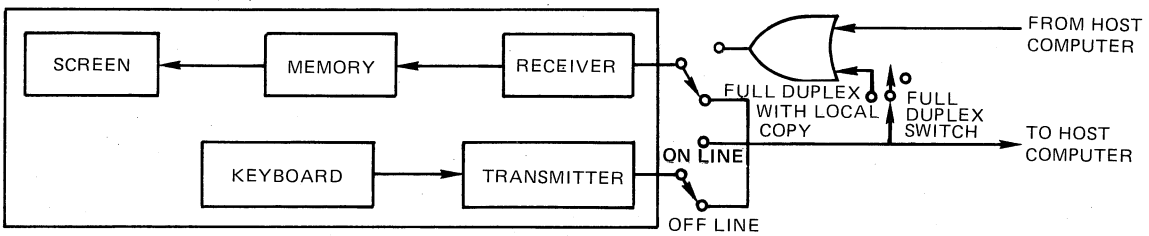
When the VT50 is in . . .

. . . Normal Mode the next ASCII character received is treated as data.

. . . Escape Mode the next ASCII character received is treated as a command.

Octal Code	Char	Action Taken	Resulting Mode	Action Taken	Resulting Mode
134	\	Displayed	Normal	Disables Hold Screen Mode. (See page 23.)	Normal
135	]	Displayed	Normal	None	Normal
136	^	Displayed	Normal	None	Normal
137	–	Displayed	Normal	None	Normal
140	\	Displayed as @	Normal	None	Normal
141	a	Displayed as A	Normal	None	Normal
142	b	Displayed as B	Normal	None	Normal
143	c	Displayed as C	Normal	None	Normal
144	d	Displayed as D	Normal	None	Normal
145	e	Displayed as E	Normal	None	Normal
146	f	Displayed as F	Normal	None	Normal
147	g	Displayed as G	Normal	None	Normal
150	h	Displayed as H	Normal	None	Normal
151	i	Displayed as I	Normal	None	Normal
152	j	Displayed as J	Normal	None	Normal
153	k	Displayed as K	Normal	None	Normal
154	l	Displayed as L	Normal	None	Normal
155	m	Displayed as M	Normal	None	Normal
156	n	Displayed as N	Normal	None	Normal
157	o	Displayed as O	Normal	None	Normal
160	p	Displayed as P	Normal	None	Normal
161	q	Displayed as Q	Normal	None	Normal
162	r	Displayed as R	Normal	None	Normal
163	s	Displayed as S	Normal	None	Normal
164	t	Displayed as T	Normal	None	Normal
165	u	Displayed as U	Normal	None	Normal
166	v	Displayed as V	Normal	None	Normal
167	w	Displayed as W	Normal	None	Normal
170	x	Displayed as X	Normal	None	Normal
171	y	Displayed as Y	Normal	None	Normal
172	z	Displayed as Z	Normal	None	Normal
173	{	Displayed as [	Normal	None	Normal
174	|	Displayed as /	Normal	None	Normal
175	}	Displayed as]	Normal	None	Normal
176	~	Displayed as >	Normal	None	Normal
177	Delete	None	Normal	None	Escape

Interfacing with a Computer



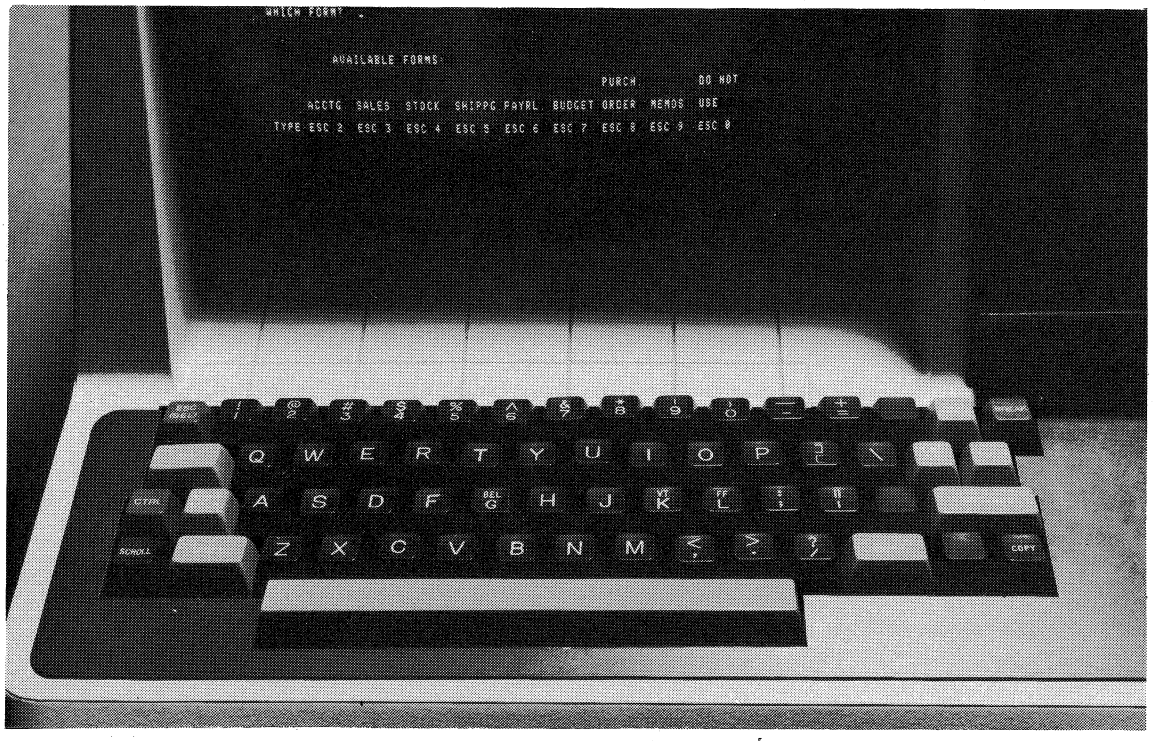
The Offline/Online switch determines whether the terminal operates as an isolated device or transmits data to and receives data from a host computer. In Offline Mode, the transmitter and receiver are disconnected from the external output and input cables. Any data entered at the keyboard is sent directly through the transmitter and to the receiver for processing. Offline Mode is useful for training and maintenance. For normal operation, Online Mode is used — all data entered at the keyboard is transmitted to the host computer.

The Full Duplex/Full Duplex with Local Copy switch specifies the source of data received in Remote Mode. When this switch is set to Full Duplex with Local Copy, data entered at the keyboard is transmitted to the terminal's receiver at the same time it is sent to the host computer. When the switch is set to Full Duplex, data transmitted from the keyboard goes to the computer only. This data may be transmitted from the computer back to the terminal to give the operator a visual image of the information transmitted. The echoing appears to be immediate, since the timing circuits for the terminal's transmitter and receiver are independent.

Because it permits an interactive relationship between the VT50 and the host computer, Full Duplex is the most versatile of the two settings. For example, in Full Duplex you can create your own Escape Sequences; the host computer can be programmed so that the receipt of ESC 1 (033 061) from the terminal implements one routine, ESC 2 another, and so on.

The VT50 is designed to permit the space above the top row of keys to act as a labeling area for special user-defined Escape sequences. Ten keys are available for this special coding; the labeling can be changed easily to accommodate changing functions and applications.

In addition to the static labeling capability, host system software can use the screen as a dynamic labeling medium. Function names can be displayed on the bottom line of the screen. Ribbing lines molded into the VT50's chassis direct the operator's eyes to the proper top row key needed in each Escape Sequence. Note that if the bottom line on the screen is used for Escape Sequence function definition, subsequent scrolls will move this line up the screen. Hence, it is advisable to have system software erase the displayed label names after the operator has chosen a function.



Communication Rates

Two rotary switches on the VT50 allow you to select communication rates from 75 to 9600 baud, and operation modes.

Mode	Baud Rate Transmit	Receive	Switch S1*	Switch S2**
Local	9600	9600	1	G
	4800	4800	1	F
	2400	2400	1	E
	1200	1200	1	D
	600	600	1	C
	110	110	1	B
Full Duplex with Local Copy	9600	9600	2	G
	4800	4800	2	F
	2400	2400	2	E
	1200	1200	2	D
	600	600	2	C
	110	110	2	B
Full Duplex	9600	9600	3	G
	4800	4800	3	F
	2400	2400	3	E
	1200	1200	3	D
	600	600	3	C
	300	300	4	A
	150	150	5	A
	110	110	3	B
	75	75	6	A
Full Duplex (Split Speeds)	300	9600	4	G
	150	9600	5	G
	75	9600	6	G
	300	4800	4	F
	150	4800	5	F
	75	4800	6	F
	300	2400	4	E
	150	2400	5	E
	75	2400	6	E
	300	1200	4	D
	150	1200	5	D
	75	1200	6	D
	300	600	4	C
	150	600	5	C
	75	600	6	C

***Switch S1 Labels**

1 = Off-Line
2 = Full Duplex with Local Copy
3 = Full Duplex
4 = 300 Baud
5 = 150 Baud
6 = 75 Baud

****Switch S2 Labels**

A = Bell 103
B = 110 Baud
C = 600 Baud
D = 1200 Baud
E = 2400 Baud
F = 4800 Baud
G = 9600 Baud

Hold Screen Mode

For the purpose of writing software to interact with the VT50 terminal, the term "baud" means number of bits per second. It requires 10 bits to transmit or receive each character (one start bit, seven data bits, one parity bit, and one stop bit). Thus, at 9600 baud, the terminal can receive 960 characters per second — enough to fill the entire VT50 screen.

Normally, text is displayed on the screen as fast as it is received at the terminal. For example, if the host computer transmits 24 lines of data with 80 characters per line at 9600 baud, the first 12 lines are displayed on the screen for only one second before being replaced by the second 12 lines. To hold the first 12 lines for a visual inspection, the terminal can be placed in Hold Screen Mode. When in Hold Screen Mode, the terminal will attempt to control the scrolling speed as directed by the operator. Each time the SCROLL key is typed, an additional scroll is permitted, and by typing SHIFT and SCROLL, 12 scrolls are allowed, filling the entire screen with new data. The terminal enters Hold Screen Mode when ESC [(033 133) is received, and returns to normal mode upon receipt of ESC \ (033 134).

If the terminal receives more data than it has been directed to display, it will transmit XOFF (023) and start buffering characters in a "silo" portion of terminal memory which accommodates 13 characters. And when the operator again permits scrolling by typing either SCROLL or the SHIFT/SCROLL sequence, the terminal will process the characters in the silo. As the last character in the silo is processed, the terminal sends XON (021), indicating that the computer can resume transmission.

The essential purpose of the silo is to permit a delay between the time XOFF is sent to the computer, and when the computer stops transmission. If more than 13 characters are received, the silo will overflow and the terminal will process its characters on a first-in, first-out basis. Thus, even if the computer ignores the XOFF, no characters will be lost. However, for ease of operation, Hold Screen Mode should be used only when the XON/XOFF feature is implemented in system software.

Parity Checks

Each ASCII character received or transmitted is in the form of a 10-bit data word — one start bit, seven bits which comprise the character, one parity bit, and one stop bit. (When operating at 110 Baud, an extra stop bit is added at the end). The VT50 normally transmits characters with an even parity bit, depending on the character transmitted, so that an even number of bits in the data word will be set to one. The host can use this characteristic to detect transmission errors. The VT50 can be switched to always send a mark (one) in the parity-bit position instead of an even parity bit, by a switch on the underside of the terminal. It can also be rewired to transmit an odd parity bit, or a space (zero) in the parity-bit position. (NOTE: Performing this rewiring yourself may affect your warranty.) The VT50 ignores the parity bit on incoming ASCII codes.

The BREAK Key

The BREAK function is commonly used to forceably interrupt the flow of data coming to the VT50 terminal. It is provided for users with older software written to operate in Half Duplex. In Half Duplex, only one data communication line exists between terminal and host computer. If the host computer has control of this line, BREAK is the only means of forcing an interrupt. However, because the VT50 has both an input and output line, the forceable BREAK is normally unnecessary.

Holding down the CTRL key and typing the BREAK key reinitializes the terminal — the screen is cleared and the cursor set to its Home position. This procedure is equivalent to switching power off and then repowering the terminal. Typing CTRL BREAK sends no signal to the host.

VT50 Specifications

Dimensions	Height: 360mm (14.1 in.) Width: 530mm (20.9 in.) Depth: 690mm (27.2 in.) Minimum Table Depth: 450mm (17.7 in.)
Weight	20 kg (44 lbs)
Operating Environment	DEC STD 102 – Class B environment 10°C to 40°C (50°F to 104°F) Relative humidity 20% to 80% Maximum wet bulb 25°C (77°F) Minimum dew point 2°C (36°F)
Line Voltage	(US model) 100-126 Volts (European model) 191-238 Volts or 209-260 Volts
Line Frequency	(US model) 60 ± 1 Hz (European model) 60 ± 1 Hz or 50 ± 1 Hz
Power Consumption	110 Watts
Power Line Hash Filter	Low leakage Balun type
Display	Format: 12 lines x 80 characters Character Matrix: 5 x 7 Character Size: 2.0mm x 4.0mm (0.08 in. x 0.16 in.) Screen Size: 210mm x 105mm (8.3 in. x 4.1 in.) Character Set: 64-character displayable ASCII subset (upper case, numeric, and punctuation)
Keyboard	Character Set: Same as display with addition of 32 control codes Key layout: Typewriter – rather than keypunch – format
Audible Signals	Key-click: Switch-controlled Bell: Sounds (a) upon receipt of control character BEL; (b) when Keyboard input approaches right margin (output from host approaching right margin does not cause bell to ring)
Terminal Modes	Local Mode Remote Mode: Full Duplex or Full Duplex with Local Copy
Page Overflow	Upward scroll
Parity	Even or mark (no parity) switch-selectable Odd or space possible with rewiring
Cursor	Type: Blinking underline Control: Up or down one line; right or left one character; home; tab; erase display from cursor position to end of line; erase to end of screen
Hold Screen Mode	Allows operator to halt transmission from host, preserving data on display. Enabled/disabled by Escape sequences sent by system software.
Communications	20mA current loop standard; EIA interface optional Code: USASCII extended through Escape Sequences Speed: Switch-selectable Full Duplex: 75, 110, 150, 300, 600, 1200, 2400, 4800, and 9600 Baud Full Duplex with Local Copy: 110, 600, 1200, 2400, 4800, and 9600 Baud Full Duplex Split Speeds: Transmission at 75, 150, 300 Baud with reception at 600, 1200, 2400, 4800, 9600 Baud
Operator Controls	Power On/Off, Intensity Control, Baud Rate Switch, Terminal Mode Switch, Key-Click On/Off, Even/No Parity
Overload Protection	Thermal switch in line transformer or fuse
Case Material	Expansion-cast ABS or injection-molded Noryl
Screen Phosphor	P4

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