**PRODUCT BULLETIN
BEEHIVE MODEL I, II AND III
CRT DISPLAY TERMINALS**
THE EXPANDABLE ONE

January, 1972

BEEHIVE TERMINALS   *A division of Beehive Medical Electronics, Incorporated*

BEEHIVE TERMINALS PRESENTS...MODEL III....BASIC SPECIFICATIONS
1. 64 CHARACTER SET ASCII ### OPTIONAL upper and lower case display
2. REMOTE COMPOSITE VIDEO
3. PARITY GENERATION AND CHECKING
4. FULL DUPLEX/HALF DUPLEX/LOCAL [   ] OPERATION
5. SELECTABLE BAUD RATES TO 4800 BAUD (SWITCHABLE)
6. TELEPRINTER KEYBOARD LAYOUT
7. RS 232 C COMMUNICATIONS INTERFACE ### [   ]
8. FOUR WAY CURSOR CONTROL
9. CLEAR CAPABILITY
10. SCROLLING CAPABILITY
11. HOME CAPABILITY
12. 800 CHARACTER STORAGE 40 CHAR/LINE ### OPTIONAL 80 CHAR/LINE 03
13. BLOCK TRANSFER CAPABILITY
14. PRINTER INTERFACE
15. TYPEWRITER TABS
16. ERASE CURSOR TO END OF LINE & SCREEN
17. THREE LEVEL INTENSITY BLINK
18. TEXT EDITING...CHAR AND LINE INSERTION AND DELETION
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BEEHIVE CRT DISPLAY TERMINALS MODELS I, II and III
(BASIC SPECIFICATIONS)

Display Format . . . . .20 lines x 40 characters

Display Size . . . . .Approximately 6″ high x 9″ wide

CRT Size . . . . .12″ rectangular

Character Size . . . . .0.1″ wide x 0.2″ high (approximate)

Character Type . . . . .5 x 7 dot matrix

Character Set . . . . .64 character (USASCII)

Character Generation . . . . .MOS Read Only Memory

Refresh Rate . . . . .60 Hz

Refresh Memory . . . . .MOS dynamic shift register

Page Overflow . . . . .Upward Scroll. Top line is lost (on-line)
Page overwrite (local)

Parity . . . . .Parity (VRC) is checked on all received and transmitted characters. Selectable Odd, Even or no parity. If no parity is desired, the parity error is indicated by a "?" in the character position containing the error.

Cursor Control . . . . .5 way (left, right, up, down and home)

Cursor Type . . . . .Non-destructive, blinking underscore

Communications Interface .EIA RS-232. Fully compatible with Western Electric Data Sets 103, 202, and 201 and equivalent commercial modems. Will accept external clocking for synchronous operation.

Transmission Rate . . . . .Serial — up to 4800 BPS asynchronous or synchronous, 7 level, 11 unit code (2 stop bits) at 110 BPS, 10 unit code (1 stop bit) at all high speeds. 11 unit code on all speeds available, if specified, at time of order.

Baud rate is switch selectable on the back connector panel of the terminal.

The baud rate switch has five positions marked:
110, 150, 300, variable 1 and variable 2
The variable positions are controlled by a pair of screw driver adjustments (course and fine) which offer continuous range between 300 to 1200 baud for variable 1 and 1200 to 2400 baud for variable 2. The fixed ranges have a fine adjustment. Consult factory for higher data rate requirements.

Transmission Code . . . . .USASCII

Operator Controls . . . . .Keyboard panel: Power, full duplex, half duplex, local mode selector, contrast, and brightness
Back panel: Baud rate selector switch

Input Voltage . . . . .117 VAC plus or minus 10%, 60 Hz

Power Consumption . . . . .110 watts maximum

Overload Protection . . . . .Power supply and CRT individually fused. Power supply is current limited and over voltage protected.

Operation Temperature . . . .+ 10° C to + 40° C convection cooling

Humidity . . . . .20% − 80% non condensing

Terminal Size . . . . .14″ high x 16″ wide x 21″ deep

Terminal Exterior Finish . . . . .Armorhide Textured Vinyl
Colors: Off-white U-492 (standard color)
Light Blue U-216 (optional color)

I/O Connectors . . . . .BNC − Video Output
Standard 25 pin RS-232B connector
Printer I/O

Keyboard . . . . .Integral with the terminal. Layout is as indicated on the attached drawing for each specific model.

Video Output . . . . .Provides composite video signal capable of driving up to 500′ of coaxial cable when terminated in 75 OHMS. The signal is capable of driving most standard video monitors or customer provided distribution amplifiers for multiple monitor installations.

Displayable Control Character . . . . .When in the local mode, all control functions except New Line (NL) are stored in memory and displayed as lightly detensified characters (see Page 8) and they shall all be non-active except New Line which is a lightly detensified "H" but active, i.e., performs function of CR and LR. When the terminal is in an on-line mode, all control characters are active and not displayed.

												CLEAR

! 1	// 2	# 3	$ 4	% 5	& 6	' 7	(8	) 9	φ	* :	= —	NEW LINE

ESC	Q	W	E	R	T	Y	U	I	O	@ P	LINE FEED	RETURN

CTRL	A	S	D	F	BELL G	H	J	[K	L	+ ;	DEL	REPT	BREAK

ALPHA LOCK	SHIFT	Z	X	C	B	V	N	] M	< ,	> .	? /	SHIFT

SPACE

LOC   FDX   HDX   PWR

↑   HOME   ←   →   ↓
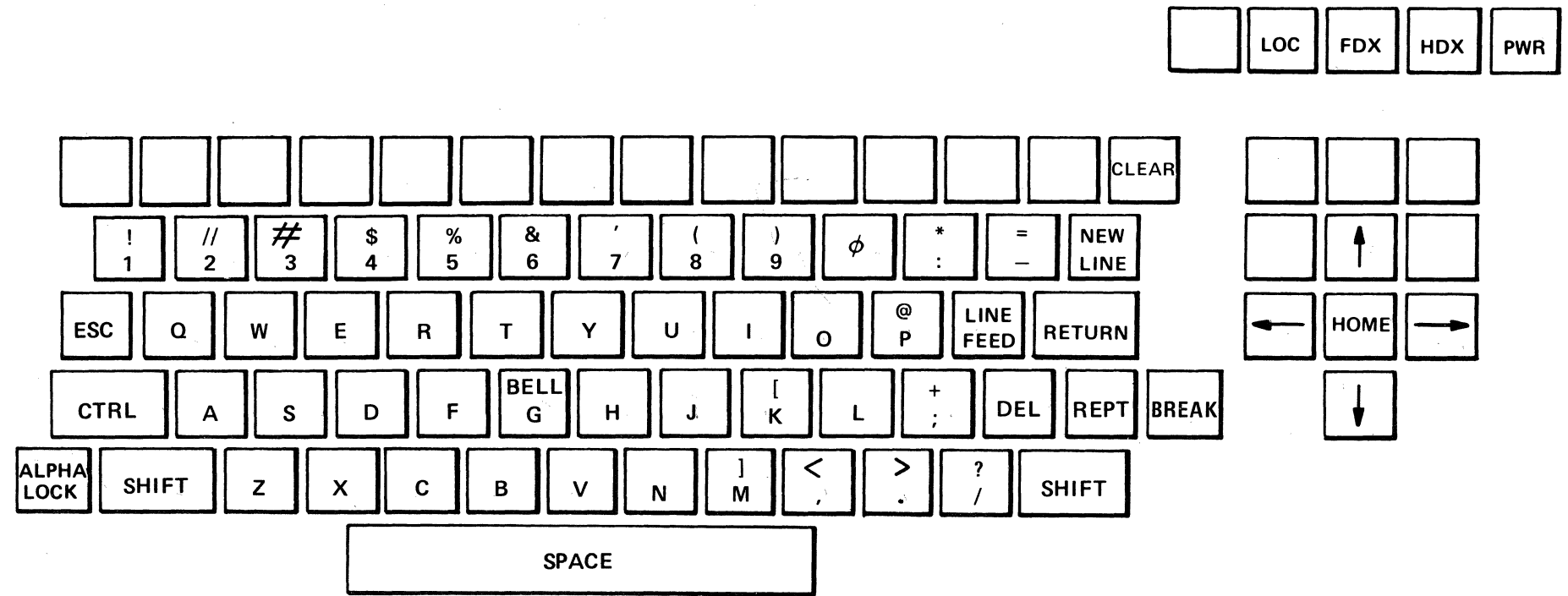
MODEL I
BEEHIVE TERMINAL
KEYBOARD LAYOUT

BEEHIVE TERMINAL MODEL I
"VIDEO TELEPRINTER"

The Model I provides the minimum functional capabilities required in an alphanumeric CRT display terminal. The unit is plug-to-plug compatible with the Teletype Models 33 and 35 teleprinters when the RS-232B type interface is used. 20/60 ma current loops may be handled by use of a TTY Loop Adapter (see Accessories).

The standard features of the Model I are:

Standard 53 key teleprinter style keyboard including an alpha lock function which allows the keyboard to operate as upper/lower case keyboard. All forbidden codes are disabled.

800 character storage and display (20 lines of 40 characters each)

Parity generation and detection — Strap Selectable

Remote composite video output available through BNC connector on rear panel connector plate

Upward scroll in "on-line" operation

Four-way control of non-destructive blinking cursor

Cursor home and clear screen keys

Selectable baud rates of 110, 150, and 300 plus Variable 1 (300 — 1200) and Variable 2 (1200 — 4800)

Operator adjustment of contrast and brightness

Local, half and full duplex modes of operation

EIA RS-232B communication interface

64 character USASCII Code — lower case displayed as upper case

Dual intensity video — control characters lightly intensified and displayed in local mode

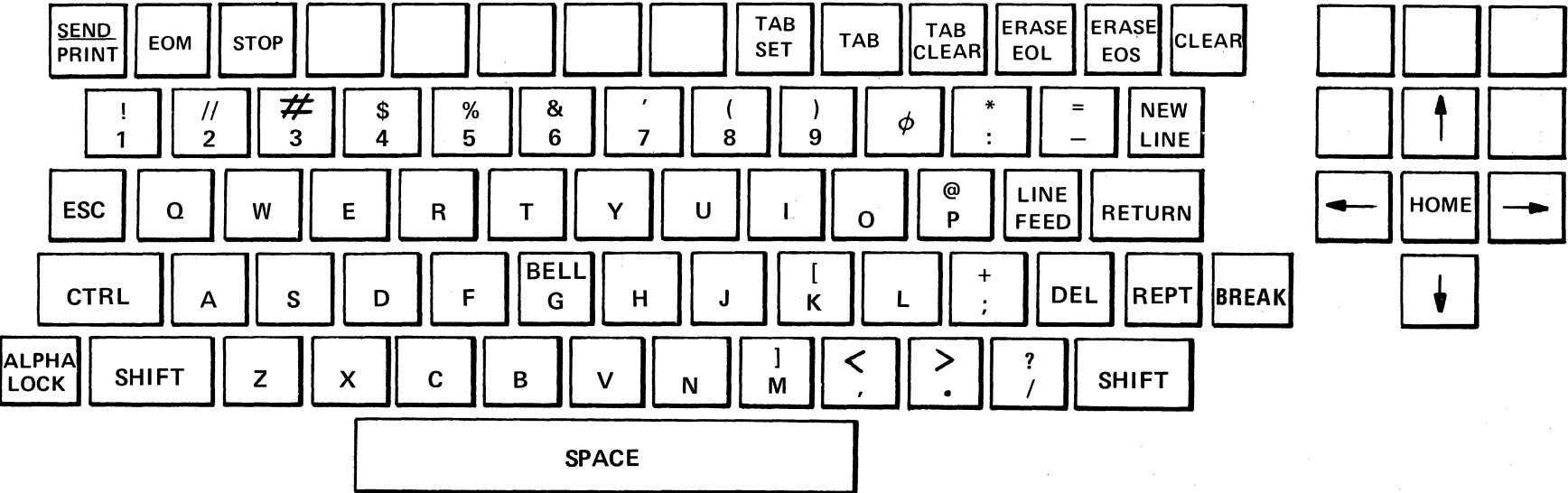Dual intensity video — — control characters lightly intensified and displayed in local mode

Options:

A,B,D,E

Available Accessories:

See Price List Page

LOC | FDX | | PWR

SEND PRINT | EOM | STOP | | | | | | TAB SET | TAB | TAB CLEAR | ERASE EOL | ERASE EOS | CLEAR

! 1 | // 2 | # 3 | $ 4 | % 5 | & 6 | ' 7 | (8 |) 9 | φ | * : | = − | NEW LINE

ESC | Q | W | E | R | T | Y | U | I | O | @ P | LINE FEED | RETURN

CTRL | A | S | D | F | BELL G | H | J | [K | L | + ; | DEL | REPT | BREAK

ALPHA LOCK | SHIFT | Z | X | C | B | V | N |] M | < , | > . | ? / | SHIFT

SPACE

↑

← HOME →

↓

MODEL II
BEEHIVE TERMINAL
KEYBOARD LAYOUT

BEEHIVE TERMINAL MODEL II
"BUFFERED VIDEO TELEPRINTER"

The Model II provides the features of a Model I plus the additional features to enable use of the terminal in Batch oriented type applications. (Note that it is possible to expand from a Model I to a Model II in the field.)

The additional features of the Model II are:

Tab: TAB SET, TAB CLEAR, and TAB. Permits inserting a tab "flag" at any character position on a line as indicated by the cursor position. The tab position remains available for character display.

Erase: Provides two Erase keys:

a. Erase to end of line (EOL). Erases all characters from cursor position to end of line.

b. Erase to end of screen (EOS). Erases all characters from the cursor position to the end of the screen.

Send/Print: Provides the ability to transmit a complete message or page of data for Batch applications. When in the Local mode, depressing the End of Message key (EOM) causes the EOM symbol to be displayed at the cursor position and the cursor to return to the Home position.

Depressing the SEND key with the mode switch to HDX position will cause the data contained within the cursor home position and EOM symbol to be transmitted via the send connector. The EOM character is also transmitted.

Three Level Blink: Incorporated in all Model II or III CRT Terminals, permits the display of a character word or message to be either blinked (Level 1), reversed video (Level 2), or blinking reversed video (Level 3). It is possible to have all levels of the blink feature active on an individual message or line. Activation of this feature is available either from the keyboard or by the means of program control. The code assignments for the three level blink feature are as follows:

Blink	Control/Shift	L
Reversed Video	Control/Shift	M
Blink Reversed Video	Control/Shift	N
Reset Blink	Control/Shift	O
Erase Blink on Total Page	Control/Shift	K

A position in memory is required for each of the three level blink features: i.e., in order to blink a portion of a line, the cursor must be positioned to the first space prior to that portion of the line which will be blinking. By depressing the (Control/Shift L) keys simultaneously, the remainder of the line will begin blinking. By positioning the cursor to the first space following the portion of the line which you desire to blink and by depressing simultaneously (Control/Shift O), that portion of the line to the right of the cursor will return to normal video and that portion to the left of the cursor will be blinking. The same philosophy holds true for the reversed video and the blinking reversed video features. By depressing simultaneously the (Control/Shift K), the entire screen will be cleared of the blinking features.

Serial RS-232B Remote Printer I/O: Incorporated in all Model II or III CRT Terminals, permits the terminal to be interfaced to any off-line Serial ASCII RS-232B printing device. The point of connection shall be through J7 at the rear connector panel. When the terminal is in the LOCAL mode and the SEND/PRINT Key is depressed, all of the displayed information from the cursor position to the EOM symbol

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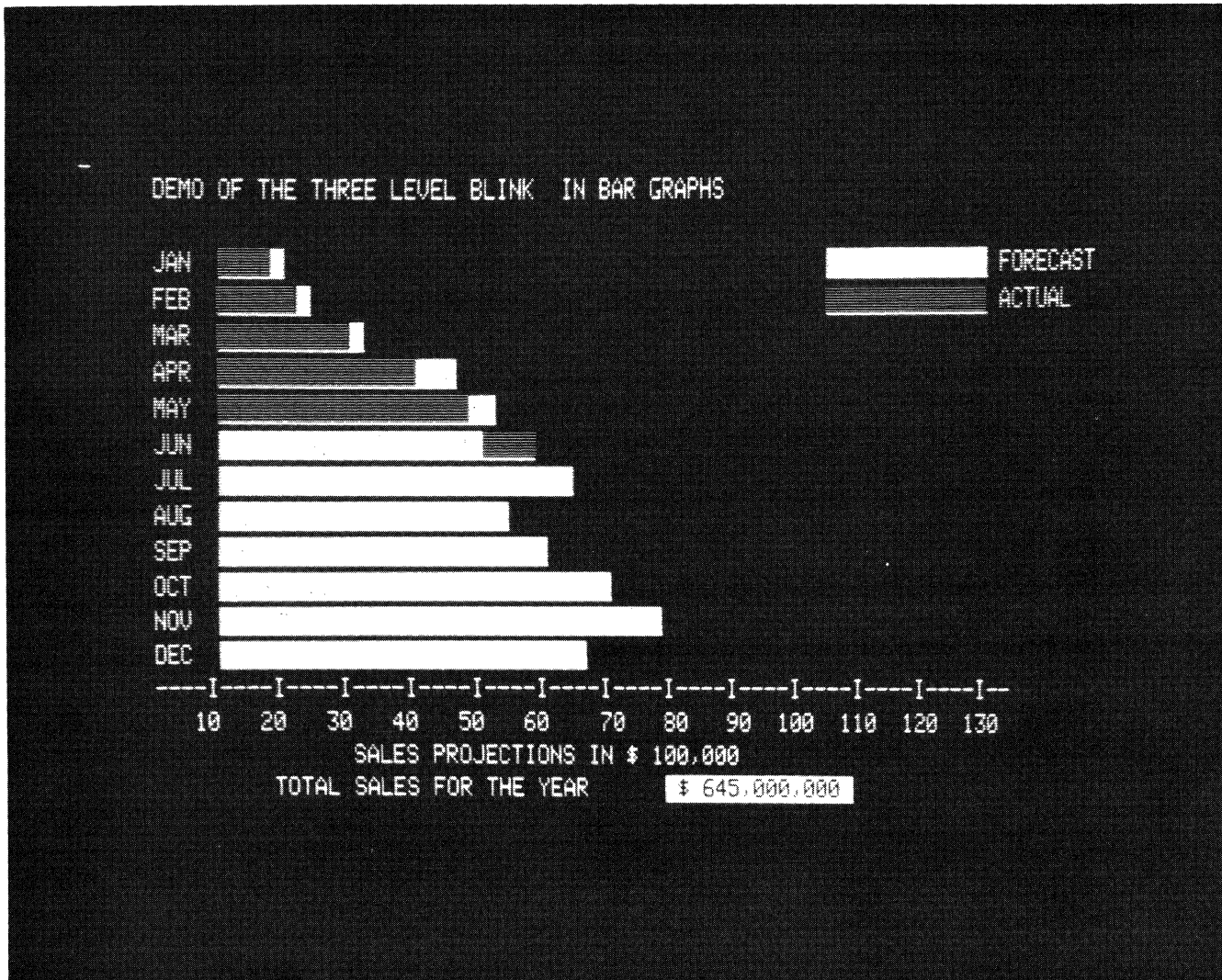shall be transmitted via the Print Connector J7 to the remote (customer furnished) printing device.

A separate printer oscillator provides transmission rates up to a maximum of 6600 baud. The desired rate must be specified at time of order. An adjustment of plus or minus 20% of specified rate is available for customer fine tune.

Options:

A,B,D,E

Available Accessories:

See Price List Page

DEMO OF THE THREE LEVEL BLINK IN BAR GRAPHS

```
                                                    ┌──────────┐ FORECAST
JAN ▓▓▓▓▓░                                           ├──────────┤
FEB ▓▓▓▓▓░                                           └──────────┘ ACTUAL
MAR ▓▓▓▓▓▓▓░
APR ▓▓▓▓▓▓▓▓▓░
MAY ▓▓▓▓▓▓▓▓▓▓▓▓░
JUN ░░░░░░░░░░░░░░▓▓▓
JUL ░░░░░░░░░░░░░░░░░░░░░
AUG ░░░░░░░░░░░░░░░░░
SEP ░░░░░░░░░░░░░░░░░░░
OCT ░░░░░░░░░░░░░░░░░░░░░
NOV ░░░░░░░░░░░░░░░░░░░░░░░
DEC ░░░░░░░░░░░░░░░░░░░░░
    ----I----I----I----I----I----I----I----I----I----I----I----I----I--
       10   20   30   40   50   60   70   80   90  100  110  120  130
            SALES PROJECTIONS IN $ 100,000
         TOTAL SALES FOR THE YEAR      $ 645,000,000
```

THREE LEVEL BLINK IN BAR GRAPHS
(Actual Photograph)

BEEHIVE TERMINAL
CODE SHEET
FOR MODELS I, II, AND III

BITS 4321 \ 765	000 (CONTROL)	001 (CONTROL)	010	011	100	101	110	111
0000	NULL @	→P	SP	∅	@	P		p
0001	RECORD ADDRESS A	START READ Q	!	1	A	Q	a	q
0010	START WRITE B	↑R	"	2	B	R	b	r
0011	STOP WRITE C	STOP READ S	#	3	C	S	c	s
0100	←D	CLEAR T	$	4	D	T	d	t
0101	HOME E	U	%	5	E	U	e	u
0110	SET TAB F	CLEAR TAB V	&	6	F	V	f	v
0111	BELL G	FORMAT ERASE W	'	7	G	W	g	w
1000	NEW LINE H	TERMINAL OFF X	(	8	H	X	h	x
1001	HORIZONTAL TAB I	TERMINAL ON Y	)	9	I	Y	i	y
1010	LINE FEED J	REWIND Z	*	:	J	Z	j	z
1011	ERASE SCREEN K	ERASE BLINK [	+	;	K	[	k	
1100	ERASE LINE L	BLINK \	,	<	L	\		
1101	CARRIAGE RETURN M	REVERSED VIDEO]	—	=	M	]	m	
1110	FORMAT OUT N	BLINK REVERSED VIDEO ∧	.	>	N	∧	n	
1111	FORMAT IN O	RESET BLINK _	/	?	O	—	o	

Cassette Accessory

Priority Blink Feature

Lower Case Option

FORM	LOC	FDX	HDX	PWR

SEND PRINT	EOM	STOP						TAB SET	TAB	TAB CLEAR	ERASE EOL	ERASE EOS	CLEAR

INSERT CHAR	PAGE EDIT	DELETE CHAR

! 1	// 2	# 3	$ 4	% 5	& 6	' 7	(8	) 9	φ	* :	= -	NEW LINE

INSERT LINE	↑	DELETE LINE

ESC	Q	W	E	R	T	Y	U	I	O	@ P	LINE FEED	RETURN

←	HOME	→

CTRL	A	S	D	F	BELL G	H	J	[K	L	+ ;	DEL	REPT	BREAK

↓

ALPHA LOCK	SHIFT	Z	X	C	V	B	N	] M	< ,	> .	? /	SHIFT

SPACE
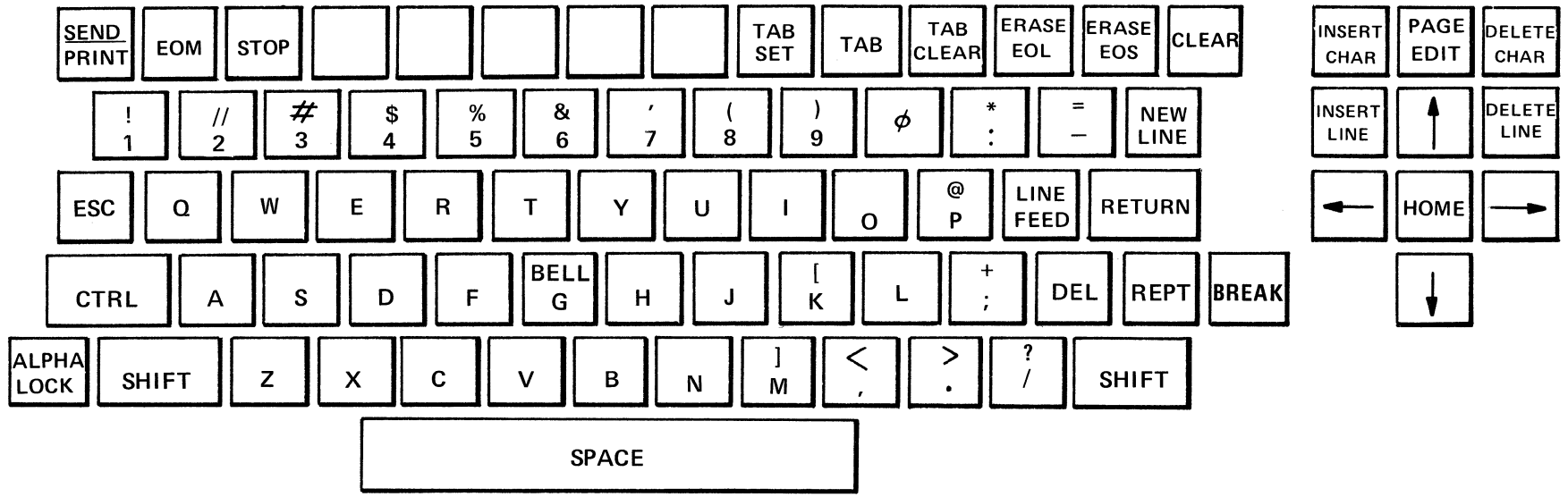
MODEL III
BEEHIVE TERMINAL
KEYBOARD LAYOUT

The Model III provides all the features and functional capabilities of the Model I and II plus the following features to enable the use of the terminal in a more sophisticated time sharing environment, or applications where editing and protected field formatting is a necessity. **(Note that it is possible to expand from a Model I or II to a Model III in the field.)**

The additional features of the Model III are:

Edit:	This feature is active only in the local mode and provides the operator with the ability to manipulate the displayed data with minimum efforts. The Edit capability is inhibited when the unit is in the Format mode. There are five keys associated with this feature: Insert Character, Delete Character, Insert Line, Delete Line and Page Edit. The function of each key is as follows:

a. **Page Edit.** This is an alternate action key. When depressed latches in the lower position which signifies the unit is in the Page Edit mode. This key is used in conjunction with the insert and Delete Character keys.

Its function is to eliminate the 40/80 character line boundaries so that all data on a screen (display) is treated as one continuous line of data. Insertion of a character in Page Edit mode shall cause all data from the cursor and to its right to be moved one position to the right. The last character on the page (display) is lost.

The Delete Character key, when in Page Edit mode, causes the reverse of the Insert function. The character at the cursor position is deleted and all data to the right of the cursor is moved left one position. A space is inserted into the last position of the display.

b. **Insert Character.** Alternate action key when depressed latches in the lower position which signifies the unit is in the Insert Character mode. Depressing any character key causes all characters from the cursor position to the end of the line to be moved right one position and the new character to be inserted at the cursor position. The last character on the line is discarded. The cursor moves right one position in the normal manner and additional characters may be added as necessary. Depressing the Insert Character key a second time unlatches it and removes the unit from the Insert Character mode.

c. **Delete Character.** This key causes the character at the cursor position to be deleted and all data on that line to move left. A space is inserted into the last position of the line and the cursor remaining at its position.

d. **Insert Line.** This key causes the next 80 characters from the cursor position to the end of the line and all lower lines to be moved down one line. The 20th line is lost. The cursor remains at its position.

e. **Delete Line.** This key causes the line where the cursor is located to be replaced by the next lower line. All lines below are moved up one line, with a blank line inserted into the bottom (20th line).

Format:	Provides the ability for **either** the keyboard or program control to display a fixed format with the appropriate blanks, which are to be filled in by the operator.

Variable data will be entered only between open ([ ) and closing ( ]) brackets. With the format enabled, only the variable data will be transmitted. The specifics for implementing this function are defined as follows:

a.   The Model III may be placed into the format mode by use of a **control O** received from the keyboard or computer (if in an on-line mode of operation) or by depressing the alternate action lighted control switch which is labelled Form. The switch is illuminated when in the format mode.

b.   While the terminal is in format mode, the CRT display is file protected. That is, only the data between the opening bracket ([ ) and the closing bracket ( ]) of any two bracket sets can be altered by the operator.

c.   The cursor (which defines the location of the next character to be written) will skip to the next opening bracket by the following:

1.   Receipt of a **control I** from the computer.

2.   Being positioned under a closing bracket by the process of filling in the blanks.

3.   Depressing the **TAB** key on the keyboard.

d.   The model III is removed from the format mode by receipt of the **control N** code from the keyboard or the computer when in an on-line mode of operation, or by depressing the Form switch at which time the Form light is extinguished. When the terminal is out of the format mode, the memory is not file protected. In addition, the opening bracket, the closing bracket, and the HT codes take on their ordinary meaning.
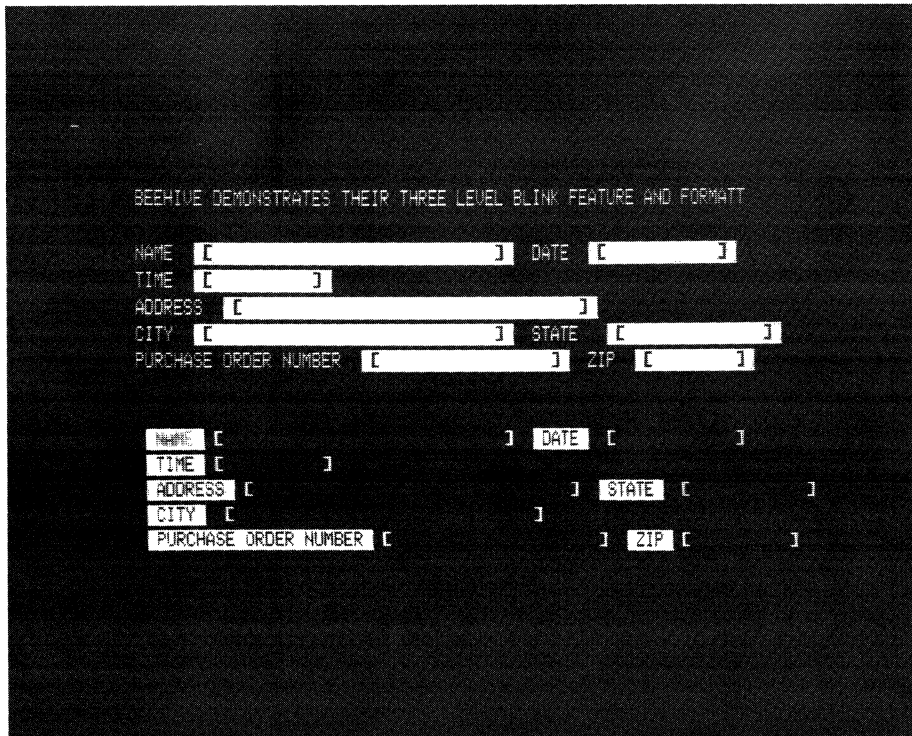
e.   The code assignments for the format option are:

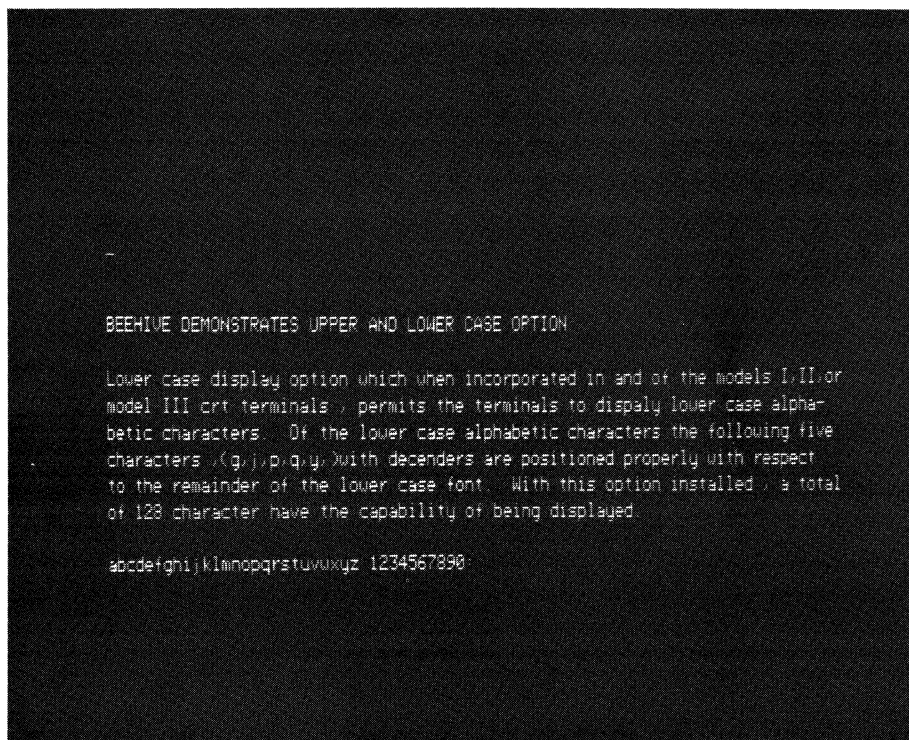|	
Automatic Skip	**Control I**
Format in	**Control N**
Format out	**Control O**
Opening bracket	**Control/Shift K**
Closing bracket	**Control/Shift M**
Format erase	**Control W**

Options:

A, B, D, E

Available Accessories:

See Price List Page

THREE LEVEL BLINK FEATURE AND FORMAT
(Actual Photograph)

UPPER AND LOWER CASE OPTION
(Actual Photograph)

BEEHIVE TERMINAL MODELS I, II, III

OPTION DESCRIPTIONS

OPTION A: 80 Character Per Line option, which when incorporated in any Model I, II, or III CRT Terminal, doubles the memory capacity of the Terminal (the number of characters per line doubles from 40 characters per line to 80 characters per line). The size of the character remains the same, the difference in the line capacity is brought about by the reduction of the spacing between characters.

This is a field installable option and can be installed by BMEI's national service organization.

OPTION B: Parallel Interface option, which when incorporated in any Model I, II, or III CRT Terminal, permits the terminal to interface to a computer in a hard wire connection with data rate of up to 10,000 characters per second. This option utilizes the standard Request/Acknowledge technique for synchronizing data transfers. The data is presented in a bit parallel character serial format. Standard logic levels are Logic 1 = O volt and Logic 0 = +5 volts. The basic output gates are TTL Series Type 7400. The input gates are DTL Series Type 946, with a 2000 OHM pull-up resistor. Unless specified by the customer at the time of order, the input parity is strapped to a Logic "0".

Input parity may be specified at the time of order to check for either even or odd, output parity may be selected even or odd. Also, the logic levels may be inverted to provide a Logic 1 = +5 volts and Logic 0 = 0 volt.

This is not a field installable option and must be specified at the time of order.

OPTION D: Export Model option, which when incorporated in any of the Model I, II or III CRT Terminals, enables the terminal to be operated from a 50 Hz, 200 to 260 volt power source.

This is not a field installable option and must be specified at the time of order.

OPTION E: Lower Case Display option, which when incorporated in any of the Model I-A, II-A or III-A CRT Terminals, permits the terminal to display lower case alphabetic characters. Of the lower case alphabetic characters, the following five characters, i.e., (g, j, p, q, y), with decenders are positioned properly with the respect to the remainder of the lower case font. With this option installed, a total of 128 characters have the capability of being displayed.

This is a field installable option and may be installed by BMEI's national service organization.

Option A, 80 character line, is a prerequisite for this option.

ACCESSORIES: **TTY Current Loop Adapter,** — This accessory, when added to any Model CRT Display Terminal, allows interfacing of the terminal via its EIA RS-232B interface to a standard three or four wire teleprinter 20 or 60 milliampere current loop. This adapter is a stand-alone mini-box which houses the necessary interface relays, EIA RS-232B level converters, the appropriate loop battery supply, and the compatible connectors to make a complete stand-alone package.

Stand-Alone Cassette — The stand-alone cassette terminal is a cassette loaded magnetic tape terminal incorporating both a terminal compatible and a line compatible interface. The stand-alone cassette terminal provides the capability to function as a stand-alone batch processing station for point-to-point data transmission and as a companion unit to a Beehive Model I, II or III CRT Terminal device without hardware or system modification.

The stand-alone cassette terminal interface is compatible to standard data processing and communication equipment and includes selectable transmission speed to accommodate both high and low speed devices. The standard features of this terminal are as follows:

1. Plug-to-Plug compatible dual interfaces, communication line and operator terminal, both EIA RS-232B compatible.

2. The instant updating of the existing data.

3. Re-usable cassette magnetic tape storage.

4. Both read and write capability.

5. Unique Storage technique provides 70,000 character storage on a single pass.

6. Capability of being able to record at one speed and play back at any other speed. Switch selectable speeds.

7. High Speed Search — Search rate is at approximately 1,000 characters per second. A maximum of 99 records may be identified by the search mode.

8. Human engineered with control and indicators for upmost in simplicity and clarity.

9. Unit is a direct replacement for paper tape systems.

10. The terminal is system tailored with operator interlock to insure high reliability.

11. It is portable and can be located to suit your application.

12. 1200 baud high speed transmission rate.

The ability to converse freely, both directions to the communication line, has been maintained without degregation so that the applications can be accommodated where the operator input and machine stored input are intermixed.

The stand-alone terminal is completely compatible with present time sharing and computer systems by utilizing the USA standard code for information interchange (USASCII). Since the line I/O interface conforms to EIA RS-232B standards, it is compatible with all Bell Data Sets or equivalent modems and most acoustical couplers. Data Services that can be attached to the terminal I/O interface include keyboard printers, CRT terminals, tape readers and punch combinations. For additional information on this terminal, consult the factory.

CABLES: The accessory cables permit the connection of the serial I/O connector on the terminal to the appropriate serial connector on the Acoustic Coupler or Computer.

PRICE LIST
BEEHIVE TERMINAL MODELS I, II, III

MODEL I	$ 2,180
MODEL I-A	2,495
MODEL II	$ 2,452
MODEL II-A	2,767
MODEL III	$ 2,672
MODEL III-A	2,987

OPTIONS AVAILABLE

*Option B:	Parallel Interface	$	212
Option D:	Export Model — 200 - 260 VAC, 50 Hz	$	60
Option E:	Upper and Lower Case Display	$	212

ACCESSORIES AVAILABLE

TTY Current Loop Adapter	$	100
Stand Alone Cassette	$	2,150
Acoustic Coupler Cable	$	25
Nova Computer Serial I/O Cable	$	50
Hewlett Packard 2114-2116 Computer Serial I/O Cable	$	50

NOTE: All Models I, II and III are 40 character per line terminals
All Models I-A, II-A, and III-A are 80 character per line terminals
Printer Interface and Three Level Blink is standard on all Models II and III.
These features are not available on the Model I and I-A.
Interconnection cables are not supplied with the terminals.

*   Not available with a Print Adapter.

Prices subject to change without notice.