B100 COMPUTER TERMINAL

BEEHIVE INTERNATIONAL

B100
COMPUTER TERMINAL

Operator Manual

June 1977

TM76 - B101

TABLE OF CONTENTS

OPTION CONFIGURATION FOR: _____

SERIAL NUMBER: _____

POWER OPTION

Factory Set

- ☐ 115 V   50/60 Hz
- ☐ 100 V   50/60 Hz
- ☐ 200 V   50/60 Hz
- ☐ 230 V   50/60 Hz

DISPLAY OPTION

- ☐ 64 ASCII Character Set *
- ☐ 96 ASCII Character Set

DISPLAY FORMAT

- ☐ 12x80 Characters (12 Line)
- ☐ 24x80 Characters (24 Line) *

BAUD SELECTION

EXTERNAL   I/O PORT

☐	75	☐	1800
☐	110	☐	2000
☐	150 ·	☐	2400
☐	300	☐	3600
☐	600	☐	4800
☐	1000	☐	7200
☐	1200	☐	9600 *
		☐	19200

INTERNAL STRAP SELECTION AUX. PORT

SWITCH E-13

- ☐ 1. 19200 Baud
- ☐ 2. 9600
- ☐ 3. 7200
- ☐ 4. 4800
- ☐ 5. 3600
- ☐ 6. 2400
- ☐ 7. 2000

SWITCH E-14

- ☐ 1. 1800
- ☐ 2. 1200
- ☐ 3. 1000
- ☐ 4. 600
- ☐ 5. 300 *
- ☐ 6. 150
- ☐ 7. 110
- ☐ 8. 75

UPPER & LOWER CASE

- ☐ Upper Case only
- ☐ Upper/Lower Case

REFRESH RATE

- ☐ 50 Hz
- ☐ 60 Hz *

HALF/FULL DUPLEX

- ☐ Half-Duplex
- ☐ Block
- ☐ Full Duplex *

CL/LCL/RS232C

- ☐ CL
- ☐ LCL
- ☐ RS232C *

STRAPPING CONFIGURATIONS

- ☐ Low Intensity (Always "on" with format)
- ☐ High Intensity (Always "on")

- ☐ RTS Controlled
- ☐ RTS "ON"

- ☐ Internal Aux. Delay *
- ☐ AUX Busy Control
- ☐ AUX Ready Control

WORD LENGTH SELECTION

Main I/O	Aux. Port	
☐	☐	2 Stop Bits
☐	☐	1 Stop Bit
☐	☐	No Parity
☐	☐	Parity Enable
☐	☐	Even Parity
☐	☐	Odd Parity
☐	☐	8-Bit Word
☐	☐	7-Bit Word
☐	☐	Bit 8 Mark
☐	☐	Bit 8 Space

Beehive standard for word length unless otherwise specified.

10 bit parity to marking state

*Beehive standard setting, when not specified.

The B100 Operator's Manual

SECTION I

Introduction

- *Cursor Control*

- *Erase Mode*

- *Addressable Cursor*

- *Switch Selectable Transmission Rates: 75 to 19,200 bps*

- *Communication Mode:* HDX/FDX*/Block

- *Auxiliary Interface Printer Interface or Storage Media I/O*

- *Non-Glare Screen*

The BEEHIVE B100 is a low cost multi-feature remote video display terminal. The terminal is self-contained, operator oriented, and computer accessible. The BEEHIVE B100 is an attractively styled sophisticated electronic package designed for use in serially transmitting information to and receiving information from, an interconnected data source. The terminal is fast, with an operational exchange of data at any of several preselected transmission rates — 75 to 19,200 baud. Other features include cursor control, RS-232C and current loop interface, addressable cursor, and erase mode. Expansion options, such as formatting, hard copy capability with printer interface, editing, blink, and 16 function keys are available.

The BEEHIVE B100 is controlled by an operator designed keyboard employing N-Key rollover feature. When a key is held down for longer than half a second, it automatically repeats at a rate of 15 characters per second. Auto repeat on some keys is inhibited where not meaningful. Keyboard features include an eleven key numeric pad for convenient entering of numbers; cursor up, down, right and left controls; optional function keys and edit and data transmit keys.

Interfacing, baud rate selection, half and full duplex* switching, and video controls, are conveniently

arranged on the rear panel. The Input/Output and auxiliary I/O connectors will interact with most standard serial RS-232C external devices. The auxiliary data can be received and transmitted at a baud rate separate from that of the standard I/O Port and is strap selectable.

The CRT is a 12-inch/30.5 cm (measured diagonally) digital-type monitor which is formatted to display 12 lines with 80 characters on each line for a total page memory of 960 characters. A 24x80 character option provides a total of 1,920 character memory for additional text storage. Each character is generated from a 5 x 7 dot matrix, with two dot spacing between adjoining characters and a two scan spacing between adjacent lines. The standard character set consists of 64 displayable characters where optionally there are 95 characters consisting of upper and lower case.

This manual provides a general equipment description and operating instruction for the BEEHIVE B100 VIDEO TERMINAL. Included are sufficient diagrams, tables, and descriptive text to provide information to obtain a thorough understanding of the operational characteristics of the equipment.

A brief equipment description/option list, installation with setup procedures, and operating instructions are included in three general sections.

* Full Duplex operation allows data to be transmitted with the terminal's receiver input enabled for immediate computer reply of the transmitted data (echoplexed) to verify proper receipt of the data.

Figure 1-1   BEEHIVE B100 TERMINAL

Table 1-2 BEEHIVE B100 SPECIFICATIONS

1. Physical Characteristics

Width	19.00 inches	38.3 cm
Height	13.50 inches	34.3 cm
Depth	22.25 inches	56.5 cm
Weight	45 lbs	20.41 kg

2. Power Requirements

Input Voltage   115/100/230 VAC $\pm$ 10%, 50/60 Hz
Power Consumption   100 Watts (nominal)

3. Environmental Specifications

Altitude   Sea Level to 10,000 ft. (3km)
Temperature   0 to +40 degrees C (+32 to 104 deg F)
Humidity   5% to 90% non-condensing
Vibration   10 Hz to 55 Hz, 0.01 inch peak-to-peak
Non-operative Storage Temp.   -20°C to 85°C

4. General Specification

Display Size   12 inch diagonal (rectangular) (30.5 cm)
Active Display Size   6.5 x 8.4 inches (16.6 cm x 21.4 cm)
Display Format   24 lines of 80 characters each
Character Type   5 x 7 dot matrix (7 x 9 field)
Character Set   64 character ASCII set
                        112 character ASCII optional

Table 1-2 BEEHIVE B100 Specifications Cont'd.

Cursor Type	Non-destructive block (7 x 9 field)
Erase Functions	Clear Memory
	Erase to end of line
	Erase to end of screen
	Erase unprotected field in Format Mode
Operation Modes	HDX/FDX/BLOCK
	RS232/Local/Current Loop
Strapping Options	Printer Baud rate
	Refresh Rate (50/60 Hz)
	Parity Odd/Even
	9, 10, or 11 Bit Word
	Parity Bit Mark/Space
	Aux Port CR/LF Delay Enable
	Aux Port Ready/Busy Control
Communications	Per RS-232C EIA Standard
	20 ma Current Loop
Signal Characteristics	
Transmit Mark	−10 volts nominal
Transmit Space	+10 volts nominal
Receive Mark	−3 to −25 volts
Receive Space	+3 to +25 volts
Transmission Rates	75, 110, 150, 300, 600, 1000, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, or an externally provided clock (X16)
	X8 TTL output also provided

Figure 1-2 KEYBOARD CONFIGURATION
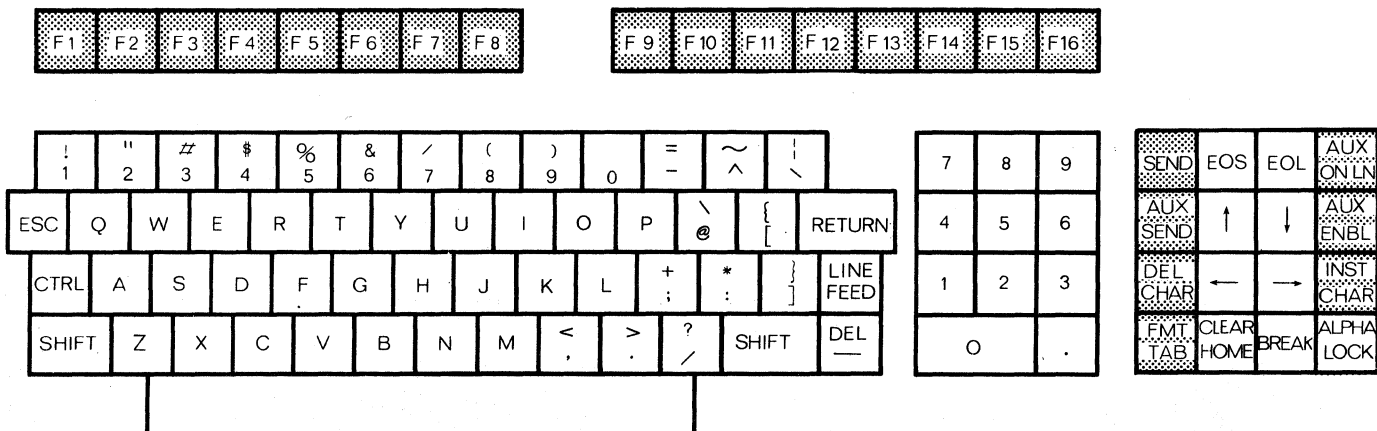
Shaded Areas Denote Optional Keys

Table 1-2 BEEHIVE B100 Specifications Cont'd

Transmission Code
     Start Bit   one Bit
     Data Bits   seven Bits USASCII
     Parity Bit   one Bit or none
     Stop Bit   one or two Bits

Baud Selection
     Main I/O   Switch Selectable
     Auxiliary   Internally strap selectable

Refresh Rate   50 or 60 Hz

Display Memory   MOS Random Access Memories

Character Generation   MOS Read Only Memory

OPTIONS LIST

CHARACTER GENERATOR

1. 96 Displayable Character Set

DISPLAY MEMORY

1. 12 Line x 80 characters

EDIT

1. Edit/Function Keys

MONITOR/FREQUENCY/VOLTAGE
1. 115V 50/60 Hz
2. 100V 50/60 Hz
3. 230V 50/60 Hz

SECTION II

Installation

2.1 INTRODUCTION

This section contains information on unpacking, receiving inspection, connection of the communications interface, physical placement of the terminal and preliminary functional control setting for the specific requirements of a given user.

2.2 UNPACKING

The following items are furnished with each B100 terminal:

    a. The display terminal with keyboard
    b. Operator's Manual

There are no tiedowns or packing materials inside the unit which need to be removed. Store the carton for use as a future shipping container.

2.3 INSPECTION FOR IN-SHIPMENT DAMAGE

Upon receipt, carefully check components for any signs of shipping damage. All shipping containers have been specially designed to protect their contents, and special care has been taken to prevent damage under normal shipping conditions. Mis-handling will be evident upon inspection of the shipping container, and if damage is found after visual inspection, take care not to destroy the evidence. If necessary document the damage with photographs and contact the Transport Carrier as soon as possible.

2.4 THE BEELINE

In a continuing effort to provide the best in support and service to terminal users, a one year subscription to a continuing information service is available. Service tips, manual updates and changes, corrective modifications and documentation, and recommended spare parts are only a few of the items this service provides. Please refer to the order form at the beginning of this manual for further information.

2.5 ACCESSORIES

The following accessories are available for use with the B100 terminal:

    a. Acoustic Coupler Cable
            Part No. 112-0031
    b. NOVA* Computer Serial I/O Cable
            Part No. 112-0040

* Trademark Data General Corp.

2.6 IDENTIFICATION

An identification plate located on the bottom cover of the terminal provides the model number, serial number, weight, voltage and current requirements, and frequency and power classifications.

2.7 INSTALLATION

2.7.1 Placement for Operation

The terminal is fully self-contained, and its portability allows it to be moved and relocated to alternate operating positions without removing or altering any wiring. Select a convenient, level surface and place the terminal where the power cable and data I/O cables will not be in the way of the operator. Route the cables in such a manner that they not be inadvertently pulled or disturbed by minor changes in terminal position or by working personnel. Position the terminal so that operator use will be as convenient as possible.

> CAUTION: Do not place the terminal on any surface that will block cooling air from the bottom or back of the cabinet. The terminal is provided with an internal fan for cooling. Air enters through slots in the bottom and out slots provided in the rear of the terminal case. To maintain efficient air circulation, keep at least two inches of clearance at the rear and on the sides of the terminal (See Figure 2-1).

2.7.2 Power Connection

The terminal is shipped with a three-conductor power cord which grounds the instrument through the offset pin. The safety feature of this ground should always be preserved by grounding the terminal to the outlet box or other earth ground. If it is necessary to use an adapter, ground the pigtail.

2.7.3 Current Loop Interface

The Current Loop Interface is a 20ma device and can be used for computers up to 2000 feet (608 m) from the terminal. If shielded, twisted pairs are used, the terminal may be located up to 6000 feet (1.8 km) away if utilized at slower baud rates. Interface consists of:

    2 wire source
    2 wire receive data
    2 wire xmit data

The current loop signals are contained within the RS-232C I/O connector and will not interfere with normal RS-232C signals required for asynchronous operation. See Table 2-1 for location of pin assignments.

NOTE: Current Loop will not operate above 9600 baud. Set the baud rate at 9600 or below.

2.7.4 Composite Video

The B100 is provided with a Composite Video device capabile of driving a remote monitor up to 1000 feet from the terminal over a 50-ohm coaxial cable. A BNC connector is provided on the rear of the terminal for this installation (See Figure 2-2).

2.7.5 Data Interface Connection

Signals used in communicating with the B100 conform to the requirements of EIA specification RS-232C. In particular, output voltage swings from −10 volts to +10 volts, while the receivers present a minimum of 3k ohms impedance to the line. The receiver circuits employed in B100 switch at approximately +1.0 volt with 0.1 volts of hysteresis. The input resistance is approximately 4k ohms. The driver circuits current limit is at 10 milliamps on both source and sink.

All data source interconnections are made via the rear panel Input/Output connector (refer to Figure 2-2). A 25 pin minature D-type ITT Cannon connector (DM-25S or equivalent) is used for connecting to the computer. Pin assignments are listed in Table 2-1 and defined in the following paragraphs.

2.8 DATA INTERFACE CONNECTIONS

All data source interconnections are made via the rear panel I/O connector (see Figure 2-2). The I/O connectors are RS-232C type. The pin connections are described in the following paragraphs and in Table 3-1.

2.8.1 Frame Ground (AA) Pin 1

This conductor, where used, is electrically bonded to the machine frame.

2.8.2 Transmitted Data (BA) Pin 2

This circuit transfers data from the terminal to the data set for transmission to the external device. The terminal holds circuit BA in the marked condition during any time interval between characters or words, or when no signals are to be transmitted.

2.8.3 Received Data (BB) Pin 3

The circuit transfers data from the data set to the terminal. Signals on this circuit are generated by the data set in response to data signals received from the

PIN NO.	SIGNAL DESCRIPTION	RS-232C
1	frame ground	AA
2	transmitted data	BA
3	received data	BB
4	request to send	CA
5	clear to send	CB
7	signal ground	AB
8	carrier detect	CF
15	X16 terminal data clock input	*
16	X8 terminal data clock output	*
17	trans	CL
18	source +20V (Current loop)	CL
19	GND	CL
20	data terminal ready	CD
23	receive GND	CL
24	trans GND	CL
25	receive	CL

*(Not RS-232C, TTL Level)   NOTE: CL is bipolar

DATA INTERFACE PIN ASSIGNMENTS (Main I/O Port)

PIN NO.	SIGNAL DESCRIPTION
1	frame ground
2	aux receive data
3	aux send data
4	aux request to send
5	aux clear to send
7	signal ground
6&8	Data Set Ready — Carrier
20	aux ready/busy line

AUXILIARY PORT PIN ASSIGNMENTS
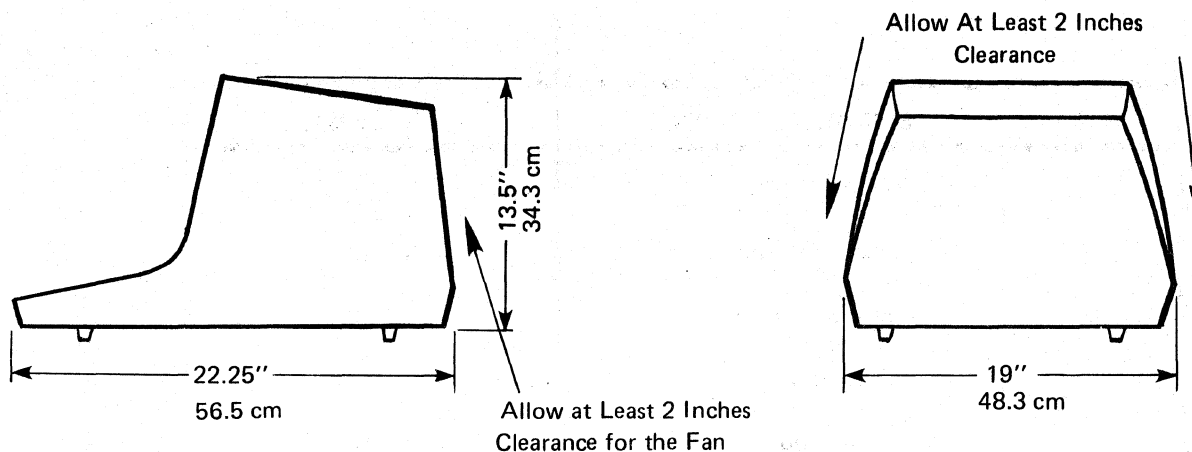
Figure 2-1 Mounting Requirements

external device. The data set holds this line in the marking condition when the line is idle.

2.8.4 Request to Send (CA) Pin 4

Signals on this circuit are generated by the terminal to condition the local data set to transmit. The "on" condition is maintained whenever the terminal has information ready for transmission or is being transmitted. The terminal transmits data on circuit BA (Transmitted Data) only when the "on" condition is maintained on circuits CA, CB, and CD. Request to Send is determined internally.

2.8.5 Clear to Send (CB) Pin 5

Signals on this circuit are generated by the data set to indicate that it is prepared to transmit data. The "on" condition on circuit CA (Request to Send) is replayed as long as may be required to establish a connection to an external device. When Circuit CA is turned off, circuit CB is also turned off.

2.8.6 Signal Ground (AB) Pin 7

This conductor establishes the common ground reference for all interface lines.

2.8.7 Carrier Detect (CF) Pin 8

An input signal (High) will enable the unit to receive.

2.8.8 X8 Terminal Data Clock Pin 16

X8 TTL level transmit clock is provided to clock external modem or interface units.

2.8.9 X16 Terminal Data CLock Pin 15

TTL level clock provided to B100 to slave terminal to any clock rate, up to 19,200 baud. Input clock must be X16 the baud rate desired and baud rate switch must be set to # 15 setting.

2.8.10 Data Terminal Ready (CD) Pin 20

Terminal ready is high whenever power is on.

2.8.11 Auxiliary Port Interface Connections

All Aux Port interconnections are made via the rear panel Aux Port connector (see Figure 2-2). Table 2-1 contains a list of pin assignments for the Aux Port connector.

2.8.12 Frame Ground Pin 1

This conductor, where used, is electrically grounded to the machine frame.

2.8.13 AUX Receive Data Pin 2

The circuit transfers data from the data set to the terminal. Signals on this circuit are generated by the data set in response to data signals received from the external device.

2.8.14 AUX Transmit Data Pin 3

This circuit transfers data from the terminal to the data set for transmission to the external device.

2.8.15 AUX Request to Send Pin 4

Signals on this circuit are generated by the data set to indicate that it is prepared to transmit data.

2.8.16 AUX Clear to Send Pin 5

Signals on this circuit are generated by the terminal to condition the local data set to transmit.

2-4

COMPOSITE VIDEO CONNECTOR

This connector provides an interface to a remote monitor, which can be located up to 1000 feet from the terminal and operates through a 50 ohm coaxial cable.

AC POWER

POWER ON/OFF SWITCH

Controls power to the terminal.

CIRCUIT BREAKER

Prevents damage to circuitry during voltage/current overload.

COOLING FAN

CL/LCL/RS 232C

In the CL position, the input/output data is routed to the current loop transmitter and receiver only. In addition, RS 232C elements are inactive. The RS 232C position disables the current loop elements and the data is routed through the RS 232C elements. The local position (LCL) inhibits any transmission.

BRIGHTNESS

Provides the adjustment for the over-all brightness of the video display.

CONTRAST

Provides the adjustment for the contrast level of the video display.

BAUD RATE SWITCH

This control selects the baud rate that the transmitter and receiver will utilize for transmission. There are 15 internal and 1 external baud rate selection.

MAIN PORT

This port provides data source interface for the terminal, RS 232C or current loop interface.

AUXILIARY PORT

This connector provides an interface for peripheral device such as disks, printers, tape drives, etc.

HDX/BLOCK/FDX

Selects half-duplex, block mode, or full-duplex operation. In HDX operation data from the keyboard is displayed, stored in memory, and transmitted out the I/O port. In FDX operation, data is routed to the I/O port and not displayed or stored. In block mode, data is only stored and displayed in the terminal until the SEND or AUX SEND keys are depressed.

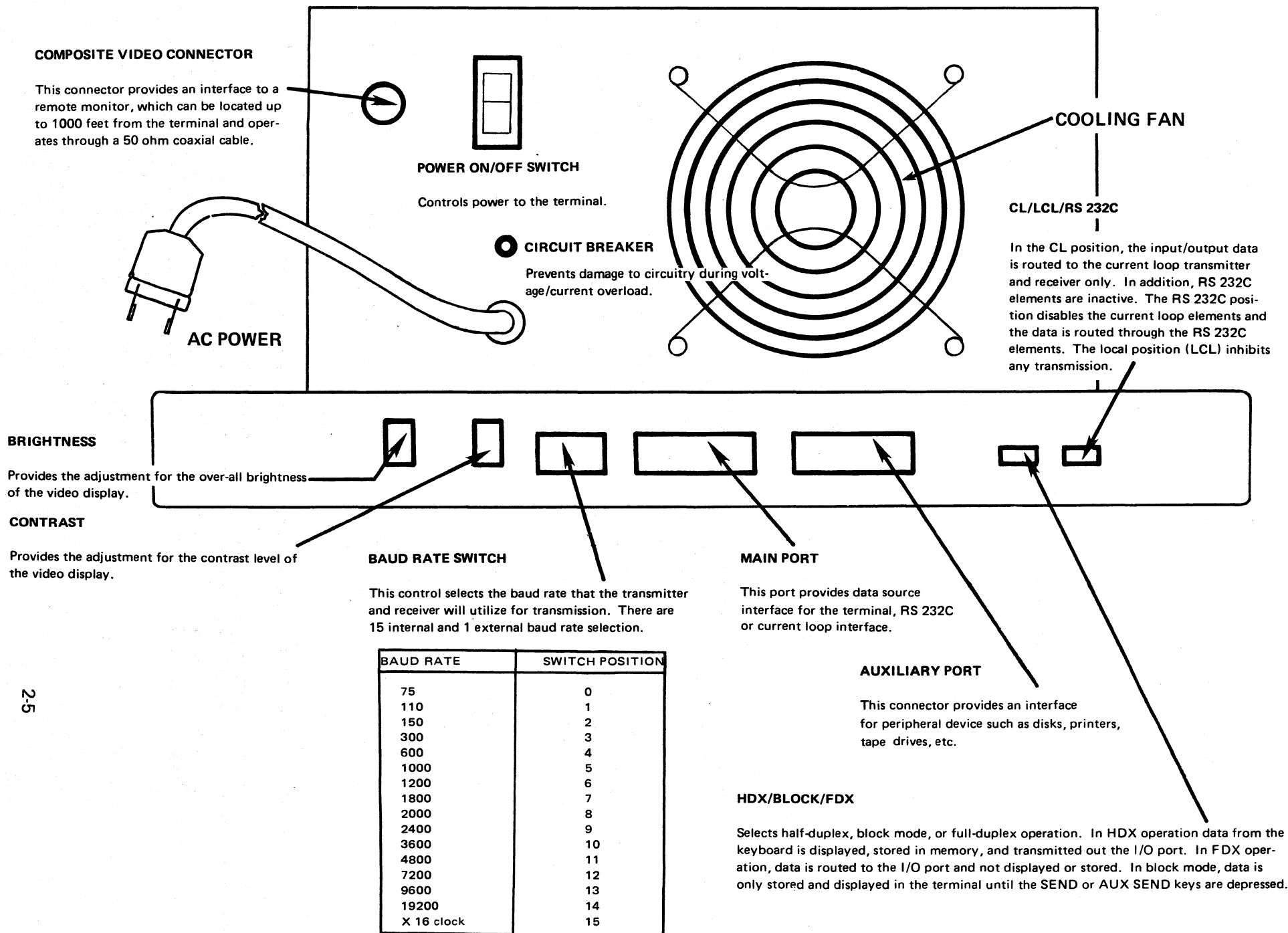| BAUD RATE	SWITCH POSITION
75	0
110	1
150	2
300	3
600	4
1000	5
1200	6
1800	7
2000	8
2400	9
3600	10
4800	11
7200	12
9600	13
19200	14
X 16 clock	15

Figure 2-2 REAR PANEL VIEW OF THE TERMINAL B100

2.8.17 Data Set Ready Pin 6 and 8

When the terminal is "on", the line remains high.

2.8.18 Signal Ground Pin 7

This conductor establishes the common ground reference for all interface lines.

2.8.19 AUX Ready/Busy Line Pin 20

Receives a signal from an outside source indicating a busy or ready mode for a transmission controlled delay to an outside source.

2.8.20 Special Precautions

If the terminal is to be operated in conjunction with a data phone, data modem, direct to the CPU or any other device, special care should be taken to ensure that the interface requirements are established per EIA Specification RS-232C. The logic levels required by this specification may cause serious damage to communication interfaces designed strictly for standard DTL or TTL integrated circuit logic levels. The same precaution should be made when connecting to any communications I/O. In addition, care should be taken to be sure the pins used for current loop are open in the cable or interface device to prevent damage to the terminal.

To protect operating personnel, this unit is equipped with a detachable, three-conductor shielded power cable that grounds the unit. The unit should be operated only with this or a similar type grounded power cable. To temporarily operate the B100 from a two-conductor outlet, use a three-conductor to two-conductor adaptor. Preserve the safety feature by grounding the adaptor pigtail lead.

2.9 PC BOARD MOUNTED CONTROL JUMPERS

A number of terminal controls are mounted on the printed circuit board. These controls are referred to elsewhere in this manual as strappable options or controls and are illustrated in Figure 2-3 and Table 2-2.

2.9.1 Parity Inhibit

With this strap installed, an odd or even parity bit will be generated following the data in the serial data word. If the strap is not installed, no odd or even parity will be generated.

2.9.2 Parity Selection (odd/even)

With this stap installed, odd parity will be generated following the data. With this switch out, even parity will be generated. This strap is active only if the Parity Inhibited strap is installed.

2.9.3 Parity Generation (mark/space)

Mark or Space parity is generated by transmitting an eight-bit data word and forcing the eighth bit high or low. Therefore, if Mark or Space is desired, the Word Length Control strap must be left out to generate an eight-bit word (data). Then, if the eighth bit control strap is installed, a spacing parity bit is generated. If left out, the parity position will mark. **Note: The eighth bit control is only active with 8 data bit word lengths.**

2.9.4 Word Length Selection

A nine-bit transmission word can be generated by sending one start bit, seven data bits, no parity bit, and one stop bit. A 10-bit word is generated by sending one start, seven data bits, one parity bit (odd, even, mark, or space); and one stop bit. An 11-bit word has two stop bits.

2.9.5 Refresh Rate Selection

With this strap installed, the terminal functions at a refresh rate of 50 Hz. With no switch installed, the terminal functions at a standard 60 Hz vertical refresh rate. With the strap set at 50 Hz and the power commoning block configured to the proper power strapping (see Table 2-3), the terminal conforms to export requirements.

2.9.6 Auxiliary Baud Rate

This control has 15 switch locations to select one of 15 baud rates normally provided for the Main I/O Port. Only one strap should be installed. This baud rate will be enabled when the AUX ENABLE key is depressed or when the AUX SEND key is activated.

Table 2-2 JUMPER ASSIGNMENTS

STRAP LOCATION A1

OPEN	No.	CLOSED (+)
UNUSED	1	UNUSED
LOW INTENSITY	2	LOW INTENSITY W/FORMAT
UNUSED	3	UNUSED
	4	
ONLY ONE CLOSED	5	INTERNAL AUX DELAY
	6	AUX BUSY CONTROL
	7	AUX READY CONTROL

STRAP LOCATION D10

OPEN	No.	CLOSED (+)
MAIN 2 STOP	1	MAIN 1 STOP
MAIN NO PARITY	2	MAIN PARITY ENABLE
MAIN EVEN PARITY	3	MAIN ODD PARITY
MAIN 8-BIT WORD	4	MAIN 7-BIT WORD
MAIN BIT 8 MARK	5	MAIN BIT 8 SPACE
60 Hz	6	50 Hz
LOWER CASE	7	UPPER CASE

STRAP LOCATION D11

OPEN	No.	CLOSED (+)
AUX 2 STOP	1	AUX 1 STOP
AUX NO PARITY	2	AUX PARITY ENABLE
AUX EVEN PARITY	3	AUX ODD PARITY
AUX 8-BIT WORD	4	AUX 7-BIT WORD
AUX BIT 8 MARK	5	AUX BIT 8 SPACE
24 LINES	6	12 LINES
UNUSED	7	UNUSED

STRAP LOCATION E13

OPEN	No.	CLOSED (+)
	1	19200 BAUD
ONLY ONE STRAP	2	9600
IS JUMPERED IN	3	7200
LOCATIONS SE13	4	4800
& SE14	5	3600
	6	2400
	7	2000

STRAP LOCATION E14

OPEN	SW No.	CLOSED (+)
	1	1800
	2	1200
	3	1000
	4	600
	5	300
	6	150
	7	110
	8	75

Table 2-3.   POWER COMMONING BLOCK STRAPPING

100 VOLT	
T B I	**WIRE**
1	TI–BROWN
2	TI–YELLOW
3	FAN
4	SI–1
5	KEY
6	TI–BLACK
7	TI–GRAY
8	POWER CORD WHITE
9	KEY
10	BLANK

For 100V, connect the fan
on the Transformer's red tap.

115 VOLT	
T B I	**WIRE**
1	TI–BROWN
2	TI–YELLOW
3	FAN
4	SI–1
5	KEY
6	TI–ORANGE
7	TI–RED
8	FAN
9	POWER CORD WHITE
10	KEY

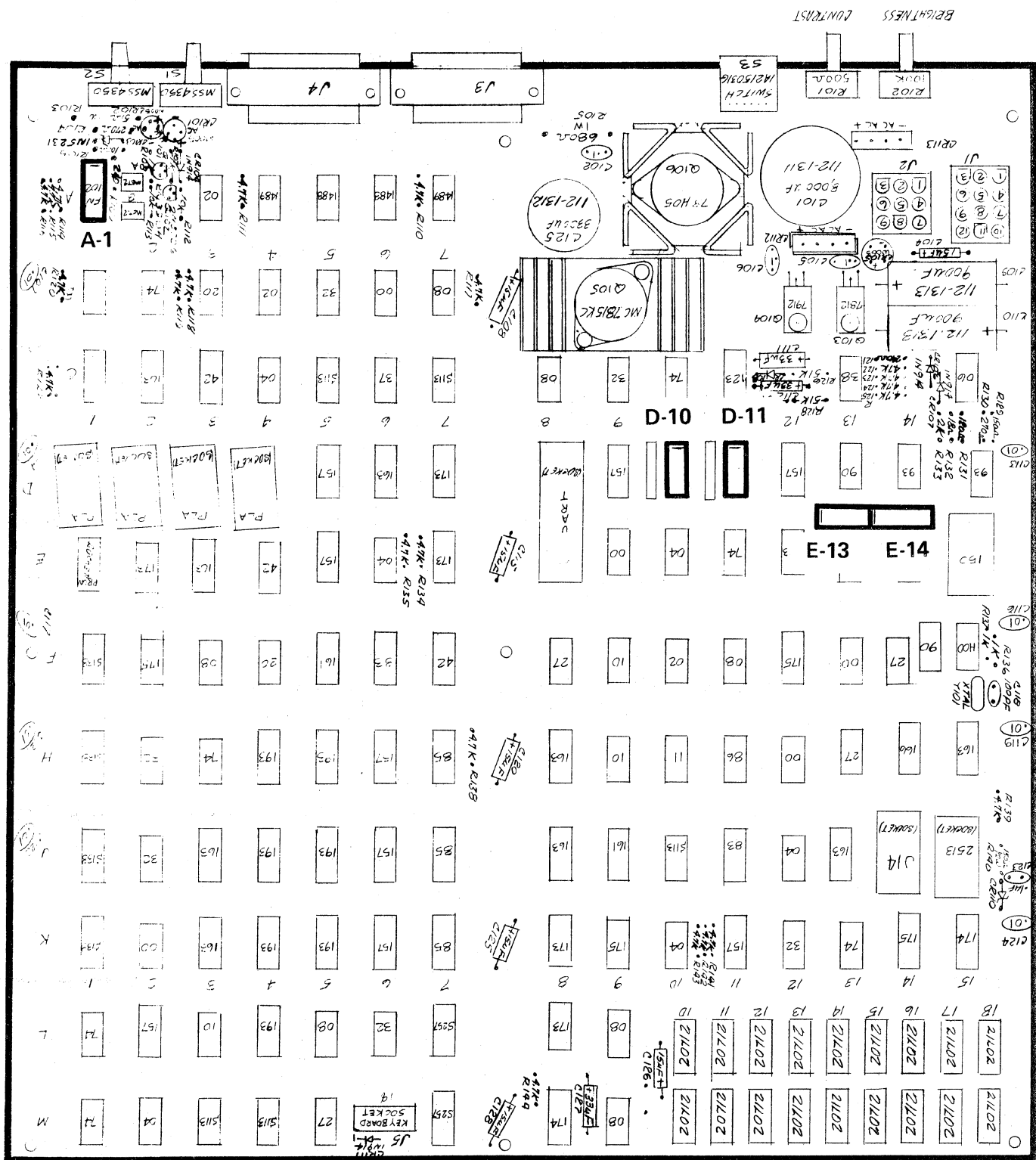| 230 VOLT	
T B I	**WIRE**
1	TI–BROWN
2	FAN
3	SI–1
4	KEY
5	TI–YELLOW
6	TI–RED
7	FAN
8	KEY
9	TI–ORANGE
10	POWER CORD WHITE

Figure 2.4 ROCKER SWITCH SETTINGS

SECTION III

Operation

3.1 INTRODUCTION

This section provides basic operating instructions for the B100 Computer Terminal. To operate this terminal efficiently, the operator should be familiar with the instructions contained in this section. The B100 should be properly installed in accordance with the procedures outlined in Section II of this manual.

The information in this section begins with the general operator's information and becomes more complex with programming information.

3.2 OPERATOR CONTROLS

The Keyboard and key explanations are shown in Figures 3-1 and 3-2. Operation of any key on the keyboard causes either character codes, control codes, or escape sequences to be generated. The one of three types of codes selected by the operator is determined by the key or sequence of the keys depressed. The keycaps are engraved alphanumeric keys or control keys. There are three keys that are used in a sequence with any alphanumeric key:

> To perform an Escape Operation, depress and release the ESC key, followed by the designated alphanumeric key (see Figure 3-2).

To perform a Control Function, depress the CTRL key and hold this key down while simultaneously typing the alphanumeric key.

If the lower case option is selected, the SHIFT key is used to generate upper case codes and is operated the same as a typewriter shift key.

Some Control Codes, generated by depressing a Function key, produce a single 8-bit code which is acted upon but not transmitted, e.g, cursor movement controls, SEND, CHARACTER DELETE, etc. The Escape or Control codes generated by depressing the ESC or CTRL keys and an alphanumeric key produce two 7-bit codes which are acted upon and also transmitted, e.g, ESC-A, etc.

3.3 INITIAL TURN-ON PROCEDURE

Read carefully Figures 3-1 and 3-2 before operating the terminal.

The proper turn-on procedure for the terminal is as follows:

a. Set the rear panel POWER ON/OFF switch to ON; allow a warm-up period of approximately one minute.

3-1

B100 Keyboard

ALPHABETIC and NUMERIC KEYS
generate all displayable (alpha/
numeric and special) character
codes corresponding to the let-
ters, symbols or numbers,
including the 11 key numeric
pad.

FUNCTION keys F 1 through 16 are special keys
that produce a code sequence to the I/O Port. The
code sequence begins with an STX followed by an
ESC-alphanumeric key and ends with an ETX.

The ESC (Escape) key generates
the ASCII code which is used as
the initial code of an escape
sequence.

The RETURN key causes the
cursor to go to the first column
of the same line.

| F 1 | F 2 | F 3 | F 4 | F 5 | F 6 | F 7 | F 8 |

| F 9 | F 10 | F 11 | F 12 |

| ! 1 | " 2 | # 3 | $ 4 | % 5 | & 6 | / 7 | (8 |) 9 | 0 | = − | ~ ^ | | \ |

| ESC | Q | W | E | R | T | Y | U | I | O | P | \ @ | { [| RETURN |

| CTRL | A | S | D | F | G | H | J | K | L | + ; | * : | }] | LINE FEED |

| SHIFT | Z | X | C | V | B | N | M | < , | > . | ? / | SHIFT | DEL — |
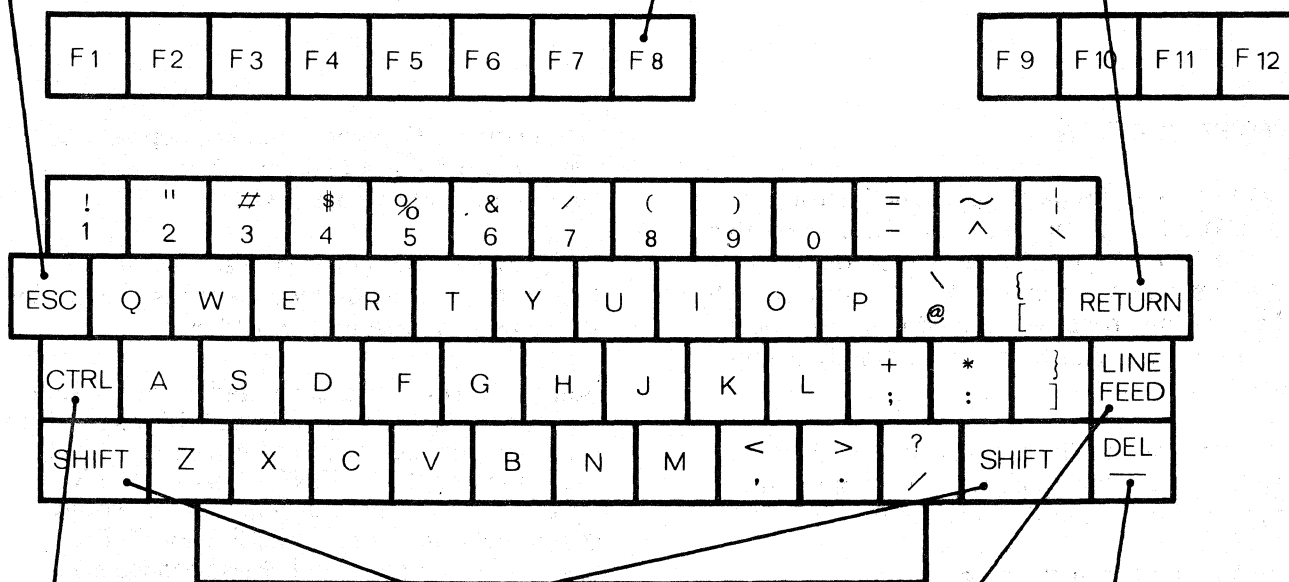
The CTRL (Control) key when
depressed simultaneously with
any alpha key; bits 6 and 7 are
both forced to a 0. This allows
operation of the control codes
as shown in column 0 and 1 of
the ASCII code chart. This is
a momentary action key.

(see Table 3-2)

The SHIFT key is a momentary
key that enables upper case alpha
and special characters to be
entered.

The LINE FEED key causes the
cursor to move in the same
column and down one line. It
results in the same action
caused by the CURSOR DOWN
key. The keys CTRL-J can
also be used.

The DEL (Delete) key generates
a non-displayable delete code
when shifted. Lower case use
of this key produces an under
score.

3-2

The 11 key NUMERIC PAD for convenient entry of numerical data. These keys are not affected by the SHIFT key.

The EOL key causes data to be cleared from cursor position to the end of the line.

The EOS key causes data to be cleared from cursor position to the end of the screen.

The CURSOR UP key causes the cursor to move to the same column on the line above its present location. If on the first line, the cursor will wrap around to the same column of the last line. The keys ESC-A can also be used.

F 13	F 14	F 15	F 16

7	8	9
4	5	6
1	2	3
O		.

SEND	EOS	EOL	AUX ON LN
AUX SEND	↑	↓	AUX ENBL
DEL CHAR	←	→	INST CHAR
FMT TAB	CLEAR HOME	BREAK	ALPHA LOCK

CURSOR DOWN causes the cursor to move to the same column, one line below its present location. If on the last line and not in FORMAT MODE, the CURSOR DOWN command will cause the display to scroll. If in the FORMAT MODE, the CURSOR DOWN causes the cursor to wrap around to the same column in the first line. If the cursor ends in a protected field, Cursor Down will move forward to the first unprotected location found. The keys ESC-B can also be used.

The CURSOR RIGHT key causes the cursor to move one location to the right. If the cursor is in the last position of a line, this sequence moves the cursor to the first position of the next line down. If the terminal is not in FORMAT MODE and the cursor is in the last position of the last line, the command will cause the cursor to wrap around to the first position of the last line and the screen will scroll. If in FORMAT MODE a command off the last position of the screen will cause the cursor to return to the Home position. The keys ESC-C can also be used.

The CURSOR LEFT key causes the cursor to move one location to the left. If in the first location of a line, the command will cause the cursor to go to the last location of the line above. If the cursor is in the Home position, the command will cause the cursor to go to the last location of the last line. The keys ESC-D may also be used.

NOTE: In FORMAT MODE, the CURSOR KEYS will not allow the cursor to remain in a protected field. The cursor will skip to the next unprotected field automatically.

When CLEAR/HOME key is activated in the unshifted mode, the cursor will move to the Home position. If shifted (type the SHIFT key simultaneously typing the CLEAR/HOME key), a "clear screen" operation is activated. If not in the FORMAT MODE, all data will be erased. If in the FORMAT MODE, only the unprotected data (high intensity) will be erased. The keys ESC-H can be used to Home the cursor. The keys ESC-E can also be used to clear the screen.

The BREAK key generates a pulse of approximately 450 (+−20%) milliseconds which is used to place the transmit data line in the spacing state.

Figure 3-1. THE B100 KEYBOARD WITH OPERATING DEFINITIONS

FORMAT MODE

To start an Unprotected Field, the keys ESC-[are used. The Unprotected Field is the area the operator will use to enter desired data when the FORMAT MODE is used. These fields are identified by higher intensity characters.

To end the Unprotected Field and start the Protected Field, use the keys ESC-]. All data entered into memory following this sequence will be entered as a Protected Field.

The keys ESC-W places the terminal in FORMAT MODE and allows the terminal to recognize protected areas.

To take the terminal out of FORMAT MODE, use the keys ESC-X. This sequence takes the terminal out of FORMAT MODE where low intensity areas look unprotected to the terminal.

| F 1 | F 2 | F 3 | F 4 | F 5 | F 6 | F 7 | F 8 |

| F 9 | F 10 | F 11 |

```
! "  #  $  %  &  /  (  )     =  ~  |
1 2  3  4  5  6  7  8  9  0  -  ^  \

ESC Q W E R T Y U I O P \@ {[ RETURN

CTRL A S D F G H J K L +; *: }] LINE FEED

SHIFT Z X C V B N M <, >. ?/ SHIFT DEL
```

ESC Key Function Instructions

- The keys ESC-m terminates entry of data into a blink field.

- The keys ESC-l entered into memory following this sequence will be placed in a blink field.

- The keys ESC-b causes the keyboard to be enabled (data can be entered from the keyboard).

- The keys ESC-c causes the keyboard to be disabled (data cannot be entered from the keyboard).

  WARNING: Only the computer can remove the disabled state after the keyboard is locked, unless the Control, Shift and Home/Clear keys are depressed together. This command will do a RESET FUNCTION, but all display data is lost because this is still a Clear sequence.

- The cursor can be sent to a specific location on command of the operator. Use the keys ESC-F followed by two characters (see Table 3-4) that represents the line and column coordinates for the character location. If operating in FORMAT MODE and the cursor is placed in a protected area of the display as a result of this command, the cursor will scan right and will stop when it finds the first unprotected location.

- The keys ESC-0 produces a page type block send out the Auxiliary Port.

3-4

Additional explanation and exercises contained in this Section of the text.

The AUX SEND key initiates a page-type
block send out the Auxiliary Port.

The SEND key initiates a page-type block send
out the Main I/O Port if unshifted. If shifted,
initiates a line-type block send. The ESC-I
sequence can also be used.

F 12	F 13	F 14	F 15	F 16

The AUX ON LN (Auxiliary On Line) key is an
alternate action key designed to connect the
I/O Port with the Auxiliary Port. This allows
the terminal to send a receive in a Daisy Chain
fashion.

NOTE: Baud rates between the two ports must
be identical.

7	8	9
4	5	6
1	2	3
O		.

SEND	EOS	EOL	AUX ON LN
AUX SEND	↑	↓	AUX ENBL
DEL CHAR	←	→	INST CHAR
FMT TAB	CLEAR HOME	BREAK	ALPHA LOCK

The AUX ENABLE is an alternate action key
which enables conversational mode trans-
mission out the Auxiliary Port only. When
this key is activated, the I/O Port is disabled.

The INST CHAR (Insert Character) is an
alternate action key. Any character
entered while in this mode will be inserted
under the cursor while all characters
starting at the cursor and extending to the
end of the line or to the next protected
field will shift one position to the right.
The last character will be lost.

The DEL CHAR (Delete Character)
key causes the data, starting
to the right of the cursor and end-
ing at the end of the line or the
next protected field, to shift one
position to the left. The character
under the cursor will be lost.

The ALPHA LOCK key is an alternate
action key that locks the terminal in
an upper case mode. Allows the ter-
minal to be teletype code compatible.

The FMT TAB (Format Tab) key will move the
cursor to the first position (in FORMAT MODE)
of the next unprotected field. In this way, the
operator can quickly position the cursor where
necessary. The keys CTRL-I can also be used.

Out of format, the cursor remains stationary, but
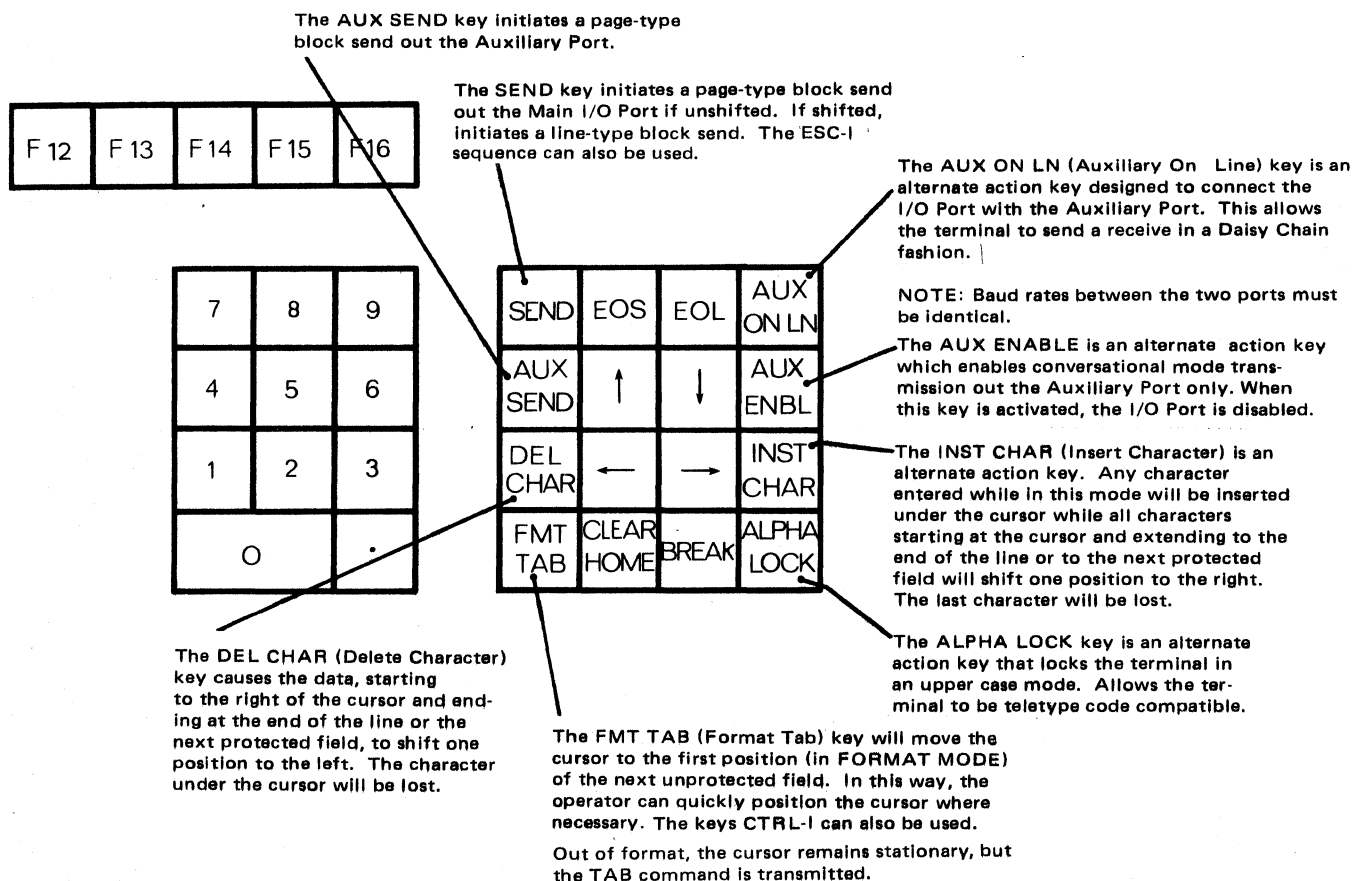the TAB command is transmitted.

Figure 3-2. B100 KEYBOARD INSTRUCTIONS

and insure that the cursor has appeared in the upper left hand corner of the screen. If the cursor does not appear, check that AC power is secure and go through the Brightness and Contrast adjustments explained below.

b. Turn the BRIGHTNESS CONTROL (located on the rear panel see Figure 2-2) until a raster is faintly visible on the screen. Write several characters on the screen using both high and low intensities (The keys ESC-[and ESC-] produce the different intensities). Reduce the Brightness until the back-ground raster is extinguished. Adjust the Contrast CONTROL (located on the rear panel see Figure 2-2) until the characters are sharply defined and the difference between the two intensities is easily distinguished.

c. Simultaneously depress the SHIFT and CLEAR/ HOME keys to clear the screen.

Perform the checkout procedures described in the following paragraphs:

3.4 OPERATOR CHECKOUT PROCEDURES

To test the functional capabilities of the terminal, perform the operator checkout procedures given in the following paragraphs. Before proceeding, insure that the screen is clear and the cursor is in the Home position.

3.4.1 Alternate Action Keys

Perform the initial setup as follows:

a. Set the rear panel HDX/BLOCK/FDX switch to HDX. (see Figure 2-2)
b. Set the rear panel CL/LCL/RS-232C switch to RS-232C.
c. Depress the 'a' key and enter a number of the characters in memory and on the display. Depress the SHIFT key and enter more characters. Note that any letters entered are now capitalized.
d. Depress the RETURN key and notice that the cursor moves to the first location of that line.
e. Depress the LINE FEED key and note that the cursor moves to the same column in the line directly below its previous location.
f. Depress the HOME key and note that the cursor returns to the Home position (the first column on the first line).
g. Depress the LINE FEED key several times followed by several 'a' keys. This should move the cursor toward the center of the screen.

h. Depress the SHIFT and CLEAR keys simultaneously. Note that the display completely erases and the cursor returns to the Home position.

3.4.2 Cursor Movement Checkout

Before performing the checkout, depress the CTRL, SHIFT, and CLEAR/HOME keys simultaneously to initialize the terminal circuitry. Insure that the terminal is in a loopback mode (LOCAL or BLOCK or HDX), the cursor is in the Home position, and the display is blank. Perform the checkout as follows:

a. Depress and hold the CURSOR DOWN key until the cursor reaches the bottom line of the display. Once the cursor is on the bottom line and the key is not released, the cursor should remain on the bottom line. The display is actually rolling up at this time.
b. Depress and hold the CURSOR RIGHT⟶key until the cursor reaches the last position on the line. Release the key at this time.
c. Depress and hold the CURSOR UP ↑ key until the cursor is on the top line of the display. Release the key with the cursor remaining on the top line.
d. Depress and hold the CURSOR RIGHT⟶key. When the cursor reaches the end of the line, the cursor will wrap around to the first position of the next line.
e. Depress and hold the CURSOR LEFT◀— key to cause the cursor to wrap around to the next position of the line above.
f. Depress the HOME/CLEAR key to move the cursor to the first character position of the first line.

3.4.3 SEND and AUX SEND Checkout

Perform the initial setup as follows:

a. Depress the CTRL, SHIFT, and CLEAR keys simultaneously. This should initialize the display, clear the screen, and Home the cursor.
b. Type a message test consisting of several lines of data.
c. Move the Baud Rate Selection switch to a slow baud rate (use any low number).
d. Leave the cursor at the end of the data which should terminate close to the end of a line.

Perform the checkout as follows:

a. Depress the SEND key. The cursor should automatically move to the Home position and move slowly (rate depends on the baud rate selected)

to the right, character by character and line by line. The transmission should terminate at the original cursor position. This is called PAGE SEND.

b. Depress the SHIFT and SEND keys simultaneously. The cursor should move to the first position of the current line and move slowly across that line only and terminating with the cursor in its original position. This operation is called a LINE SEND.

c. Depress the ESC-I keys simultaneously. The resulting operation is identical to that accomplished by depressing the SEND key alone (Page Send).

d. Depress the AUX SEND key. This operation looks like a PAGE SEND. The only difference is that the data is transmitted out the AUX PORT instead of MAIN I/O PORT.

3.4.4 FORMAT Checkout

Perform the initial setup in the following manner;

a. Depress the CTRL, SHIFT, and CLEAR/HOME keys simultaneously. This initializes the display, clears the screen, and sends the cursor to the Home position.

b. Establish the screen format (Unprotected and Protected Fields) by completing the following sequence:
  1. Key in the characters desired in the first unprotected field.
  2. Enter ESC-] this starts a protected field.
  3. Key in the characters desired in the first protected field.
  4. Enter ESC-[this ends a protected field.
  5. Repeat steps 1 through 4 at each location desired.

c. Send an ESC-W sequence which puts the display in FORMAT MODE. The protected areas are the positions of lower intensity. The cursor should have moved to the first unprotected location on the screen.

d. Depress the CURSOR RIGHT→ key. The cursor should now move to the right and jump over all of the protected areas (low intensity).

e. Simultaneously depress the SHIFT CLEAR/HOME keys. All data residing in the unprotected areas (high intensity) should be erased, leaving only the protected fields (low intensity) on the screen.

f. Depress the FORMAT TAB key once. The cursor should move to the first position of the next unprotected field. Repeated depressions of the FORMAT TAB key will move the cursor from field to field. When the cursor resides in the first position of the last unprotected field on the screen, the next depression will cause the cursor

to then move to the first unprotected position on the screen.

g. Initialize the display with the simultaneous depression of the CTRL, SHIFT, and CLEAR/HOME keys.

3.5 CONTROL FUNCTION OPERATIONS

The Control Functions may be generated from the keyboard or by receipt of corresponding commands from the I/O port. Figures 3-1 and 3-2 provide the sequence of operation for each control function when generated from the keyboard or when received from the I/O port. Table 3-2 depicts the ASCII codes for each control function. Control and Escape Codes generated at the keyboard by depressing the function keys are single 8-bit codes. The Control and Escape Codes generated as a Control or Escape Code sequence at the keyboard or received at the I/O port consist of two 7-bit words.

3.6 OPERATION CODES

The B100 code structure consists of 32 ASCII control codes, 96 ASCII alpha-numerics, and 96 escape sequence codes. Operation codes perform the necessary functions in response to commands generated by control or escape code sequences rather than a single key command. These functions may be generated from the keyboard or received at the I/O Port. Table 3-2 lists the codes, describes their functions and lists the code sequence with octal code.

3.7 TIMING CONSIDERATIONS

Certain functions require longer intervals than one character time at high transmission rates to complete the operation. Longer intervals are provided by inserting filler (null) codes into the data block. The number of fill characters required to fill these intervals for various operations and various baud rates is given in Table 3-1. Although any character may be used, the NULL character (ØØØ octal) is suggested since this code will be completely ignored.

3.8 PERFORMANCE CHARACTERISTICS

Modes of Communication

The B100 Terminal is capable of operating Off-Line (Local) or On-Line. In the Local Mode, all communication with external devices is cut off and data generated at the Keyboard is only seen locally by the terminal itself. Three operational modes of communication are provided when the terminal is On-Line; Full Duplex (conversational), Half Duplex (conversational), and Block. Full Duplex operation

allows data to be transmitted with the terminal's receiver input enabled for immediate computer reply of the transmitted data (echoplexed) to verify proper receipt of the data, if the computer is so programmed. Half Duplex Data Transfer is generally used for messages or sending messages character by character where echoplex is not available. Keyboard data entered while the terminal is operating in Half Duplex is entered into memory and displayed, and does not require the echoplex process from the CPU to verify the accuracy of the message. In Block Mode, data generated at the Keyboard is not sent out the main I/O port but is sent directly to the screen. This mode allows the operator the option of composing the message on the screen, verifying its accuracy, and sending the entire message on command. The transmission of the message is initiated by depressing the SEND key. Transmission is accomplished by simply depressing the SEND key alone while the data can be sent a line at a time with the simultaneous actuation of the SEND and SHIFT keys. While transmitting data in either the Line or Page modes, the Keyboard is disabled. Use of the block mode feature differs from message preparation Off-Line by the fact that the terminal receiver is enabled in Block Mode.

3.9 MODES OF TRANSMISSION

3.9.1 Character (conversational) Transmission

During character transmission, the terminal must be on line. Received alphanumerics are stored in memory and displayed. Received Control Codes or Escape Codes cause the unit to perform the appropriate function, and are not stored in memory or displayed. In Full Duplex operation, Control Codes and Escape Sequence Codes are transmitted but are not acted upon unless echoplexed back to the terminal. In Half Duplex mode, Control Codes and Escape Sequence Codes are transmitted and acted upon. In FORMAT MODE, the cursor cannot enter the protected fields established by the delimiter codes, therefore, only the data in the unprotected fields are transmitted. In Character Mode, all data is transmitted.

3.9.2 Block Transmission (Line or Page)

Block Transmission is used to allow the operator to prepare data and then transmit the data as a unit. The transfer can be initiated either from the Keyboard or the I/O. A Block Transfer is initiated from the Keyboard by depressing the SEND key (unshifted for Page Mode or shifted for Line Mode). A Page Mode Transmission may be initiated from

the I/O by sending an ESC-I. Line Mode Transmission is accomplished by sending an ESC-i. When the Page Mode Transmission is actuated, the cursor returns to Home, the Request-to-send line is actuated, and the terminal waits for approximately 200 milliseconds and waits for a Clear-to-send to come true.

The terminal then issues an STX as the start of message delimiter and begins transmission. Transmission begins at the Home position and the cursor advances one position to the right after each character is transmitted. If not in the FORMAT MODE, a two-character sequence (Carriage Return and LINE FEED) is issued whenever the end of a line is encountered. All NULL codes residing in memory are not transmitted. When the cursor reaches its original position and the character is transmitted, the terminal issues an ETX code to indicate the end of the message. The terminal then waits approximately 200 milliseconds, drops the request-to-send line and enables the Keyboard. If in FORMAT MODE, only the unprotected data fields are transmitted and an ASCII Horizontal Tab (HT) code is transmitted at the end of each unprotected field. Also in FORMAT MODE, the CR/LF sequence at the end of each line is suppressed.

In the Line Send Transmission Mode, the operation is essentially the same as described above. However, the cursor is returned to the first position of the current line instead of the Home position before the transmission is started.

3.9.3 Auxiliary Character Transmission

Conversational Mode (character-by-character) transmission can be accomplished out the AUX PORT by depressing the alternate action AUX ENABLE key on the keyboard. Then, if the terminal is in one of the conversational modes (HDX or FDX), any alphanumeric keys depressed on the Keyboard will cause transmission of the associated code out the AUX PORT instead of the Main I/O Port. A block transmission for the Main Port will override this Aux Enable switch for the duration of the message.

3.9.3 Auxiliary Port Block Transmission

This transfer can be initiated from the Keyboard or the I/O Port. A page-type transmission out the Aux Port is actuated by depressing the AUX Send key on the Keyboard or by sending and ESC-0 (zero) sequence into the I/O Port. Delimiters may be sent in four positions during this page transmission; Start of Message, End of an Unprotected Field, End of Line, and End of Message.

3.9.4 Auxiliary Port Block Transmission

This transfer can be initiated from the Keyboard or the I/O Port. A page-type transmission out the Aux Port is actuated by depressing the AUX Send key on the Keyboard or by sending an ESC-0 (zero) sequence into the I/O Port. Delimiters may be sent in four positions during this page transmission; Start of Message, End of an Unprotected Field, End of Line, and End of Message.

3.10 BAUD RATE SELECTION

Transmission rates for the main I/O Port are rotary switch selectable at the rear of the terminal. This rotary switch has sixteen positions which select the normal fifteen baud rates and an externally supplied baud clock. The rates internally available range from 75 to 19200 baud.

3.11 OPERATING MODES

Format Mode

The FORMAT MODE is selectable from the Keyboard or from a remote data source initiated by an Escape Sequence (ESC W). In the FORMAT MODE, the terminal display has Protected Fields in which the cursor cannot be positioned and no data entered. The Protected Fields are differentiated from variable data by being displayed in half intensity. The display of the half intensity data can be internally selected to operate in one of two ways. First, the half intensity can be enabled continuously without regard to the state of the FORMAT MODE. However, the display of the lower intensity can be strapped to follow the FORMAT MODE. That is, if the display is not in FORMAT, all data would be displayed in normal intensity, and would only go to lower intensity if the data is truly protected. If in the FORMAT MODE the display will not roll if the cursor is taken off the bottom line of the display. In this situation, the cursor recycles to the top line.

3.12 MEMORY AND DISPLAY ORGANIZATION

The B100 terminal has 1920 displayable character locations. Characters are stored in the memory on a line basis, 80 characters per line. The lines in the memory are organized on a page basis where 24 lines make up one page. The memory location where the next character will be stored is marked by the cursor. Character codes already entered can be replaced by a space or any other code. If the cursor is advanced beyond the end of the display and the terminal is in FORMAT MODE, the display

will not scroll and the cursor returns to the first unprotected field at the top of the display. If not in the FORMAT MODE, and the cursor is advanced beyond the end of the display, the cursor remains on the last line and the display scrolls up a line. Writing beyond the end of the display or scrolling the display causes the loss of the data on the first line. If the line in memory has less than 80 characters, the displayed line has ASCII Null codes written to the eightieth character position.

3.13 CHARACTER OVERWRITE

When an error is made in entering a character (misspelled word), a correction can be made by repositioning the cursor and overwriting the character. When in either of the conversational transmission modes, characters will overwrite the display, but will also be transmitted as additional data.

3.14 AUXILIARY PORT

The AUX Port operates at RS-232C logic levels and outputs and receives negative-true data. This port is not affected by the local switch and is always "on line" to its external device. The operator can talk to the external device on this port in both Conversational and Block Modes. In Conversational Mode, the operator can accomplish a character-by-character transmission out the AUX Port by depressing the AUX ENABLE alternate action key on the Keyboard. If a Block Mode transmission is desired, a page send operation can be initiated by depressing the AUX SEND key on the keyboard. Data may be transmitted at a different baud rate than that of the Main I/O Port (e.g., the I/O may operate at 9600 baud while the AUX Port may operate at 1200 baud). The AUX Port baud rate is strap selectable internally in the unit. The AUX Port may be controlled by utilizing the READY/BUSY line or with an internally activated time delay.

3.15 MAIN INPUT/OUTPUT PORT

The main I/O Port operates at RS-232C logic levels and outputs and receives negative-true data. The I/O Port outputs data to and inputs data from the remote data source when the terminal is in the On-Line condition.

The only requirement for receiving data is that the terminal be in the On-Line condition. Therefore, if the terminal is On-Line, any data coming into the terminal from either the AUX or Main Ports will be processed. When transmitting data, if the terminal is On-Line and a key is depressed on the Keyboard, the I/O will place circuit CA (request-to-send) in an

"on" condition. If the terminal then receives Clear-to-Send, it will send the data and drop Request-to-Send. If no connection is made to the Clear-to-Send input, the terminal assumes that permission was granted and the data is transmitted.

The B100 terminal offers Serial Asynchronous Transmission and Reception of data. Asynchronous word structure consists of a start bit, seven data bits, a parity bit (odd, even, mark, or space) and one or two stop bits. All of these configurations are internally strap selectable.

3.16 CURSOR ADDRESS

Cursor addressing allows the cursor to be positioned by sending a four code sequence. The cursor may be addressed from the keyboard or from the I/O Port. The cursor is addressed by receiving the following four word sequence: ESC-F, Line, Address, and Character Address.

> NOTE: Illegal addresses placing the cursor beyond the 80th character will cause the cursor to disappear. The cursor can be recovered by depressing the HOME or SHIFT/CLEAR keys.

For example, to position the cursor to line 15 and character position 41, send the following sequence: ESC-(0001 1011), F (0100 0110), period (0010 1110), H (0100 1000). Table 3-4 gives the character and line location ASCII characters required to address any position on the display.

3.17 FORMAT TAB

In FORMAT MODE, the cursor moves from one Unprotected Field to another as the FORMAT TAB key is depressed. If the cursor is located in the last unprotected Field when the TAB key is depressed, the cursor moves through the Home position. If the Home position is protected, the cursor moves forward to the first unprotected position on the screen. If the Home position is unprotected, the cursor will remain there.

3.18 BLOCK SEND DELIMITER PROM

In normal operation, the B100 automatically sends an STX at the beginning of each block of data, and an ETX as a message trailer at the end of the block. If in Format Mode, a format field delimiter (ASCII HT) is sent at the end of each unprotected field. If not in Format Move, an end-of-line delimiter (ASCII CR followed by an ASCII LF) is inserted in the appropriate position in the data stream. Utilization of an optional, field programmable read-only-memory (PROM allows the terminal to conform to special user requirements. With this option, the terminal has the capability of sending either none, one, or two ASCII codes in all four of the message positions described above. In addition, the activation of an internal transmission time delay for the Auxiliary Port can be programmed into the same PROM.

FUNCTION	BAUD RATE		
	19200	9600	7200
CLEAR	5 nulls	3 nulls	1 null
EOS FROM HOME	5 nulls	3 nulls	1 null
TAB	2 null	Ø	Ø
I/O BAUD SWITCH #	14	13	12

Table 3-1. TIMING FILLER NULL CODES

Table 3-3. INPUT/OUTPUT WORD STRUCTURE

11 Bit Word With Parity "Mark"

10 Bit Word With Parity "Mark"

9 Bit Word With No Parity

Table 3-2. ASCII CODE CHART

BIT 4321	CONTROL CHARACTERS $0\,0_0$	CONTROL CHARACTERS $0\,0_1$	DISPLAYABLE CHARACTER $0\,1_0$	$0\,1_1$	$1\,0_0$	$1\,0_1$	$1\,1_0$	$1\,1_1$	ESCAPE SEQUENCE $0\,1_0$	$0\,1_1$	$1\,0_0$	$1\,0_1$	$1\,1_0$	$1\,1_1$
0000	NUL @	DLE P	SP	0	@	P	\	p		AUX SEND ø		DELETE CHAR P		F1
0001	SOH A	DC1 Q	!	1	A	Q	a	q			↑ A			F2
0010	STX B	DC2 R	"	2	B	R	b	r			↓ B		KEYBOARD ENABLE b	F3
0011	ETX C	DC3 S	#	3	C	S	c	s			→ C		KEYBOARD DISABLE c	F4
0100	EOT D	DC4 T	$	4	D	T	d	t			← D			F5
0101	ENQ E	NAK U	%	5	E	U	e	u			CLEAR E			F6
0110	ACK F	SYN V	&	6	F	V	f	v			CURS ADD F			F7
0111	BEL G	ETB W (XMIT)	/	7	G	W	g	w				FORMAT ON W		F8
1000	BS H	CAN X	(	8	H	X	h	x			HOME H	FORMAT OFF X		F9
1001	HT I	EM Y	)	9	I	Y	i	y			PAGE SEND I		LINE SEND i	F10
1010	LF J	SUB Z	*	:	J	Z	j	z			EOS J			F11
1011	VT K	ESC [	+	;	K	[	k	{			EOL K	START Unprotected Field [		F12
1100	FF L	FS ,	'	<	L	\	l	|					START BLINK l	F13
1101	CR M	GS]	−	=	M	]	m	}				END Unprotected Field]	STOP BLINK m	F14
1110	SO N	RS ^	.	>	N	∧	n	∿						F15
1111	SI O	US	/	?	O	—	o	DEL						F16

Table 3-4. CURSOR ADDRESS CODES

ABSOLUTE CURSOR POSITIONING

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

warranty

Beehive International warrants that each terminal will be free from defective materials and workmanship for one year from date of shipment to the original customer.

Beehive agrees to correct any of the above defects (parts and labor only) when the terminal is returned to the factory freight prepaid by the customer. Return authorization must be obtained from Beehive Medical Computer Systems Field Service Department before returning the terminal to the factory. The repaired terminal will be returned to the customer freight collect.

Under this warranty, Beehive may at its option repair or replace the defective component. Repaired or replacement components will be shipped by Beehive to the customer collect on a billing memo which will be cancelled upon receipt of the defective component (freight prepaid by the customer) at the Beehive factory or service depot. When ordering components for repair or replacement, the model number and serial number of such component must be furnished at the time of customer request.

This warranty shall be invalid if, in Beehive's sole judgment, the terminal or component has been subjected to misuse, abuse, neglect, accident, improper installation or application, alteration or neglect in use, storage, transportation or handling, or if the serial number has been removed, defaced or altered.

BEEHIVE
INTERNATIONAL

BEEHIVE MEDICAL COMPUTER SYSTEMS, Inc.

USA: 4910 Amelia Earhart Drive • Box 25668 • Salt Lake City, Utah 84125 • Phone (801) 355-6000 • TWX 910-925-5271

EUROPE: Schiphol Airport Amsterdam • Building 70 Schiphol East • The Netherlands • Phone 451-522 • Telex 15284

EQUIPMENT MAINTENANCE AGREEMENT

Agreement No _____

An Agreement, executed this _____ day of _____, 19_____ by and between
BEEHIVE MEDICAL COMPUTER SYSTEMS, Inc., (BMCS) and

CUSTOMER NAME   (CUSTOMER)

STREET ADDRESS

CITY   STATE   ZIP CODE

In consideration of payment by CUSTOMER of the maintenance charge specified herein, BMCS agrees to furnish at the place mentioned below maintenance service on the equipment listed below subject to the terms and conditions set forth herein.

A. LOCATION OF EQUIPMENT:

COMPANY NAME _____

STREET ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

QUANTITY	MODEL, DESCRIPTION & S/N	UNIT ANNUAL MAINTENANCE CHARGE	TOTAL ANNUAL MAINTENANCE CHARGE

(Continued)

B. TERM

The term of maintenance service pursuant to this Agreement shall be one year commencing _____, and shall continue in effect thereafter subject to termination by either party upon ninety (90) day written notice. Said notice may be given during the last 90 days of the initial term hereof.

C. PERIODS OF MAINTENANCE SERVICE

The primary maintenance period hereunder is between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday excluding local holidays. Payment of maintenance charge entitles Customer to on-site maintenance service during the primary maintenance period. Response time on calls within such period shall be not more than 24 hours. If Customer requests maintenance service to be performed outside the primary maintenance period, the service will be furnished at standard per call hourly rates and terms then in effect, and shall be performed on a man power availability basis only. Service started within the primary maintenance period and completed within one hour after such period shall be deemed within such period and no additional charges made.

D. FREEDOM OF ACCESS

Customer shall provide full and free access to the equipment to allow service thereof, and use of necessary data communications facilities and equipment at no charge, subject to Customer's industrial security rules.

E. INSPECTION AND REPAIR

If the equipment identified above was not under BMCS's maintenance service responsibility immediately prior to the commencement date of maintenance hereunder, it shall be subject to inspection by BMCS to determine if it is in good operating condition which for purposes hereof is defined as the level established for equipment maintained by BMCS. Any repairs or adjustments then deemed necessary by BMCS to bring the equipment up to good operating condition shall be made at Customer's expense prior to commencement of maintenance service.

F. REPAIRS NOT INCLUDED

Maintenance service provided hereunder *does not* include:

1. Maintenance or repairs attributable to unauthorized attempts by Customer to repair or maintain the equipment, fault or negligence of Customer. Improper use or misuse of the equipment by Customer shall not be considered due to normal wear or tear. Labor, parts and other expenses for any such repairs or adjustments due to causes other than normal wear and tear shall be made at Customer's expense subject to Customer's prior authorization.

2. Repair of damage resulting from accident, transportation, neglect or misuse; failure of electrical power, air conditioning or humidity control; or causes other than ordinary use.

3. Electrical work external to the machines.

4. Furnishing platens, supplies or accessories; painting or refinishing the machines or furnishing material therefor; making specification changes or performing services connected with relocation of machines; or adding or removing accessories attachments or other devices.

5. Such service which is impractical for the service representative to render because of alterations in the machines or their connection by mechanical or electrical means to another machine or device.

6. Systems engineering services, programming, and operations procedures of any sort.

G. MODIFICATION

The primary method of furnishing repair service hereunder shall be by exchange of parts. Exchange and repair will be performed only upon standard configuration parts. Equipment modified by Customer shall be serviced hereunder only upon the following basis:

1. Modified parts to be repaired must be restored by Customer to original configuration prior to repair or exchange. Following repair or exchange hereunder, modification will be the sole responsibility of Customer, or

2. Customer will furnish BMCS with such documentation as will enable BMCS to perform needed repairs and Customer agrees to pay such reasonable additional charges for time and material as BMCS determines.

H. INVOICES, PAYMENTS AND RATES

Maintenance charges shall begin on the commencement date specified in Paragraph B of this Agreement and shall be payable by Customer quarterly in advance upon receipt of invoice. All other charges shall be invoiced by BMCS after the month in which charges are incurred. BMCS may change the rates specified herein effective one (1) year after the commencement date of maintenance service under this Agreement, or at the end of any calendar month thereafter, by giving at least ninety (90) days written notice to Customer.

I. WARRANTY ON REPAIRS

Equipment exchanged or repaired pursuant to this Agreement is warranted against defects in materials and workmanship for a period of ninety (90) days following delivery at Customer's plant. BMCS will repair or replace, at its option, equipment which proves defective during the warranty period.

J. LIMITATION OF LIABILITY

BMCS shall not be liable for any failure to keep the equipment in good working order when such failure is due to causes beyond its reasonable control including but not limited to, acts of God, acts of civil or military authority, priorities, strikes, labor disputes, floods, epidemics, war, riots, delays in transportation, or inability to obtain labor or materials. BMCS shall not, under any circumstances, be liable for incidental or consequential damages.

K. ENTIRE AGREEMENT

This Agreement contains all the terms and conditions between Customer and BMCS concerning maintenance of the equipment, and shall not be varied, supplemented, qualified or interpreted by any prior or subsequent course of dealings, written or oral, by any trade usage, or by any terms or condition of Customer's purchase order, unless specifically agreed to in writing by an authorized officer of BMCS.

L. GENERAL

a. BMCS reserves the right to adjust the specified unit annual maintenance charge if the machine specifications, attachments or features of any item of equipment are changed after the date hereof.

b. The Customer represents that it/he is the owner of the machines subject to this Agreement or, if not the owner, that it/he has authority to enter into this Agreement.

c. Any notice or other communication given hereunder shall be in writing and mailed to the appropriate party at the address shown on this Agreement, or to such other address as such party shall have theretofore designated by notice in writing. Any such notice, if mailed properly addressed and postage prepaid, shall be deemed given when deposited in the United States mail.

d. This Agreement shall be deemed to have been entered into in and shall be construed in accordance with the laws of the State of Utah. The terms of this Agreement shall be binding and inure to the benefit of the parties and their respective successors and assigns.

e. In the event it becomes necessary to retain the services of an attorney to enforce any of the provisions of this Agreement, the defaulting party agrees to pay the other parties' costs thereof, including a reasonable attorney's fee and court costs, if any.

f. Customer shall assume all responsibility for compliance with local laws, ordinances or other regulations relating to the operation and the use of the equipment in the area where the equipment is located.

CUSTOMER:

BY_____

TITLE _____

BEEHIVE MEDICAL COMPUTER SYSTEMS, Inc.

BY_____

TITLE _____

MALFUNCTION REPORT

Dear Customer:

We are trying to manufacture the most reliable product possible. You would do us a great courtesy by completing this form should you experience any failures.

1. Type Unit_____Serial No._____

     Module (if applicable)_____

2. Part failed (Name and Number)_____

3. Cause of failure (If readily available)

     _____

     _____

     _____

4. Approximate hours/days of operation to failure_____

5. Failure occurred during:

     Final Inspection   Customer Installation   Field Use

6. Personal Comment:

     _____

     _____

     _____

                              Customer_____

                              Address_____

                              Signed_____

                              Date_____

RETURNING PARTS/EQUIPMENT
FOR REPAIR

When the terminal requires service or repair, whether in accordance with the enclosed warranty or after warranty expiration, unnecessary delays may be avoided when parts or equipment are returned by using the following procedures:

1. Contact the nearest BMCS Service Depot, listed below, for Return Authorization. An R.A. Number will be issued and used for future reference. Serial numbers of terminals and parts will be needed.

2. Package the unit or part in accordance with the method of shipment. Enclose a list of the material being returned and the reason for returning it. Reference the Return Authorization Number on the shipping label. If the number is not visible, the Receiving Department may refuse to accept the shipment.

3. Send the unit or part, transportation *prepaid,* to the address stipulated for returning parts and equipment.

All equipment and parts described in the warranty will be replaced provided BMCS's examination discloses that the defects are within the limits of warranty. If damage or defects are not within the limits of the warranty, the customer will be notified of the extent of repairs required and the cost. The unit will be repaired and returned upon agreement and receipt of a written purchase order number.

If the unit is out of warranty, repairs will be made or exchange effected upon receipt of a P.O. at BMCS. P.O. number should be communicated to BMCS when Return Authorization is requested to expedite repair and return.

BMCS SERVICE DEPOTS

BMCS
740 West 1700 South, Suite 7
Salt Lake City, Utah 84104
(801) 487-0741

California Service Center
265 Sobrante Way No. D
Sunnyvale, California 94086
(408) 738-1560

Costa Mesa Service Center
3190 G
Airport Loop Drive
Costa Mesa, California 92626

Boston Service Center
No. 2 Ray Avenue
Burlington, Massachusetts 01803

Washington Service Center
400 West Service Road
Gateway Bldg. 1
Chantilly, Virginia 20041

BMCS SERVICE REPRESENTATIVES (On-Site Service Only)
Refer to local phone book under Beehive Terminals for address and phone number

Boston, Mass.
New York City, N.Y.
Washington D.C.
Raliegh/Durham, N.C.

Miami, Fla.
San Diego, Cal.
Chicago, Ill.
Detroit, Mich.
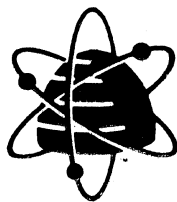
BEEHIVE INTERNATIONAL

Dear Customer:

In a continuing effort to provide the best in support and service to Beehive Computer Terminal users, we are offering a one year subscription to THE BEELINE. Provided at no cost to Beehive Terminal Maintenance Manual owners, this service will provide the latest information concerning terminal operation, maintenance and service, including:

- Service Updates and Tips
- Manual Updates and Changes
- Corrective Modification Kits and Documentation
- Recommended Spare Parts

Subscriptions may be obtained separately or through the purchase of the Beehive Terminal Maintenance Manual Package (Maintenance Manual, Illustrated Parts Breakdown and THE BEELINE subscription). This package can be purchased with the Beehive Computer Terminal or separately for $50.00. Subsequent yearly subscriptions will be available through Beehive Terminals for $10.00 per year.

The Beehive Terminal Maintenance Manual Package and other individual documents can be ordered by completing the form below and returning it to Beehive.

- -

the Bee✦Line

"a direct service line to Beehive"

Name _____ Position or Title _____

Company _____ Address _____

Terminal Model ☐ Mini Bee ☐ Super Bee ☐ Other (List) _____ Date Purchased _____

Manuals Required: (List quantity and cost):

_____ MAINTENANCE MANUAL PACKAGE	@ $50.00 =	$
_____ OPERATORS MANUAL	@ 10.00 =	
_____ ILLUSTRATED PARTS BREAKDOWN	@ 15.00 =	
_____ SERVICE MANUAL	@ 30.00 =	

_____ Make check or money order payable to:

TOTAL $ _____

NOTE: This offer is subject to contractual agreements

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