B150 SERIES
COMPUTER TERMINAL

Operator Manual

AUGUST 1978
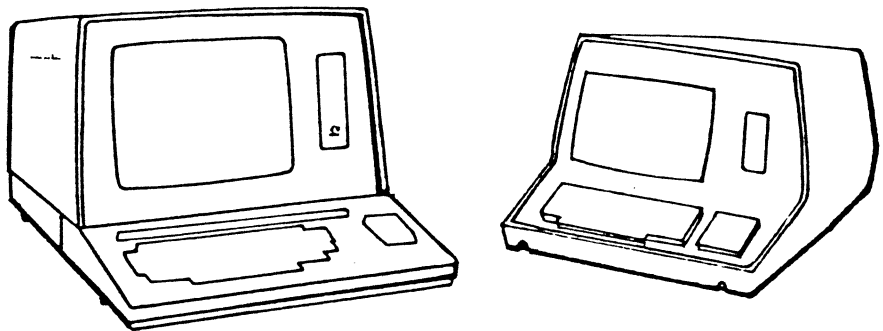
Another Terminal from

BEEHIVE INTERNATIONAL
Manufacturer of Quality Computer Systems

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SECTION I

INTRODUCTION

This manual provides a general equipment description and operating instruction for the Beehive B150 series video terminals. Included are sufficient diagrams, tables and descriptive text to provide an 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.

Section I provides a brief description of the B150 series terminals and a brief summary of the differences between the B150 series terminal models.

Section II describes the installation and initial checkout of the terminal.

Section III describes the operational characteristics and functions of the terminal.

The Beehive B150 series units (see Figure 1-1) are low-cost multi-feature remote video display terminals. The terminals are self-contained, operator oriented, and computer accessible. The Beehive B150 series are attractively styled sophisticated electronic packages, designed for use in serially transmitting information to and receiving information from an interconnected data source. The terminals are fast, with an operational exchange of data at any of several preselected transmission rates — 75 to 19200 baud. Other features include cursor control, lower case descender characters, and an auxiliary interface. In addition, Block Send, Auxiliary Send, editing, formatting, blinking, and 16 special function keys are some of the features available in upper level terminal configurations.

The B150 and B157 terminals are packaged in a single-piece housing; the B152 features a two-piece housing, allowing the keyboard to be removed. The B157 capabilities have been expanded to provide a programmable keyboard and PLA program changes, making it capable of communicating and operating with most time-share systems.

The Beehive B150 series are 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. Autorepeat on some keys is inhibited where not meaningful. Keyboard features include an 11-key numeric pad for convenient entering of numbers; cursor up, down, right and left controls; and optional function keys with edit and data transmit keys.

Interfacing, baud rate selection, half and full duplex switching, and video controls are conveniently arranged on the rear panel. (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.) The Input/Output and auxiliary I/O connectors will interact with most standard serial RS232C external devices. Data from the auxiliary port can be received and transmitted at a baud rate separate from that of the standard I/O Port. The baud rate of the auxiliary port is strap selectable.

The CRT is a 12-inch/30.5 cm (measured diagonally), digital type monitor which is formatted to

display 24 lines with 80 characters on each line, for a total page memory of 1920 characters. Each character is generated from a 5 x 7 dot matrix, with two-dot spacing between adjoining characters and a one-scan spacing between adjacent lines. The standard character set consists of 95 display-able characters. The character set includes lower case character descenders (e.g., y, g, etc.).

Each terminal model in the B150 series is described in the appendices to this book. The basic B150 series terminals feature:

- Auxiliary/Printer Interface

- Numeric Pad
- Transmission rates to 19,200 bps
- Cursor Control Cluster
- Addressable Cursor
- Low Power Schottky Technology

Upper level features include:

- Block Send
- Blinking
- Auxiliary Send
- Editing
- Formatting
- 16 Special Function Keys
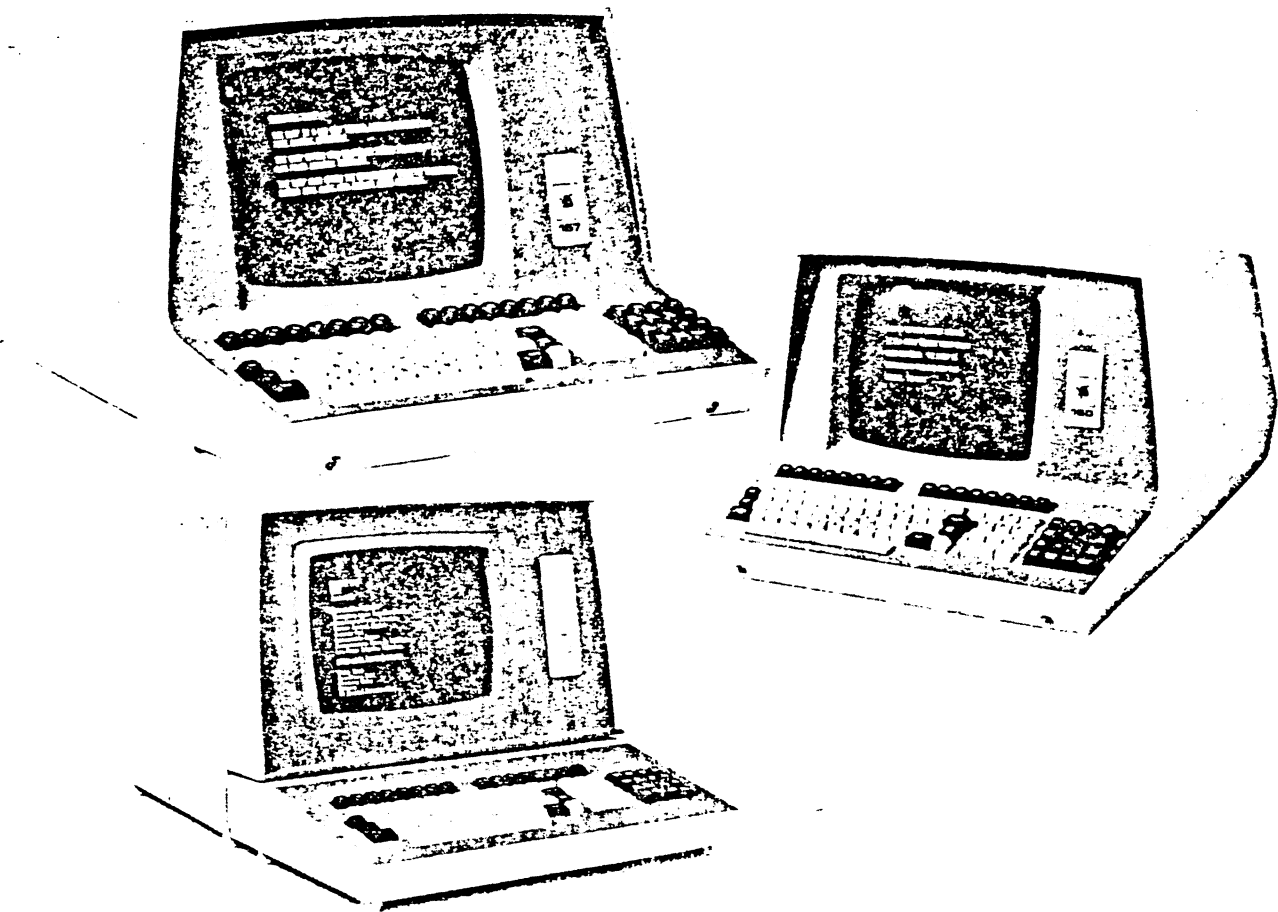
Figure 1-1 B150 Series Terminals.

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 settings. This allows the user to tailor the B150 series for specific requirements.

2.2   UNPACKING

The following items are furnished with each B150 series terminal:

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

There are no tie-downs or packing materials inside the unit which need to be removed. Store the carton for use as a future shipping container, if desired.

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. Mishandling 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 an updating information service is available. Service tips, manual 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 end of this manual for further information.

2.5   ACCESSORIES

The following accessories are available for use with the B150 series terminal:

    a.   Acoustic Coupler Cable (Part #112-0031)
    b.   NOVA* Computer Serial I/O Cable
        (Part #112-0040)

2.6   IDENTIFICATION

An identification plate located on the bottom cover of the terminal provides the model number, serial number, weight, voltage, current requirements, 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 alter-

*Trademark of Data General Corporation.

nate operating positions without removing or changing 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 perator. Route the cables in such a manner that they will 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 of 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 Figures 2-1A and B).

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 unit 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 (Optional)

The Current Loop Interface is a 20 mA device which allows the terminal to be used up to 2000 feet (608 m) from the computer. 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 a 2-wire source, a 2-wire receive data line, and a 2-wire transmit data line.

Data transmission is normally limited to 50 feet. The Current Loop adaptor converts the TTL logic into current or voltage patterns at one end of the loop, transmits the pattern, reconverts the pattern to TTL logic at the other end, and delivers it to the computer or terminal. The current loop signals are contained within the RS232C I/O connector and will not interfere with normal RS232C signals required for asynchronous operation. See Table 2-1 for location of pin assignments and Figure 2-2 for cabling.

2.7.4 Composite Video (Optional)

The B150 series unit is provided with a composite video device capable of driving a remote monitor up
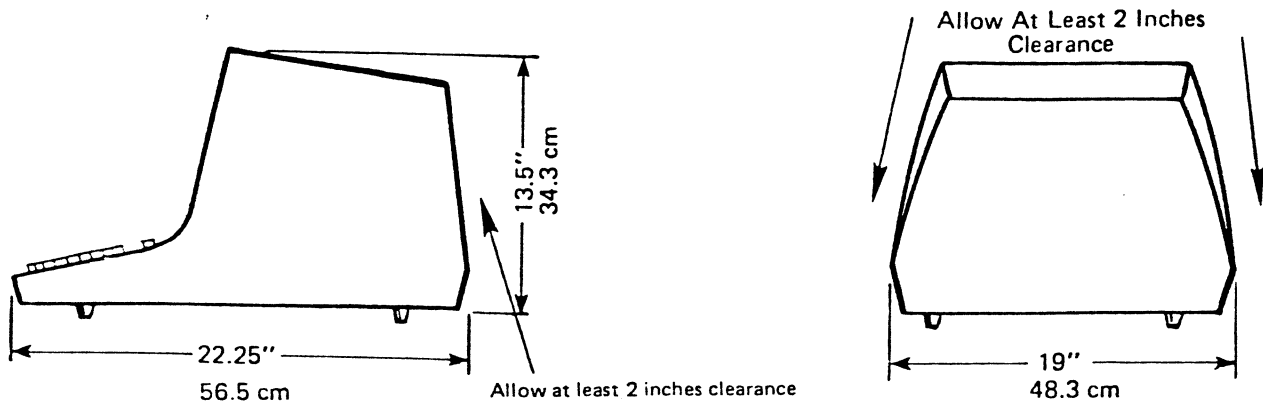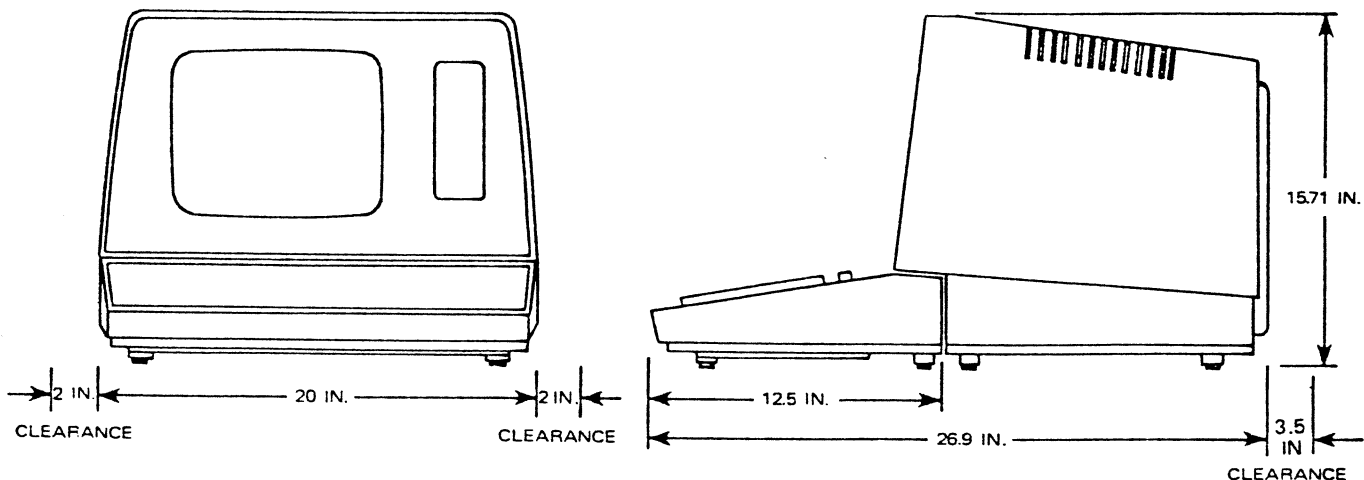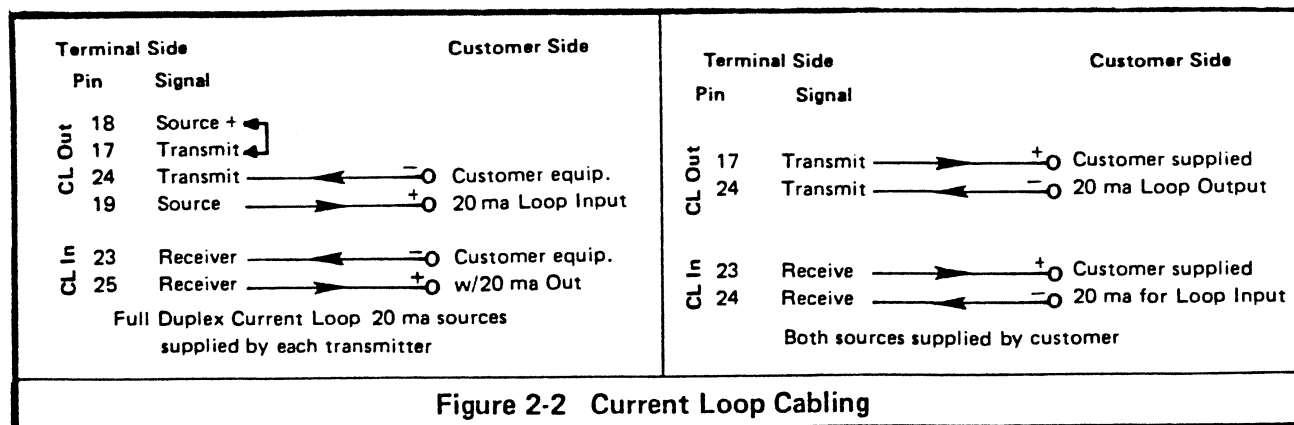

Figure 2-1A B150/B157 Mounting Requirements

Figure 2-1B B152 Mounting Requirements

2-2

Figure 2-2 Current Loop Cabling

Left side:

Terminal Side — Customer Side

Pin | Signal

CL Out:
- 18 Source +
- 17 Transmit
- 24 Transmit ← −o Customer equip.
- 19 Source → +o 20 ma Loop Input

CL In:
- 23 Receiver ← −o Customer equip.
- 25 Receiver → +o w/20 ma Out

Full Duplex Current Loop 20 ma sources
supplied by each transmitter

Right side:

Terminal Side — Customer Side

Pin | Signal

CL Out:
- 17 Transmit → +o Customer supplied
- 24 Transmit ← −o 20 ma Loop Output

CL In:
- 23 Receive → +o Customer supplied
- 24 Receive ← −o 20 ma for Loop Input

Both sources supplied by customer

Figure 2-2 Current Loop Cabling

Table 2-1 I/O End Auxiliary Port Pin Assignments

I/O Port Pin Assignments

PIN NO.	SIGNAL DESCRIPTION	RS-232C	ASSIGNMENTS
1	Frame Ground	AA	This conductor, where used, is electrically bonded to the machine frame.
2	Transmitted Data	BA	This circuit transfers data from the terminal to the data set for transmission to the external device. The unit holds circuit BA in the marked condition during any time interval between characters or words or when no signals are to be transmitted.
3	Received Data	BB	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. The data set holds this line in the marking condition when the line is idle.
4	Request to Send	CA	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 unit 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.
5	Clear to Send	CB	Signals on this circuit are generated by the data set to indicate that it is prepared to receive 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.
7	Signal Ground	AB	This conductor establishes the common ground reference for all interface lines.
8	Carrier Detect	CF	An input signal (High) will enable the unit to receive.
15	X16 Terminal Data Clock	-	TTL level clock provides a B150/B152 to slave terminal 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.

PIN NO.	SIGNAL DESCRIPTION	RS-232C	ASSIGNMENTS
16	X8 Terminal Data Clock	--	X8 TTL level transmit clock is provided to clock external modem or interface units. Strap on Board location XD 11-7, see Table 2-2.
17	Current Loop Transmit Data	CL	Transmit data from the terminal via CL.
18	Current Loop 20 mA Constant Source—Minimal	CL	Provides the 20 mA power source to CL.
19	Current Loop Source Ground	GND	Provides common ground for CL circuitry.
20	Data Terminal Ready	CD	Terminal ready is high whenever power is on.
23	Receive Data Ground	CL	Provides ground for CL Receive circuit.
24	Transmit Data Ground	CL	Provides ground for CL Transmit circuit.
25	Receive Data	CL	Receives data from external device via CL.

Auxiliary Port Pin Assignments

PIN NO.	SIGNAL DESCRIPTION	ASSIGNMENTS
1	Frame Ground	This conductor, where used, is electrically grounded to the machine frame.
2	AUX Receive Data	This 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.
3	AUX Transmit Data	This circuit transfers data from the terminal to the data set for transmission to the external device.
4	AUX Request to Send	Signals on this circuit are generated by the data set to indicate that it is prepared to transmit data.
5	Clear	Signals on this circuit are generated by the terminal to condition the local data set to transmit.
6 & 8	Data Set Ready	When the terminal is ON, the line remains high.
7	Signal Ground	This conductor establishes the common ground reference for all interface lines.
20	AUX Ready/Busy Line	Receives a signal from an outside source indicating a busy or ready mode for a transmission-controlled delay to an outside source.

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 Figures 2-3A & B).

7.5 Data Interface Connections

Signals used in communicating with the B150 Series conform to the requirements of EIA Specification RS232C. 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 B150 switch at approximately +1.0 volt, with 0.1V 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 2-3). A 25 pin miniature 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 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 ollows:

a. Set the rear panel POWER ON/OFF switch to ON; allow a warm-up period of approximately one minute and ensure 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 the Brightness and Contrast adjustments, explained below.

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

Perform the checkout procedures described in the following paragraphs.

b. Turn the BRIGHTNESS CONTROL (located on the rear panel, see Figure 2-3) 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 background raster is extinguished. Adjust the Contrast CONTROL (located on the rear panel, see Figure 2-3) until the characters are sharply defined and the difference between the two intensities is easily distinguished.

2.9 OPERATOR CHECKOUT PROCEDURES

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

2.9.1 Alternate Action Keys

Perform the initial setup as follows:

a. Set the rear panel HDX/BLOCK/FDX switch to HDX (see Figure 2-3 for Switch location).

b. Set the rear panel CL/CL/RS232C switch to RS232C.

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.

2.9.2 Cursor Movement Checkout

Before performing the checkout, depress the CTRL SHIFT, and CLEAR/HOME keys simultaneously to initialize the terminal circuitry. Ensure that the terminal is in a loopback mode (LOCAL, 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. Re-

Figure 2-3A diagram labels:

COMPOSITE VIDEO

ON
OFF
POWER

POWER RESET

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

BRIGHTNESS   CONTRAST   BAUD   MAIN PORT   AUX PORT   H B F   CL R EIA

CIRCUIT BREAKER

Prevents damage to circuitry during voltage/current overload.

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

This control selects the baud rate that the transmitter and receiver will utilize for transmission. There are 15 internal and 1 external baud rate selections, as shown in the above chart.

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.

CL/R/RS232C (EIA)

In the CL position, the input/output data is routed to the current loop transmitter and receiver only. In addition, RS232C elements are inactive. The RS232C position disables the current loop elements and the data is routed through the RS232C elements. The EIA position inhibits any transmission.

MAIN PORT

This port provides data source interface for the terminal, RS232C or current loop interface.

Figure 2-3A   Rear Panel View of the B150/B157 Terminal

Figure 2-3B diagram labels:

BRIGHTNESS   BAUD   CONTRAST   REMOTE VIDEO   MAIN PORT   AUX PORT   H B F   CL R EIA   PLUG   FUSE   ON/OFF POWER SWITCH

CIRCUIT BREAKER

Prevents damage to circuitry during voltage/current overload.

AUXILIARY PORT

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

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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.

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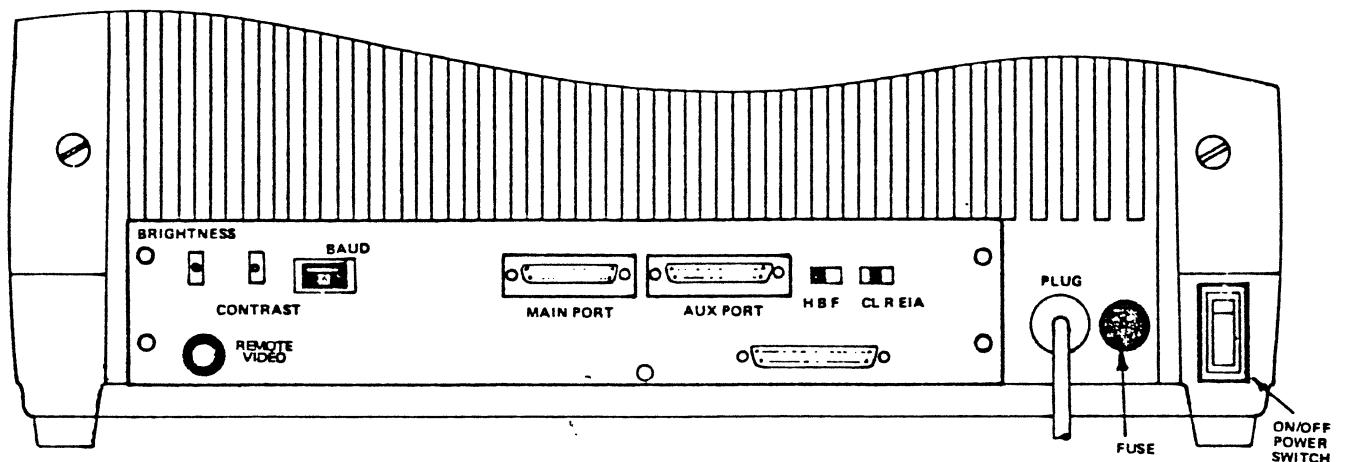
CL/R/RS232C (EIA)

In the CL position, the input/output data is routed to the current loop transmitter and receiver only. In addition, RS232C elements are inactive. The RS232C position disables the current loop elements and the data is routed through the RS232C elements. The EIA position inhibits any transmission.

MAIN PORT

This port provides data source interface for the terminal, RS232C or current loop interface.

Figure 2-3B   Rear Panel View of the B152 Terminal

lease the key with the cursor remaining on the top line.

1. 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.

2.9.3 SEND and AUX SEND Checkout (Optional)

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, terminating with the cursor in its original position. This operation is called a LINE SEND.

c. Depress the ESC-1 key. 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 the MAIN I/O PORT.

2.9.4 FORMAT Checkout (Optional Feature)

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 unprotected 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.

2.10 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 RS232C. 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, these units are equipped with a three-conductor shielded power cable that grounds the unit. The units should be operated only with this or a similar type grounded power cable. To temporarily operate the B150 series from a two-conductor outlet, use a three-conductor to two-conductor adapter. Preserve the safety feature by grounding the adapter.

2.11 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. They are listed in Tables 2-2.

2.11.1 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.

2.11.2 Parity Selection (Odd/Even)

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

2.11.3 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 length.**

2.11.4 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 (See Figure 2-4.).

2.11.5 Refresh Rate Selection

With this strap installed, the terminal functions at a refresh rate of 50 Hz. With no strap 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 section 2.11.7) the terminal conforms to export requirements.

2.11.6 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.
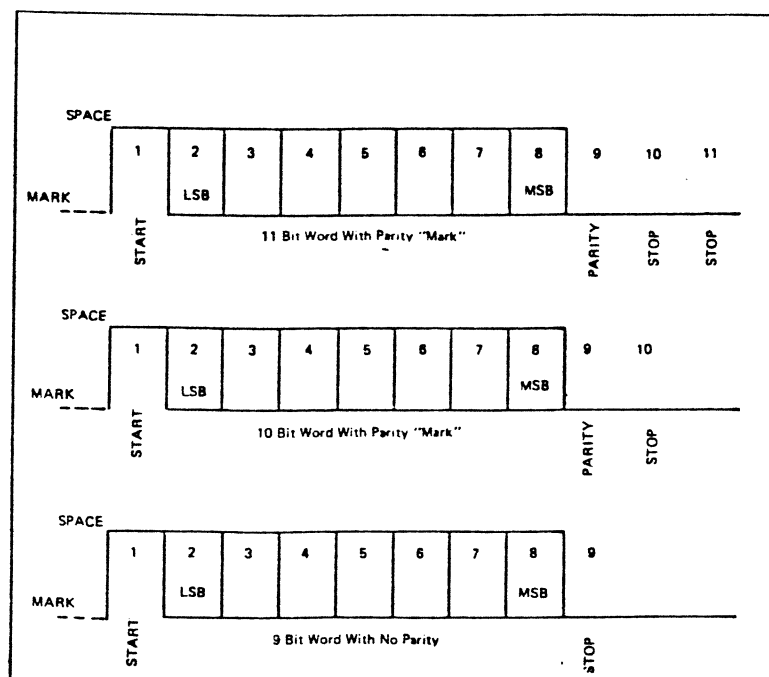
Figure 2-4   INPUT/OUTPUT Word Structure

Table 2-2 B150 Series Jumper Assignments and Logic Board Strapping Locations

OPEN	NO.	CLOSED (+)	OPEN	NO.	CLOSED (+)
STRAP LOCATION XA1			**STRAP LOCATION XDE13**		
UNUSED	1	UNUSED		1	19200 BAUD
LOW INTENSITY	2	LOW INTENSITY W/FORMAT		2	9600
UNUSED	3	UNUSED	ONLY ONE STRAP	3	7200
	4			4	4800
	5	INTERNAL AUX DELAY	IS JUMPERED	5	3600
ONLY ONE CLOSED	6	AUX BUSY CONTROL		6	2400
	7	AUX READY CONTROL		7	2000
STRAP LOCATION XD10			**STRAP LOCATION XDE14**		
MAIN 2 STOP	1	MAIN 1 STOP		1	1800
MAIN NO PARITY	2	MAIN PARITY ENABLE		2	1200
MAIN EVEN PARITY	3	MAIN ODD PARITY		3	1000
MAIN 8-BIT WORD	4	MAIN 7-BIT WORD		4	600
MAIN BIT 8 MARK	5	MAIN BIT 8 SPACE		5	300
60 HZ	6	50 HZ		6	150
UPPER & LOWER CASE DISPLAY	7	UPPER CASE ONLY		7	110
STRAP LOCATION XD11				8	75
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			
UNUSED	6	UNUSED			
NO X8 CLOCK	7	X8 CLOCK OUT PIN 16 ON I/O			
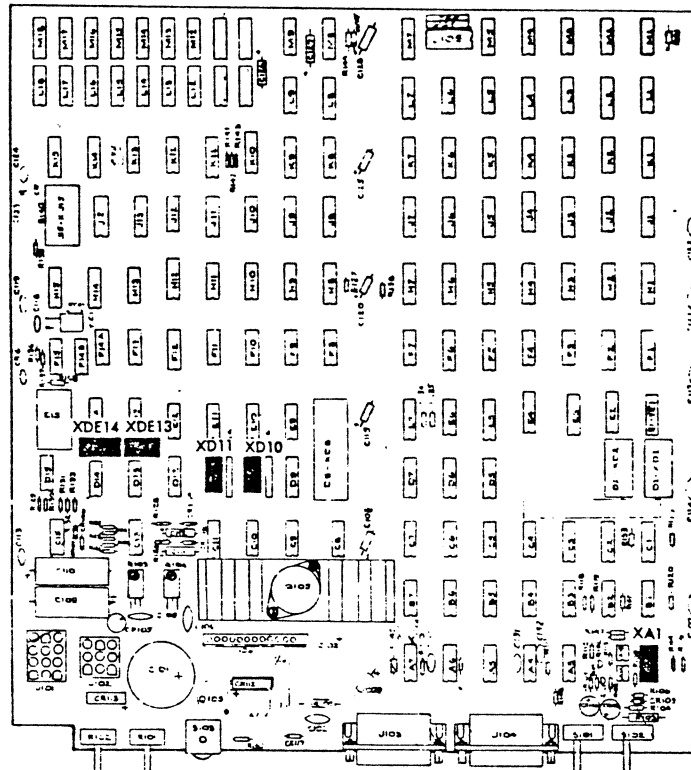
2.11.7 Power Supply Voltage Changes

The following procedure is given so that the user can configure the Power Supply voltage to suit a particular incoming line voltage.

CAUTION: Only trained technical staff should be allowed to reconfigure the terminal Power Supply.

A chart is given in Figure 2-5 that describes the various wiring configurations for the voltages 100 vac-50/60 hz, 115 vac 50/60 hz, and 220 vac 50/60 hz. Some of the changes are complex as when converting from 115 vac 60 hz to any other voltage and frequency. Figure 2-5 contains wiring diagrams that explain these changes and the necessary additional parts (if any) are listed to the right.

QUANTITY/ITEM	PART NO.	USE
1 Line Filter	610-0004-6617	115vac 50hz, 100vac 50/60hz, & 230vac 50/60hz.
1 Line Cord	601-0602-2105	Used in 230vac 50/60hz
1 Circuit Breaker	611-0104-0150	Used in 230vac 50/60hz
5 .250 Faston Terminals	704-0169-9778	All Cases
1 Connector (closed end)	606-0035-EC56	100vac 50/60hz only
2 No. 6 Lock Nut	701-0002-0006	All except 115vac 60Hz
2 Starlock Washers	701-0006-0006	All except 115vac 60Hz

Figure 2-5   Power Supply Voltage Change Documentation
(continued on following page)

TB1	WIRE
100 VOLT 50/60Hz	
1	T1-Brown
2	T1-Yellow
3	Fan
4	Line Filter No. 4
5	Key
6	T1-Black
7	T1-Gray
8	Line Filter No. 5
9	Key
10	Blank
T1 Red	Fan †
115 VOLT 50Hz	
1	T1-Brown
2	T1-Yellow
3	Fan
4	Line Filter No. 4
5	Key
6	T1-Orange
7	T1-Red
8	Fan
9	Line Filter No. 5
10	Key
230 VOLTS 50/60Hz	
1	T1-Brown
2	Fan
3	Line Filter No. 4
4	Key
5	T1-Yellow
6	T1-Red
7	Fan
8	Key
9	T1-Orange
10	Line Filter No. 5

FROM	TO
T1-Violet	P2-9
T1-Violet/White	P2-7
T1-Violet	P2-8
T1-Green	P2-6
T1-Green	P2-5
T1-Blue	P2-3
T1-Blue	P2-2
SPK-Yellow	P2-1
SPK-Brown	P2-4
S1-2	CB1-1
Power Cord Blk. or Brn	CB1-2
Power Cord Green	Line Filter No. 2
S1-1	Line Filter No. 1
Power Cord Wht. or Blu	Line Filter No. 3

FROM	TO
T1-Violet	P2-9
T1-Violet/White	P2-7
T1-Violet	P2-8
T1-Green	P2-6
T1-Green	P2-5
T1-Blue	P2-3
T1-Blue	P2-2
SPK-Yellow	P2-1
SPK-Brown	P2-4
S1-2	CB1-1
Power Cord Black	CB1-2
Power Cord Green	E1

TB1	WIRE
115 VOLT 60Hz	
1	T1-Brown
2	T1-Yellow
3	Fan
4	Switch S1-1
5	Key
6	T1-Orange
7	T1-Red
8	Fan
9	Power Cord-White
10	Key

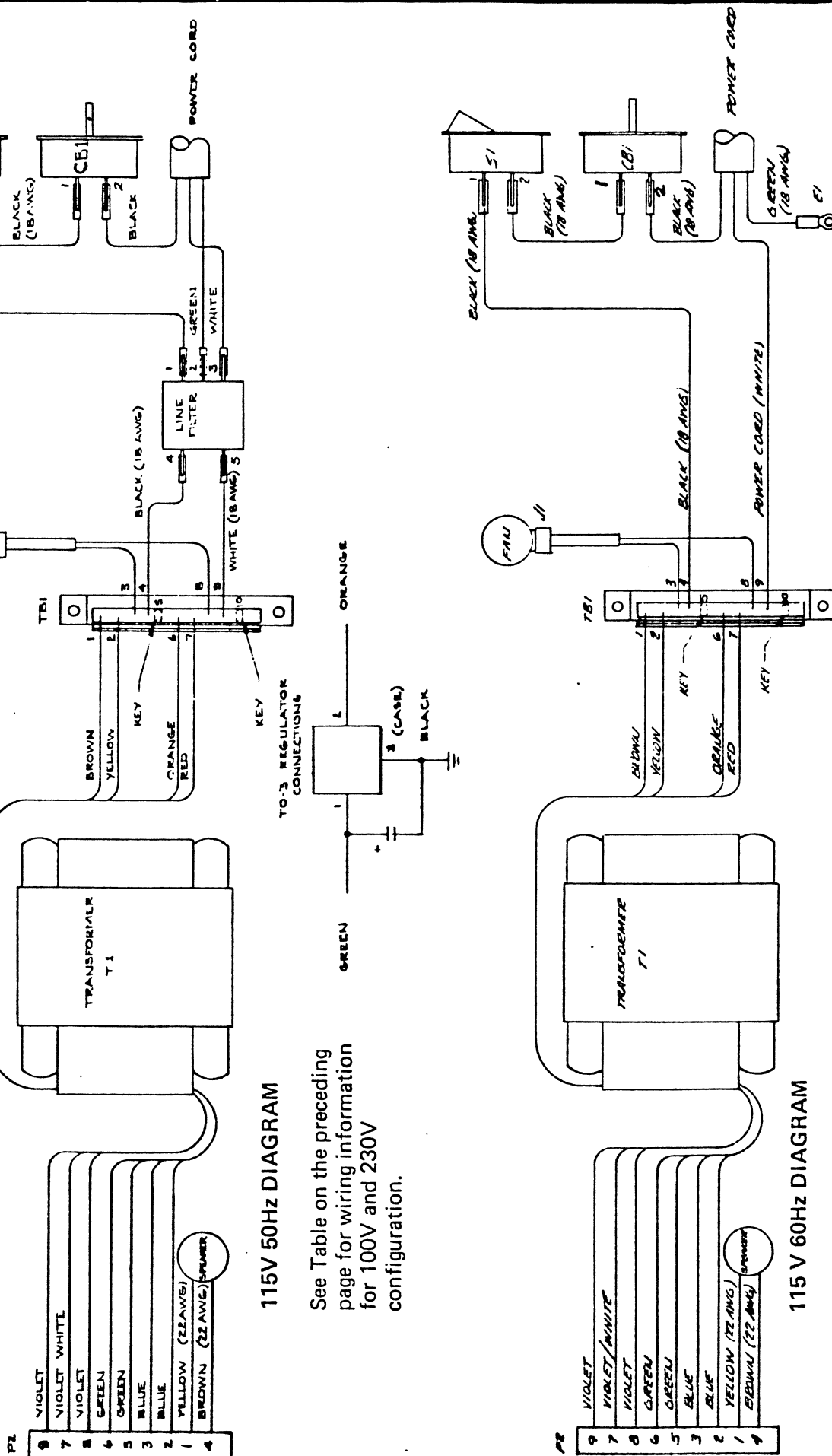† For 100 vac configuration connect T1 Red and Fan lead together using a closed end connector. See parts list above.

Figure 2-5 Power Supply Voltage Change Documentation (concluded)

115V 50Hz DIAGRAM

See Table on the preceding page for wiring information for 100V and 230V configuration.

115 V 60Hz DIAGRAM

See Table on the preceding page for wiring information