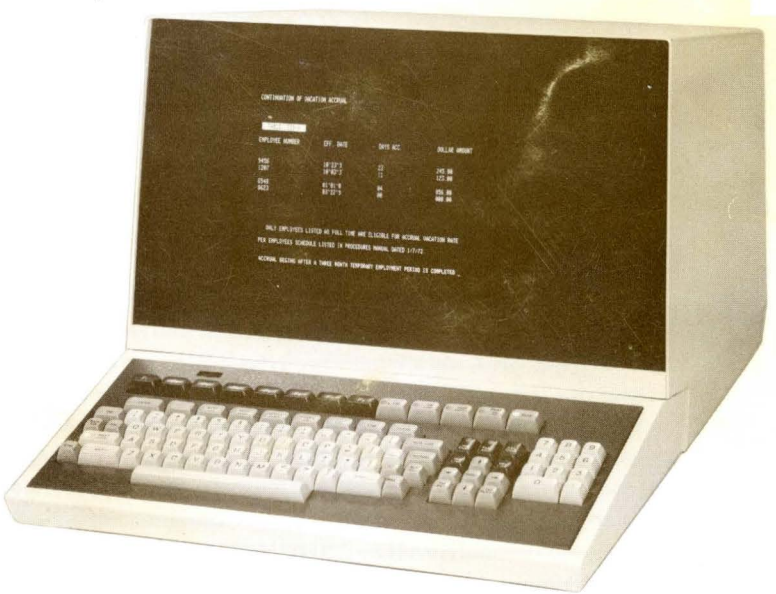
operator manual

SUPER BEE

COMPUTER TERMINAL



BEEHIVE MEDICAL ELECTRONICS, Inc.

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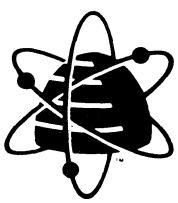
SUPER BEE 2 COMPUTER TERMINAL

Operator Manual

MAY 1975



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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

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 = $*
_____	*OPERATORS MANUAL*	*@ 10.00 =*
_____	*ILLUSTRATED PARTS BREAKDOWN*	*@ 15.00 =*
_____	SERVICE MANUAL	@ 30.00 =
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_____	BEELINE SUBSCRIPTION	@ 10.00 =
	TOTAL	*$*

_____ *Make check or money order payable to:*

NOTE: This offer is subject to contractual agreements

Beehive Terminals

warranty

Beehive Medical Electronics, Inc. certifies that each terminal will be free from defective materials and workmanship for one year from date of shipment to the original customer.

B.M.E.I. agrees to correct any of the above defects when the terminal is returned to the factory prepaid. Return authorization must be obtained from Beehive Medical Computer Systems Field Service Department before returning the terminal to the factory.

Under this warranty, B.M.E.I. will provide the necessary components required by the customer to correct the terminal in the field. The components will be shipped, collect, on a billing memo which will be cancelled upon receipt of the defective components at the factory. When ordering components for repair or replacement, the model number and serial number must be included on the customer request.

This warranty is invalid if the terminal is subject to misuse, abuse, neglect, accident, improper installation or application, alteration or negligence in use, storage, transportation or handling and where the serial number has been removed, defaced or changed.

BEEHIVE MEDICAL
ELECTRONICS, Inc.

EFFECTIVE MAY 1, 1975

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 part or equipment are returned by using the following procedures:

1. Contact the nearest BMCS Service Center, 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 damages 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 SERVICES CENTERS

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

BMCS
740 W. 1700 So. Suite 7
Salt Lake City, Utah 84104
(801) 487-0741

Washington Service Center
400 West Service Road
Gateway Bldg. 1
Chantilly, Virginia 20041
Attn: Airborn
(703) 661-8400

Florida Service Center
610 North Andrews Ave.
Ft. Lauderdale, Florida 33301
(305) 764-4038

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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_____

Beehive Medical Electronics, Inc.
c/o Field Service Department
870 West 2600 South
P.O. Box 19244
Salt Lake City, Utah 84120

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SECTION III
INSTALLATION

FIGURES

TABLES

OPTION CONFIGURATION FOR:_____

SERIAL NUMBER:_____

FUNCTION	BACK PANEL	PROCESSOR BOARD	INTERCONNECT BOARD	SWITCH BOARD	INTERNAL
HALF/FULL DUPLEX	SWITCH HDX _____ FDX _____				
LOWER CASE INHIBIT	SWITCH ENBL L. C.___ INHBT L. C.___				
I/O BAUD RATE SELECT	SWITCH 1____ 16____ 2____ 32____ 4____ 64____ 8____				
I/O BAUD RATE MULTIPLIER	SWITCH 110_____ 150_____				
AUTO EFFECIENT PAGING	SWITCH AUTO EFF PAGE_____ RRLF_____				
PSEUDO POLL		STRAP IN_____ OUT_____			
BACK SEARCH BLOCK TRANSMIT		STRAP IN_____ OUT_____			
PARITY TEST		STRAP IN_____ OUT_____			
ASYNC / SYNC OPERATION		STRAP IN_____ OUT_____			
SEND CONTROL CODES		STRAP IN_____ OUT_____			
GO-OFF-LINE		STRAP IN_____ OUT_____			
EXT CLOCK		STRAP IN_____ OUT_____			
STORE SPECIAL FUNCTIONS		STRAP IN_____ OUT_____			
PRINTER BAUD RATE SELECT				STRAP 1____16____ 2____32____ 4____64____ 8____ ____	
PRINTER BAUD RATE MULTIPLIER				STRAP 110_____ 150_____	
TTL KMIT CLOCK				STRAP 1____ 8____ 2____16____ 4____	
POWER OPTION					STRAP IN_____ OUT_____

SECTION I
GENERAL INFORMATION

1 INTRODUCTION

This manual presents a general equipment escription, and installation and operation instructons for the SUPER BEE Computer Terminal. Section I provides a general description and the specifications of the terminal and Section II outlines basic operating procedures. Installation procedures are ven in Section III. This manual provides the operator with sufficient information to obtain a thorough nderstanding of the operational characteristics of ne equipment.

.2 PRODUCT DESCRIPTION

The SUPER BEE Computer Terminal shown Figure 1-1, is a self-contained, operator controlled emote display terminal with a detached ANSI keyoard. The terminal is designed for use in serially ansmitting information to, and receiving information om, an interconnected data source. The terminal will perate to exchange data at any of several preselected ransmission rates; 9600 baud maximum.

The SUPER BEE employs a 12-inch (measured liagonally) rectangular television type monitor which s implemented to display up to 25 lines with 80 characers. Each character is generated from a 5- by 7 -dot natrix with two-dot spacing between adjoining characters.

The SUPER BEE Terminal has a detached keyboard interfaced to the display unit by means of a flexible 4-foot cable. The keyboard employs the N-key rollover feature. When any alphanumeric key is held down for longer than half a second, it automatically repeats at a rate of approximately 25 characters per second. Some of the control keys also auto repeat, however auto repeat has been inhibited where not meaningful.

Interfacing is accomplished via the rear panel connectors. The Input/Output and Printer connectors are connected in parallel and will interface most standard serial ASCII printers. The printer data can be transmitted at a separate baud rate from that of the terminal and may be adjusted from 110 to 9600 baud. A Video connector is provided for connection to a remote display monitor. The output from this connector is a composite video signal capable of driving 1000 feet of 50-ohm coaxial cable.

1.3 PERFORMANCE CHARACTERISTICS

1.3.1 Modes of Communication

Half-Duplex/Full-Duplex Transmission

The SUPER BEE Terminal may be operated off-line or on-line. A rear panel switch allows the operator to select either half-duplex (HDX) or full-duplex (FDX) communications. Reset key must be depressed following FDX/HDX selection. Full-duplex operation allows data to be transmitted with each keyboard entry wherein the terminal's receiver input is enabled for immediate computer reply of the transmitted data (echoplex) to verify proper receipt of data. Half-duplex data transfer is generally used for sending precomposed messages, either a few lines at a time (block mode) or an entire memory dump at a time (page mode). While transmitting data in either the page or block modes, both the keyboard and the receiver inputs are disabled. Operation in the off-line mode allows the operator to edit the message before block transmission of the data. Operation in the on-line mode enables the transmitter and the receiver.

Synchronous or Asynchronous Transmission

The SUPER BEE Terminal allows the selection of either serial synchronous or serial asynchronous transmission. During synchronous operation, the word structure consists of eight bits; seven data bits and a parity bit. Synchronization is accomplished by receiving and identifying two or more sync codes at the beginning of a transmission; synchronous operation is not possible during conversational type transmission (character by character). The asynchronous word structure consists of a start bit, seven data bits, a parity bit, and one or two stop bits (One stop bit if baud rate switch is in

Figure 1-1
SUPER BEE Computer Terminal

X150 position and 2 stop bits when in X110 position).

Data Compression

Delete codes are used in data compression to eliminate the transmission of trailing spaces. Transmission of only operator-entered data is possible by placing a delete code after the data to be transmitted. (Data on the line after a delete code is not transmitted.) When a delete code is encountered during transmission, a Carriage Return and Line Feed (CR-LF) are sent as a record separator and a CR-LF are performed by the terminal. Transmission continues at the first character location in the next line.

Conversational Transmission

During conversational transmission, the CRT terminal must be on-line. Received alphanumerics are stored in memory and displayed. Received control codes or ESC sequence codes cause the unit to perform the appropriate function, and are not stored in memory or displayed. An exception is the "NEW LINE" code which is acted upon, stored in memory, and displayed as a space. Keyboard-generated alphanumerics are transmitted to the computer. In full-duplex operation, control codes and ESC sequence codes are transmitted but not acted upon until echoplexed to the terminal.

Block Transmission

Block transmission is used to allow the operator to prepare data off-line 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 ENTER key and may be one of the following types of block transfer:

If the terminal is strapped for the Pseudopoll on and ETX search off, the following sequence is performed:

a. Writes an ETX at the cursor location.

b. The cursor is positioned in the first character location in the memory or, in Format mode, the first character location in the first unprotected field.

c. The terminal transmits a DC1 code on the I/O and waits to receive an ETB (Control W) from the I/O.

d. Upon receipt of the ETB, data is transmitted out on the I/O until an ETX code is transmitted, at which time transmission is stopped.

A block transfer initiated remotely from the I/O requires the ETX code to be received and the cursor to be positioned at the location where desired transmission will commence upon the receipt of an ETB (Control W). The transfer proceeds as though it were initiated from the keyboard. When Pseudopoll is configured to off, the data transmission begins as soon as the Clear-to-Send signal is received from the I/O.

If the ETX search is configured to on, a reverse search is made for the most recent ETX code in the memory. When located, the cursor is positioned at the first character location in the next line. The transfer will begin from that point.

When the terminal is strapped for pseudo-polling off, it is the CPU's responsibility to see that an ETX is placed in memory before sending the terminal an ETB.

When a NEW LINE code or DELETE code is encountered in the memory during a block transfer and while operating in the Character mode, a CR-LF function is performed and is transmitted to the I/O and the printer's I/O. There should not be an ETX code stored after a DELETE code in the same line. There also should not be two ETX codes on the same line. When the DELETE code or a protected location in the memory is sensed, the CR-LF function codes are transmitted to the I/O and the printer I/O internally, a TAB function is performed.

The block transfer operations are performed the same for a PRINT command except that when an ETX is sensed, the CR-LF codes are transmitted in place of the ETX command. The terminal can also be configured to switch to off-line (local) after printing.

When the CPU ends transmission of a block of data while in synchronous mode and the terminal is to remain on-line, the following codes can be used to re-establish sync with the computer:

Cursor Sense: will start a sync search, after sending out the cursor address, until the CPU sends out a new block of data.

Print: Without go-off-line, will reply with fewer sync codes and go into sync search.

Baud Rate Selection

Transmission rates are switch-selectable at the rear of the terminal. The baud rate switch has seven positions 1, 2, 4, 8, 16, 32, and 64. The baud rate multiplier switch has two positions; 110 times or 150 times. The selected position causes the selected baud rate to be multiplied by 110 or 150. The switches produce rates of 150, 300, 600, 1200, 2400, 4800, and 9600 baud for 10-bit word operation; or 110, 220, 440, 880, 1760, 3520 and 7040 baud for 11-bit word operation.

1.3.2 Operating Modes

The SUPER BEE Computer Terminal normally operates in one of three modes; the Character mode, the Program Entry mode, and the Format mode. In each mode, the SUPER BEE can be operated either on-line or off-line.

Character Mode

Character mode is selected upon power-on or depression of the RESET key. In this mode, the monitor displays all characters and reacts to all control codes. Depression of RESET key automatically returns the terminal from any other mode to Character mode.

Character Mode (Off-Line) - Characters entered from the keyboard are stored in the terminal memory and displayed but not communicated to the I/O port. Control and escape sequence codes are dependent upon appropriate strapping. Characters received at the I/O port are ignored.

Character Mode (On-Line) Characters entered from the keyboard are transmitted from the I/O port as they are entered. If operated half duplex (HDX), the characters are stored in the memory and displayed as they are entered. When operated full duplex (FDX), the characters are transmitted to the I/O port only, and are stored in the memory and displayed if a remotely connected data source echoes each transmitted code.

Program Entry Mode

A Program Entry mode is selectable from the keyboard or from a remote data source intiated by an escape sequence code. When in the Program Entry mode, the terminal does not respond to control and escape codes, but stores these codes in memory and displays their associated character or symbol. NEW LINE and ENTER functions are exceptions. They are displayed in normal video and acted upon. The Program Entry mode is intended to display control characters and escape sequence characters prior to transmission or after receipt of a transmission Programming from the terminal is made possible through the implementation of the Program Entry mode.

Program Entry Mode (Off-Line)- Characters entered from the keyboard are stored in the terminal memory and displayed but not transmitted to the I/O port. Control codes are displayed as special symbols and are not acted upon, with the exception of NEW LINE and ENTER. Escape function characters are displayed in reverse video and are not acted upon.

Program Entry Mode (On-Line)- The terminal operates the same as that for the Program Entry mode (off-line), with the exception that data entered from the keyboard is transmitted to the I/O port. The transmitted control escape and sequence codes are dependent upon appropriate strapping.

Format Mode

A Format mode is selectable from the keyboard or from a remote data source initiated by an escape sequence code. In the Format mode, the terminal display has protected fields in which the cursor can be positioned, but no data may be entered. If desired, unprotected fields may be delimited by use of brackets or reverse video to indicate the area for data entry.

Format Mode (Off-Line)- Characters entered from the keyboard are stored in the unprotected locations in the terminal's memory and displayed but are not transmitted to the I/O port. Select-

able edit functions (INSERT LINE and DELETE LINE) are inoperative in Format mode.

Format Mode (On-Line)-Operation in this mode is the same as that for Format mode (Off-Line), except that data entered from the keyboard is transmitted to the I/O port. For a block transmission, a CR-LF is transmitted at the end of each field as a field delimiter.

Print-On-Line Mode

The Print-On-Line mode is a selectable keyboard function or initiated from a remote data source. The I/O baud rate is slaved to the selected printer baud rate of the SUPER BEE when the terminal is operating in the Print-On-Line mode and with terminal in on-line mode. The data sent to or received by the terminal is both displayed on the terminal and printed by the printer. Data transmitted from the terminal is sent to both the I/O port and the printer port at the selected printer baud rate. The CPU must supply null codes as required. In print-on-line and with the terminal in off-line, the printer baud rate must be consistent with the I/O baud rate. Keyboard data will not be printed while off-line and received data will not be displayed.

1.3.3 Display Organization

The display is organized on a page basis, where the page contains 25 lines with 80 character positions in each line. Any of the 96 USASCII codes can be displayed on the monitor in a line-page organization. If a line in the memory has less than 80 characters, the displayed line contains blanks or spaces filled to the 80th character.

Upon power-up or depression of the RESET key, the Character mode is selected. In this mode of operation, the CRT monitor displays all characters and reacts to all control codes. A keyboard or I/O code selectable Program Entry mode prevents the terminal from reacting to control and escape function codes, and displays instead the control symbols and escape function codes as reverse video characters. In the Format mode of operation, protected areas of the display cannot be erased or overwritten.

When it is required that data serve as alarm or status indicators or direct attention, video can be displayed as follows: (1) normal video (white characters on a black background); (2) normal video blinking; (3) reverse video (black characters on a white background); and (4) reverse video, blinking. These functions are initiated by an escape sequence operation which stores a single video control character in memory and which is displayed as a space. The reverse video and/or blink field is terminated by the end of the line or by either the NEW LINE or Line-Blink-Off codes. Additionally, all level video and blink control codes in memory may be reset with space codes by the Page-Blink-Off command.

1.3.4 Memory Organization

The memory in the SUPER BEE terminal is organized in such a manner that only the display characters and receiving control codes are stored in memory. This means that if only 10 characters are written on a line, only 10 memory locations are used for display of that line. The other 70 spaces on that line are not stored. This technique is known as "efficient paging." The total number of memory locations is 2048. This means, for instance, that through the use of efficient paging, 256 lines of 7 characters each can be stored (The maximum number of lines is limited to 256). Only 25 lines of memory data can be displayed at one time; however, the memory can be scrolled up or down to bring any 25-line window of the memory data into view.

WARNING: Use of less than 7 characters per line may cause the terminal to jump to non-existent memory and the content of memory to be non-recoverable. Loss of control of the terminal may occur until power is turned off.

When a CLEAR operation is performed the entire memory is filled with space codes and the cursor is positioned home. The memory is then organized as 80 characters per line and displayed as an entire blank screen. As data is entered, display characters replace the space character as defined by the cursor location. The memory organization remains the same until a "NEW LINE" code is entered into the terminal. The "NEW LINE" code is stored into the display memory at the cursor location and terminates the display of that particular line. (The remaining part of that line is

displayed as blanks that occupy no memory locations.) The code entered immediately following the "NEW LINE" code in memory is displayed as the first character on the next line. If the 80 character by 25 line format must be retained, the Carriage Return-Line Feed (CR-LF) functions may be keyed in to move the cursor to the first character position on the next line. After all 2048 memory locations are used up, the memory continues to receive data and scrolls up. At the end-of-memory indicator (a block of reverse video), when a new character is received, a line of data is lost from the top of the memory.

The cursor is always displayed on screen and if any cursor control is given which would move the cursor off the display, the display will be scrolled up or down so that the cursor will remain displayed on the screen. With efficient paging, the cursor may be positioned to an undefined location on a particular line by moving it to the right of the New Line (N/L) position. When this happens, data cannot be entered on this portion of the line to the right of where the N/L code was entered. If insertions are to be made in a particular line, the cursor must be positioned to a character located to the left or under the N/L position. Any time the cursor is under the N/L position, the terminal automatically operates as though in the Insert Character mode.

1.3.5 Memory Overwrite

When data input has filled all memory locations, Cursor Right and Cursor Down are inhibited to prevent the cursor from moving through end-of-memory. If the last line of memory appears as the first line of the display, Scroll Up, Next Page, Cursor Right and Cursor Down functions are inhibited so that they do not move the cursor beyond the end of the 2048 memory locations. Line Feed (LF), Horizontal Tab (HT), and simply writing data will cause Memory Overwrite to occur. When memory overwrite does occur, the first line of memory is filled with DEL codes and made available for additional data. Care must be taken that these DEL codes do not cause mistakes if the memory is to be retransmitted, as DEL codes are interpreted as CR-LF codes and will cause the ETX code to be missed if preceded by a DEL code in the same line.

Warning: Memory overwrite may occur if any of the following conditions occur:

a. Cursor is on line 24, column 49-80 and a Cursor Down is repeatedly attempted.
b. Cursor is on line 25, column 0-48, and a Cursor Down is repeatedly attempted.
c. Cursor is on line 25, column 48, and a Cursor Right is repeatedly attempted.

1.3.6 Space Overwrite (SPOW)

The space bar normally writes a space code in memory and advances the cursor one character position to the right. However, following the operation of a Carriage Return (CR), the space code re-acts to perform a Cursor Right function but does not write a space. The SPOW latch is reset by performing a NEW LINE, Line Feed, HOME or TAB function.

1.3.7 Character Overwrite

When an error is made in entering a character (e.g., a misspelled word) a correction can be made by overwriting the character. Note: When terminal is in either On-Line or Print-On-Line mode, character overwrite will overwrite display only and will transmit or print overwrite characters as additional data. The use of Delete Character or Insert Character functions may be required to allow for a fewer or greater number of characters.

1.3.8 Special Function Keys

Eight special function sequence keys (F-1 through F8) are provided to allow the user to call up routines unique to the user. Any of the eight escape sequence codes (ESC and p through ESC and w), when generated by the keyboard, are stored as a two-code sequence starting at the cursor's location in the memory. When the terminal is configured to "store special function", the two-code sequence is stored in page memory. When the terminal is configured to "send special function", the two-code sequence followed by an ETX is stored in memory and the ENTER function is performed. During the ENTER function, if the terminal is configured for psudeopolling, the

"Request For Service" code DC1 is sent and the terminal waits for an ETB to begin transmission.

1.3.9 Printer Port

The serial printer port operates at RS232C logic levels and outputs negative-true data. The SUPER BEE terminal has three printer communication modes: (1) Print-On-Line, (2) Print and (3) Print-On-Line while On-Line. In the Print-On-Line and while On-Line, the I/O baud rate is slaved to the selected printer baud rate of the SUPER BEE. Data sent to or received by the SUPER BEE terminal is both displayed on the terminal and printed by the printer. Data transmitted from the terminal is sent to both the I/O port and the printer port at the selected printer baud rate. The Print-On-Line mode is selectable from the keyboard. The Print-On-Line mode is selectable from a remote data source, initiated by an escape sequence code if the terminal is in the On-Line mode. In the Print-On-Line mode, data from the CPU is routed directly to the printer, allowing preparation of data by the operator while the CPU is out putting info to the printer. The Print mode provides the capability of receiving data from the remote data source at a baud rate different from that of the printer. In this mode, the CRT terminal buffers between the printer and the remote data source. The Print mode is selectable from the keyboard or from a remote data source, initiated by an escape sequence code.

1.3.10 Input/Output Port

The I/O port operates at RS232C 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.

1.3.11 I/O Processor Board Strapping

There are eight strappable options available on the SUPER BEE I/O Processor board. These options are implemented by installing the appropriate strap on the 16-pin strapping pad (S1). A brief summary of these strapping selections is provided in the following paragraphs and detailed in Section 3.5.7.

Send Control Codes

All escape codes entered by the keyboard will be performed and transmitted. With the control codes strap installed, all escape sequences are performed locally only, but not transmitted.

Go-Off-Line

At the beginning of a block print while On-Line, an ETX is transmitted. At the end of the block print, the on-line mode is maintained. With a go-off-line strap installed, the unit goes off-line at the end of the block print and no ETX is transmitted, to the CPU. However, a CR-LF is sent to the printer.

Store Special Functions

Without this strap installed, special function codes are transmitted. With this strap installed, special functions are stored only and not transmitted.

External Clock

The SUPER BEE uses its own internal clock. However, with this strap installed, it provides for the use of external clocks provided by a modem or other interface.

Synchronous or Asynchronous Operation

The SUPER BEE is configured to operate asynchronously. With this strap installed, the terminal operates in the synchronous mode and generates words of eight bits. While operating in the asynchronous mode, the length of the generated word is determined by the multiplier toggle switch position. In the 110 position, an 11-bit word is generated. A 10-bit word is generated in the 150 position.

Block Transmit

With this strap installed, the SUPER BEE is configured to perform a block transmit. (This strap is installed as shipped from the factory.) Without this strap the SUPER BEE is configured to do a page transmission.

Pseudopolling/Immediate Block Transmit

Operation of the ENTER key or any of the eight special-function keys stores an ETX and positions the cursor at the beginning of the text. In the pseudopolling mode, a request for service code (DC1 octal 21) is transmitted and the terminal waits to receive a clear-to-transmit code (ETB octal 27) before transmission of the text begins.

Parity Test

SUPER BEE checks incoming data for even parity when operating asynchronously and odd parity when operating synchronously. With this strap installed, no parity check is made. Transmitted data is in the same sense as received data, with the exception that data is transmitted with a mark parity bit with strap installed. A parity error symbol (reverse video, backward question mark) is displayed whenever an invalid character is sensed by the parity test.

1.4 ACCESSORIES

The following accessories are available for use with the SUPER BEE Computer Terminal:

a. Current loop adapter, BMEI pa number 112-0606, (requires te to include interconnect Board, part number 112-0609, and In assy, BMEI part number 112-0

b. Acoustic coupler cable, BMEI p number 112-0031.

c. Nova computer serial I/O cable BMEI part number 112-0040.

d. Hewlett-Packard 2000-Series se I/O cable, BMEI part number 112-0048.

e. Printer cable, BMEI part numbe 112-0106.

1.5 SPECIFICATIONS

Specifications of the SUPER BEE Cc puter Terminal are given in Table 1-1.

Table 1-1. SUPER BEE Computer Terminal Specifications

CHARACTERISTIC	DESCRIPTION
Power Requirements	115/230 Vac (+ 10 percent), 50/60 Hz, single phase, 180W maximum 225 VA maximum.
Display Size Standard Optional	 12 inches (305 mm) rectangular. (112-0601) 15 inches (381 MM) rectangular. (112-0602)
Active Display Size Standard Optional	 6-1/2 inches x 7-1/2 inches (165 mm x 190 mm) approx. (112-0601) 8 inches x 10 inches (203 mm x 254 mm approx. (112-0602)
Display Format	25 lines of 80 characters.
Character Type Standard	 5 x 7 dot matrix (7 x 10 scan), approximately 0.08 x 0.20 inches.
Character Set	224 displayable as follows: 32 control characters (in Program Entry mode) 64 upper case ASCII set 32 lower case ASCII set (with descenders shifted down two scans) 96 escape sequence control codes (in Program Entry mode)
Page Overflow	Upward scroll - No loss of data until memory overflow.
Memory Overflow	Wrap around and first line of data is lost from memory.
Communications Interface	Per EIA Standard RS232C.

Table 1-1. SUPER BEE Computer Terminal Specifications (Continued)

CHARACTERISTIC	DESCRIPTION
Printer Interface	Per EIA Standard RS232C.
Video Port	Composite video for remote monitor.
Signal Characteristics	
Transmit	
Mark	−15 volts
Space	+10 volts
Receive	
Mark	−3 to −25 volts
Space	+3 to +25 volts
Transmission Rates	
11 bit	110, 220, 440, 880, 1760, 3520, and 7040
10 bit	150, 300, 600, 1200, 2400, 4800 and 9600
Transmission Code	8-bit USASCII.
Baud Rate Selection	Switch selectable.
Parity	Asynchronous-even/none (Parity Bit= Mark) Synchronous-odd/none (Parity Bit = Mark)
Refresh Rate	60 Hz (50 Hz optional)
Display Memory	MOS shift registers
Memory Organization	Efficient Paging
I/O Controller	Microprocessor
Program Memory	MOS ROM
Video	Standard, Blinking, Reversed and Blinking Reversed
Character Generation	MOS ROM
Erase Functions	Clear Memory Erase to end of line (end of field in format mode) Erase to end of memory (unprotected fields in format mode)

Table 1-1 SUPER BEE Computer Terminal Specifications (Continued)

CHARACTERISTIC	DESCRIPTION
Edit	Page Mode or Line Mode Insert Line Delete Line Insert Character Delete Character
Operation Modes	Character Format On-Line Program Entry Print-On-Line Page/Line Edit Insert Character
Format	Enable field protection
Transmission Modes	Half Duplex or Full Duplex 11 Bits Asynchronous 10 Bits Asynchronous 8 Bits Synchronous Block/Page Data Compression (Format and Non-Format modes)
Printer Mode	ON LINE/OFF LINE
Strapping Options	Printer Baud Rate Auto Efficient Paging Internal Clock Multiplier Internal/External Clock Parity Pseudopolling Go-Off-Line Block/Page Transmit Store Special Functions
Bell	Audible alarm when Control G is received, and on the 72nd character of a line when keyboard data is being entered.
Cursor Type	Non-destructive blinking underscore.

CHARACTERISTIC	DESCRIPTION
Cursor Controls	Horizontal tab (forward and back) Cursor up Cursor down Cursor left Cursor right Home Carriage return Line feed New line Format tab (forward and back)
Cursor Address	Positions cursor to the character number and line number specified.
Cursor Sense	Cursor location transmitted upon request.
Space Overwrite (SPOW)	Depression of the Space Bar writes a space in memory and advances the cursor (overwriting any character). Following performance of CR the space bar functions as cursor-right key which inhibits Space Code generation (Non-destructive).
Operator Controls Keyboard/ Rear Panel	Brightness Control (thumb wheel) FDX6HDX Switch (full-/half-duplex) Lower Case Character inhibit switch I/O Baud Rate Switch Contrast Control Power Switch
Function Keys	PRINT ENTER ERM EOL PREV PAGE NEXT PAGE SCROLL UP SCROLL DOWN TAB TAB SET TAB CLEAR
Special Function Keys	8 special function keys (F1 through F8) used to call up special user functions.

Table 1-1 SUPER BEE Computer Terminal Specifications (Continued)

CHARACTERISTIC	DESCRIPTION
Dimensions	
Width	20 inches (508 mm)
Height	16 inches (406.4 mm)
Depth (w/Keyboard)	26-1/2 inches (673 mm)
Depth (less Keyboard)	17-1/4 inches (438 mm)
Depth (Keyboard only)	12-1/2 inches (317 mm)
Weight	
Monitor	55 pounds (25 kg), less Keyboard, approx.
Keyboard	10 pounds (4.54 kg), approx.
Operating Temperature	+5-°F to 104°F (+10°C to +40°C)

1.6 IDENTIFICATION

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

SECTION II
OPERATION

2.1 INTRODUCTION

This section provides operating instructions for the SUPER BEE Computer Terminal. The operating instructions include descriptions of the operator controls and indicators, general operating procedures and operating instructions. The general operating procedures provide information for operating personnel. The operation instructions provide information that allows a programmer to vary the operational format to the extent presented herein.

2.2 OPERATOR CONTROLS AND INDICATORS

The operator controls and indicator are defined in Tables 2-1 and 2-2 and are depicted in Figures 2-1 and 2-2. Table 2-1 describes the keyboard controls and indicators and Table 2-2 describes the monitor rear panel controls. Figure 2-1 depicts the keyboard and Figure 2-2 depicts the monitor rear panel.

Table 2-1. SUPER BEE Computer Terminal Keyboard, Controls and Indicators

KEY OR CONTROL	FUNCTIONS
CONTROL AND FUNCTION KEY GROUP	
F1 through F8	Eight special function keys generate two-code sequences which are entered in the memory. When any of the special function keys are depressed, the code is entered in memory and an enter function is performed. If the terminal is strapped to store special functions, the codes are stored in memory only.
FMT (Format)	Terminal is placed in Format mode. Key includes indicator that lights when the terminal is in Format mode. In this mode, the cursor is moved to first unprotected memory location. When the key is pressed and unlatched, the terminal is placed in Character mode and indicator extinguishes. Keyboard Operation: Depress FMT or ESC, W places terminal in Format mode. Depress FMT again or ESC, X to return to Character mode. I/O Port Operation: Receipt of ESC, W for Format mode ON and ESC, X for Format mode OFF.
ON-LINE	Terminal is placed in the On-Line Character mode, and the key indicator lights. The transmit and receive circuitry, and keyboard are enabled. If synchronous I/O has been selected, the terminal will wait for synchronization from the computer. The terminal will not go on-line in response to a command from the computer.

Table 2-1. SUPER BEE Computer Terminal Keyboard, Controls and Indicators (continued)

KEY OR CONTROL	FUNCTION
	CONTROL AND FUNCTION KEY GROUP (continued)
ON-LINE (cont.)	Keyboard Operation: Depress ON-LINE or ESC, j for on condition and RESET for off condition.
PROG ENTRY	Lights key indicator, resets Format (FMT) mode, sets Program Entry mode to on. When this mode is on, all printing characters as well as control codes and escape sequence codes display their assigned characters. The escape sequence codes are displayed as reverse video and only the New Line and ENTER functions can be performed. When the key is pressed and released, Program Entry mode and the key indicator are turned off. Keyboard Operation: Depress PROG ENTRY or ESC, Y for on condition. Depress PROG ENTRY again or ESC, Y for the off condition. I/O Port Operation: Receipt of ESC, Y for on condition and ESC, Z for off condition. ESC, Z stored in reverse video if received when terminal is in off condition.
PRINT-ON-LINE	Sets the terminal to Print-On-Line mode and lights the key indicator. All printing characters and control functions that are received or transmitted by the terminal are applied to the printer I/O. In this mode, the I/O baud rate can assume the printer's baud rate. This function can be used as a high-low baud rate selection switch when a printer is not slaved to the terminal. When the key is pressed and released, the key indicator is turned off and the Print-On-Line function is reset. The I/O baud rate is restored to the I/O switch setting. Keyboard Operation: Depress PRINT-ON-LINE or ESC, f for on condition and depress PRINT-ON-LINE again or ESC, g for off condition. I/O Port Operation: Receipt of ESC, f for the on condition and receipt of ESC, g for off condition.
RESET	Resets the terminal mode of operation to Character off-line mode. The cursor is moved to the home position. The following functions or modes are reset to the off conditions: FMT, ON-LINE, PROG ENTRY, PRINT-ON-LINE, PAGE EDIT, INS CHAR, page blink, and SPOW. The keyboard is enabled and the protect latch is set. (Note: The RESET function does not erase the display screen.)
ENTER	When the terminal is in Character mode, an ETX is written at the present cursor location, then the cursor returns to home or to the first character on the next line below the preceding ETX (strap option). The terminal is placed on-line and starts transmitting data from the cursor position to the next ETX. When the ETX is read and transmitted, the transmission stops and the cursor is located in the next character location following the ETX. If the unit is strapped for pseudopolling sequence, an ETX is written at the present cursor location and the terminal is placed on-line. However, before transmission starts, the terminal transmits a DCI (Control Q code) on the I/O and enables the data receiver to accept an ETB (Control W) from the I/O before initiating transmission.

Table 2-1. SUPER BEE Computer Terminal Keyboard, Controls and Indicators (continued)

KEY OR CONTROL	FUNCTION
CONTROL AND FUNCTION KEY GROUP (continued)	
ENTER (cont.)	When the terminal is in the Format mode, the same sequence occurs as that which occurs in the Character mode, except that only data in the unprotected fields are transmitted. When the terminal is in the Program Entry mode, the same sequence occurs as that for the Character mode. Keyboard Operation: Depress ENTER or CTRL-C. I/O Port Operation: Receipt of CTRL-W causes ETX to be displayed but ENTER function is not performed.
PRINT	When the terminal is in the Character mode, an ETX is stored at the cursor location when the command is received. The same sequence occurs as that for the Character mode ENTER command, except that data is outputted through the printer I/O. The ETX is transmitted as a CR-LF. In pseudo-polling, the printer does not have to respond with an ETB (Control W). In the Format mode, the same sequence occurs as that for the Character mode, except that only data in the unprotected fields are transmitted to the printer. A CR-LF is generated between every unprotected field. In the Program Entry mode, the special character is displayed in reverse video and the cursor moves to the next descending character location in the memory. Keyboard Operation: Depress ENTER or CTRL-C. I/O Port Operation: Receipt of CTRL-W causes ETX to be displayed but enter function is not performed.
ERM (Erase to End of Memory)	When the terminal is in the Character mode, all memory locations from the cursor to the end of the memory are filled with space codes. In the format mode, all unprotected memory locations from the cursor to the end of the memory are filled with space codes. In the Program Entry mode, the code J is displayed in reverse video and the cursor moves to the next descending memory location. Keyboard Operation: Depress ERM or ESC, J. I/O Port Operation: Receipt of ESC, J.
EOL (Erase to End of Line)	When the terminal is in the Character mode, all memory locations from the cursor location to the end of the current line or New Line code are filled with space codes. In the Format mode, all memory locations from the cursor location in an unprotected field to the end of that field are filled with space codes. In the Program Entry mode, the code K is displayed in reverse video and the cursor moves to the next memory location. Keyboard Operation: Depress EOL or ESC, K. I/O Port Operation: Receipt of ESC, K.

Table 2-1. SUPER BEE Computer Terminal Keyboard, Controls and Indicators (continued)

KEY OR CONTROL	FUNCTION
CONTROL AND FUNCTION KEY GROUP (continued)	
NEXT PAGE	When the terminal is in Character or Format modes, the display is moved up 25 lines and the cursor is repositioned at the first character location of the display in Character mode. In Format mode, the cursor is repositioned to the first unprotected character location on that page. When the last line of the memory is the first line of the display, the command is ignored and the contents of the memory are unchanged. In the Program Entry mode, the code U is displayed in reverse video and the cursor moves to the next descending memory location. Keyboard Operation: Depress NEXT PAGE or ESC, U. I/O Port Operation: Receipt of ESC, U.
PREVIOUS PAGE	When the terminal is in the Character or Format modes, the display moves 25 lines down with the cursor repositioned at the first character location of the display. In the Format mode, the cursor is repositioned to the first character location in the first unprotected location on that page. When the first line of the memory is displayed, the command is ignored and the contents of the buffer remain unchanged. In the Program Entry mode, the code V is displayed in reverse video and the cursor moves to the next descending memory location. Keyboard Operation: Depress PREV PAGE or ESC, V. I/O Port Operation: Receipt of ESC, V.
SCROLL DOWN	When the terminal is in the Character or Format modes, the display moves down one line. The command will be ignored if the first line of the memory is displayed. The cursor location stays in the same column and line in which it is currently displayed until that line reaches the last line of the display. Then the cursor is moved up one line at a time for each line scrolled down and the contents of the memory remain unchanged. In the Program Entry mode, the code T is displayed in reverse video and the cursor moves to the next descending memory location. Keyboard Operation: Depress SCROLL DOWN or ESC, T. I/O Port Operation: Receipt of ESC, T.
SCROLL UP	When the terminal is in the Character or Format modes, the display moves up one line. The command is ignored when the last line of the memory is the top line of the display. The cursor stays in the same column and line to which it is located until that line reaches the top of the display. Then the cursor moves down one line for each line scrolled up and the contents of the memory remain unchanged. In the Program Entry mode, the code S is displayed in reverse video and the cursor moves to the next descending memory location. Keyboard Operation: Depress SCROLL UP or ESC, S. I/O Port Operation: Receipt of ESC, S.

Table 2-1. SUPER BEE Computer Terminal Keyboard, Controls and Indicators (continued)

KEY OR CONTROL	FUNCTION
CONTROL AND FUNCTION KEY GROUP (continued)	
CLEAR	When the terminal is in the Character mode, all memory locations are reset to space codes, all tabs are cleared, and cursor moves to the home position. In the Format mode, all unprotected locations of the memory are reset to space codes, and the cursor is moved to the first unprotected location in the memory. In the Program Entry mode, the code E is displayed as a reverse video character and is not acted upon. Keyboard Operation: Depress CLEAR or ESC, E. I/O Port Operation: Receipt of ESC, E.
ESC (Escape)	Control key that generates the initial code in an escape code sequence.
CTRL (Control)	When pressed with any alpha key, the code structure of the alpha key is changed by forcing the seventh bit to O. This allows operation of the control codes assigned to columns one and two of the ASCII Code Chart.
LF (Line Feed)	When the terminal is in the Character and Format modes, the cursor is positioned one line down in the same column and the SPOW latch is reset to a destructive space bar. If the cursor's position in the next descending line would be beyond the end of the memory, then memory overwrite will occur, and the first line in the buffer will be lost. Also, if the terminal has been configured for Automatic Efficient Paging, and the command preceding the Line Feed is a RETURN, a NEW LINE code will be stored and displayed (strap option) at the location in the memory where the cursor was located when the RETURN was generated. In the Program Entry mode, the Line Feed control J symbol is displayed and the cursor moves to the next descending character location in the buffer. Keyboard Operation: Depress LF or CTRL-J. I/O Port Operation: Receipt of CTRL-J.
NEW LINE	In Character, Format and Program Entry modes, the special character can be displayed or not displayed; however, it will be stored in memory. The SPOW latch is reset so that the space bar becomes destructive. When the cursor is positioned beyond the NEW LINE character of a given line, characters cannot be entered in the memory nor will they be displayed. Keyboard Operation: Depress NEW LINE or CTRL-(underscore). I/O Port Operation: Receipt of CTRL-(underscore).
RETURN	When the terminal is in Character and Format mode, the cursor is caused to reposition on the first character location of the current line. Return sets the SPOW latch to a non-destructive space bar. In Program Entry mode, the code € is displayed and the cursor moves to the next descending character location in memory. Keyboard Operation: Depress RETURN or CTRL-M. I/O Port Operation: Receipt of CRTL-M.

Table 2-1. SUPER BEE Computer Terminal Keyboard, Controls and Indicators (continued)

KEY OR CONTROL	FUNCTION
CONTROL AND FUNCTION KEY GROUP (continued)	
TAB	In the Character mode, the cursor is positioned at the next tab location or the first character location of the next descending line. SPOW latch is reset to a destructive space bar. In the Format mode, the cursor is positioned in the first character location of the next following unprotected field. SPOW is reset. In Program Entry mode, the tab's special character (ↄ) is displayed and the cursor moves to the next descending character location in memory. Keyboard Operation: Depress TAB or ESC, I. I/O Port Operation: Receipt of CTRL-I.
BACK TAB	In Character mode, the cursor is positioned at the next most previous tab location in the memory or the first character position of the preceding line if no tab locations are present. In Format mode, the cursor is repositioned to the first character location of the current unprotected field or, if already positioned there, to the first character location of the most previous unprotected field. If located in the first character position of the first unprotected field, this command is ignored. In Program Entry mode, this function's code special character (') is displayed in reverse video and the cursor moves to the next descending character location in the memory. Keyboard Operation: Depress BACK TAB or ESC ' (accent grave). I/O Port Operation: Receipt of ESC '.
BREAK	When pressed, a 400-millisecond (approx.) one-shot signal is transmitted. This function is not active in the off-line (local) mode.
INS CHAR (Insert Character)	When the terminal is in the Character mode, operation sets the insert character mode latch. A character inserted at the cursor location moves the text one character to the right. The cursor also moves one character position to the right as each character is inserted. If that page edit latch is set, the character that was at the cursor location is moved to the next descending location in the memory and this operation can be repeated to the end of the memory. If in the Line Edit mode, this operation ends on the first line to contain at least two (2) spaces at the end of the line. One space code will exist between all words. Should a NEW LINE code exist in the memory beyond the cursor location, an automatic INS LINE occurs when the NEW LINE code is wrapped around the end of the line. All data appearing below the NEW LINE code is scrolled down one line. Should the data be scrolled down out of the memory, the last character of data is lost for each insert operation.

Table 2-1. SUPER BEE Computer Terminal Keyboard, Controls and Indicators (continued)

KEY OR CONTROL	FUNCTION
	CONTROL AND FUNCTION KEY GROUP (continued)
INS CHAR (cont.)	In the Format mode, the character inserted at the cursor location causes the character at that location to be shifted right one location in the unprotected field. All data to the right of the cursor will be shifted one character to the right. Should the unprotected field be full and the cursor location be other that the last character position of the unprotected field, the last character in the field will be lost upon insertion. If the cursor is in the last character position of the unprotected field when the insertion is made, the cursor will tab to the first character location of the next unprotected field where character insertion will continue. In the Program Entry mode, the code Q is displayed in reverse video and the cursor moves to the next descending character location in the memory. Keyboard Operation: Depress INS CHAR or ESC, Q for on condition and depress INS CHAR again or ESC, R for off condition. These keys toggle the condition. I/O Port Operation: Receipt of ESC, Q for on condition and receipt of ESC, R for off condition.
PAGE EDIT	In the Character mode, Page Edit is selected by depressing the PAGE EDIT key. In On-Line mode, Page Edit is selected by receipt of an ESC followed by an N. Depressing of the PAGE EDIT key again or the ESC key followed by the O key resets the page edit latch. The page edit latch may also be reset by an ESC followed by receipt of O from the I/O. Keyboard Operation: Depress PAGE EDIT or ESC, N for on condition and depress PAGE EDIT or ESC, O for off condition. Keys toggle the condition. I/O Port Operation: Receipt of ESC, N puts terminal in on condition and receipt of ESC, O will turn condition off.
DEL CHAR (Delete Character)	When the terminal is in the Character mode, the character at the cursor location is deleted and characters on that line to the right of the deletion are shifted left one character. A space code is inserted in the memory's last location on thatline, and the cursor does not move. If a line below the cursor location is terminated by a NEW LINE code with the page edit latch set, the memory between the cursor and the new line code shifts left one character location. As the new line code is shifted left until it wraps around to the most previous line, an automatic DEL LINE will occur. In the Format mode, as characters are deleted, a space code is inserted in the last location of the current unprotected field. Page Edit is effective only in multi-lined fields, where it operates as explained in Character mode above. In the Program Entry mode, this function's code P is displayed in reverse video and the cursor moves to the next character location in the memory.

Table 2-1. SUPER BEE Computer Terminal Keyboard, Controls and Indicators (continued)

KEY OR CONTROL	FUNCTION
	CONTROL AND FUNCTION KEY GROUP (continued)
DEL CHAR (Delete Character) (cont.)	Keyboard Operation: Depress DEL CHAR or ESC, P. I/O Port Operation: Receipt of ESC, P.
INS LINE (Insert Line)	When the terminal is in the Character mode, this function causes the line on which the cursor is located to be moved down one line. The NEW LINE code is stored at the first character location of the inserted line, which causes the last character in the memory to be lost. In the Format mode, this function is disabled. In the Program Entry mode, the code L is displayed in reverse video and the cursor moves to the next descending character location in the memory. Keyboard Operation: Depress INS LINE or ESC, L. I/O Port Operation: Receipt of ESC, L.
DEL LINE (Delete Line)	When the terminal is in the Character mode, this function causes the line on which the cursor is located to be deleted from the memory. Space codes are inserted at the end of the memory to replace all characters of that line. The memory is shifted up one line to fill in where the line has been deleted. In the Format mode, this function is disabled. In the Program Entry mode, the code M is displayed in reverse video and the cursor moves to the next descending character location in the memory. Keyboard Operation: Depress DEL LINE or ESC, M. I/O Port Operation: Receipt of ESC, M.
HOME	When the terminal is in the Character mode, this function repositions the cursor to the first character location of the memory. It does not alter the contents of the memory. The SPOW latch is reset to a destructive space bar. In the Format mode, the cursor is repositioned to the first unprotected location of the memory. The SPOW latch is reset. In the Program Entry mode, code H is displayed in reverse video. Keyboard Operation: Depress HOME or ESC, H.
TAB SET	When the terminal is in the Character mode, a tab is set at the cursor character location for all lines in the memory. In the Format mode, tab sets are not recognized. In the Program Entry mode, the code 1 is displayed in reverse video and the cursor moves to the next descending character location in the memory. Keyboard Operation: Depress TAB SET or ESC, 1. I/O Port Operation: Receipt of ESC, 1.
TAB CLEAR	When the terminal is in the Character mode, this function clears the tab set located at the cursor character location on all lines of the memory.

Table 2-1. SUPER BEE Computer Terminal Keyboard, Controls and Indicators (continued)

KEY OR CONTROL	FUNCTION
CONTROL AND FUNCTION KEY GROUP (continued)	
TAB CLEAR (cont.)	In the Format mode, TAB CLEARs are not recognized. In the Program Entry mode, the code 2 is displayed in reverse video and the cursor moves to the next descending character location in the memory. Keyboard Operation: Depress TAB CLEAR or ESC, 2. I/O Port Operation: Receipt of ESC, 2.
↑ (Cursor Up)	In the Character and Format modes, this command repositions the cursor up one line and reamins in the same column as previously located. If the cursor is on the first line, the command is ignored. In the Program Entry mode, the function code A is displayed in reverse video and the cursor moves to the next descending character in the buffer. Keyboard Operation: Depress Cursor Up ( ) or ESC, A. I/O Port Operation: Receipt of ESC, A.
↓ (Cursor Down)	In the Character and Format modes, this command repositions the cursor down one line in the same column as previously located. If the cursor is located on the last line of the memory, the command is ignored. In the Program Entry mode, the code B is displayed in reverse video and the cursor moves to the next descending character location in the memory. Keyboard Operation: Depress Cursor Down ( ) or ESC, B. I/O Port Operation: Receipt of ESC, B.
→(Cursor Right)	When the terminal is in the Character and Format modes, the cursor is moved one character location to the right. If the cursor is located in last character position of a line, it is positioned to the first character position of the next descending line. If the cursor is in the last character location in the memory, the command is ignored. In the Program Entry mode, the code C is displayed in reverse video and the cursor moves to the next descending character location in the memory. Keyboard Operation: Depress Cursor Right ( ) or ESC, C. I/O Port Operation: Receipt of ESC, C.
←(Cursor Left)	When the terminal is in the Character and Format modes, the cursor is moved one character location to the left. If the cursor is in the first character location of a line, then it is repositioned to the last character position of the preceding line. If the cursor is located in the HOME position, then the command is ignored. In the Program Entry mode, the code D is displayed in reverse video and the cursor moves to the next descending character location in the memory. Keyboard Operation: Depress Cursor Left ( ) or ESC, D. I/O Port Operation: Receipt of ESC, D.

Table 2-1. SUPER BEE Computer Terminal Keyboard, Controls and Indicators (continued)

KEY OR CONTROL	FUNCTION
CONTROL AND FUNCTION KEY GROUP (continued)	
Alphabetical and Numerical Keys	Generate character codes corresponding to letter, numerical or symbol engraved on key. Keyboard layout is similar to that of standard typewriter, including space bar, shift and shift lock (which is lighted). Keys generate upper and lower case letters, using shift keys.
11-key Numeric Pad	Numerical key group arranged for convenient generation of large numeric entries. Keys perform the same function as those for numerical keys on alphanumeric keyboard. This group is unaffected by setting of the shift lock key or the lower case inhibit switch.
RUB OUT	When the terminal is in the Character mode, depression of the RUB OUT key generates a delete code which is displayed as a space and stored in Memory. When the code is encountered in a block transmit, a Carriage Return-Line Feed function is performed and a CR-LF is transmitted. When the code is encountered in a block transmit while in Format mode, the cursor is positioned at the first character location of the next unprotected field (TAB). A CR-LF is transmitted. In the Program Entry mode, the code is displayed as a dot (delete code). Keyboard Operation: Depress RUB OUT. I/O Port Operation:
Cursor Address	I/O port only. Receipt of ESC, F sets the terminal ready to receive six decimal digit characters (3 column and 3 line). The cursor is then positioned to any column (000 through 079) and line (000 through 255) in the memory, specified by the six decimal digit address characters. It is possible to overwrite the entire memory with delete codes if the line number is too large for the number of lines stored in memory. The character numbers larger than 79 position the cursor in column 79.
Cursor Sense	I/O Port Only. When a two character sequence (EXC and a is received from the I/O, the terminal is conditioned to transmit an eight character code sequence. (ESC,

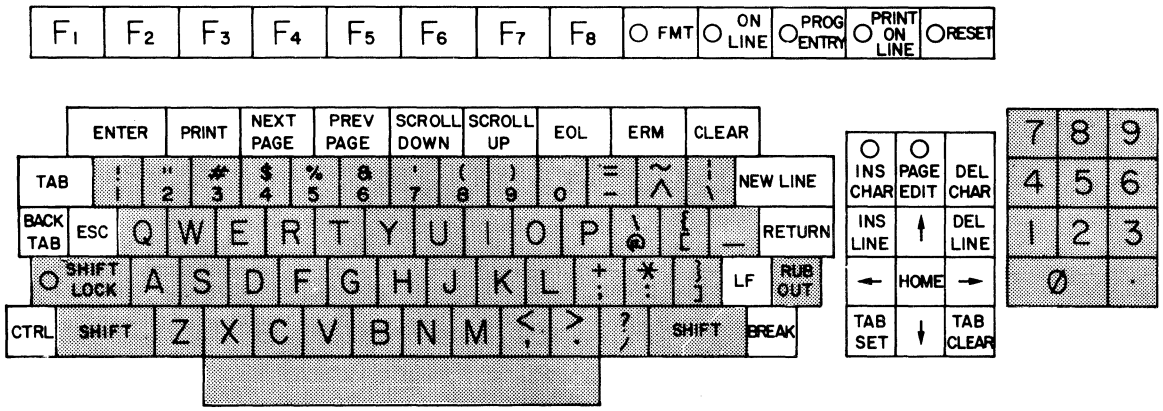
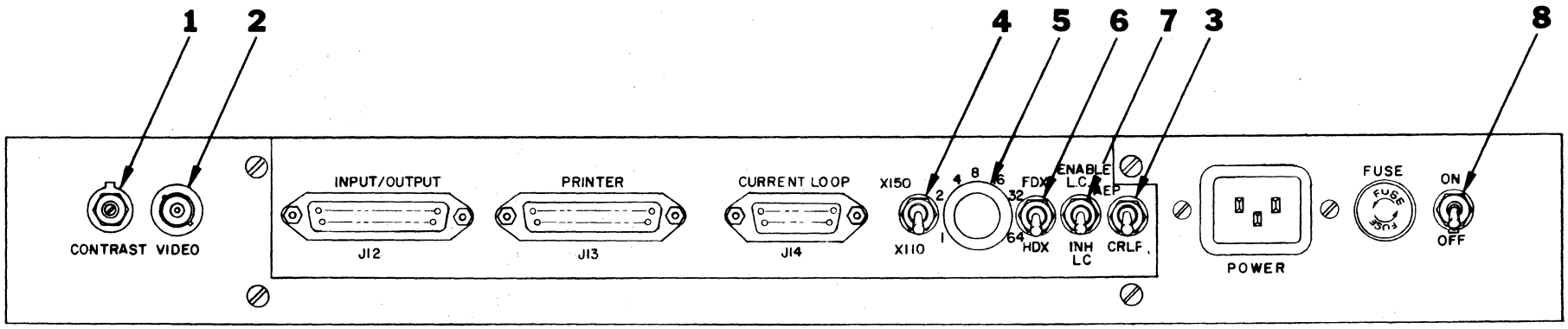


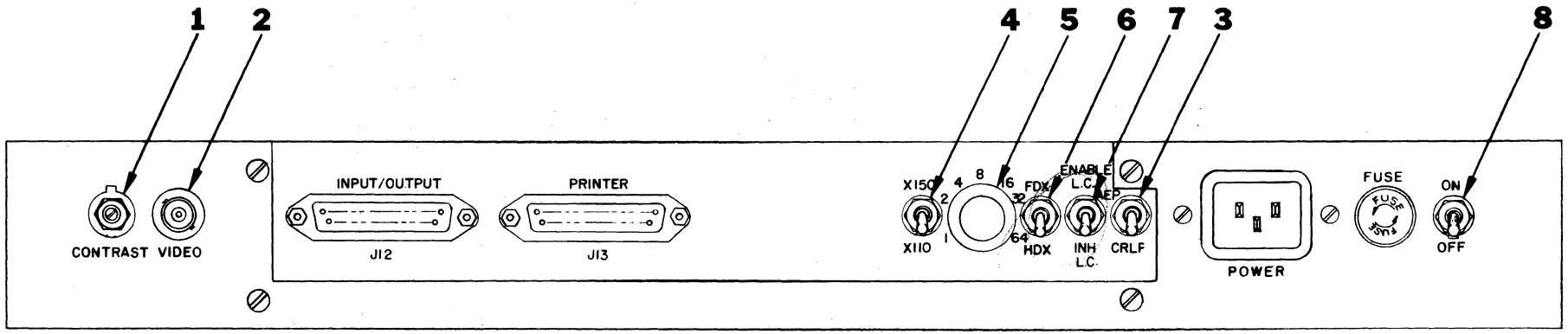
Figure 2-1
Keyboard Controls and Indicators

Table 2-2. Monitor Rear Panel Controls

INDEX No.	CONTROL	FUNCTION
1	CONTRAST	Adjustment that sets contrast level of video on display.
2	VIDEO Output	Outputs composite video signal to remote monitor.
3	AUTO EFF PAGE-CRLF Switch	When set to AUTO EFF PAGE (auto efficient paging), the CR-LF code sequence generates a NEW LINE function. When set to CR-LF, the CR-LF code sequence is performed normally.
4	I/O Baud Rate Multiplier Switch	When set to 150, the selected baud rate is multiplied by 150. When set to 110, the selected baud rate is multiplied by 110. Changes the length of the word depending on whether the terminal is in synchronous or asynchronous mode.
5	I/O Baud Rate Select Switch	Seven-position selector switch that selects basic rates of 1, 2, 4, 8, 16, 32, and 64. Basic rate is multiplied by either 110 or 150, determined by position of Multiplier Switch.
6	HDX-FDX Switch	Selects half-duplex (HDX) or full duplex (FDX) operation, in conjunction with the RESET key. RESET key must be depressed following selection of FDX or HDX before the terminal will make the change.
7	INH LC Switch	When set to INH LC (inhibit lower case), the alpha character codes selected from the keyboard are stored in the memory and transmitted out on the I/O as upper case codes. Lower case characters received by the I/O are displayed as lower case. When the switch is set to the Off position (up), the keyboard generates all upper and lower case characters.
8	Power ON-OFF Switch	Applies ac power to terminal.



a. Rear Panel Controls - with Current Loop Adapter



b. Rear Panel Controls

Figure 2-2
Rear Panel Controls

2.3 TURN-ON PROCEDURES

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

a. On the monitor rear panel, set the POWER switch to ON. The light in the RESET key should illuminate, indicating power is on. Allow a warm-up period of approximately five minutes.

b. Adjust the CONTRAST control, located on the lower rear panel, clockwise (CW) to its stop.

c. Adjust the BRIGHTNESS control knob, located in the upper left area of the keyboard, counterclockwise (CCW) until the raster scan lines barely disappear from the display.

d. A blinking cursor (underscore) should be visible in the top left corner of the display. Check all indicators to verify that only the RESET indicator is illuminated. Hold the E key down until several E characters are displayed on the monitor. Adjust the contrast control until the characters are sharp and provide the operator with maximum eye comfort.

e. Depress the CLEAR key to clear displayed data, then perform the operator checkout procedures.

2.4 OPERATOR CHECKOUT PROCEDURES

To test the functional capabilities of the terminal, perform the operator checkout procedures given in paragraphs 2.4.1. through 2.4.7. Before proceeding with the procedures, ensure that the POWER switch is in the ON position, the indicator on the RESET key is illuminated, the screen is clear and the cursor is located at the home position (upper left corner), and that the indicators on the alternate action keys are extinguished.

2.4.1 Alternate Action Keys Checkout

Perform the initial setup as follows:

a. Set the rear panel HALF DUPLEX/FULL DUPLEX switch to HDX.

b. Depress the RESET key. The terminal is now set up so that all lighted keys should toggle by manual operation.

Perform the checkout on the action keys listed follows:

PRINT-ON-LINE
PROG ENTRY
ON-LINE
FMT (Cursor moves to end of memory, indicated by end of memory mark
INS CHAR
PAGE EDIT
SHIFT LOCK

a. Depress the key and observe that the indicator lights illuminate.

b. Depress the key a second time and ensure that the indicator is extinguished. Each key should be left in the off position to prevent confusion while checking operation of the other keys.

2.4.2 ESC Code Sequences Checkout

Before performing the checkout, depress the RESET key followed by the PROG ENTRY key and ensure that the indicator lights. The checkout is performed by depressing the function keys PRINT, TAB SET and TAB CLEAR. The corresponding escape codes (0, 1 and 2) will be displayed in reverse video. If these codes appear on the monitor, the program

entry mode is functioning correctly. The control codes are displayed as their corresponding special symbols (i.e., CR is ∈ and LF is ≡).

2.4.3 Cursor Movement Checkout

Before performing the checkout, depress the RESET key, followed by the CLEAR key. Ensure that the cursor is located in the home position and the display is blank. Perform the checkout as follows:

a. Depress and hold the Cursor Down (↓) key until the end-of-memory mark (EOM - a block of reverse video) and the cursor are visible on the same line.

b. Depress and hold the Cursor Right (→) key until cursor movement is inhibited by the EOM mark.

c. Depress the Cursor Up (↑) key to cause the EOM to move down as the cursor reaches the top line.

d. Depress and hold Cursor right (→) key. When positioning the cursor right beyond the end of the first line, the cursor moves to the beginning of the next line.

e. Depress and hold Cursor Left (←) to cause the cursor to wrap back around to the next line above.

f. Depress the HOME key to move the cursor to the character zero and line zero position.

2.4.4 Tab Checkout

Perform the initial setup as follows:

a. Depress the RESET key followed by the CLEAR key. This will clear all previously set tab position.

b. The TAB and BACK TAB should appear, when operated, as a Cursor Down and Cursor Up, respectively.

c. Set several tabs by positioning the cursor to a character position and pressing the TAB SET followed by a depression of a character key to aid in locating the position where the tab was set.

Perform the checkout as follows:

a. Operate the TAB key through several lines to assure that the tabs which have been set are effective on each line.

b. Using the BACK TAB key, move back to the home position, checking to assure that the tabs are set in the same position on all lines, and that the home position may be reached.

c. Alternately operate the TAB and TAB CLEAR keys until the TAB key performs a Cursor Down and the BACK TAB key performs a Cursor Up at the first character position of each line. This indicates that all tabs have been cleared.

2.4.5 Scrolling And Erase Functions Checkout

Perform the initial setup as follows:

a. Depress the RESET key followed by the CLEAR key.

b. Depress the ESC key followed by the lower case e. The screen will fill with DEL codes.

c. Depress the EOL key to erase the DEL codes to the end of the current line.

d. Depress the ERM key to erase all DEL codes to the end of memory.

e. Type "PAGE n", where n is the current page number (i.e., Page 1 for this page).

f. Depress the NEW LINE key until these characters are scrolled up off the top of the display.

g. Repeat steps e and f for pages 2, 3, 4 and 5.

h. Depress the HOME key to position the cursor on the first line of text.

Perform the checkout as follows:

a. Depress and hold the SCROLL UP key to cause the characters to move up the screen and the next page characters will move up into view. Continue to scroll up until the end of memory mark appears on the top line of the display.

b. Depress and hold SCROLL DOWN key until the home position is on the top line of the display.

c. Operate the NEXT PAGE key to move the window in memory down a page at a time until the last page is reached.

d. Operate the PREV PAGE key to move the window in memory up a page at a time until the home position is the first line on the display.

2.4.6 Enter and Print Checkout

Perform the initial setup as follows:

a. Depress the RESET key followed by the CLEAR key.

b. Type a message text consisting of several lines.

c. Depress the following keys in the order given:

ESC
ENTER (Stores an ETX (┘) but does not act upon it)
NEW LINE

d. Type another message text consisting of several lines.

Perform the checkout as follows:

a. Depress the ENTER key, the cursor will move to the home position. If back search block transmit strap installed the cursor moves to the first character on the line following any previous ETX. Transmission will begin at the cursor and end with the next ETX. (If pseudopolling has been selected, the cursor will remain at the peviously described location, a Request-For-Service code is transmitted, and will wait indefinitely to receive a Clear-To-Transmit code before transmission begins.

b. Depress the RESET key, position the cursor under the last ETX (┘).

c. Depress the PRINT-ON-LINE key, followed by the ENTER key. Transmission will proceed at the preselected printer rate. If this is the same as the I/O rate, transmission will not be noticeably different.

d. Connect and test the printer at this time if a printer is to be used with the terminal. Pseudopolling has no meaning to the printer. Transmission in step b is not sent to the printer, but is a copy of data being sent to the I/O port.

e. Position cursor under the last ETX (┘).

f. Depress the PRINT key. The cursor will either move to the home position or to the line after the previous ETX, and then transmit the data to the printer.

2.4.7 Format Checkout

Perform the initial setup as follows:

a. Depress the RESET key followed by the CLEAR key.

b. Select the Program Entry mode.

c. Hold down the space bar for several characters.

d. Depress the Cursor Down key (↓) until several capital B's are displayed in reverse video.

e. Repeat steps c. and d. until several lines are displayed on the monitor.

f. Depress RESET key and then depress the FMT key to enter Format mode.

g. Depress the CLEAR key. The cursor should be in the first unprotected position. From this point, data may be entered.

Perform the checkout as follows:

a. Type several characters until the cursor skips over the protected area.

b. Continue to fill in the form until the last character entered causes the cursor to move to the home position.

c. TAB and BACK TAB to the first unprotected location in several fields, to ensure that these functions operate properly in format mode.

2.5 CONTROL AND EDIT FUNCTION OPERATIONS

The control functions may be generated from the Keyboard or by receipt of commands from the I/O port. Table 2-1 provides the sequence of operation for each control function when generated from the keyboard or when received from the I/O port. Figure 2-3 depicts the ASCII codes for each control function or character generated from the keyboard or received from the I/O.

2.6 OPERATION CODES

The SUPER BEE code structure consists of 32 ASCII control codes, 96 ASCII alphanumeric characters, and 96 escape sequence control codes. A switch is provided on the rear of the terminal so that all lower-case alphabetic characters are translated into their upper case equivalents.

The operation codes provide the necessary functions that are not defined in the control and edit group functions. These functions may be generated from the keyboard, received at the I/O port, or may be internally generated by present circuitry. Table 2-3 lists the codes and describes their functions.

2-7 TIMING CONSIDERATION

Certain SUPER BEE functions require longer than one character time at high transmission rates. The number of fill characters required to fill these intervals are given in Table 2-4. Although any character may be used, the NULL character (000 Octal) is suggested since this code will be completely ignored and will not affect the AUTO-NEW LINE feature of the terminal, i.e., the CR and LF may be separated by NULL codes and the N/L code will still be stored at the position where the CR was performed.

BIT 7 6 5 / 4 3 2 1	CONTROL CHARACTERS		DISPLAYABLE CHARACTER						ESCAPE SEQUENCE					
	0_0	0_1	0_1 0_0	0_1 1_0	1_0 0_0	1_0 1_0	1_1 0_0	1_1 1_0	0_1 0_0	0_1 1_0	1_0 0_0	1_0 1_0	1_1 0_0	1_1 1_0
0000	NUL @	DLE P	SP	0	@	P	\	p		PRINT Ø		CHAR DEL P	BACK TAB I	F 1 p
0001	SOH A	DCI ENTER Q	!	1	A	Q	a	q		TAB SET 1	↑ A	CHAR INS ON Q	CURS SENSE a	F 2 q
0010	STX B	DC2 R	"	2	B	R	b	r		TAB CLR 2	↓ B	CHAR INS OFF R	KEYBOARD ENABLE b	F 3 r
0011	ETX C	DC3 S	#	3	C	S	c	s			→ C	SCROLL UP S	KEYBOARD DISABLE c	F 4 s
0100	EOT D	DC4 T	$	4	D	T	d	t			← D	SCROLL DOWN T	d	F 5 t
0101	ENQ E	NAK U	%	5	E	U	e	u			CLEAR E	NEXT PAGE U	EOS DEL e	F 6 u
0110	ACK OFF LINE F	SYN V	&	6	F	V	f	v			CURS ADDR F	PREV PAGE V	PRINTER ON LINE f	F 7 v
0111	BEL G	ETB (XMIT) W	'	7	G	W	g	w				FORMAT ON W	PRINTER OFF LINE g	F 8 w
1000	BS H	CAN X	(	8	H	X	h	x			HOME H	FORMAT OFF X	h	x
1001	HT I	EM Y	)	9	I	Y	i	y			I	PROG ENTRY ON Y	i	y
1010	LF J	SUB Z	*	:	J	Z	j	z			ERM J	PROG ENTRY OFF Z	ON LINE j	z
1011	VT K	ESC [	+	;	K	[	k	{			EOL K	END Protect [	OFF LINE k	{
1100	FF L	FS \	,	<	L	\	l	¦			LINE INS L		l	:
1101	CR M	GS]	–	=	M	]	m	}			LINE DEL M	Start Protect]	m	}
1110	SO N	RS ^	.	>	N	Λ	n	~			PAGE EDIT ON N	Λ	n	~
1111	SI O	US NEW LINE _	/	?	O	–	o	RUB OUT			PAGE EDIT OFF O	Video Control _	o	DEL

Note: 1. Lower case code will display upper case characters on Mini Bee.

Figure 2-3. ASCII Code Chart

Table 2-3. Operation Codes

CODE	OPERATION
ETX-CONTROL C (003)	When this code is recognized from the keyboard or I/O, the code is stored and displayed at the cursor's location and marks the end of a block in the memory. The ENTER function is initiated when entered from the keyboard.
ACK-CONTROL E (006)	This code, when recognized from the Keyboard or I/O, sets the terminal to LOCAL, disables the I/O data transmitter/receiver, and enables the keyboard. When a block of data is ended while terminal is in Synchronous mode and is to remain on-line the following codes can be used: Cursor Sense: will start a sync search after sending out the cursor address until the CPU sends out a new block of data. Print: without go-off-line, will reply with four sync codes and go into sync search.
BELL-CONTROL G (007)	When this code is recognized, an audible alarm is generated. The audible alarm is also generated when the 72nd character is entered in the line from the Keyboard, but is not generated from the I/O at the 72nd character location.
BACK SPACE CONTROL H (010)	When this code is recognized from the Keyboard and I/O, the cursor is moved back one character location in the memory. The command is ignored if the cursor is located at the first position of the memory. The contents of the memory are unchanged.
DCI-CONTROL Q (021)	This code is sent to the I/O in the pseudopolling mode to indicate a request for service.
SYN-CONTROL V (026)	Four SYN codes precede all synchronous transmissions and at least two SYN codes are required to establish synchronization on the receiver.
ETB-CONTROL W (027)	When this code is received from the I/O, a block transmit is initiated.

Table 2-3. Operation Codes (Continued)

CODE	OPERATION
ESC-CONTROL [	This is the initial code in an escape sequence control function.
ESC-b (Keyboard Enable)	This two code sequence from the I/O enables the keyboard.
ESC-c (Keyboard Disable)	This two character code sequence disables the Keyboard from generating any characters or control functions except the RESET function. The keyboard may subsequently be enabled normally by the RESET key or from the I/O by an ESC and b.
ESC-[(End Protect)	When this two-code sequence is recognized from the Keyboard or I/O, it resets the protect latch and inserts an 0 in the eight bit position of each character stored in the memory after the reset. In Format mode, the 0 in the eighth bit indicates an unprotected character location in the memory. In the Program Entry mode, the characters in the unprotected locations are displayed as reverse video characters.
ESC-] (Start Protect)	When this two-code sequence is recognized from the Keyboard or I/O, it sets the protect latch and a 1 is inserted in the eighth bit position of each character stored in the memory after it is set. In the format mode, the 1 in the eighth bit indicates a protected character location in the memory.
ESC-e (EOS Delete)	When this two-code sequence is recognized from the Keyboard or I/O, all the characters in the memory from the cursor's location to the end of memory are replaced with delete codes in a Character mode. In the Format mode all the unprotected characters in the memory from the cursor's location to the end of memory are replaced with delete codes. In the Program Entry mode, the code e is displayed in reverse video and the function is not performed.
ESC- (underscore)	When this two-character code sequence is recognized from the Keyboard or I/O, the terminal is ready to receive one of the following video control characters: space - video reset Ø - video blink 1 - video reverse 2 - video blink reverse 3 - video line reset In the Character mode or Format mode, all special video functions are terminated by the end-of-line or a new line code and its special symbol is displayed. In the Program Entry mode, the function is not performed.

Table 2-3. Operation Codes (Continued)

CODE	OPERATION
Video Reset	Replaces all the blink function codes in the memory with protected or unprotected space codes and sets the eighth bit of each code depending upon the state of the protect latch.
Video Line Reset	Code is stored in the memory at the cursor's location and restores to the normal video the memory's characters from that location to the end of the line.
Video Blink	Code is stored in the memory at the cursor's location and starts blinking the remaining characters in that line when in the Character mode or Format mode.
Video Reverse	Code is stored in the memory at the cursor's location, then the next character and following characters to the end of the line are displayed in reverse video when in Character mode or Format mode.
Video Blink Reverse	Code is stored in the memory at the cursor's location, then the next character and following characters to the end of the line are displayed in blinking reverse video when in Character mode or Format mode.
BREAK	When this key is depressed, a 400 millsecond (approx.) one-shot spacing signal is transmitted. This function is not active in the local mode.
CTRL (Control)	When this is depressed together with any alpha key, it changes the code structure of that key by forcing the seventh bit to "o." This allows operation of the control codes assigned to column one and two of the ASCII Code Chart.
SPOW Latch	Set by the RETURN function and reset by the following functions: LINE FEED NEW LINE TAB HOME

TABLE 2-4

TIMING CONSIDERATIONS

FUNCTION	TIME REQ'D MICRO SECONDS	LOW RATES	FILL CHARACTER REQUIRED 4800 ASYNC	4800 SYNC	9600 ASYNC	9600 SYNC
ERM Delete (ESC and e)	2500	0	1	1	3	3
ERM (ESC and J)	2500	0	1	1	3	3
Insert Line (ESC and L)	2500	0	1	1	3	3
Delete Line (ESC and M)	100 ms	*	48	60	96	120
Delete Char (ESC and P)	2500	0	1	1	3	3
Scroll Up (ESC and S)	1000	0	0	0	0	1
Scroll Down (ESC and T)	1000	0	0	0	0	1
Next Page (ESC and U)	20 ms	*	10	12	20	24
Prev Page (ESC and V)	5ms	*	2	3	5	6
Back Tab (ESC and I)	10 ms	*	5	6	10	12
Clear (ESC and E)	2500	0	1	1	3	3

* Calculate for each baud rate as required

Repetitive usage of the same code should be avoided if another method can be determined. Cursor addressi preferrable to multiple cursor or page movements.

SECTION III
INSTALLATION

3-1 INTRODUCTION

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

3-2 UNPACKING

The SUPER BEE Computer Terminal is ready for operation after removal from its shipping container. There are no tiedowns or packing materials inside the unit that need to be removed. Store the carton for future use. The Keyboard interconnection cable is stowed in the rear at the Keyboard housing during shipping.

3.3 INSPECTION FOR IN-SHIPMENT DAMAGE.

The SUPER BEE is inspected and tested prior to shipment from the factory. Upon receipt carefully remove all components from the shipping container and check each item against the packing slip to ensure completeness of your order. Visually inspect all items for any possible shipping damage. All shipping containers have been custom engineered to protect their contents. Special care has been taken to prevent damage under normal shipping conditions; therefore, damage to contents should not occur unless the package has been mishandled. Mishandling will be evident upon inspection of the shipping container. If damage is found after visual inspection, take care not to destroy the evidence. If necessary, take pictures of the damaged container. If damage is noted, please contact the Transport Carrier as soon as possible.

3.4 STANDARD ITEMS (FURNISHED)

Standard items furnished with each SUPER BEE Terminal are as follows:

a. CRT Monitor

b. Detachable Keyboard w/cable

c. Power cord

d. Operator's Manual

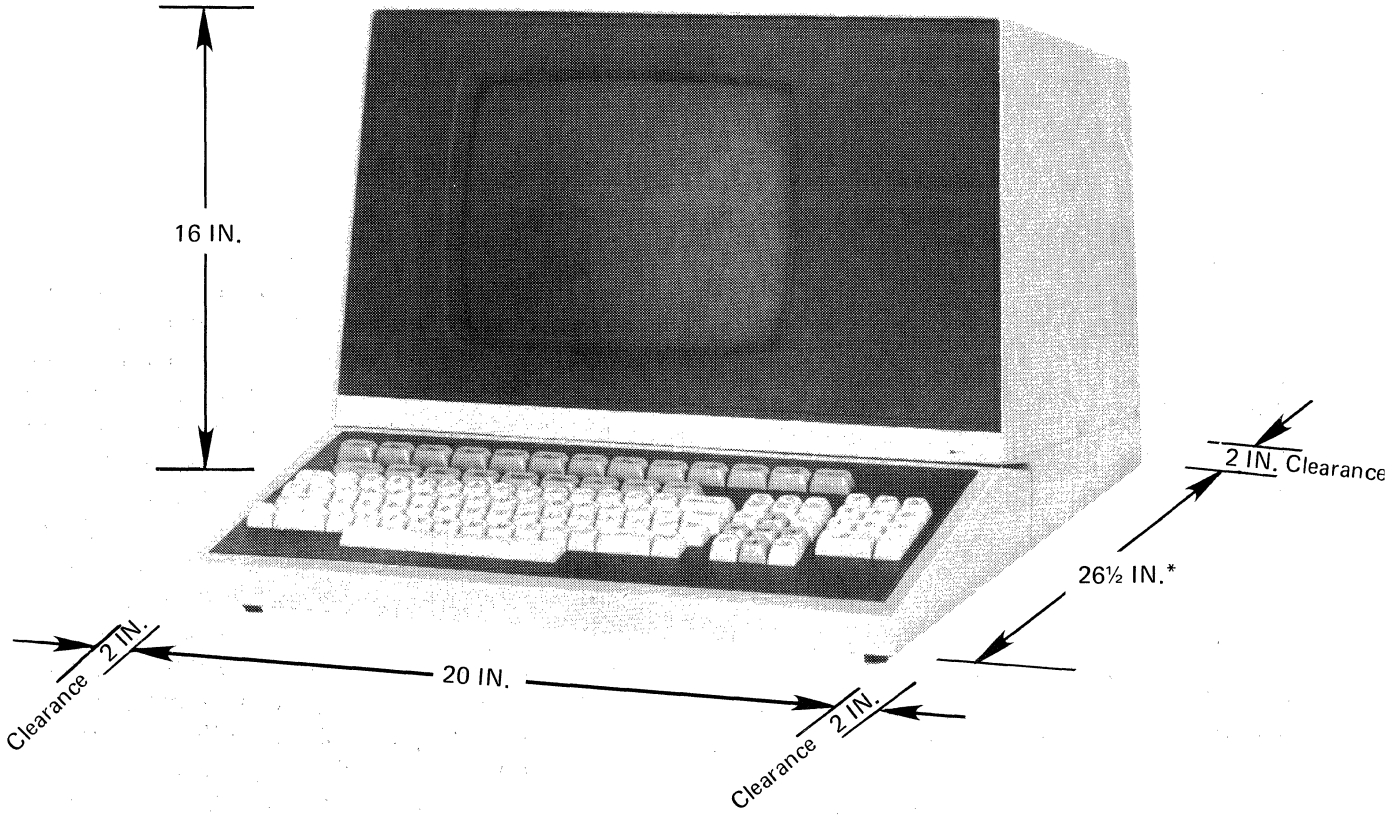
3.5 INSTALLATION

3.5.1 Placement for Operation

The SUPER BEE is self-contained and can easily be moved and relocated to alternate operating positions without removing or altering any hard wiring. Select a convenient, level surface and place the terminal where the power cord and data I/O cables will not be in the way of the operator. Route the cables in such a manner that they will not be inadvertently pulled or disturbed by nearby personnel. Rotate the terminal until it is conveniently oriented for operator viewing. Use caution when moving the terminal so that the rear panel controls are not damaged by striking the walls, etc. The cable which attaches the Keyboard to the terminal is very flexible and will allow the Keyboard to be placed in almost any position within three feet (122 centimeters approx.) of the viewed terminal.

CAUTION: Avoid placing terminal on long plush carpet or soft spongy material where base may come in contact with mounting surface, thereby shutting off or impeding air circulation.

The CRT Monitor is provided with an internal muffin whisper fan. Air is drawn in through a perforated bottom panel and exhausted out through slots in the rear of the monitor housing. It is important, therefore, that the CRT Monitor never be placed in a position where free air circulation is restricted. To maintain efficient air circulation, maintain at least 2 inches (51 milli-



*Without Keyboard 17¼ inches

Figure 3-1
SUPER BEE Mounting Requirements

meters) of clearance at the rear and sides of the Monitor (see Figure 3-1). As noted above, don't place the Monitor on long, plush carpet or spongy material where the base plate might come in contact with the mounting surface and restrict the air circulation. Never allow paper or other material to be stored under the terminal where it may cover fan screen and restrict air flow . Care must be used to ensure that the fan screen does not become bent and interfere with the fan.

3.5.2 Power Connection

It is recommended that instrument panels and cabinets be grounded to protect operating and servicing personnel. The SUPER BEE is shipped with a shielded three-conductor power cord which, when plugged into an appropriate outlet, grounds the instrument through the offset pin. To operate the SUPER BEE from a two-contact outlet, use a three-conductor to two-conductor adapter. Preserve the safety feature by grounding the adapter pigtail lead.

3.5.3 Data Interface Connections

All data source interconnections are made via the rear panel Input/Output connector (refer to Figure 2-2). The Input/Output connector mates with ITT Cannon solder pin connector (part no. DM-25P). Data source pin connections are listed in Table 3-1 and defined in the following paragraphs.

TABLE 3-1 DATA SOURCE INTERFACE CONNECTIONS

PIN NO.	FUNCTION	RS232 CIRCUIT		
		Symbol	IN	OUT
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	Received Line Signal Detector	CF	←	
15	Terminal Signal Element	DB	←	
16	Output Clock (TTL Level)	*		→
17	Receiver Signal Element	DD	←	
20	Data Terminal Ready	CD		→
24	Output Clock (RS232C)			→

* Not RS232 (Optional – 1X thru 16X Data Output Clock, strap selectable, not present unless strapped.)

CAUTION

If the terminal is to be operated in conjunction with a data phone or data modem, special care should be taken to ensure that the interfaces are per EIA Specification RS232C. The logic levels called out in 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 hard wire to any communications I/O.

Frame Ground (AA)

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

Transmitted Data (BA)

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

Received Data (BB)

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. The data set holds this line in the mark condition when the line is idle or the carrier is not detected.

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 being transmitted. The terminal transmits data on circuit BA (Transmitted Data) only when the "on" condition is maintained on circuits CA, CB and CD. In half-duplex service, the "off" conditions holds data set in the Receive Data condition, and the "on" condition holds the data set in the Transmit Data condition.

Clear To send (CB)

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 delayed as long as may be required to establish a connection to a external device. When circuit CA is turned off, circuit CB is also turned off.

Signal Ground (AB)

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

Terminal Ready (CD)

Terminal Ready is high whenever power is on.

Received Line Signal Detector (CF)

The signal on this line indicates that the data set has established the carrier and the data set is about to input data to the terminal.

Transmitter Signal Element Timing (DB)

Signals on this circuit are used to provide the data terminal with signal transmit element timing information.

Receiver Signal Element Timing (DD)

Signals on this circuit are used to provide the data terminal with received signal element timing information.

3.5.4 Printer Interface Connections

Printer interface connections are listed in Table 3-2.

Table 3-2. Printer Interface Connections

PIN NO.	FUNCTION	IN / OUT
1	Frame Ground	
3	Data to Printer	→
7	Signal Ground	
20	Printer Ready	←
25	Printer Status	←

3.5.5 Current Loop Adapter

An optional 15-pin connector is provided on the back panel of the terminal to provide for the current loop adapter. The adapter will make the terminal compatible with two basic interface modes. A modified TTY interface for some mini computers features an open collector output and photoisolated input and should be within 50 ft. of the terminal. A single or balanced current loop interface can be used up to 2000 ft. away, and with a twisted, shielded, two-pair cable and a slower baud rate, it may be useable up to 6,000 ft. away.

3.5.6 Video Output Connection

This is a BNC connector to drive a remote monitor located up to 1,000 feet (304 meters) from the SUPER BEE Terminal using 50-ohm coaxial cable (RG-58/V).

3.5.7 I/O Processor Board Strapping

The eight strapable options available on the SUPER BEE I/O Processor Board (Refer to Section 1.3.11) are implemented by installing the appropriate jumper on the 16-pin strapping pad (S1) located on the I/O Processor Board. A summary of these strapping selections is provided in the following paragraphs. Figure 3-2 illustrates the strapping locations.

Send Control Codes (PIN 1 AND 16)

With no strap installed, all escape codes will be performed and transmitted. With this strap installed, all escape sequences are performed locally only but not transmitted.

Go-Off-Line (PINS 2 and 15)

With no strap installed and with the terminal in on-line mode, an ETX is transmitted at the end of a block print and the on-line mode is maintained. With this strap installed the unit goes off-line at the end of the block print and the ETX is transmitted to the printer.

Store Special Functions (PINS 3 and 14)

With no strap installed, special function codes are transmitted. With this strap installed, special functions are stored only and not transmitted.

External Clock (PINS 4 and 13)

With no strap installed, SUPER BEE uses its own internal clock. With this strap installed, it provides for the use of external clocks supplied by a modem or other interface.

Synchronous or Asynchronous Operation (PINS 5 and 12)

With no strap installed, the SUPER BEE is configured to operate asynchronously. When operating in the synchronous mode, the generated word is eight bits. However, while operating in an asynchronous mode, the length of the generated word is determined by the multiplier toggle switch position. In the 110 position, an 11-bit word is generated. A 10-bit word is generated in the 150 position.

Back Search Block Transmit (PINS 6 and 11)

With no strap installed, SUPER BEE is configured to do a block transmission from the first character in the text. With a strap installed, SUPER BEE is configured to perform a back search to any previous ETX and start to transmit from the first character of the next line to the next ETX. This strap is installed as shipped from the factory.

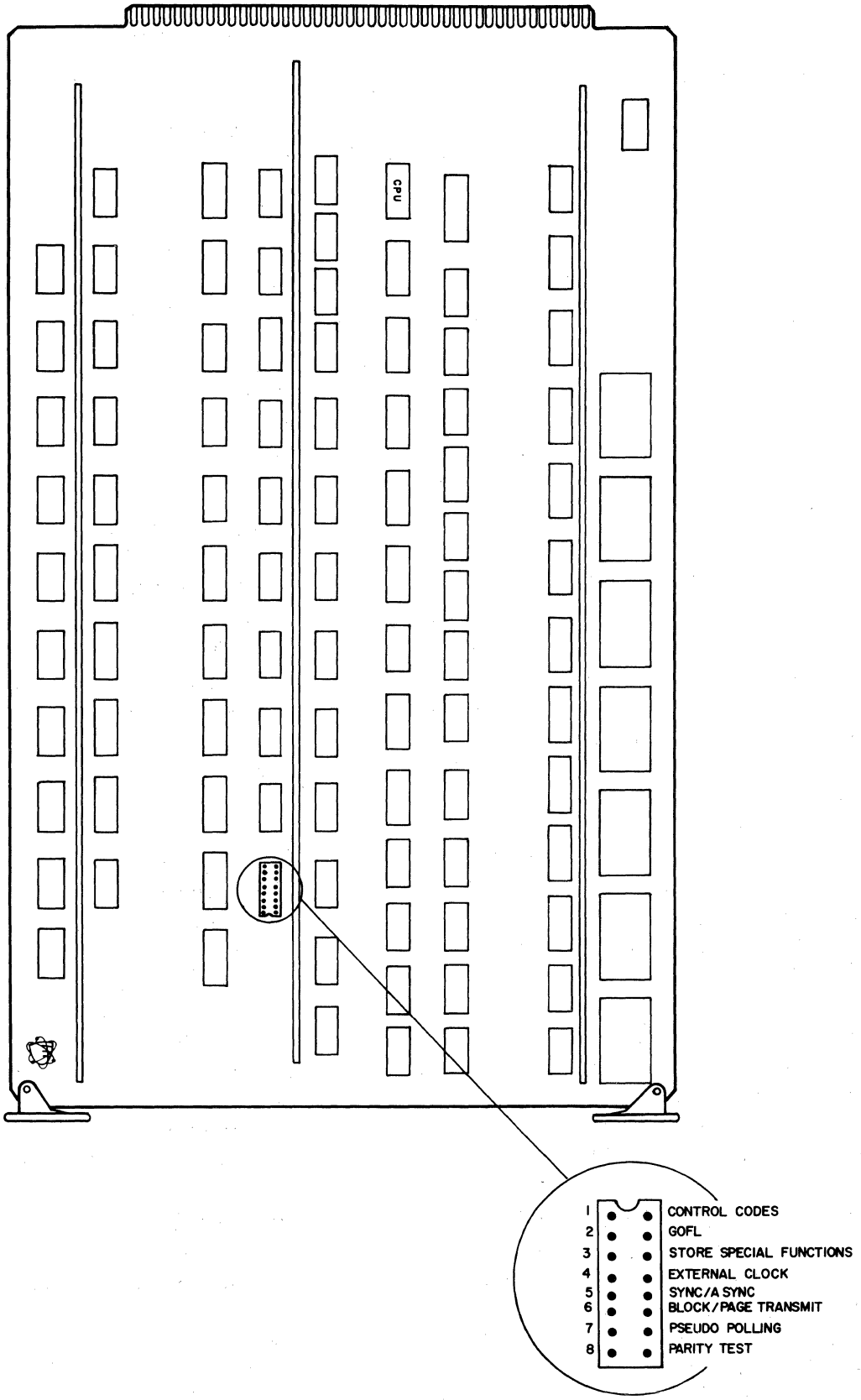


Figure 3-2
I/O Processor Board Strapping Locations

Pseudopolling/Immediate Block Transmit (PINS 7 and 10)

With no strap installed, SUPER BEE will do an immediate block transmit if "Clear-to-Send" is true (if so strapped on pin 6 to 11 block/page transmit). If strap is installed, SUPER BEE waits for an ETB (Control W) before transmitting.

Parity Test (PINS 8 and 9)

With no strap installed, SUPER BEE checks incoming data for even parity when operating asynchronously and odd parity when operating synchronously. If an invalid character is sensed during parity check, the character is replaced on the display by a parity error symbol (reverse video backward question mark). With this strap installed, no parity check is made. Transmitted data is in the same sense as received data, with the exception that data is transmitted with a mark parity bit with strap installed.

3.5.8 Printer Baud Rate and TTL Transmit Clock Strapping

The switch board of the Interface assembly includes the components and strapping to determine and produce the TTL transmit clock, 10-or-11-bit word, baud rate multiplier and baud rate for the printer port only (see Figure 3-3).

The printer TTL logic level, if unstrapped, is not present. If desired, selection of a TTL transmit clock can be made by strapping one of five pins to produce one to 16 times the internal clock baud rate. (1, 2, 3, 8 or 16).

The printer RS-232 level baud rate is determined by strapping one of the pins on the switch board. A baud rate of 1, 2, 4, 8, 16, 32 or 64 can be selected by strapping the apporpriate pins.

The determination of 10-or-11-bit word structure is made by strapping the appropriate connector pins. If no strp is added, the printer port will output 11-bit words. With a strap added, the output will be a 10-bit word. This strapping feature also provides the baud rate multiplication. With no strapping (11-bit word) multiplies the baud rate by 150. By strapping (10-bit word), it multiplies the rate by 110. The baud rate can vary, therefore, from 110 to 9600 baud.

3.5.9 Current Loop Adapter

The current loop adapter is dual purpose.

a. A modified TTY interface for some minicomputers features an open collector output and photoisolated input. The computer should be written 50 ft. of the terminal.

b. A single or balanced current loop interface can be used up to 2000 ft. away. With twisted, shielded 2 pair cable and slower baud rates. It may be useable up to 6000 ft.

A photoisolated input and 20 ma current driver is required at the other end. An operational amplifier bipolar output (+15 to -20 volt) drives about 20 ma of current through the loop. Up to 1000 ohm of loop resistance can be tolerated. (Note - the amplifier output can drive an RS232 input if desired).

In either a or b mode above, the receive line data is internally buffered and or'ed with data from the RS232 connector. Data can be input on either but not simultaneously. Data is output simultaneously on both.

Either open collector or bipolar 20 ma current balanced/unbalanced interfaces are provided for at the J14 connector. A male amphenol 17-20150-1 cable connector plugs on to J14 and is jumpered to do the desired functions. The J12 I/O RS232 port can be used while the J14 port is connected but received data is buffered and OR'ed from both. This prevents simultaneous reception

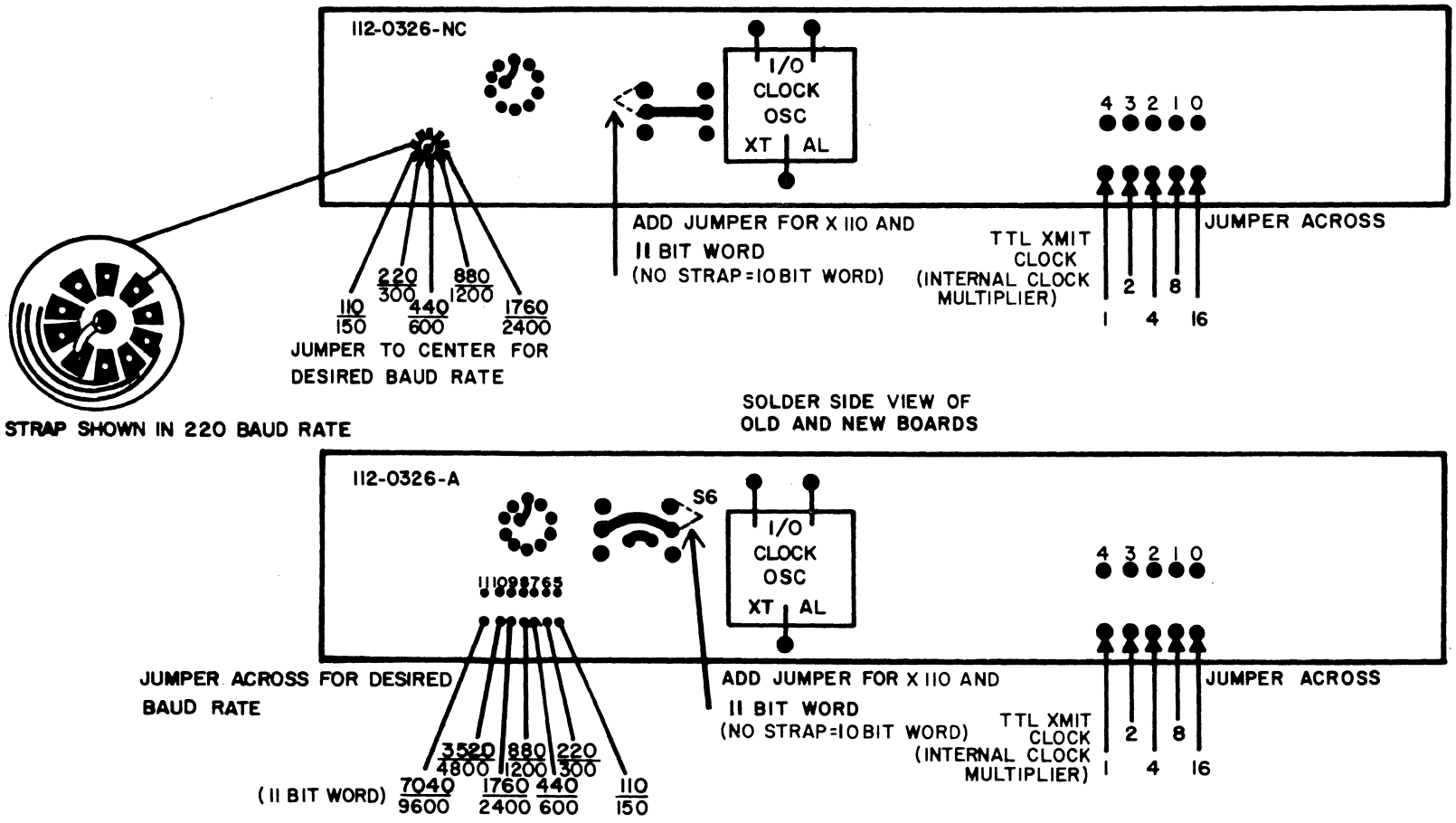
of data on J12 and J14 ports. J14 pin 10 must not be connected if the J12 port is connected. Also, note that J14 pin 4 can be used as an extra RS232 level output with J14-5 used as an extra input.

The input mode and interface, if applicable, utilized determine the pin configuration. This information can be found in Section 4.4.15 of the maintenance manual.

The current loop connector (J14) pin configuration is as follows:

Pin	Function
1	Frame Ground
2	Current Loop Out
3	*
4	Current Loop Out
5	*
6	*
7	Signal Ground
8	*
9	*
10	Aux Data In
11	*
12	*
13	Nova or Single Wire Input
14	Nova Data Out
15	Extra Input

*Jumper for input mode desired.



THE BULK OF NON RELATED CIRCUITY HAS BEEN OMITTED FROM THESE DRAWINGS, ONLY THAT ARE NEEDED TO IDENTIFY LOCATION REMAIN.

Figure 3-3
Printer Baud Rate and Internal
Clock Multipler Strapping