

# DATAMEDIA ELITE 3025 VIDEO TERMINAL OPERATOR'S HANDBOOK



**Datamedia  
Corporation**

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## **SECTION I**

# **GENERAL DESCRIPTION**

### **A. INTRODUCTION**

We are pleased that you have chosen the Elite 3025 Video Terminal. Your new terminal has many convenient features, and is surprisingly easy to operate. This handbook will acquaint you with your Terminals' features and assist you in operating, maintaining and programming it.

The handbook is organized into five separate sections. Section I presents general introductory information, highlights some of the many outstanding features of your Elite 3025, and provides a comprehensive list of the Terminals technical specifications. Section II of the handbook provides the information necessary for installing the Terminal. This includes: a step by step check-out procedure, a description of the electrical interface characteristics, and guidelines to follow in the event of a malfunction. Section III consists of instructions for the terminal operator. Section IV explains the various hardware options that are built into the terminal. Section V contains all the information that might be needed by the software programmer to successfully interface with the Elite 3025.

### **B. EQUIPMENT FEATURES**

The Elite 3025 is a buffered Teletype® compatible CRT Terminal with a single-page video memory that displays 1920 alphanumeric characters in a 24-line/80-character format. The stand-alone terminal contains an alphanumeric display, keyboard (which is separated from the display for applications flexibility), storage, control logic and asynchronous communications interface. (Isochronous communications interface is optional.)

#### **Display**

The display may be enhanced by reverse video, half-intensity, and/or blink fields in eight levels on a per-character selection basis. No memory address space is used to support character attributes.

#### **Editing**

Editing features in this Video Display Unit (VDU) include Clear Screen, Erase to End of Page, Erase to End of Line, Cursor Up, Down, Left, Right, Home, Typeover, Absolute Cursor Addressing/Sensing, and Insert/Delete (character and line).

#### **Communications**

Designed for interactive applications, data entry, information retrieval or any related data communications requirements, the new VDU accommodates a standard RS232C or optional 20mA current loop interface. The terminal supports full or half duplex, two-or four-wire, internally or externally clocked,

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asynchronous communications — providing broad versatility in communications with a data processing system, minicomputer, or other peripherals. Split Transmit/Receive speed is also supported.

**Cursor**

The cursor is a non-destructive, blinking or non-blinking underscore and fully addressable on an X-Y coordinate basis. Cursor read and horizontal tabulation (both forward and back) are also provided.

## C. TECHNICAL SPECIFICATIONS

**Screen Capacity:** 1920 characters

**Screen Type/Size:** P4 white, 12 inch

**Screen Filter:** gray or green

**Characters per Line:** 80

**Lines of Display:** up to 24

**Character Generation:** 5 x 9 dot matrix

**Character Size:** 0.18" H x 0.09" W  
(4.6mm x 2.3 mm)

**Character Set:** full ASCII-upper/  
lower case/ 128 codes stored

**Refresh Rates:** 50 or 60 Hz

**Data Rates:** 50 to 9600 bps

**Memory Type:** MOS

**Keyboard-Electronic:** typewriter layout with numeric cluster and cursor/controls; remote keyboard lock; 10 programmable function keys

**Cursor:** addressable X-Y coordinates; non-destructive; blink/non-blink; up, down, right, left and home; read cursor address

**Key Controls:** Xmit, Xmit Line, Erase to end of line, Erase to end of screen, Master Reset, Print, Roll Ins/Del, Tab, Back tab

**Split Screen-Protected Format:** variable field; tabbing horizontal and vertical; forward and back tab

**Attributes:** eight levels of video enhancements including reverse video, dual intensity and blink

**Operating Modes:** full or half duplex, Roll, Batch, Format and Tape

**Push-Button Mode Controls:** Format, Batch, Remote, Tape, half/full duplex, Ext clock, EIA/ current loop and Reset (initialize)

**Indicators:** LED lamps for Clear to Send, Carrier Detect, Roll and Insert/Delete

**Alarm:** Audible on alarm code or eight characters from end of line; level adjustable

**Interface-Line-RS232C:** 20mA current loop (optional)

**Interface-Printer:** independent printer output, speed pre-selectable, local copy capability.

**Video Output:** provision to drive up to 16 external monitors.

**Transmission:** Asynchronous-compatible with 103 or 202 modems, Isochronous (optional)-compatible with 201 modem

**Speed, Bits/Second-50 to 9600):** 15 standard rates selectable via keyboard; data rate displayed on screen

**Power:** 100/125V, 50/60Hz, 100 watts — 200/250V, 50/60Hz, 100 watts

**Operating Environment:** +10°C to +40°C (+50°F to +100°F); humidity 10% to 80% (non-condensing)

**Options-Polling:** 20mA current loop interface

### Dimensions:

	Display/Controller	
Depth	14.50"	(36.83 cm)
Height	16.00"	(40.64 cm)
Width	14.00"	(35.56 cm)
Weight	34 lbs.	(15.42 kg)

	Keyboard	
Depth	8.12"	(20.62 cm)
Height	3.75"	( 9.53 cm)
Width	18.00"	(45.72 cm)
Weight	7.16 lbs.	( 3.25 kg)

## **SECTION II**

# **INSTALLATION, CHECK-OUT AND MAINTENANCE**

### **A. INTRODUCTION**

This section of the handbook begins by offering guidelines to assist you in unpacking and installing the terminal. This is followed by a preliminary check-out procedure that is designed to give the user confidence that the terminal is operational. Next, the electrical characteristics necessary for interfacing with other devices in your system are given. Then an explanation of how to set the transmit and receive baud rates is given. Finally, a section on trouble-shooting, that will help the user localize malfunctions is included.

### **B. UNPACKING**

1. Visually inspect the shipping container for signs of damage before opening. If there is any evidence of damage report it to the carrier and notify Datamedia immediately.
2. Remove terminal from shipping container.
3. Visually inspect unit for damage. If damage is found, file a claim against the carrier and notify Datamedia immediately.

Included with your new Datamedia Elite 3025 Video Terminal are the following items:

- VDU (Video Display Unit)
- Keyboard with attached cable for mating with the Keyboard jack in the rear of VDU
- Operating Handbook

### **C. HOOK—UP**

1. Connect Keyboard cable plug to KEYBOARD jack in rear of VDU.
2. Connect power cord plug to standard 115 VAC grounded wall outlet. (When specified, use 230 VAC.)
3. Operate POWER switch (item 1, in Section III B, Figure 3-1) to the ON position, and allow a two minute warm up period.
4. Look for the cursor; if not visible, adjust BRIGHTNESS and CONTRAST controls (items 14 and 15 in Figure 3-1) in the following manner:
  - a. Operate BRIGHTNESS control in the clockwise direction to obtain a visible raster.
  - b. Operate the CONTRAST control to find the cursor.
  - c. Reduce brightness and contrast to preferred levels.

## D. PRELIMINARY CHECK-OUT PROCEDURE

The following procedure checks the more important features of the Elite 3025 Video Terminal.

1. Secure test configuration by setting the six switches, shown in Figure 3-1 (page 3-1) as Items 6 through 11, to the out position, and Item 12 (EIA) to the in position. Then depress the RESET switch (Item 13).
2. Set the ALPHA LOCK key on the left side of the Keyboard to the Up (Off) position.
3. Type of grouping of shifted and unshifted characters and observe display on CRT.
4. Depress ALPHA LOCK key and it will lock in the on-position. Repeat 3. above and observe that characters are displayed in upper case only (shifting of the number group is still controlled by the SHIFT key).
5. Type MR (Master Reset) key on the keyboard and observe that the CRT is cleared and the cursor is returned to the Home position (upper left).
6. Hold down the CTRL (Control) key on the left side of the keyboard and type the letter "G" key. Nothing will be displayed on the CRT, but the BELL (Audible Alarm) on the right side of the keyboard assembly will sound. If the Bell does not sound, operate the control knob located just forward of the Audible Alarm on the right side of the keyboard assembly in the clockwise direction.
7. Place characters on the first 3 or 4 rows of the display. Characters may be repeatedly entered by simultaneously depressing the REPEAT key and the desired character key.
8. Depress the HOME key and observe that the cursor is positioned to the top left position on the CRT.
9. Depress the INS/DEL key and observe that the INS/DEL lamp on the front of the VDU is lit.
10. Depress  (Down Cursor) key and observe that each depression moves all characters down the screen one row position.
11. Depress  (Up Cursor) key repeatedly until a row of characters has been returned to the top row.
12. Depress  (Cursor Right) key and observe that characters on the top row move to the right for each depression of this key.
13. Depress  (Cursor Left) key and observe that characters move to the left for each depression of this key.

This completes the preliminary check-out of the terminal.

## E. INSTALLATION

After the Preliminary Check-Out Procedure has been performed the baud rates should be checked. Then the terminal may be connected in the appropriate configuration for your use and placed on-line.

1. To check the baud rates (transmit baud rate and receive baud rates), hold down the SHIFT key while depressing ALT MODE. The following display will appear in the next to last row of the CRT display:

R = XXXX          T = XXXX

(Where R=Receive and T=Transmit and XXXX equals a two, three or four digit word which indicates the particular baud rates to which the terminal is presently set.)

TO CHANGE  
RECEIVE BAUD  
RATE

It is possible for the operator to change the baud rate for the Receive line by typing "R" followed by = (equals) then the numerical value of the desired baud rate. To be valid, the baud rate selected must be one of those listed in Table 4-1. Then depress the RETURN key and the display described above will change to indicate the new value. Type RETURN again and this BAUD RATE display will clear.

TO CHANGE  
TRANSMIT BAUD  
RATE

The transmit baud rate may be changed in exactly the same manner as described above for the receive baud rate by simply replacing the "R" with "T".

TO CHANGE BOTH  
BAUD RATES

The receive and transmit baud rates may be changed simultaneously by typing an "L" in place of the "R" and "T" as described above.

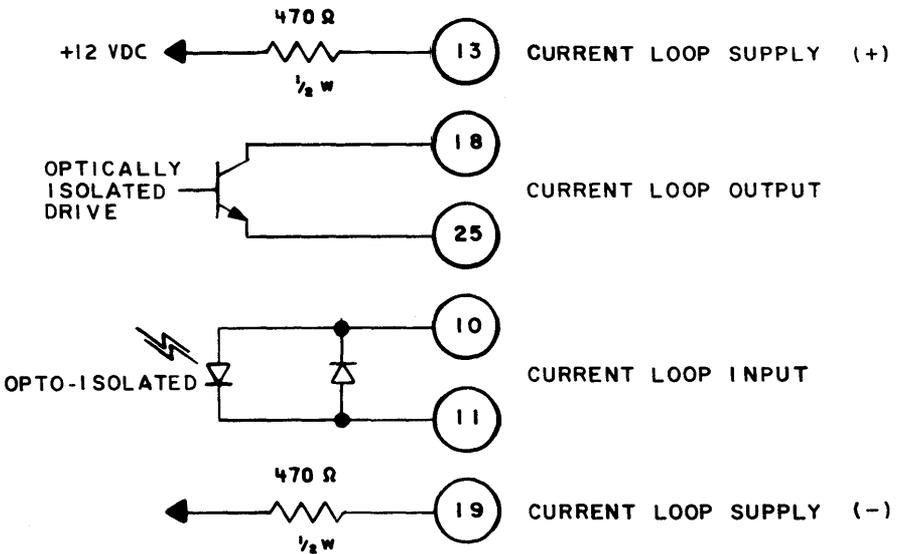
Whenever either the terminals power is turned on, or the RESET switch on the front of the VDU is pushed the receive, transmit and printer baud rates will automatically be set to a value that is predetermined by the state of switches on the P.C. Board inside the VDU. For more details on this see Section IV. "Hardware Programming".

2. Connect the EIA, RS232C cable from the Host Computer or Modem to the LINE interface connector at the rear of the VDU. The following table, (Table 2-1) lists the pin assignments for the LINE connector.

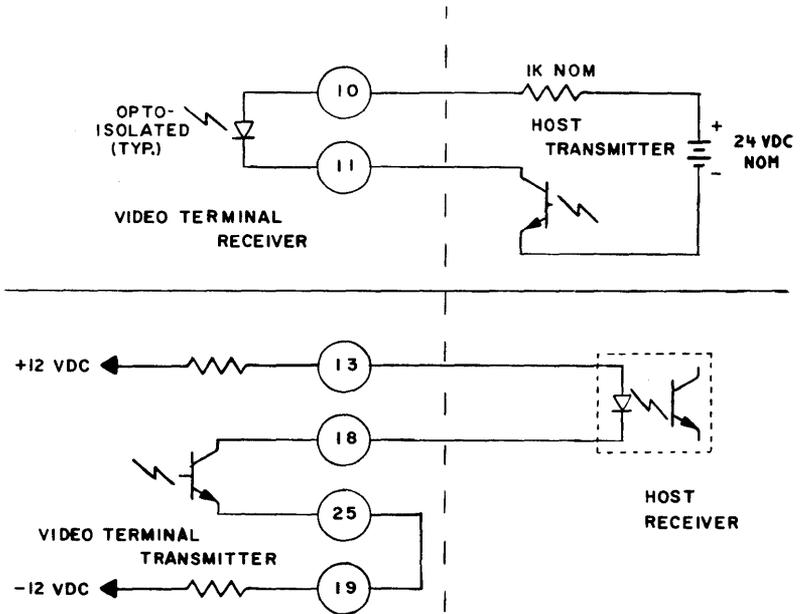
Pin No.	Signal Name	Bell System Code
1	Frame Ground	AA
2	Transmit Data	BA
3	Receive Data	BB
4	Request to Send	CA
5	Clear To Send	CB
6	Data Set Ready	CC
7	Signal Ground	AB
8	Carrier On	CF
10	Current Loop Input +	
11	Current Loop Input - RX	
13	Current Loop Supply +	
15	Transmission Signal Element Timing (DCE Source)	DB
17	Receiver Signal Element Timing (DCE Source)	DD
18	Current Loop Output +	
19	Current Loop Supply -	
20	Data Terminal Ready	CD
25	Current Loop Output - TX	

**Table 2-1  
LINE JACK PIN ASSIGNMENTS**

Figure 2-1 is a schematic diagram of the Current Loop Interface available at the LINE connector. There are several ways in which the circuits shown in Figure 2-1 may be used. Figure 2-2 is an example of just one of these ways. The actual wiring used will depend on the specific application.



**Figure 2-1  
SCHEMATIC OF LINE JACK PIN ASSIGNMENTS**



**Figure 2-2**  
**EXAMPLE OF LINE CONNECTOR USAGE**

If your application requires that the Elite 3025 be interfaced with a printer, connect the EIA cable from the device to the jack marked PRINTER at the rear of the VDU. The signal-pin assignments for the PRINTER jack are specified in Table 2-2.

Pin No.	Signal Name
1	Frame Ground
3	Data Output
6	Data Set Ready (1K to +12 VDC)
7	Signal Ground
8	Carrier Detect (1K to +12 VDC)
18	(+)
&	20mA Active Current Loop
25	(-)

**Table 2-2**  
**PRINTER JACK PIN ASSIGNMENTS**

The schematic diagram shown in Figure 2-3 below is an example of how the Printer Output Current Loop may be used. A strap change is required to use the Printer Current Loop Output. See Section IV, "Hardware Programming".

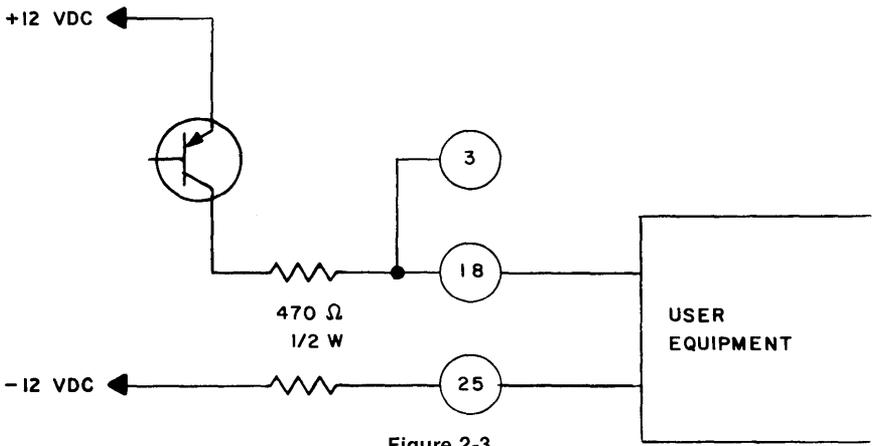


Figure 2-3  
PRINTER OUTPUT CURRENT LOOP

### F. TROUBLESHOOTING

The Elite 3025 is a highly reliable device. Improper terminal operation can usually be rectified by going over the following checklist:

1. Inspect AC input: Insure that the AC plug is firmly seated in the AC receptacle, and that the power switch (item 1 in Figure 3-1) is in the On-position.
2. Check CRT control settings: Rotate the BRIGHTNESS control to obtain a visible raster, then rotate the CONTRAST control to obtain a visible cursor.
3. Inspect the keyboard connection: Insure that the connector is firmly seated in KEYBOARD jack.
4. Inspect line connection: Insure that the connector is firmly seated in the LINE jack.
5. Repeat the Preliminary Check-Out Procedure.
6. If you are unable to obtain proper terminal operation contact Datamedia Corporation or your local sales and/or service representative, whichever is most convenient.

## SECTION III

# OPERATING INSTRUCTIONS

### A. INTRODUCTION

This section is intended for use by the terminal operator, as a quick reference. Sub-section B gives a brief description of the switches and indicators that are located on the VDU. Sub-section C gives a brief description of the various groups of keys on the keyboard. Wherever it is appropriate a reference is given to indicate where (in Section V, "Software Programming") more detailed information may be found.

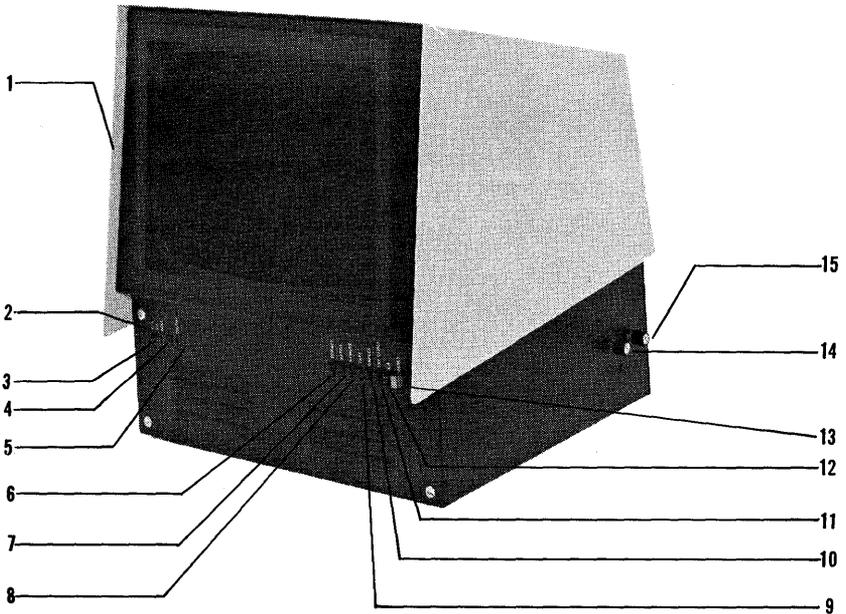


Figure 3-1  
VDU SWITCHES AND INDICATORS

## **B. VDU SWITCHES AND INDICATORS**

There are eight single action type switches and four LED's (Light Emitting Diodes) on the front of the VDU (Video Display Unit). In addition to these there are two control knobs on the right side of the VDU and a power switch on the left side. The items described in this sub-section are arranged according to numerical sequence as they appear in Figure 3-1.

*Item 1*

**POWER ON/OFF  
SWITCH**

Pushing the top of this switch applies AC source voltage to the terminals power supply. Pushing the bottom removes the AC source.

*Item 2*

**CLEAR TO SEND  
(CTS)**

Goes on whenever the Host raises the clear to send signal, permitting the VDU to transmit data to the Host.

*Item 3*

**CARRIER DETECT  
(CD)**

This LED goes on to indicate that carrier detect control signal is present at the EIA interface.

*Item 4*

**ROLL**

When this LED is lit it indicates that the VDU is in Roll mode. (See Section V-B.)

*Item 5*

**INS/DEL**

Indicates (when lit) that the VDU is in the Insert/Delete mode. (See Section V-B.)

*Item 6*

**FORMAT**

Is used to put the VDU in Format mode. To use this switch, push to set (in-position), then push the RESET switch (item 13). (See Section V-E.)

*Item 7*

**BATCH**

Is used to put the VDU in Batch mode. To use, push to set, then push RESET (See Section V-D.)

*Item 8*

**REMOTE**

Enables the operator to put the VDU in Remote mode. To use, push to set, then push RESET. (See Section V-D.)

*Item 9*

**TAPE**

Enables the operator to put the VDU in tape mode, (transparent). To use, push to set. (See Section V-D.)

*Item 10*  
**DUPLEX**

When in the set (in) position the VDU is set for full duplex operation, and when in the out-position for half duplex. To set, push. To reset, push again. (See Section V-C.)

*Item 11*  
**EXT CLOCK**

Permits the use, when in the in-position, of an external clock for isochronous operation (optional).

*Item 12*  
**EIA**

Push to set when operating through the EIA interface, and push to release when operating via the current loop.

*Item 13*  
**RESET**

This switch is used to: (1) reset the baud rate to that specified by switches inside the VDU, (See Section IV-B), (2) clear the CRT screen, (3) put the terminal in one of the seven operating modes specified by VDU switches, items 6, 7 and 8; and (4) places the cursor in the Home position (upper left).

*Item 14*  
**BRIGHTNESS**

Turn clockwise to increase the brightness of the CRT display and counter-clockwise to decrease.

*Item 15*  
**CONTRAST**

Use to vary the relative brightness of the normal brightness characters and any that may be displayed in DIM brightness.

## C. KEYBOARD DESCRIPTION

### Group I

PF1 thru PF10  
(Program Function)

These keys generate unique commands to the Host computer. They are assigned functions by the Systems Programmer and shall be used as indicated by supervisory personnel. (See Section V-B.)

XMIT  
(Transmit Page)

This key is depressed when it is desired to transmit the text that is displayed on the VDU screen. (See Section V-B, C.)

XMIT LINE  
(Transmit Line)

This key functions the same as XMIT except that only the line that the cursor is on will be transmitted rather than the entire page. After the line has been transmitted the cursor will stop in the first column of the next lower line. (See Section V-B, C.)

ERAS EOL (Erase  
to End of Line)

Depressing this key will clear the current line from the cursor through the end of the line. (See Section V-B.)

ERAS EOS (Erase  
to End of Screen)

Depressing this key will clear the screen from the current cursor location through the end of the screen. (See Section V-B.)

MR (Master Reset)

Depressing this key will clear the entire CRT screen. (See Section V-B.)

PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10		XMIT	XMIT LINE	ERAS EOL	ERAS EOS	MR
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)

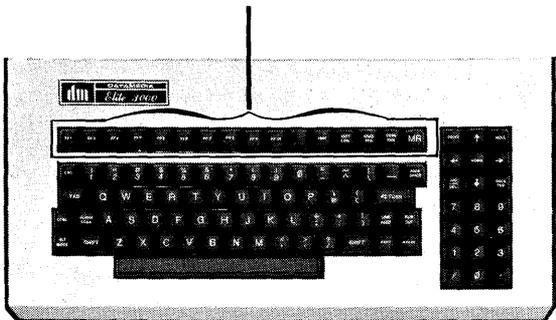
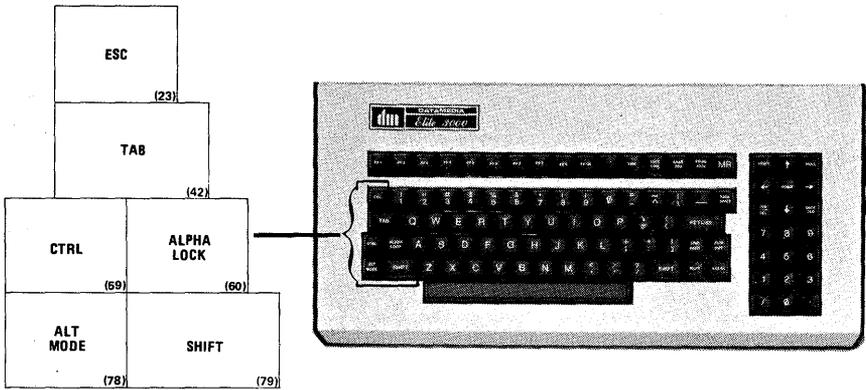


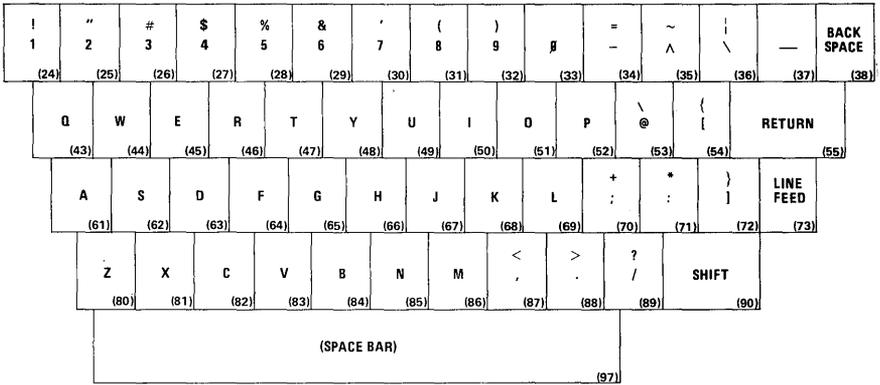
Figure 3-2  
KEYBOARD KEYS — GROUP I



**Figure 3-3**  
**KEYBOARD KEYS — GROUP II**

*Group II*

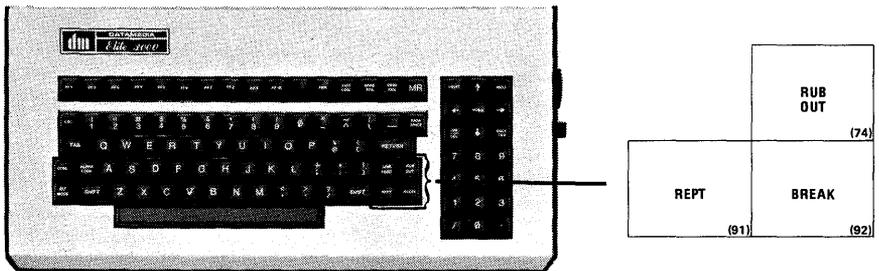
- ESC (Escape)** Used in combination with alphanumeric keys to develop escape sequences. The ESC key is depressed first, then the alphanumeric key. (See Section V-B and Chart on back cover.)
- TAB** Used to advance the cursor to appropriate tab stops on the CRT display. (See Section V-B, E.)
- CTRL (Control)** Used in combination with certain alphanumeric keys to generate control sequences. (See Section V-B and Chart on back cover.)
- ALPHA LOCK** This is a single action type keyswitch. When in the down (lock) position all alphabetic keys produce capital letters.
- ALT MODE** Used in combination with the SHIFT key to facilitate checking the terminal baud rates or for altering them (See Section II-E.)
- SHIFT** There are two SHIFT keys on the keyboard. They are used simultaneously with alphabetic keys to produce capital letters and with double legend keys to produce the upper character.



**Figure 3-4**  
**KEYBOARD KEYS — GROUP III**

*Group III*

The keys displayed in Figure 3-4 are used to produce the characters shown on the individual keycaps. They function the same as the keys on an ordinary typewriter.



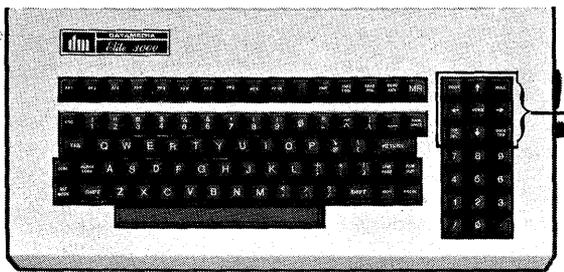
**Figure 3-5**  
**KEYBOARD KEYS — GROUP IV**

*Group IV*

**RUBOUT** Used to send a rub-out character to the Host computer.

**REPT (Repeat)** Used in combination with any alphanumeric key to cause it to be continuously repeated.

**BREAK** When this key is depressed the level on the transmit line is set to space polarity, (only if in Remote Mode.)



PRINT (17)	↑ (18)	ROLL (19)
← (20)	HOME (21)	→ (22)
INS DEL (39)	↓ (40)	BACK TAB (41)

**Figure 3-6  
KEYBOARD KEYS — GROUP V**

*Group V*

**PRINT**

↑  
(Cursor Up)

Depressing this key causes the contents of the page buffer to be formatted and output to the serial printer interface. (See Section V-B and chart on back cover.)

Each time this key is depressed the cursor is moved up one row position. (See Section V-B and chart on back cover.)

**ROLL**

←  
(Cursor Left)

Depressing this key places the terminal in ROLL mode. This is indicated by the ROLL LED on the front of the VDU on. To remove terminal from Roll mode, hold down the SHIFT key and depress ROLL key again. (See Section V-B and chart on back cover.)

Each time this key is depressed the cursor moves left one column. This key functions the same as the back space. (See Section V-B and chart on back cover.)

**HOME**

→  
(Cursor Right)

Depressing this key causes the cursor to go to the Home position, (upper left). (See Section V-B and chart on back cover.)

Each time this key is depressed the cursor moves one column to the right. (See Section V-B and chart on back cover.)

**INS/DEL**

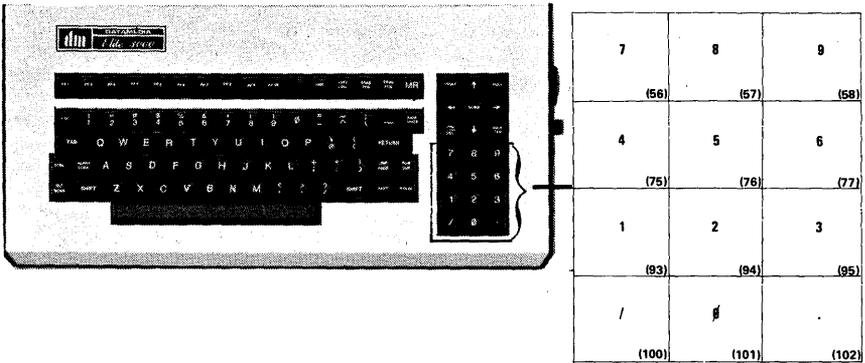
↓  
(Cursor Down)

Depressing this key puts the terminal in the Insert/Delete mode. To remove terminal from this mode hold down SHIFT key and depress INS/DEL key again. (See Section V-B and chart on the back cover.)

Each time this key is depressed the cursor moves down one row. This key functions the same as LINE FEED. (See Section V-B and chart on back cover.)

## BACK TAB

Whenever this key is depressed the cursor is moved to the next tab stop to the left. (See Section V-B and chart on back cover.)



**Figure 3-7**  
**KEYBOARD KEYS — GROUP VI**

### *Group VI*

The keys comprising Group VI are referred to as the auxiliary numeric key pad. When depressed they produce the same characters as the numeric keys in the alphanumeric section of the keyboard, (Group III) except they have no upper legend. They produce the same character whether the SHIFT key is held down or not.

## SECTION IV

# HARDWARE PROGRAMMING

### A. INTRODUCTION

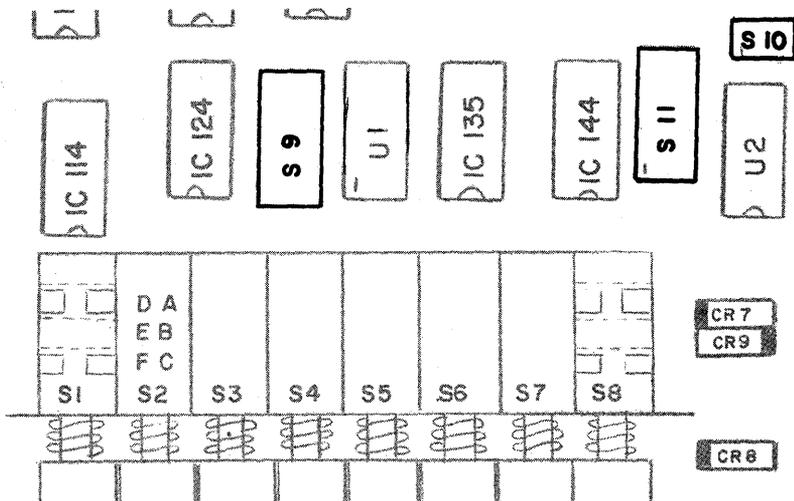
There are seven areas of operation in the Elite 3025 that can be altered by hardware programming. Four of these are alterable by bit switches on the P.C. Board inside the VDU and are described in Sub-Section B. The remaining three are altered by solder strap options on the same P.C. Board and are described in Sub-Section C.

### B. BIT SWITCHES

The four areas of operation that can be altered by the bit switches are:

- Baud Rates at Power On or Reset
- Carriage Return with or without a Line Feed
- Parity — Even or Mark
- Local Copy in Remote Mode Full Duplex

Figure 4-1 below shows the locations of the Bit Switches on the P.C. Board.



**Figure 4-1**  
**P.C. BOARD BIT SWITCHES**

1. Baud Rates — Whenever the terminal power is turned on or the RESET switch on the front of the VDU is depressed, the terminals transmit, receive and printer baud rates are automatically set to a predetermined value. This value is determined by the eight positions of switch S11 on the P.C. Board inside the VDU. The different switch settings and the baud rates they produce are listed in Table 4-1 below:

Line Interface	S11 Position				BAUD RATE
	4	3	2	1	
Printer Interface	8	7	6	5	
	ON	ON	ON	ON	50
	ON	ON	ON	OFF	75
	ON	ON	OFF	ON	110
	ON	ON	OFF	OFF	*134.5
	ON	OFF	ON	ON	150
	ON	OFF	ON	OFF	300
	ON	OFF	OFF	ON	600
	ON	OFF	OFF	OFF	1200
	OFF	ON	ON	ON	1800
	OFF	ON	ON	OFF	2000
	OFF	ON	OFF	ON	2400
	OFF	ON	OFF	OFF	3600
	OFF	OFF	ON	ON	4800
	OFF	OFF	ON	OFF	7200
	OFF	OFF	OFF	ON	9600
	OFF	OFF	OFF	OFF	9600

\*Input as 134 (not 134.5) to select this rate.

**Table 4-1  
BAUD RATE SWITCH SETTINGS**

- Carriage Return with or without Line Feed — The keyboard generated or program generated carriage return will produce a local line feed if position 2 of switch S10 is on.
- Parity — May be either: (1) Even if position 1 of switch S10 is on, or (2) Mark if position 1 of S10 is off.
- Local Copy — To obtain a local copy while in Remote Mode Full Duplex, set S9-8 "ON".

### C. SOLDER STRAP OPTIONS

The three areas of operation that can be altered by solder straps are 50/60 Hertz, blinking/non-blinking cursor, and printer interface.

- 50/60 Hertz

50Hz	60Hz
H to F	H to J
L to K	L to M
M1 to N1	N1 to P1

- Cursor Blink

BLINK	NON-BLINK
J1 to H1	REMOVE STRAP

- Printer Interface

20mA	EIA
E2 to F2	E2 to D2

## SECTION V

# PROGRAMMING REFERENCE

### A. INTRODUCTION

This section offers all the information the programmer should have to successfully interface with the Elite 3025 Video Terminal. The areas given attention are:

Terminal Functions:

1. Single character control functions
2. Multiple character escape sequences

Communications  
Operating Modes  
Format Mode  
Execution Times

### B. TERMINAL FUNCTIONS

1. Single character control functions:

BELL (BEL)

Each time this character is received by the terminal, the audible alarm on the right side of the keyboard assembly will sound for  $\frac{1}{4}$  second. This can be done from the keyboard by holding down the control key then depressing upper case "G".

 CURSOR LEFT (BS)

Each time this is received the cursor moves one column position to the left. If the cursor is in the leftmost position, no further cursor movement will occur.

FORWARD TAB  
(HT)

The cursor will move right to the next tab stop. The new cursor location is dependent upon the terminal operating mode and whether the function is input from the host computer or is input from the keyboard (Tab Key).

Host Entered Forward Tab: Tab stops are located at the fixed column addresses of 0, 8, 16, 24, 32, 40, 48, 56, 64 and 72 and are independent of the operating mode. The tab function will not cause the cursor to move off the current line.

Keyboard Entered Forward Tab: Tab is identical to the program entered tab function except when operating in Format Mode or Format Mode (Modified). If in one of the format modes, the cursor will advance to the first character position of the next unprotected field. If the cursor is positioned in the last unprotected field on the screen, the cursor will advance to the first unprotected location after the home position.

↓  
CURSOR DOWN  
(LF)

The cursor down, or line feed, moves the cursor down one row. If cursor is on the last row and Roll mode is off, it will move to the top row and the same column. If in the last row and Roll mode is on, the absolute cursor position does not change but the text will move up one line and the bottom line will be clear.

CARRIAGE RETURN  
(CR)

When this character is entered the cursor will return to the first column position of the current line. The Carriage Return may be with or without a Line Feed depending on the condition of a Bit Switch inside the VDU. (See Section IV-B.) When the terminal is in Format Mode or Format Mode (Modified) the Carriage Return functions differently depending on whether it is entered from the keyboard or from the Host:

Keyboard Entered Carriage Return in Format Mode: The cursor will move to the first column position of the first unprotected field in the current line.

Host Entered Carriage Return in Format Mode: The cursor will move to the first column position of the current line and set the remainder of the line (from the original cursor position to the end) to protected spaces.

## 2. Multiple character escape sequences:

KYBD OFF  
(ESC @)

Disables the keyboard input. Keyboard may be reenabled by the operator by simultaneously depressing BREAK and SHIFT.

↑  
CURSOR UP  
(ESC A)

Moves the cursor up one row. If the cursor is on the top row it will not be moved.

→  
CURSOR RIGHT  
(ESC C)

Moves the cursor right one column. If cursor is in right most column, the cursor will move to the first character position of the next line. If cursor is in the right most column of last line, and Roll mode is off, the cursor will move to the Home position.

BACK TAB  
(ESC E)

The cursor will move left to the next tab stop. The new cursor location is dependent upon the terminal operating mode and whether the function is input from the host computer or from the keyboard.

Host Entered Back Tab: Tab stops for a program entered back tab are located at the fixed column addresses of 0, 8, 16, 24, 32, 40, 48, 56, 64 and 72, and are independent of operating mode. The back tab function will not cause cursor movement off of the current line.

Keyboard Entered Back Tab: The keyboard entered back tab is identical to the program entered back tab function except when operating in Format Mode or Format Mode (Modified). If in one of the Format Modes the cursor will move left to the first position of the current field. If the cursor is already at the first character position in the field, the cursor will move left to the first position of the preceding unprotected field. If the cursor is in the first character position of the first unprotected field on the screen, the cursor will not move.

**MODE CHANGE  
(ESC F VALUE)**

Where VALUE defines the operating mode according to Table 5-1. To set the operating mode from the keyboard, set the switches to the desired configuration, then either turn on power or depress RESET. To set the operating mode from the host, send ESC F followed by the VALUE as designated in Table 5-1. (For more details on operating modes, see Sub-Section V-D.)

RTS — Request to Send  
CTS — Clear to Send  
CD — Carrier Detect

Terminal Mode	Value	Mode Switch Settings			O = OUT I = IN	Comm. Signal Requirements			A = ACTIVE O = ON X = DON'T CARE / = EITHER/OR
		Format	Batch	Remote		RTS	CTS	CD	
Remote	34	O	O	I		A	A	A	
Half Duplex						O	O	O	
Full Duplex						O	O	X	
Full Duplex x/Local Copy								X	
Local	30	O	O	O		A	A	A	
Half Duplex						O	O	X	
Full Duplex									
Batch	32	O	I	O					
or									
Batch (Mod)	36	O	I	I		A	A	A	
Half Duplex						A	A/O	X	
Full Duplex									
Format	31	I	O	O					
or									
Format (Mod)	35	I	O	I		A	A	A	
Half Duplex						A	A/O	X	
Full Duplex									

**Notes:**

1. RTS may be wired to CTS if no transmission delay is required.
2. Reset switch must be depressed to set operating mode.
3. CD may be Off for Half Duplex operation. RTS will not be raised if CD is ON.

**Table 5-1  
COMM. INTERFACE AND SWITCH SETTINGS VS. OPERATING MODE**

READ CURSOR (ESC G)	The terminal will send the four character sequence (ESC) (Y) (column address plus 20 hex) (row address plus 20 hex). (Column position plus 20 hex) ranges between 20 hex and 6F hex corresponding to column positions 0 through 79. (Row position plus 20 hex) ranges between 20 hex and 37 hex corresponding to row positions 0 through 23. (See Table 5-3.)
HOME (ESC H)	The cursor will move to the first column and first row (top left).
ERASE EOS (ESC J)	All unprotected characters from the current cursor position through the end of the screen are set to unprotected spaces with character attribute tags set to 0. The cursor position does not change and the state of the attributes are unchanged.
ERASE EOL (ESC K)	All unprotected characters from the current cursor location through the end of the line are set to unprotected spaces with character attribute tags set to 0. The cursor position does not change and the state of the attributes are unchanged.
XMIT PAGE (ESC L)	The contents of the display buffer are formatted and output to the communication interface. The format is dependent upon the operating mode and the setting of the DIM attribute.

Format mode and DIM Attribute ON: If the operating mode is either Format or Format (Modified) and the DIM attribute is ON, only unprotected characters are output. Each line is treated as a logical record by the formatter in the following manner:

1. A (FS) character is output to indicate the existence of a protected field (no data is output).
2. Unprotected characters are output, except that only the first space character, in a group of trailing spaces within a field, is output. (Redundant space suppression.)
3. Each line is terminated by a (GS) character except that the last line output is terminated by a (CR) character.

Format Mode and DIM Attribute OFF: If the operating mode is either Format or Format (Modified) and the DIM attribute is OFF, all characters are output. Each line is treated as a logical record by the formatter in the following manner:

1. All characters are output except that only the first space character, where spaces continue to the end of the line is output. (Redundant space suppression.)

- Each line is terminated by a (GS) character except that the last line output is terminated by a (CR) character.

All other conditions: In any mode other than Format or Format (Modified), and independent of attribute setting, the output format is as described above for Format Mode with DIM attribute Off.

**MASTER RESET  
(ESC M)**

The terminal state following a Master Reset (MR) command is as follows:

Cursor: At home position (top left)

Screen: Cleared to spaces

Keyboard: On

Insert/Delete: Off

Attributes: Set to Ø, (Off) except the DIM attribute is On if the terminal is in Format Mode and host entered data is displayed in half-intensity.

**ATTRIBUTE  
CHANGE (ESC O  
VALUE)**

Where (VALUE) defines the attributes according to Table 5-2.

Attributes			Value (Hex)
Blink	Dim	Reverse Video	
			30
		*	31
	*		32
	*	*	33
*			34
*		*	35
*	*		36
*	*	*	37

**Table 5-2  
ATTRIBUTE CHANGE VALUES**

**INSERT/DELETE  
ON (ESC P)**

Places the terminal in the Insert/Delete mode, enabling the following operations:

Insert Character: Characters may be inserted at the cursor location. This causes all characters to the right of the cursor to move right one position for each character inserted. The operation terminates at a protected character or at the end of the line. The right most character in the line (field) is deleted. To use this feature, place the cursor at the position in the text where the insertion is desired, then set Insert/Delete on. Any character entered will be inserted in the text as

described above and the cursor will advance. Forward cursor commands will cause a space character to be inserted at the cursor location, but the cursor will not advance. The current state of the attributes will be appended to each character inserted.

**Delete Character:** The character at the cursor location will be deleted and all characters to the right of the cursor will be shifted left one position. The operation terminates at a protected character or at the end of the line. The right most character on the line (field) is set to a space with the current state of the attributes appended to it. To use this feature, place the cursor under the character to be deleted, then set Insert/Delete on. Each execution of the back cursor command will delete a character as described above.

**Insert Line:** A blank line with attributes set to  $\emptyset$  will be inserted on the line containing the cursor. The text on the line containing the cursor and all lines below this line will be shifted down the screen by one line. The last line on the screen will be deleted. To use this function, place the cursor on the line where the insertion is desired. Then set Insert/Delete on. Each execution of the Down Cursor (or Line Feed) command will insert a line as described above. **NOTE:** Insert Line will not execute if Format Mode is on.

**Delete Line:** The text at the line containing the cursor will be deleted. The text on all lines below this line will be shifted up one line. The last line of the display will be set to spaces with attributes set to  $\emptyset$ . To use this function, place the cursor on the line to be deleted, then set Insert/Delete on. Each execution of the up cursor command will delete a line as described above. **NOTE:** Delete line will not execute if Format Mode is on.

**INSERT/DELETE  
OFF (ESC Q)**

Cancels Insert/Delete mode.

**SEND FUNCTION  
KEY (ESC S)**

If the operating mode is either Batch (Modified) or Format (Modified), the ten (10) Program Function Keys (PF1-PF10) output an (ENQ) character in lieu of the standard sequence. The program should respond with a Send Function Key (ESC S) sequence. The terminal output is then (ESC VALUE CR), where VALUE is used to distinguish between the different function keys. (See code chart on back cover for VALUE associated with the individual Program Function Keys, PF1-PF10). If (ESC S) is received and the operator has not depressed a function key, only (CR) will be output.

<b>XMIT LINE (ESC T)</b>	The line at the cursor 'Y' location is formatted and output. The format is identical to XMIT PAGE except that only one line is output. The line is output beginning at column 0, regardless of where on the line the cursor is. The output is terminated by a (CR).
<b>KEYBOARD ON (ESC U)</b>	Enables keyboard input.
<b>ROLL MODE ON (ESC V)</b>	If Roll mode is on and the cursor is on the bottom row a (LF) or (Cursor Down) will cause all displayed text to move up the screen one line. The top line will be deleted and the bottom line will be set to all space characters with attributes set to 0. Roll mode is set by default when the operating mode is Remote Mode.
<b>ROLL MODE OFF (ESC W)</b>	Terminal is taken out of Roll Mode.
<b>CURSOR X-Y (ESC Y VALUE VALUE)</b>	<p>The Host computer is able to position the cursor anywhere on the VDU screen with the command sequence (ESC Y VALUE VALUE).</p> <p>The first (VALUE) represents the desired column (X) address. This is a hexadecimal value offset by 20 hex to place it above the Control Character Codes, (See Code Chart). There are 80 columns on the VDU screen, column 0 to 79. Column 0 is specified by 20 hex and column 79 is specified by 6F hex.</p> <p>The last (VALUE) is the desired row (Y) address which can range from row 0 to row 23 dec. Row 0 is specified by 20 hex and row 23 is specified by 27 hex.</p> <p>If the (VALUE) that is given for the row address is out of range, (greater than 37 hex) the cursor remains on the same line. This can be useful when only column (X) addressing is desired.</p> <p>Table 5-3 is given for handy reference.</p>
<b>PRINT (ESC J)</b>	<p>Causes the terminal to send the contents of the page buffer to the printer. The format is:</p> <ol style="list-style-type: none"> <li>1. Spaces at the end of a line will be replaced by a single space. (Redundant Space Suppression).</li> <li>2. At the end of every line (CR), (LF) and ten (Rubouts) will be sent.</li> <li>3. The last line sent to the printer will be the last line that has data other than just spaces.</li> </ol>
<b>PROGRAM FUNCTION KEYS (PF1-PF10)</b>	Generate (ESC) (Value) (CR), where (Value) is (p), (q), (r), (s), (t), (u), (v), (w), (x), and (y) corresponding to the PF1 through PF10 keys respectively. Program function keys are usually used to call data or special programs.

DEC	B <sub>7</sub>	B <sub>6</sub>	B <sub>5</sub>	B <sub>4</sub>	B <sub>3</sub>	B <sub>2</sub>	B <sub>1</sub>	ASCII
<b>ROW/COLUMN ADDRESS</b>								
1.	0	1	0	0	0	0	0	SPACE
2.	0	1	0	0	0	0	1	!
3.	0	1	0	0	0	1	0	"
4.	0	1	0	0	0	1	1	#
5.	0	1	0	0	1	0	0	\$
6.	0	1	0	0	1	0	1	%
7.	0	1	0	0	1	1	0	&
8.	0	1	0	0	1	1	1	'
9.	0	1	0	1	0	0	0	(
10.	0	1	0	1	0	0	1	)
11.	0	1	0	1	0	1	0	*
12.	0	1	0	1	0	1	1	+
13.	0	1	0	1	1	0	0	,
14.	0	1	0	1	1	0	1	-
15.	0	1	0	1	1	1	0	.
16.	0	1	0	1	1	1	1	/
17.	0	1	1	0	0	0	0	0
18.	0	1	1	0	0	0	1	1
19.	0	1	1	0	0	1	0	2
20.	0	1	1	0	0	1	1	3
21.	0	1	1	0	1	0	0	4
22.	0	1	1	0	1	0	1	5
23.	0	1	1	0	1	1	0	6
24.	0	1	1	0	1	1	1	7
<b>COLUMN ADDRESS (END OF ROW ADDRESSING)</b>								
25.	0	1	1	1	0	0	0	8
26.	0	1	1	1	0	0	1	9
27.	0	1	1	1	0	1	0	:
28.	0	1	1	1	0	1	1	:
29.	0	1	1	1	1	0	0	:
30.	0	1	1	1	1	0	1	=
31.	0	1	1	1	1	1	0	>
32.	0	1	1	1	1	1	1	?
33.	1	0	0	0	0	0	0	@
34.	1	0	0	0	0	0	1	A
35.	1	0	0	0	0	1	0	B
36.	1	0	0	0	0	1	1	C
37.	1	0	0	0	1	0	0	D
38.	1	0	0	0	1	0	1	E
39.	1	0	0	0	1	1	0	F
40.	1	0	0	0	1	1	1	G
41.	1	0	0	1	0	0	0	H
42.	1	0	0	1	0	0	1	I
43.	1	0	0	1	0	1	0	J
44.	1	0	0	1	0	1	1	K
45.	1	0	0	1	1	0	0	L
46.	1	0	0	1	1	0	1	M
47.	1	0	0	1	1	1	0	N
48.	1	0	0	1	1	1	1	O
49.	1	0	1	0	0	0	0	P
50.	1	0	1	0	0	0	1	Q
51.	1	0	1	0	0	1	0	R
52.	1	0	1	0	0	1	1	S
53.	1	0	1	0	1	0	0	T

Table 5-3  
CURSOR ADDRESS TABLE

DEC	B <sub>7</sub>	B <sub>6</sub>	B <sub>5</sub>	B <sub>4</sub>	B <sub>3</sub>	B <sub>2</sub>	B <sub>1</sub>	ASCII
<b>COLUMN ADDRESS</b>								
54.	1	0	1	0	1	0	1	U
55.	1	0	1	0	1	1	0	V
56.	1	0	1	0	1	1	1	W
57.	1	0	1	1	0	0	0	X
58.	1	0	1	1	0	0	1	Y
59.	1	0	1	1	0	1	0	Z
60.	1	0	1	1	0	1	1	[
61.	1	0	1	1	1	0	0	\
62.	1	0	1	1	1	0	1	]
63.	1	0	1	1	1	1	0	^
64.	1	0	1	1	1	1	1	_
65.	1	1	0	0	0	0	0	\
66.	1	1	0	0	0	0	1	a
67.	1	1	0	0	0	1	0	b
68.	1	1	0	0	0	1	1	c
69.	1	1	0	0	1	0	0	d
70.	1	1	0	0	1	0	1	e
71.	1	1	0	0	1	1	0	f
72.	1	1	0	0	1	1	1	g
73.	1	1	0	1	0	0	0	h
74.	1	1	0	1	0	0	1	i
75.	1	1	0	1	0	1	0	j
76.	1	1	0	1	0	1	1	k
77.	1	1	0	1	1	0	0	l
78.	1	1	0	1	1	0	1	m
79.	1	1	0	1	1	1	0	n
80.	1	1	0	1	1	1	1	o

Table 5-3 (Cont'd.)  
CURSOR ADDRESS TABLE

## C. COMMUNICATIONS

### Communications Interface

The Elite 3025 terminal supports conversational mode (character-by-character) or batch mode communications in full or half duplex using 2 or 4 wire over a (RS232C) compatible interface. The interface can be set to handle the 3 most popular communication environments, which are:

1. Full Duplex                      Request to Send is ON  
Clear to Send is required  
Carrier Detect is displayed only
2. Full Duplex/  
with Local Copy                  Same (See Hardware Programming Section IV-B)
3. Half Duplex                      Request to send is raised for transmission, provided  
Carrier Detect is off, and is lowered 5ms after the end of  
transmission character is transmitted.  
Clear to Send is Required

In half duplex conversational (Remote) Mode, Request to Send is raised upon depression of any keyboard keyswitch, providing that Carrier Detect is off, and is lowered 5ms after transmission of a (CR) character. In any other half-duplex mode, Request to Send is raised upon depression of the following keyswitches:

1. XMIT
2. XMIT Line
3. PF1 thru PF10

*NOTE:* If the host does not support Clear to Send, or if current loop is used, Clear to Send may be provided by connection to Request to Send at the interface connector.

### Communications Method

The Elite 3025 terminal supports an operating environment using either dedicated buffers or dynamically allocated buffers. Dynamic Buffer Allocation is supported in either Batch Mode (Modified) or Format Mode (Modified) by outputting single control codes as cues for the 3 Transmit functions. The cue characters and expected responses are as follows:

Keyswitch	Transmitted Character	Expected Response*
XMIT	DC2	ESC L
XMIT LINE	DC4	ESC T
PF1-PF10	ENQ	ESC S

In other modes, the data stream is continuous until the end of transmission character is transmitted.

\*Note: This is the response which will execute the original function. Any response is acceptable.

## Message Formats

Communication line formats contain imbedded control characters for the purpose of conveying the following information:

1. (FS) indicates that a protected field was encountered. The Field itself is not transmitted.
2. (GS) indicates that the end of a line was reached.
3. (CR) indicates the last character in a transmission.

Redundant spaces are also suppressed. This is accomplished by transmitting only the first occurrence of a space character where spaces trail to the end of a field or to the end of a line.

In multiple line transmission, each line is treated as a logical record for the purpose of inserting control characters in the data stream.

The Printer Interface is RS232. The Print format is Data followed by (CR) (LF) (10 Rubout characters). Redundant Space Suppression is used and all fields are output to the printer.

## D. OPERATING MODES

The Elite 3025 terminal has 6 operating modes in addition to Tape (Transparent) Mode, which may be set by either the Operator or the Host Computer. (See Table 5-1.)

There is 1 conversational operating mode, 3 batch oriented modes which differ either in communications interface, or method, and 2 protected field handling modes which differ in communications method only.

**NOTE:** See Section V-C, Communications, for Interface details.

**Remote  
(Conversational)  
Mode**

In Remote Mode, the keyboard is used to transmit to the host computer as typing occurs, character-by-character. The keyboard keys used to perform functions locally in other operating modes, will generate their identifying control code, or sequence, in this mode. The functions will also execute, except in Full Duplex (and no Local Copy).

The communication interface may be either half-duplex, full-duplex or full-duplex with local copy. It is important to note that half-duplex is intended for remote communications; eg., 202 type modem interface. Most locally connected terminals will use either full-duplex or full-duplex with local copy.

Local Mode	This is a batch operating mode. All terminal operations occur locally upon depression of applicable key-switches. Transmission to host occurs upon depression of XMIT, or XMIT LINE keys. Function key identification proceeds upon depression of PF1-PF10.
Batch Mode	Terminal operation is identical to Local Mode except for communications interface. See Table 5-1 for interface differences.
Batch Mode (Modified)	Terminal operation is identical to Batch Mode and Local Mode. The difference is in the communications method. This mode supports dynamic buffer allocation.
Format Mode	This is a batch operating mode in which protected fields and operator entry fields may be created by the host for formatted data entry applications. Transmission of Operator entered data only or all data is permitted by line or page. For further details of Format Mode see Section V-C and V-E.
Format Mode (Modified)	Terminal operation is identical to Format Mode. The communication method supports dynamic buffer allocation.
Tape Mode	Whenever the terminal is in this mode all characters received from the Host that are ordinarily non-printable are converted to special printable characters and are displayed. These characters ordinarily represent executable codes such as Line Feed (LF) or Carriage Return (CR). The characters used to display these codes are given the chart on the back cover.

## **E. FORMAT MODE**

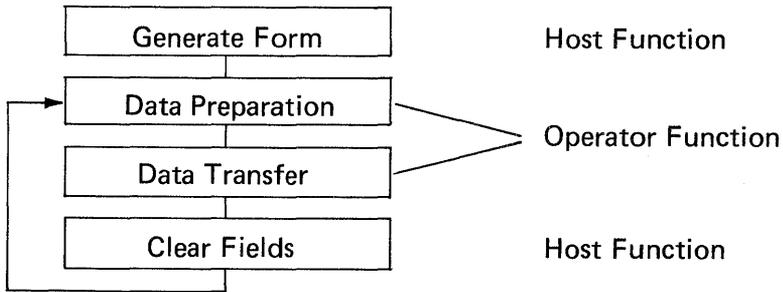
Line usage and form storage requirements may be significantly reduced when the following features exist:

1. No pad characters are required to compensate for slowly executing functions (even at 9600 baud).
2. Columnar tabs are available for fast cursor positioning.
3. Blocks of characters may be protected automatically.
4. Operator entered fields are efficiently transmitted to host.

The Elite 3025 terminal has all these features:

- The function execution times are exceptionally fast.
- Columnar tabs are used for host input, while operator input uses field tabbing.
- (CR) from the host protects from cursor to end of line.
- Redundant trailing spaces are suppressed in either lines or fields.

The following terminal procedure may be used to support interactive data entry:



**Figure 5-8**  
**TERMINAL PROCEDURE FOR INTERACTIVE DATA ENTRY**

### **Form Generation**

Forms are input to the Elite 3025 terminal following an initialization sequence consisting of:

1. Set to format mode if terminal state is unknown.
2. Send Master Reset to clear keyboard tab table and otherwise initialize terminal state.

The form may now be entered considering the following:

1. The keyboard may be disabled to prevent operator interference.
2. (CR) character protects all locations from cursor thru the end of the line if the DIM attribute is ON.
3. All character entries will be displayed in half intensity and are protected from change by the operator.
4. Operator *changeable* fields may be created by setting DIM attribute to off prior to the entry of character string (other attributes effect display but not the protect function). The DIM attribute should be on prior to entering the Data Preparation phase or to end the Operator changeable field.

5. Operator entry fields are also created by simply not writing in selected locations (the entire screen is initially unprotected). The columnar tabs and/or other cursor positioning commands are used to skip over such fields.
6. Protected characters are created in only two ways:
  - a. Host character entry in any location if in Format Mode and the DIM attribute is on.
  - b. Host entry of a (CR) character if in Format Mode and the DIM attribute is on. All locations from the cursor position to the end of the line will be protected by setting all unprotected locations to protected spaces.
7. There is no limitation or restriction on the use of attributes since no memory address space is used to set the attribute.

### **Data Preparation**

The operator fills in the blanks. For those fields where the length is fixed, the cursor will be positioned to the next entry location automatically. For variable length fields, the TAB key will position the cursor to the next entry field.

Typing errors may be corrected using INS/DEL mode (which operates within the field) or overwriting the existing data.

TAB, BACK TAB, and the cursor positioning keys will quickly position the cursor to any field requiring correction.

The operator depresses the XMIT key to begin the data transfer operation.

### **Clear Fields**

The host should signal acceptance of entered data by positioning cursor to Home position and issuing an Erase to End of Screen command.

### **Function Keys (PF1-PF10)**

The operator (or supervisor) needs some method of either directly calling a format to the screen or entering a mode where format selection may be made from a menu presented on the screen. The PF keys are an ideal mechanism to initiate these types of action, since they send unique identifying sequences to the host computer.

## **F. EXECUTION TIMES**

The terminal hardware complements the firmware so that execution time of nearly all functions is minimal. Additionally, a 64-character communication line buffer stacks the input characters so that the execution time is mostly transparent to the user. The program overhead associated with the input buffer gives the capability of removing 3+ characters from the buffer and placing these characters in the display memory for each single character received at 9600 baud.

With this information, and a table of execution times for all functions, the user can determine the state of the input stack at any point in the character string he is outputting to the terminal. Rubout characters may be sent as pads to prevent

buffer overflow. Alternatively, the terminal may be set up to respond when execution is completed. A Send Function Key will output the (CR) only if no Program Function Key (PF1-PF10) has been depressed (this must be the case if the keyboard is off). A set of commands could be output to the terminal followed by Send Function Key; the terminal would execute the command sequences and respond with (CR) to indicate completion.

Table 5-4 lists all the command sequences that cannot be executed back-to-back at 9600 baud. This table assumes a 10-bit character structure.

Function	Exec. Time
1. Master Reset	
1.1 Format Mode	6ms
1.2 Other Mode	2ms
2. Erase (EOS)	2ms
3. Insert Character	6ms
4. Delete Character	6ms
5. Insert Line	130ms
6. Delete Line	130ms

**Table 5-4  
COMMAND SEQUENCE EXECUTION TIMES**

# CODE CHART — ELITE 3025

BIT 7 6 5 4 3 2 1		CONTROL CHARACTERS		DISPLAY CHARACTERS								ESCAPE SEQUENCES												
		0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1					
0	0	0	0	NUL	DLE	SPACE	Ø	@	P	`	p	SP	Ø	G	P	`	~	P						
0	0	0	1	SOH	DC1	!	1	A	Q	a	q			A	Q	a	q						PF1 VALUE	
0	0	1	0	STX	DC2	"	2	B	R	b	r		2	B	R	b	r						PF2 VALUE	
0	0	1	1	ETX	DC3	#	3	C	S	c	s	**	3	C	S	c	s						PF3 VALUE	
0	1	0	0	EOT	DC4	\$	4	D	T	d	t	\$	4	D	T	d	t						PF4 VALUE	
0	1	0	1	ENQ	NAK	%	5	E	U	e	u	%	5	E	U	e	u						PF5 VALUE	
0	1	1	0	ACK	SYN	&	6	F	V	f	v	&	6	F	V	f	v						PF6 VALUE	
0	1	1	1	BEL	ETB	'	7	G	W	g	w	'	7	G	W	g	w						PF7 VALUE	
1	0	0	0	BS	CAN	(	8	H	X	h	x	(	8	H	X	h	x						PF8 VALUE	
1	0	0	1	HT	EM	)	9	I	Y	i	y	)	9	I	Y	i	y						PF9 VALUE	
1	0	1	0	FORW TAB		)	9	I	Y	i	y												PF10 VALUE	
1	0	1	1	LF	SUB	*	:	J	Z	j	z	*	:	J	Z	j	z							
1	1	0	0	VT	ESC	+	;	K	[	k	{	+	;	K	[	k	{							
1	1	0	1	FF	FS	,	<	L	\	l		,	<	L	\	l								
1	1	1	0	CR	GS	-	=	M	]	m	}	-	=	M	]	m	}							
1	1	1	1	CAR RET		-	=	M	]	m	}													
				SO	RS	.	>	N	^	n	~	.	>	N	^	n	~							
				SI	US	/	?	O	—	o	•••	/	?	O	—	o	•••							

\* ADDITIONAL CHARACTER(S) FOLLOW

**Chart I**  
**CODE CHART — ELITE 3025**

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