

PREPRODUCTION INSTRUCTION MANUAL

Installation and Operation

ICC 40+ Data Display System



International Communications Corporation
Miami, Florida 33147

a  company

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 a milgo company

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1.0 GENERAL INFORMATION

The ICC 40+ Data Display System (DDS) terminal (Figure 1) is a data communications terminal that provides efficient entry and retrieval of data in a computer controlled communications network. Advanced design concepts permit maximum efficiency in formatting and editing data used in both batch processing and on-line environments. The latest medium scale integration (MSI), TTL logic, and printed circuit card technologies ensure maximum reliability and low power consumption.

ICC 40 + DDS uses a modular design technique which allows a customer to select a terminal system to meet his specific needs. The customer can easily expand his systems capability by ordering optional printed circuit cards with the terminal. External optional equipment is also available.

1.1 FUNCTIONAL DESCRIPTION

The primary function of the ICC 40 + DDS is to communicate with a computer directly without the intervention of permanent records such as cards or tapes.

As shown in Figure 2, the ICC 40 + DDS comprises: micro-processor, I/O bus structure, read only memory (ROM), random access memory (RAM), option RAM, cathode ray tube (CRT), and a modified ASCII keyboard.



Figure 1: ICC 40 + Data Display System (DDS) Terminal.

The micro-processor controls the use of the data bus structure, determines the direction of data flow (input/output), determines type of operation, and transmits its current status to the peripheral logic.

The display monitor consists of a cathode ray tube and circuits that control character generation, position, and intensity as they are projected on the screen.

Data may be sent from a computer to the ICC 40 + DDS terminal via a communication link. The communication link may be a direct connection, or a connection using telephone lines.

The terminals' interface applies the received data to the control electronic circuits, which cause either display writing or control execution, depending upon the coded content of the incoming signals.

The memory stores all characters that appear on the CRT and refreshes them 60 times/second to ensure flicker-free viewing. The memory is always equal to or greater than the capacity of the screen. Data is entered into memory either from the keyboard or remote devices connected to the data link. Data remains in memory until the complete message has been prepared and edited. Data can be placed on the data link for transmission (on-line) to remote devices, and also transferred (off-line) to local devices such as storage devices or printer.

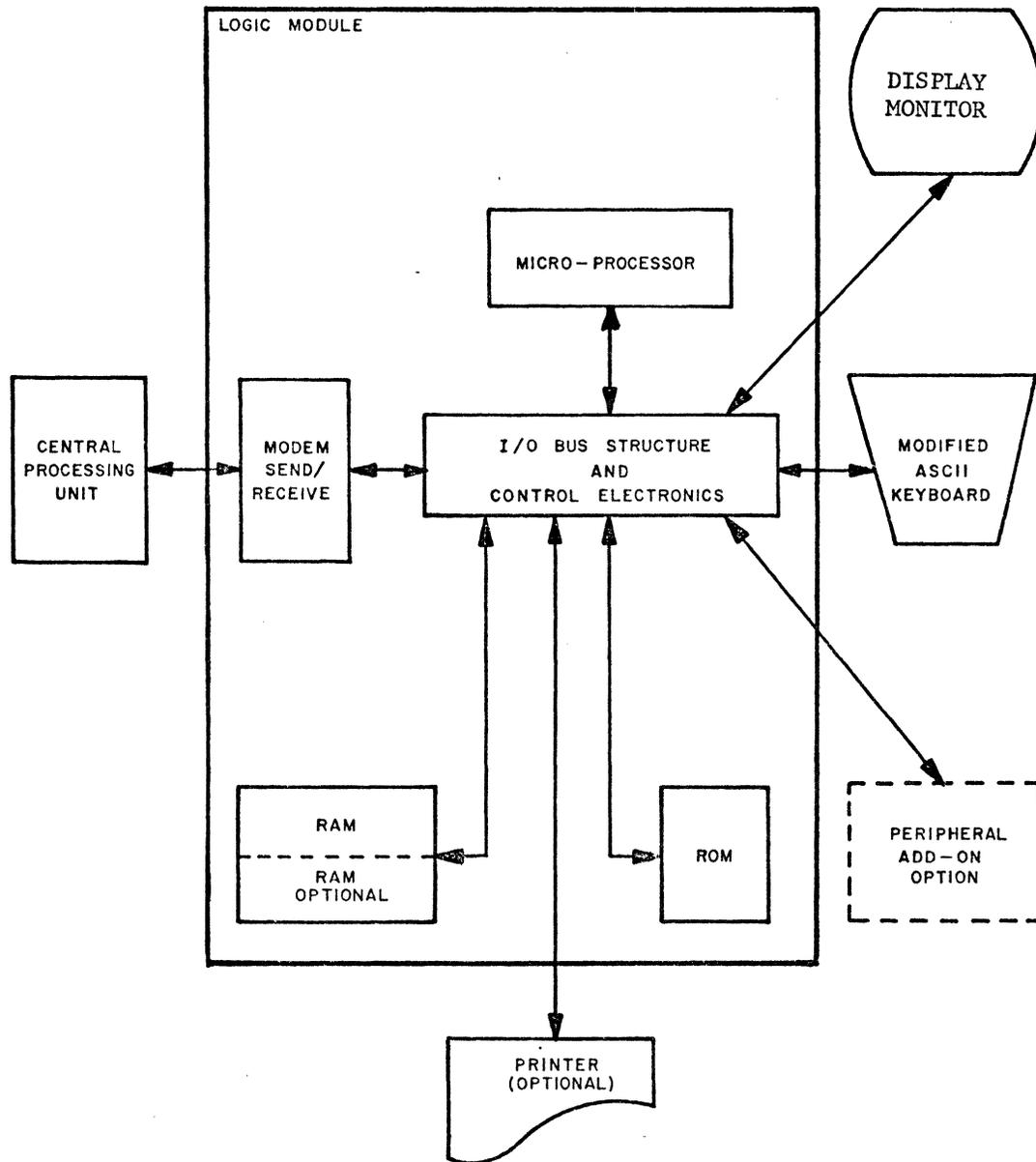


Figure 2: Simplified Block Diagram, Typical ICC 40 + DDS.

Input/output data and status information is sent and received to/from the various peripheral units via a common I/O bus. Memory address information is decoded in the control electronics section and used to access specific memory address words stored in the read only memory (ROM), random access memory (RAM), and the option RAM.

The modified ASCII keyboard (similar to a typewriter) provides the operator with an easy method of entering data into the system.

Once the data has been entered and verified, it can be transmitted via the modem and/or printed on the printer.

1.2 PHYSICAL DESCRIPTION

ICC 40 + DDS is a stand-alone, desk top unit. The power supply, control circuits, and display are contained in color coordinated, high-impact resistant, injection molded housings. The keyboard module and/or the display module may be detached from the logic module and adjusted (within limits of connecting cable) for ease of operation. The overall dimensions of the assembled terminal are shown in Figure 3. Dimensions and weight of the individual components are listed on page 7.

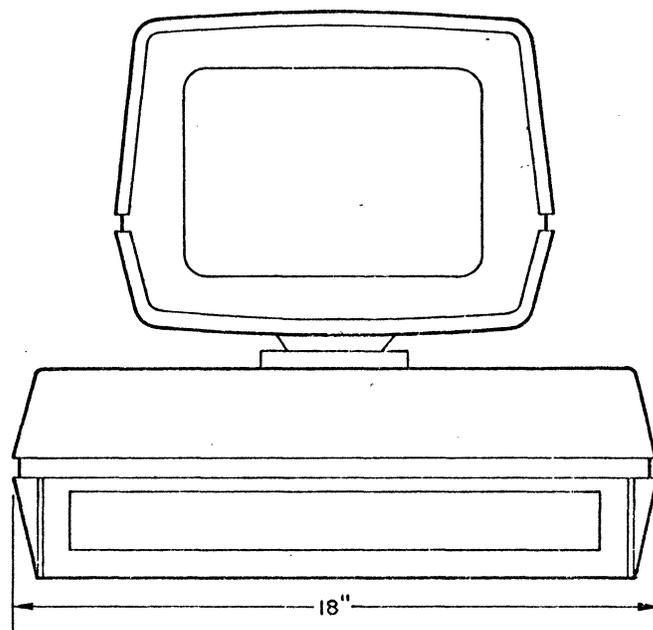
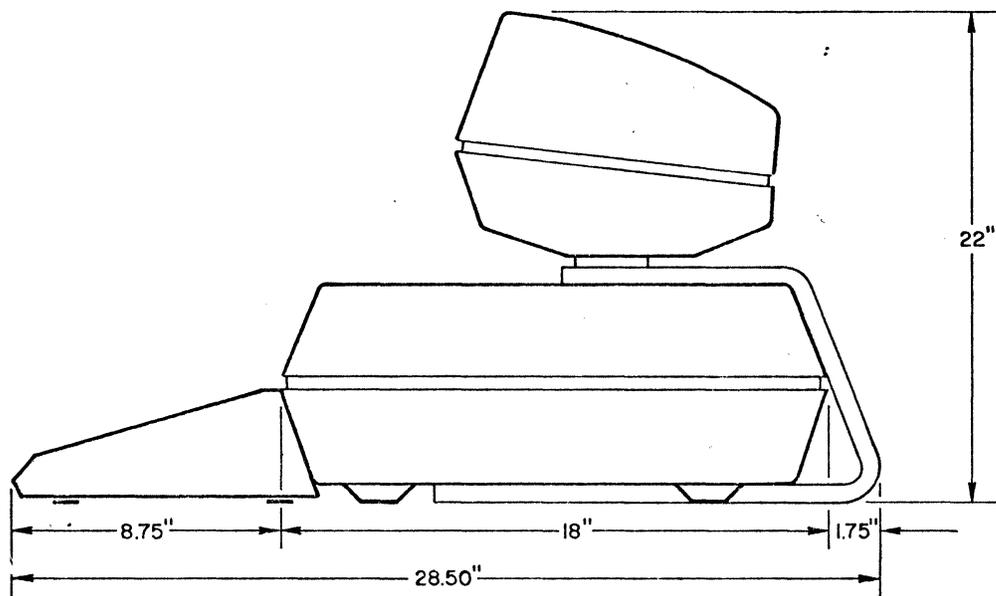


Figure 3: ICC 40 + DDS Overall Physical Dimensions.

LOGIC MODULE

Height..... 7-inches (17.8 cm)
 Width.....18-inches (45.7 cm)
 Depth.....18-inches (45.7 cm)
 Weight.....

CRT DISPLAY

Cabinet

Height.....11-inches (27.9 cm)
 Width.....16-inches (40.6 cm)
 Depth.....14-inches (35.6 cm)
 YAW.....± 30°
 Inclination/Declination...± 10°

Screen

Size.....15-inches (38.1 cm)
 Viewing Area.....10.5-inches x 5.75-inches (26.7 x 14.6 cm)

KEYBOARD MODULE

Housing

Height..... 3.5-inches (8.9 cm)
 Width.....17-inches (43.2 cm)
 Depth..... 9-inches (22.9 cm)
 Slope.....10°

1.3 CHARACTERISTICS

ICC 40 + DDS basic operating characteristics are listed in Table 1.

1.3.1 STANDARD ASCII CODE

Table 2 lists the standard ASCII code for the characters and controls generated by the ICC 40 + Keyboard Module.

All characters and controls listed can be sent

by ICC 40 + DDS with the exception of Backspace (BS).

All characters can be received.

Table 1: ICC 40 + DDS Basic Operating Characteristics

UNIT	CHARACTERISTIC
DISPLAY MONITOR	<ul style="list-style-type: none"> ● High resolution 7 x 9 dot matrix character formation. ● White rectangle cursor 9 x 12 dot matrix. Character covered by cursor is viewed as negative image. ● 1920 character (24 lines x 80 characters) capacity. ● 60 frames/second refresh rate. ● Displays 127 characters of the ASCII code (all except the Backspace character). Includes all upper and lower case alphas, numerics, graphics and symbols for control codes. ● Anti-glare screen and manual tube tilt. ● Brightness control permits adjustment of display brightness to compensate for ambient light changes.
KEYBOARD MODULE	<ul style="list-style-type: none"> ● Repeat feature incorporated into selected keys. ● Six cursor controls; Home, Cursor Right, Cursor Left, Cursor Up, Cursor Down, and Cursor Return. ● Audible alarm. ● Eight editing controls; Clear, Character Insert, Character Delete, Line Insert, Line Delete, Line Erase, Word Insert, and Word Delete. ● Upper and lower case alphabet. ● Basic terminal controls: Local, Send, and Receive.
COMMUNICATIONS	<ul style="list-style-type: none"> ● Digital Interface: Serial EIA-RS232C (external modem). ● 1200 bps asynchronous/2400 bps synchronous transmission speeds. ● ASCII Code. ● Mode: full/half duplex. ● Parity: Odd. ● Line: Public telephone switched network or private line.

The BS function is performed by the function CURSOR LEFT. As shown in the table some control characters are displayed on the CRT as two small upper case characters (arranged on a diagonal) occupying the same space as a single upper case character. All other control characters and the delete character are displayed on the CRT as the indicated symbol.

1.3.2 PARITY ERRORS

Depending upon the option selected, a detected parity error can either be displayed as the substitute character (SB) or the invalid code can be displayed.

1.4 SPECIFICATIONS

The following electrical and environmental specifications must be met to ensure proper operation of the terminal.

1.4.1 OPERATING ENVIRONMENT

Ambient Temperature.....0° C to 40° C
Relative Humidity.....10%-90%, non-condensing
Altitude.....10,000 feet (3048 meters)
maximum

1.4.2 POWER REQUIREMENTS

The terminal accepts input, through an instrument grade shielded power transformer of either 115± 10 Vac or 230± 20 Vac (switch selectable), 45-65 Hz, single phase, and consumes approximately 200 watts.

Table 2: ASCII Code (American Standard Code for Information Interchange).

				ASCII									
				Controls		Characters							
0	0	0	0	NUL N_U	DLE D_L	SP	0	@	P	'	P		
1	0	0	0	SOH S_H	DC1 D_1	!	1	A	Q	a	q		
0	1	0	0	STX S_X	DC2 D_2	"	2	B	R	b	r		
1	1	0	0	ETX E_X	DC3 D_3	#	3	C	S	c	s		
0	0	1	0	EOT E_T	DC4 D_4	\$	4	D	T	d	t		
1	0	1	0	ENQ E_Q	NAK N_K	%	5	E	U	e	u		
0	1	1	0	ACK A_K	SYN S_Y	&	6	F	V	f	v		
1	1	1	0	BEL B_L	ETB E_B	'	7	G	W	g	w		
0	0	0	1	BS	CAN C_N	(	8	H	X	h	x	
1	0	0	1	HT \blacktriangleright	EM E_M	)	9	I	Y	i	y	
0	1	0	1	NL \equiv	SUB S_B	*	:	J	Z	j	z		
1	1	0	1	VT V_T	ESC E_C	+	;	K	[	k	{	
0	0	1	1	FF F_F	FS F_S	,	<	L	\	l	|		
1	0	1	1	CR \leftarrow	GS G_S	-	=	M	]	m	}	
0	1	1	1	SO S_0	RS R_S	.	>	N	^	n	~		
1	1	1	1	SI S_1	US U_S	/	?	O	-	o	DEL //		
1	2	3	4										
BITS				5	0	1	0	1	0	1	0	1	
				6	0	0	1	1	0	0	1	1	
				7	0	0	0	0	1	1	0	1	

Table 2: (cont'd)

NUL - Null	DLE - Data Link Escape
SOH - Start of Heading	DC1 - Device Control 1
STX - Start of Text	DC2 - Device Control 2
ETX - End of Text	DC3 - Device Control 3
EOT - End of Transmission	DC4 - Device Control 4
ENQ - Enquiry	NAK - Negative Acknowledge
ACK - Acknowledge	SYN - Synchronous
BEL - Bell	ETB - End of Trans'n Block
BS - Back Space	CAN - Cancel
HT - Horizontal Tab	EM - End of Media
NL - New Line	SUB - Substitute
VT - Vertical Tab	ESC - Escape
FF - Form Feed	FS - Field Separator
CR - Carriage Ret.	GS - Group Separator
SO - Shift-Out	RS - Record Separator
SI - Shift-In	US - Unit Separator
	SP - Space
	DEL -Delete

2.0 INSTALLATION

This paragraph instructs the user in installing the ICC 40 + DDS Terminal System for typical applications. Non-standard facilities or special system configurations are not described. Installation of this type requires special assistance and engineering. These services are supplied by ICC on an as requested basis.

2.1 UNPACKING

If any of the shipping cartons are damaged, request that the carrier's agent be present when the components are unpacked. Be particularly careful not to destroy the shipping cartons during unpacking. Save the shipping cartons and packing material for re-use in case the equipment must be returned to the manufacturer.

Carefully remove the packing material, taking special care to clear all electrical connectors of shipping debris. Examine the components for any signs of shipping damage (e.g. scratches, dents, etc). If any of the components are damaged or fail to operate after proper installation, notify the nearest ICC Customer Support facility and the carrier if applicable. ICC Customer Support will arrange for repair or replacement of the damaged component without waiting for the claim against the carrier to be settled.

2.2 MECHANICAL ASSEMBLY

Perform the following procedures to assemble the ICC 40 + DDS terminal.

- (1) Position the pedestal table as outlined in the floor plan.
- (2) Place the display monitor stand on the pedestal table.
- (3) Using the hardware attached to the stand, secure the display monitor module to the stand.
- (4) Slide the logic module underneath the display monitor module and snug against the display monitor stand.
- (5) Place the keyboard module on the pedestal stand in front of the logic module.
- (6) Position the printer (optional) according to the floor plan.

2.3 CONFIGURATION DATA

ICC 40 + DDS terminal provides data entry versatility by the addition of a variety of optional features. Each unit must be completely identified when contacting the manufacturer.

Each terminal is uniquely described by the alpha-numeric identification plate and decal mounted on the rear of the logic module. All numbers and letters stamped and printed on this plate and decal should be provided when the manufacturer's representative is contacted for service information.

2.3.1 TERMINAL OPTIONS

Table 3 lists the options that are available in the ICC 40 + DDS terminal.

Table 3: Terminal Options

OPTION	DESCRIPTION
CURSOR CONTROL KEYS	The SCROL UP, SCROL DOWN, SEGMENT ADV, and CURSOR TAB option keys are described in paragraph 3.3 and 3.4.
MODE CONTROL KEYS	The S/R, INTR, FORM SEND, PRINT LOCAL, and PRINT ON LINE option keys are described in paragraph 3.3 and 3.4.
EDITING KEYS	The HIGHLIGHT, FORM ENTER, TAB SET, TAB CLEAR, and UNDERLINE option keys are described in paragraph 3.3 and 3.4.
MEMORY EXPANSION	The basic one segment (24 lines x 80 characters) can be expanded to two (48 x 80) or three (72 lines x 80 characters) segments.
HORIZONTAL TABBING	This optional display feature permits an operator to set tab stops. Tab stops can be set or cleared either locally or via the communication link. The four keys associated with horizontal tabbing are: TAB SET, TAB CLEAR, TAB, and CURSOR TAB.
CONVERSATIONAL MODE	The system can be placed in this interactive mode (send-receive) which permits the operator to converse directly with the computer on a line at a time basis. The Mode Control keys associated with this option are: S/R and INTR.

2.3.2 OPTIONAL EQUIPMENT

Table 4 lists the optional equipment that provides additional operating capabilities and flexibilities when using the ICC 40 + DDS. The optional equipment connects to the rear of the logic module via external cables.

Table 4: ICC 40 + DDS Optional Equipment

EQUIPMENT	PART NO.	DESCRIPTION
PRINTER		Provides the line printer functions in the ICC 40 + DDS. 80 column operating at a minimum of 100 CPS, 8.5 inch wide paper, 5 x 7 Dot Matrix (9 x 7 optional), upper case ASCII 64 character font.
MODEM		ICC 24 LSI Modem(synchronous) or equivalent. 1200 bps Asynchronous (EIA Interface)

2.4 SYSTEM CONNECTIONS

ICC 40 + DDS Terminal must be properly connected before power is turned on to prevent damage to the system and to ensure proper operation of the system. Before making the cable connections, perform the following preliminary checks:

- (1) Check to ensure that the terminal is installed within 10 feet (3 meters) of a grounding type ac power outlet.
- (2) Ensure that the system fits in the location chosen.
- (3) Ensure that the system is positioned so that access can be obtained for troubleshooting purposes.
- (4) Check voltage at the power outlet. Ensure that 115± 10 Vac or 230± 20 Vac power is available.

- (5) Set the voltage select switch to the proper level. Ensure POWER switch is set to OFF.

2.4.1 CABLE CONNECTIONS

Figure 4 shows the location of the logic module cable connectors.

- (1) Connect the ac power cord from the logic module to the display monitor module.
- (2) Connect the display monitor/logic module interface cable.
- (3) Connect the keyboard/logic module interface cable.
- (4) If a printer is included in the system configuration, connect the printer/logic module interface cable.
- (5) Connect the modem/logic module interface cable.

2.4.2 LOGIC MODULE/MODEM INTERFACE

Table 5 lists the pin assignment, symbol, direction of flow (input indicates direction into logic module) and signal name for the logic module/modem interface signals. Also included in the table is a brief description of each signal. The type connector used is Cinch or Cannon Plug (DB-19604-432). The Cinch plug also requires a DB-51226-1 hood. Signal interfacing conforms to EIA RS232C specifications.

2.4.3 LOGIC MODULE/PRINTER INTERFACE (OPTIONAL)

ICC 40 + DDS terminal transfers seven bit parallel ASCII characters to the printer via a twenty-five (25) pin interface connector.

(TO BE SUPPLIED)

Figure 4: ICC 40 + DDS Terminal Cable Connections.

Data transfer begins when the printer indicates (via its status line) that it is ready to receive the information bits.

Data transfer is terminated either by the printer (a full line of data has been received) or by the terminal.

2.4.4 STRAPPING

Selecting the options in Table 6 is accomplished by setting switches located on a printed circuit card (inside the logic module) to either the ON or OFF position. The positions of the switches depend upon computer and program requirements, and in some cases, upon user preference. Initial settings of the switches are done at the factory; however, qualified ICC Field Engineers can change the settings at the user's site.

2.4.5 POWER

Before plugging the unit into the power outlet, use a small screwdriver to set the recessed slide switch at the rear of the terminal to the power voltage. If power is applied with the voltage selector in the wrong position, the fuse may be blown. Also, ensure that the POWER switch on the rear of the logic module is set to OFF. Plug the terminal power cord into the power outlet.

Table 5: Logic Module/Modem Signal Name and Pin Assignments

PIN NO.	EIA-RS232C SYMBOL	INPUT/ OUTPUT	SIGNAL NAME	FUNCTIONAL DESCRIPTION
1	AA	INPUT	PG	<u>Protective Ground</u> -Provides common for chassis and ac power.
2	BA	OUTPUT	SEND	<u>Transmitted Data</u> -Output serial data signal to modem.
3	BB	INPUT	RECEIVE	<u>Received Data</u> -Input serial data received from modem.
4	CA	OUTPUT	RTS	<u>Request to Send</u> -Indicates terminal is ready to send data.
5	CB	INPUT	CTS	<u>Clear to Send</u> -Indicates modem is ready to send data.
6	CC	INPUT	DSR	<u>Data Set Ready</u> -Indicates power is on and that the modem is ready to transmit and receive data.
7	AB	INPUT	SG	<u>Signal Ground</u> -Common ground reference for all circuits except protective ground.
8	CF	INPUT	DCD	<u>Data Carrier Detect</u> -Indicates modem is receiving proper carrier signal.
20	CD	OUTPUT	DTR	<u>Data Terminal Ready</u> -Connects the modem to the communication channel.

TABLE 6: SELECTABLE OPTIONS

Option No.	Option Name	Option Selection	Functional Description
1	Home Before Clear	Enabled Disabled	Cursor goes home prior to clear operation (clears from CPI, page 1 to end of memory). Clear operation affects only that portion of memory from cursor position to end of memory.
2	DC2 Send	Enabled Disabled	Automatically xmits DC2 at begin of multi-line transmission. Manually enter DC2 prior to transmission of multi-line text.
3	Full Edit	Enabled Disabled	Indicates that all features (protect highlight, underline, tab) are used in the system. These features are not present in the system.
4	Character Rejection/Acceptance	Reject Null Accept Null Reject CR Accept CR Reject Delete Accept Delete	In receive mode, null characters are not accepted. In receive mode, null characters are accepted. In receive mode, carriage return characters are not accepted. In receive mode, carriage return characters are displayed. In receive mode, delete characters are not accepted. In receive mode, delete characters are displayed.
5	Escape Function On Receipt	Display Perform	Permit escape sequences to be displayed, prevent escape sequence operations. Permit escape sequence operations, prevent display of escape sequences.
6	Parity Error	SB Displayed Char. Displayed	Substitute char (SB) is displayed when an error is detected. Character in error is displayed.
7	Receive Termination Character	End Form Feed Disabled (FF) End Of Text Disabled (ETX) End on EOT Disabled (EOT) End On GS Disabled (GS)	End message on Form Feed. FF inoperative as message ending code. End message on End Of Text. ETX inoperative as message ending code. End message on End Of Transmission. EOT inoperative as message ending code. End message on Group Separator. GS inoperative as message ending code.
8	S/R and Interrupt	Enabled Disabled	Indicates to logic that terminal can process conversational communications. S/R and Interrupt options are not present in system.
9	Form Enter	Enabled Disabled	Permits local operator to enter or exit the form enter mode (ignored on terminals w/o full edit). Prevents local operator from enabling the form enter mode.
10	Printer Availability	Enabled Disabled	Indicates that the system is equipped with a line printer. Functions pertaining to line printer are ignored.
11	Request to Send	Enabled Disabled	Programs turns RTS on and verifies receipt of CTS at initialization. RTS remains on. RTS is raised prior to transmission and dropped when a valid text terminator character is detected.
12	Mode After Send	Enabled Disabled	Terminal goes to local mode after transmission. Terminal goes to receive mode after transmission.
13	Home Before Send	Enabled Disabled	Cursor goes home prior to transmission. Transmission begins at current cursor position.

TABLE 6: SELECTABLE OPTIONS (continued)

Option No.	Option Name	Option Selection	Functional Description
*14	Printer Type	Enabled Disabled	Indicates that the printer can print upper and lower case. Indicates upper case only.
*15	Monospace Foldover	Enabled Disabled	Indicates lower case is to be converted to upper case. Indicates that lower case is to be printed as an error symbol.
*16	Up/Low Folddown	Enabled Disabled	Indicates that lower case is to be converted to upper case. Indicates that lower case is to be printed as lower case.
17	Line End Sequence	Enable CR LF Enable CFCRLF Enable LF	Precede line feed with carriage return - LF is displayed CR generated. Precede line feed with two carriage returns - LF is displayed, 2 CR's generated. Only line feed is sent - LF is displayed.
18	Send Horizontal Tabbing	Enabled Disabled	All unprotected HT's are converted to spaces before transmission. All HT's are sent as is.
19	Send Underline	Enabled Disabled	Send underline data and underline symbols. Send underline data and do not send underline symbols.
20	Send Highlight	Enabled Disabled	Send highlighted data, highlighted. Send highlighted data as normal data (not highlighted).
21	Send Protect Group	Group 1 Group 2 Group 3 Group 4 Group 5	Send protected and unprotected. Convert protected to spaces. Convert protected to deletes. Don't send protected. Send unprotected, send HT at end of variable field.
22	Send Termination Character	End Form Feed End of Text End on EOT End on GS	When one of these options is selected, the character associated with the switch causes the program to send that character when encountered and then stop transmission. When not selected, the character is sent and transmission continues.

* These options are ignored if option 10 is not selected.

3.0 OPERATION

Before operating the terminal, ensure that all system connections have been made and checked according to the information contained in paragraph 2.4, SYSTEM CONNECTIONS.

In addition, before operating the terminal, become familiar with all controls and indicators and understand the function of each.

3.1 LOGIC MODULE

Logic module contains the primary power supply for the terminal. The POWER switch, voltage select switch, and fuse are located on the rear of the logic module. Set the POWER switch to ON.

3.2 DISPLAY MODULE

Figure 5 shows the location of the display module controls. Set the display module POWER switch to ON. After approximately 30 seconds, the cursor will appear on the upper left hand corner of the screen. Adjust the INTENSITY control so the cursor can be viewed easily.

The display module tilts up and down, and swivels 30° to the right and left. The pivots are friction damped, so it is only necessary to push the module firmly in the direction desired. Adjust the screen to a comfortable angle.

(TO BE SUPPLIED)

Figure 5: Display Module Controls.

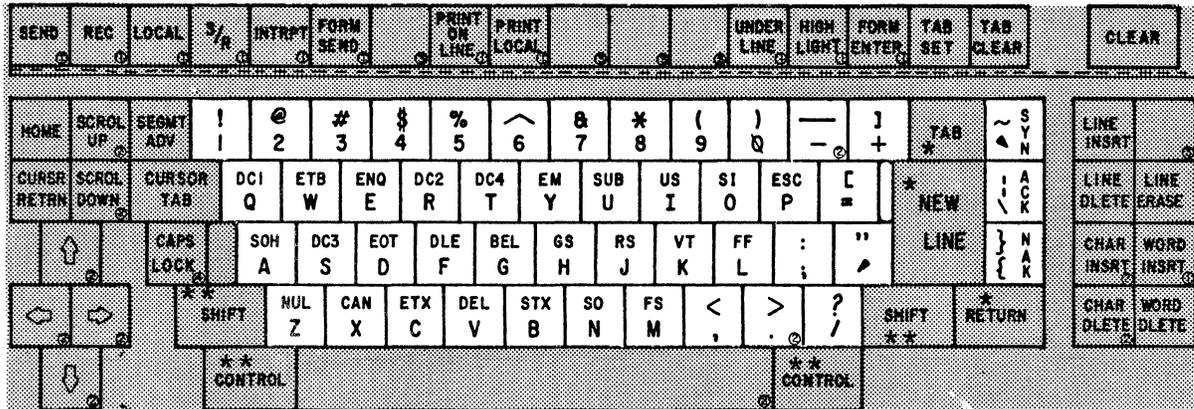
3.3 KEYBOARD MODULE

3.3.1 CHARACTER SET

The characters used by the ICC 40 + DDS terminal are all the characters and controls in the ASCII Code (except Backspace). The character set includes upper case alphabetical letters, lower case alphabetical letters, numerics, graphics and the symbols for the control codes.

Figure 6 illustrates the configuration of the character set keys. Special features of the keyboard module are as follows:

- The character keys equipped with the repeat function are: Asterisk (*), Underline(_), Dash(-), Period (.), Space.
- The SHIFT key is used to generate capital letters (A-Z) and the upper case graphic symbols.
- The CONTROL key is used to generate those ASCII controls that appear on keys also marked with a character.
- The CAPS LOCK key is used to generate capital letters (A-Z) and the numerics (0-9). This allows the generation of capital letters without the necessity of using the SHIFT key. It also allows the generation of numbers and other unshifted characters without forcing the operator to unlock the CAPS LOCK key.
- Lighted key caps for: SEND, REC, LOCAL S/R, INTR, FORM SEND, PRINT ON LINE, PRINT LOCAL, UNDERLINE, HIGHLIGHT, FORM ENTER, AND WORD INSRT.



NOTES

- ① - LIGHTED KEYS
- ② - REPEAT FUNCTIONS
- ③ - BLANK KEYS
- ④ - ALTERNATE ACTION

<u>Key</u>	<u>Description</u>	<u>Key</u>	<u>Description</u>	<u>Key</u>	<u>Description</u>
SYN	Synchronous	ESC	Escape	FF	Form Feed
DC1	Device Control 1	ACK	Acknowledge	NAK	Negative Acknowledge
ETB	End Transmission Block	SOH	Start of Heading	NUL	Null
ENQ	Enquiry	DC3	Device Control 3	CAN	Cancel
DC2	Device Control 2	EOT	End of Transmission	ETX	End of Text
DC4	Device Control 4	DLE	Data Link Escape	DEL	Delete
EM	End of Media	BELL	Bell	STX	Start of Text
SUB	Substitute	GS	Group Separator	SO	Shift-Out
US	Unit Separator	RS	Record Separator	FS	Field Separator
SI	Shift-In	VT	Vertical Tab		

*These are part of ASCII set.

**These are necessary to generate the ASCII set.

Figure 6: ICC 40 + ASCII Character Set

As shown in Table 7, certain keys can perform more than one function depending upon the selection of CAPS LOCK, SHIFT, and CONTROL function keys (Figure 7).

All other keys perform only one function and are not affected by the CAPS LOCK, SHIFT, and CONTROL function keys.

The CONTROL function overrides the CAPS LOCK function.

NOTE

Only a brief description of the keys is included on Figures 8, 9 and 10. Subsequent paragraphs provide a detail description of their functions.

SEND	REC	LOCAL	S/B	INTRPT	FORM SEND	PRINT ON LINE	PRINT LOCAL					UNDER LINE	HIGH LIGHT	FORM ENTER	TAB SET	TAB CLEAR	CLEAR	
HOME	SCROL UP	SEGMT ADV	!	@	#	\$	%	^	&	*	(	)	-	+	TAB	~	SYN	LINE INSRT
CURSR RETRN	SCROL DOWN	CURSOR TAB	DC1	ETB	END	DC2	DC4	EM	SUB	US	SI	ESC	[	]	NEW	ACK	LINE DELETE	LINE ERASE
		CAPS LOCK	SOH	DC3	EOT	DLE	BEL	GS	RS	VT	FF	:	"	LINE	MARK		CHAR INSRT	WORD INSRT
		SHIFT	MIL	CAN	ETX	DEL	STX	SO	FS	<	>	/		SHIFT	RETURN		CHAR DELETE	WORD DELETE
		CONTROL												CONTROL				

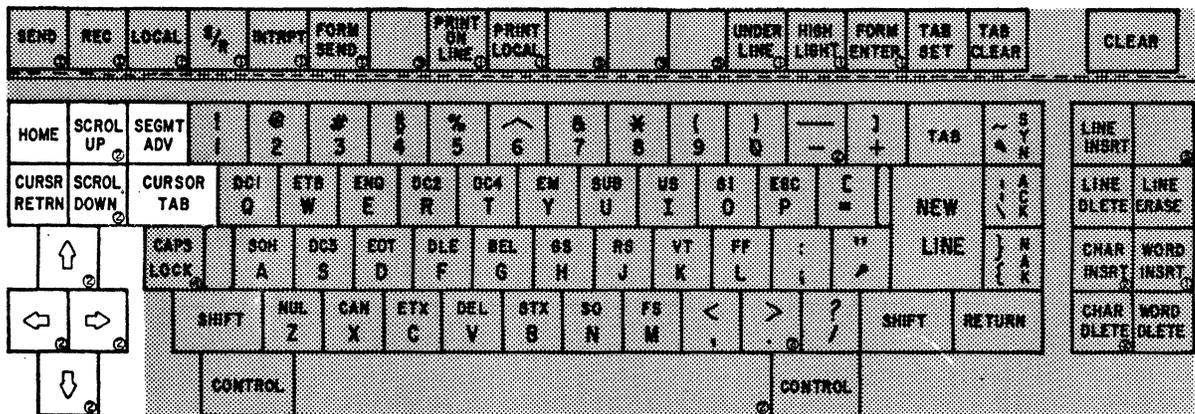
Figure 7: Multi-function Control Keys, CAPS LOCK, SHIFT, and CONTROL.

Table 7: Multi-function Control Key _____.

FUNCTION			
NORMAL	CAPS LOCK	SHIFT	CONTROL
a	A	A	SOH
b	B	B	STX
c	C	C	ETX
d	D	D	EOT
e	E	E	ENQ
f	F	F	DLE
g	G	G	BEL
h	H	H	GS
i	I	I	US
j	J	J	RS
k	K	K	VT
l	L	L	FF
m	M	M	FS
n	N	N	SO
o	O	O	SI
p	P	P	ESC
q	Q	Q	DC1
r	R	R	DC2
s	S	S	DC3
t	T	T	DC4
u	U	U	SUB
v	V	V	DEL
w	W	W	ETB
x	X	X	CAN
y	Y	Y	EM
z	Z	Z	NUL
1	1	'	1
2	2	@	2
3	3	#	3
4	4	\$	4
5	5	%	5
6	6	^	6
7	7	&	7
8	8	*	8
9	9	(	9
0	0	)	0
-	-	-	-
+	+]	+
,	,	~	SYN
=	=	[=
\	\	!	ACK
;	;	:	;
/	/	"	/
{	{	}	NAK
'	'	<	'
.	.	>	.
/	/	?	/

3.3.2 CURSOR CONTROLS

Figure 8 illustrates the cursor control keys that are clustered on the left-hand side of the keyboard. These control keys are enabled only when the LOCAL mode of operation is selected.



HOME Moves the cursor to the upper left corner of memory segment one.

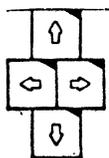
CURSR RETRN Moves the cursor to the first character position of the current line.

SCROL* UP Steps the display up one line at a time.

SCROL* DOWN Steps the display down one line at a time.

SEGMT* ADV Steps the display forward to the next logical memory segment.

CURSR* TAB Advances the cursor to the next tap stop.



Pressing one of these keys increments the cursor one position in the direction indicated. Holding the key in the down position causes the cursor to continue to increment until the key is released or display limits are reached.

*Optional

Figure 8: Cursor Controls.

3.3.3 COMMUNICATION CONTROL KEYS

Control keys illustrated in Figure 9 place the terminal in various modes so that data can be entered, received, transmitted, or printed.

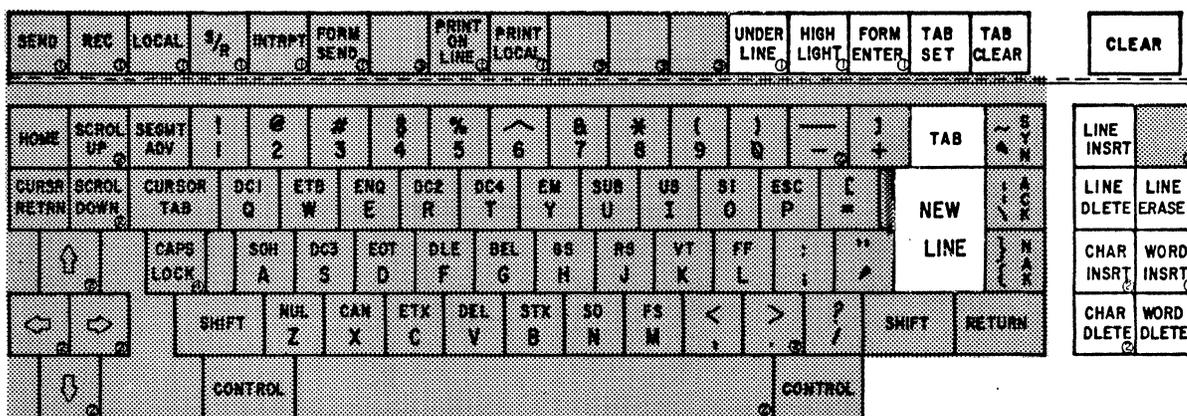
SEND	REC	LOCAL	S/R	INTRPT	FORM SEND	PRINT ON LINE	PRINT LOCAL				UNDER LINE	HIGH LIGHT	FORM ENTER	TAB SET	TAB CLEAR	CLEAR	
HOME	SCROL UP	SEMT ADV	1	2	3	4	5	6	7	8	9	0	-	+	TAB	SYN	LINE INSR
CURSR RETRN	SCROL DOWN	CURSOR TAB	DCI Q	ETB W	ENG E	DC2 R	DC4 T	EM Y	SUB U	UB I	ST O	ESC P	=	NEW	LOCK	LINE DLETE	LINE ERASE
		CAPS LOCK	SDH A	DC3 S	EDT D	DLE F	BEL G	BS H	RS J	VT K	FF L	:	"	LINE	LOCK	CHAR INSR	WORD INSR
			SHFT Z	NUL X	CAN C	ETX V	DEL	STX B	SO N	FS M	<	>	?	SHIFT	RETURN	CHAR DLETE	WORD DLETE
			CONTROL										CONTROL				

- SEND** When this mode is selected, all data between the current cursor position (automatic Home on send is optional) and a valid end message code is transmitted to the selected receive device. The format of the data transmitted depends upon the configuration of the option switches.
- REC** When this mode is selected, the terminal accepts all received data via the data link. The processing of the received data is determined by the configuration of the option switches. (Refer to table 2.)
- LOCAL** This mode is initialized when power is applied to the terminal. Keyboard data can be entered only in this mode of operation (only exception S/R mode).
- S/R*** This mode places the system into the conversational (interactive) mode of operation. This mode permits the terminal to communicate with a remote device on a single or multiple line basis without switching between Send and Receive.
- INTR*** This function is associated with the S/R mode of operation. When enabled, stops remote transmitter. Disabling the INTR function, permits the system to re-establish communication with the remote transmitter.
- FORM* SEND** This mode of operation overrides many of the options associated with data transmission. This function causes the system to transmit the message as displayed (i.e., protected, highlighted, underlined data). This key must be depressed before the SEND key.
- PRINT* LOCAL** When this mode of operation is selected, the characters on the CRT are copied to the printer. End of message terminates this mode of operation.
- PRINT* ON LINE** When this mode of operation is selected, all messages received are copied on the printer.

*Optional

Figure 9: Mode Control Keys

Figure 10 illustrates the editing keys that are located on the right hand side of the keyboard. Table 8 provides a brief description of these keys.



NOTES

- ① - LIGHTED KEYS
- ② - REPEAT FUNCTIONS
- ③ - BLANK KEYS
- ④ - ALTERNATE ACTION

Figure 10: Editing Keys.

Table 8: Editing Keys Description

KEY	DESCRIPTION
UNDERLINE*	Causes all subsequent character entry to be underlined.
HIGH LIGHT*	Causes data (protected or unprotected) to be blinked from full intensity to half intensity.
FORM ENTER*	Causes all entered data to be protected.
TAB SET*	Sets a column of tab marks from the cursor position to the end of memory.
TAB CLEAR*	Clears all tabs that are to the right and down from the cursor position.
CLEAR	If the FORM ENTER mode is enabled, all data and control (except tabs) are cleared. If the FORM ENTER mode is not enabled, only unprotected data and control (except tabs) are cleared.
LINE INSRT	Moves the line the cursor is on and subsequent lines down one line. The cursor remains on the original line and is moved to character position 1. The original line is filled with blanks. The line to be inserted can be typed.
LINE DELETE	Deletes the line the cursor is on and moves the following lines up one line.
CHAR INSRT	Shifts the character under the cursor and characters to the right of the cursor one character position to the right. The cursor remains and a blank is inserted in the original character position. Then the inserted character is entered.
CHAR DLETE	Deletes the character underneath the cursor and shifts the remaining characters in the line to the left.
LINE ERASE	Erases variable data from the cursor to the end of the line.
WORD INSERT	Inserts a character or a string of characters (either numeric or alphanumeric) under the cursor and moves the characters to the right of the cursor to the right. The mode is terminated by any character except numeric or alphanumeric.
WORD DLETE	Deletes the word on which the cursor is placed. This includes the leading delimiter.
NEW LINE	The basic function of this key is to perform a Carriage Return followed by a Line Feed. Positions the cursor to the first character position of the next line. (Used in a number of different ways in the system.)
TAB*	This function is similar to the CURSOR TAB function with the exception that it displays the HT symbol and changes variable data between tabs to blanks.

*Optional

3.4 OPERATING PROCEDURES

Before performing the following data preparation procedures, ensure that an understanding of the keyboard and display modules has been obtained. The operation of these two components has been described in paragraph 3.0.

NOTE

The usage of "text" throughout the following paragraphs is used to describe either a single character or multiple characters. "Data" and "text" are used interchangeably and have the same meaning.

3.4.1 LOCAL MODE (TEXT EDITING)

The operator performs the composition, verification, and correction of data with the terminal in the LOCAL mode. Text is entered by typing on the keyboard as an operator would on an office typewriter. Characters and symbols are instantaneously displayed on the screen as they are typed. The cursor appears on the screen over the next character to be entered. The cursor is automatically indexed with each character entry or can be manually spaced forward or backward, and up or down by use of the cursor movement keys. Changes or corrections can be made by positioning the cursor over an erroneous character and overstriking with the correct character.

As illustrated in Figure 11, the basic storage unit (1 segment) consists of 1920 characters (24 x 80) and can be incremented to two (48 x 80) or three (72 x 80) segments providing total memory capacity of 5760 characters.

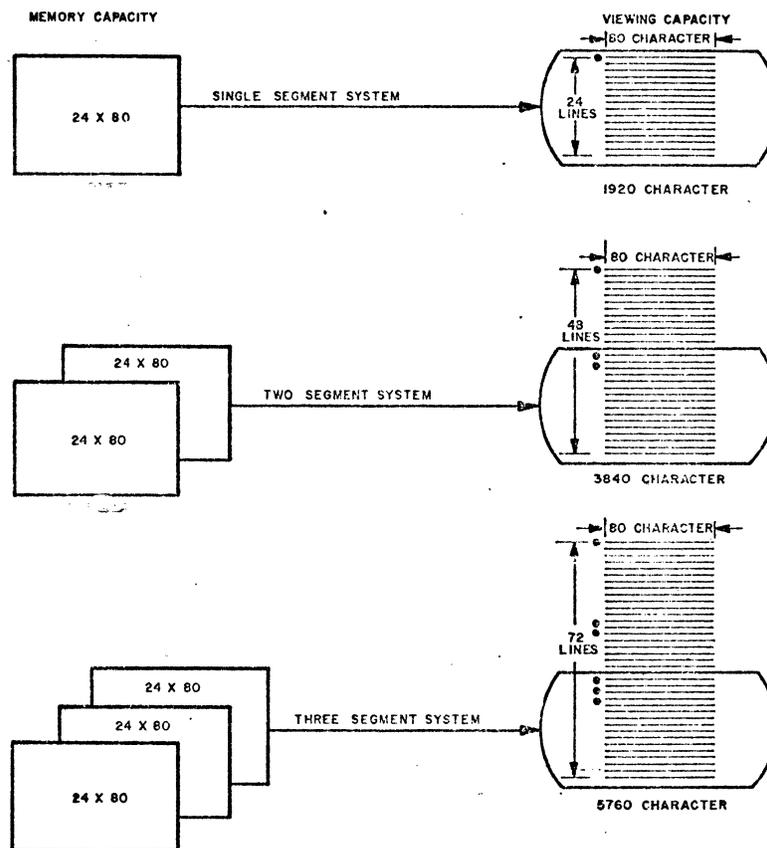


Figure 11: Memory/Viewing Capacity.

The margin notation (dot) at the upper left-hand corner (left of character position one) indicates which segment of memory is being viewed.

Table 9 illustrates the relationship between the segment dot, line number, and segment number.

As listed in the table, one dot corresponds to segment one. Segment one begins on line 1 and ends on line 24.

Two dots correspond to segment two. Segment two begins on line 25 and ends on line 48.

Three dots correspond to segment three. Segment three begins on line 49 and ends on line 72.

Table 9: Segment Line Identification

SEGMENT DOT	LINE NUMBER		SEGMENT NUMBER
	START	END	
•	1	24	ONE
• •	25	48	TWO*
• • •	49	72	THREE*

*Optional

As shown in Figure 12, the segment indicator does not occupy any of the 80 character positions on a line. In line scrolling, the segment indicator travels up or down the screen as each line is incremented or decremented. Figure 12 depicts the SCROL UP and SCROL DOWN function starting from the SEGMENT ONE position. The cursor remains at its original position.

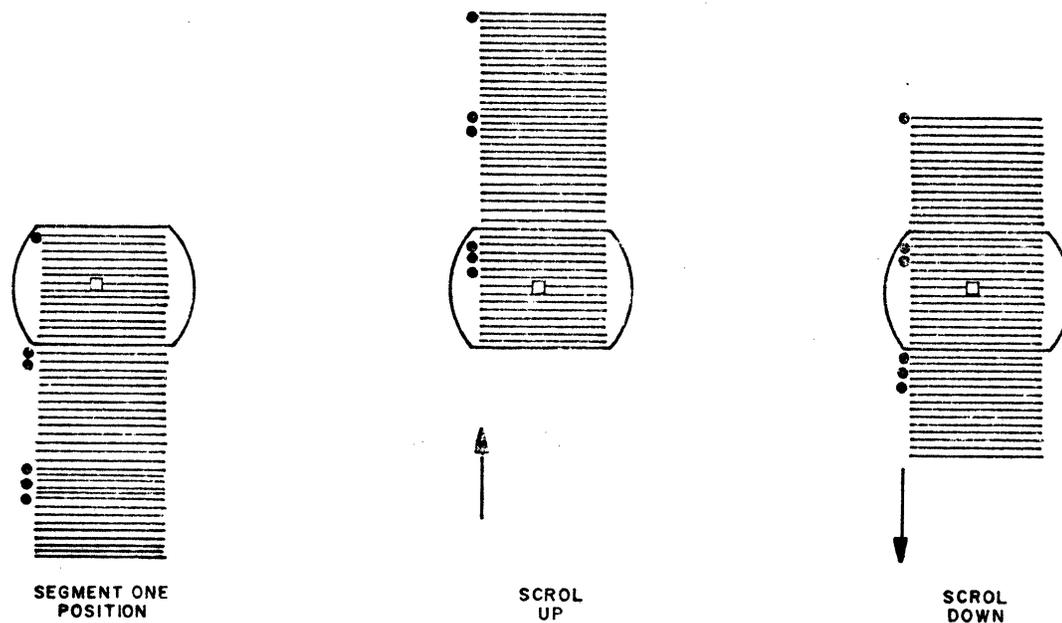


Figure 12: Scrol Up/Down Operation.

Figure 13 is a simplified diagram that illustrates the direction of the cursor by means of the CURSOR controls and the HOME key control.

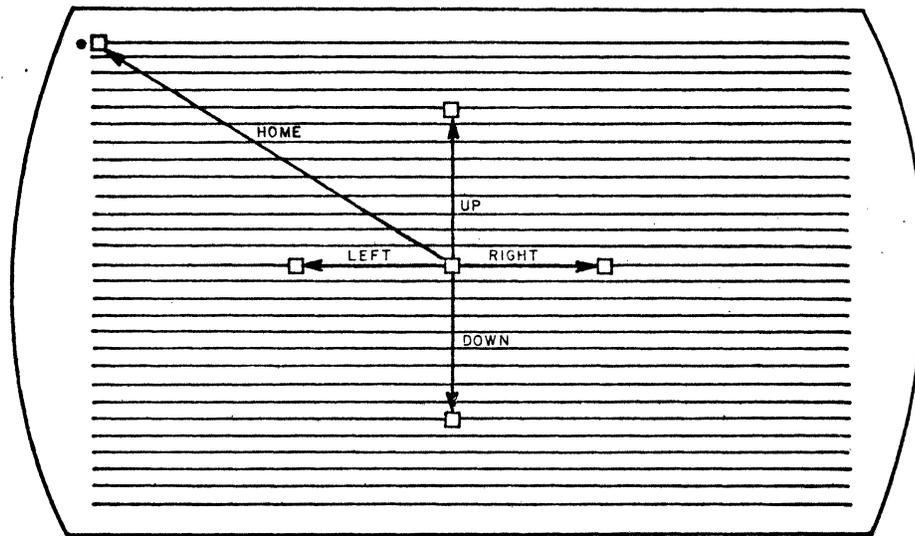


Figure 13. Cursor Controls and Home Operation

When one of the cursor control keys is pressed, the cursor moves in the selected direction until one of the four edges of the screen is encountered. Movement is then stopped. The cursor is not positioned off the screen. The audible alarm is not actuated when one of the screen boundaries is encountered. When the Cursor Up and Cursor Down functions are implemented remotely, the system will cause scrolling in the appropriate direction when a screen boundary is encountered.

3.4.1.1 GENERAL OPERATOR FAMILIARIZATION

- (1) Press LOCAL. The LOCAL indicator lights indicating that the terminal is in the off-line mode.

NOTE

The single dot at the upper left hand corner of the screen indicates that memory segment 1 is being viewed.

- (2) Press SEGMENT ADV. Two dots indicate that segment 2 is being displayed (provided memory expansion option is installed).
- (3) Press SEGMENT ADV for the second time. Three dots indicate that segment 3 is being viewed (provided memory expansion option is installed).
- (4) Press SEGMENT ADV for the third time. Notice that segment 1 returns to the screen (provided memory expansion option is installed).
- (5) Enter your first and last name on the CRT by using the keyboard as an ordinary typewriter (do not use the SHIFT key).
- (6) Move the cursor left to the first character position of your first name. Press the SHIFT key and re-type the first letter of your name. (Notice the change from lower case to upper case).
- (7) Perform the same function for your last name.
- (8) Press the NEWLINE pushbutton key, notice that the symbol (≡) is displayed indicating the end of line. Also notice that the cursor is positioned on the next line.
- (9) While holding the CONTROL Key depressed, type the keys labeled with the ASCII controls.
- (10) Depress the CAPS LOCK key and lock it in the down position. This allows the generation of all capital letters without having to use the SHIFT key. Numbers and other non-alphanumeric keys are not affected by this action.

- (11) Press the CLEAR key. The cursor is moved to the HOME position (option #1).
- (12) Type NOW IS THE APPROPRIATE TIME FOR ALL GOOD MEN TO COME TO THE AID OF THEIR COUNTRY. Notice that the alarm sounds when you approach the end of line and also after the 80th character.
- (13) Move the cursor to the first character of the word APPROPRIATE. Press the CHARACTER DELETE key and hold down until the entire word is deleted. Leave a space between THE and TIME. Move the cursor to the end of the sentence and punctuate with a period.
- (14) Press the LINE DELETE key.

3.4.1.2 NEW LINE

The following paragraphs describe how the system uses the NEW LINE Code (\equiv) in a number of special ways:

Normally used to perform the function of Carriage Return followed by a Line Feed.

Provides a delimiter at the right end of a line so that all 80 characters on a line need not be transmitted.

Inserting the New Line code in the middle of a line of text causes; the New Line symbol to be entered, the rest of the line to be deleted, and performance of the Carriage Return and Line Feed function.

If the cursor is positioned to the right of the New Line symbol, any attempt to enter text is inhibited and an audible alarm sounds indicating an invalid operation.

Provides artificial protection to the end of the line.

A New Line code on the last line of available memory does not inhibit overstriking the spaces between (≡) and column 80.

If text has been entered in character position 80 of a line and the NEW LINE key is pressed, the system does not enter a New Line code into memory but the Carriage Return and Line Feed functions are performed.

If operation of this function attempts to place the cursor off the bottom of the screen, an automatic scroll up function is executed by the system.

3.4.1.3 CHARACTER CORRECTION

Figure 14 shows an example of text that requires editing.

The following steps describe the procedure for correcting a typing error.

- (1) Move the cursor over the incorrect character.
- (2) Enter the correct character. Note that cursor advances to cover next character.
- (3) Move the cursor to its original position (text entry can be resumed).

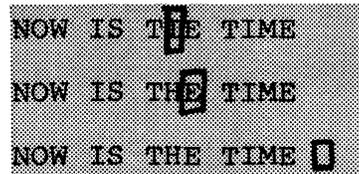


Figure 14: Correcting A Typing Error.

3.4.1.4 CHARACTER INSERT

The Character Insert function shifts the character under the cursor and characters to the right of the cursor right one character position. Figure 15 shows an example of text that requires editing. The procedure used to insert a character is:

- (1) Move the cursor to the position where the character that is omitted is to be entered.
- (2) Press the CHAR INSRT key (the cursor does not move and a blank is entered).
- (3) Enter the correct character. The cursor again advances to cover next character.

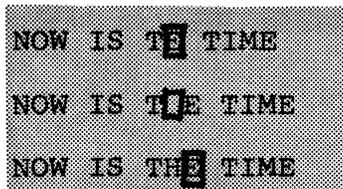


Figure 15: Inserting A Character

If several characters are missing, the CHAR INSERT key can be repeated to allow room for the missing characters. Non-blank text continues to shift right until one of the

following conditions occurs, which causes the Character Insert function to fail and an audible alarm sounds.

- The end of the line is reached.
- A tab stop is encountered.
- A protected character is encountered (provided the system is not in Form Enter mode.)

NOTE

Protected data is not moved or modified unless the system is in Form Enter mode.

If the New Line symbol () is shifted into character position 80, the next Character Insert function will cause the symbol to go off the screen and the character to the left of the New Line character to be shifted into character position 80. This causes the audible alarm to sound and terminates the Character Insert function.

3.4.1.5 CHARACTER DELETE

The CHAR DELETE key is used to delete the character under the cursor and shift the remaining characters to the right of the cursor to the left until a delimiter is encountered (Figure 16). Delimiters that define the end of a shiftable field are:

- A tab stop.
- A protected character (provided the system is not in Form Enter mode).

As the text is shifted left, blanks are inserted at the right end of the character string. The procedure used to delete a character is:

- (1) Move the cursor over the character to be deleted.
- (2) Press the CHAR DLETE key.

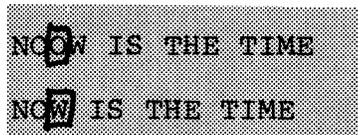


Figure 16: Deleting A Character.

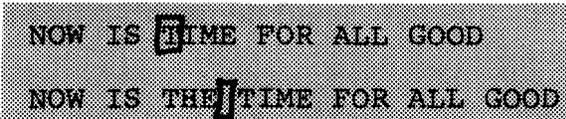
The Character Delete function can be repeated by holding the key in the down position.

3.4.1.6 WORD INSERT

The function of the WORD INSRT key is similar to the Character Insert function with the exception that a series of characters (word) can be entered eliminating the need to make room for individual characters (Figure 17).

The procedure used to enter a word (numeric or alpha characters) that has been omitted from the text is:

- (1) Move the cursor to the position where the word is to be inserted.
- (2) Press the WORD INSRT key.
- (3) Type the word.



```
NOW IS TIME FOR ALL GOOD
NOW IS THE TIME FOR ALL GOOD
```

Figure 17: Inserting A Word

All characters to the right are shifted right unless one of the following delimiters is encountered:

- Protected data (system not in Form Enter mode).
- End of the line.

When one of the delimiters is reached, an audible alarm sounds indicating an invalid operation, and the mode is terminated.

This mode of operation is terminated by: any character other than numeric or alpha, pressing the WORD INSRT key, or by using any cursor motion control key.

3.4.1.7 WORD DELETE

The function of the WORD DELETE key is to delete the word and the leading delimiter (Figure 18). The cursor can be placed over any alpha or numeric character in the word.

Other characters are considered delimiters and stop the deletion process. At the completion of the operation, the cursor is positioned over the non-alpha or non-numeric character that was to the right of the deleted word. The procedure used to delete a word from text is:

- (1) Position the cursor over any character of the word.
- (2) Press the WORD DLETE key.

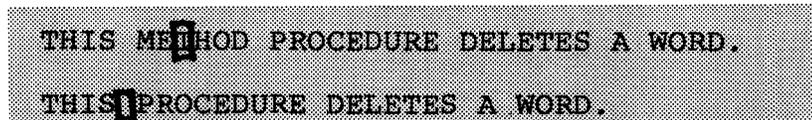


Figure 18: Deleting A Word

To delete protected data, the Form Enter mode must be enabled.

If the system is not in Form Enter mode and an attempt is made to delete a word that contains some (but not all) protected characters, the deletion process continues until a protected character is encountered and then terminates. (The protected characters remain in their original position.)

3.4.1.8 LINE INSERT

The function of the LINE INSRT key is to move the line that the cursor is on and lines below down one line. The cursor remains on the original line and is moved to character position one and the line is filled with blanks (Figure 19). The following three conditions must be met to permit operation of the Line Insert function:

- (1) In the Form Enter mode the last line of available memory must be blank.
- (2) If the system is not in Form Enter mode, there must be a blank line immediately preceding the next lower line that contains protected data, or the last line of memory.

- (3) The line the cursor is on cannot contain protected data when the system is not in the Form Enter mode.

If the three required conditions are not met, the Line Insert function is not performed, the cursor remains in the same position, and an audible alarm sounds indicating an invalid operation.

The procedure used to insert a line of text is:

- (1) Move the cursor to the line where the missing line is to be entered.
- (2) Press the LINE INSRT key.
- (3) All subsequent lines move down one line.

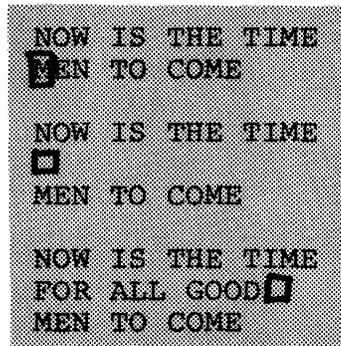


Figure 19: Inserting A Line.

If tabs are set on the line and a valid LINE INSERT command is initiated, they remain set when the text is shifted down a line (additional tabs will not be generated); however, the Line Insert function will shift all other control status (protect, underline, and highlight) associated with the data.

3.4.1.9 LINE DELETE

The function of the LINE DELETE key is to delete the line the cursor is on and move the subsequent lines of text up one line. The cursor remains on the original line and is moved to character position one (Figure 20).

If the line the cursor is on contains protected data and the system is not in Form Enter mode, the operation is not performed and an audible alarm sounds indicating an invalid operation.

If the system is not in Form Enter mode and the line does not contain protected text, subsequent lines are shifted upward until a line with protected text is encountered. The protected line is not moved and a blank line is inserted above the protected line.

If tabs are set in the area that is modified by the Line Delete function, they remain set in the same location after the operation. Tabs will not move up with the text; however, all other control bits (protect, underline, and highlight) associated with the text are moved up.

The procedure used to delete a line of text is:

- (1) Position the cursor on the line to be deleted.
(Cursor can be positioned over any character of the line.)
- (2) Press the LINE DELETE key.

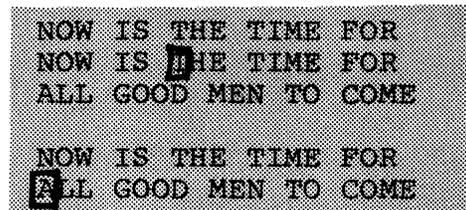


Figure 20: Deleting A Line.

3.4.1.10 LINE ERASE

The function of LINE ERASE key is to delete text under the cursor and to the right until the end of line is encountered. To delete protected data and/or underlines, the system must be in the Form Enter mode. If the system is not in the Form Enter mode, only unprotected text and highlights are deleted.

If tabs are set in the area that is modified by the Line Erase function, they remain set in the same location after the operation.

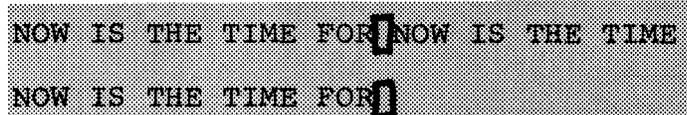
If the operation is valid and text is deleted, the protect and highlight bits are also deleted. Underlines are deleted only in Form Enter.

If the cursor is over character position one, the line is filled with blanks and subsequent lines are not moved up. Figures 21 and 22 illustrate the line erase function used for partial and complete line erasure.

The procedure used to delete a partial line of text is:

- (1) Position the cursor over the first character that is to be deleted.

- (2) Press the LINE ERASE key.

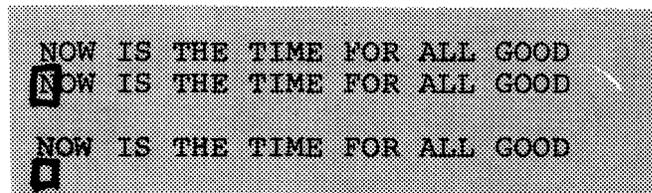


```
NOW IS THE TIME FOR NOW IS THE TIME
NOW IS THE TIME FOR
```

Figure 21: Partial Erasure of A Line.

The procedure used to delete a complete line of text is:

- (1) Position the cursor over the first character (character position one) of the line.
- (2) Press the LINE ERASE key.



```
NOW IS THE TIME FOR ALL GOOD
NOW IS THE TIME FOR ALL GOOD
NOW IS THE TIME FOR ALL GOOD
```

Figure 22: Complete Erasure of A Line.

3.4.1.11 HOME

The function of the HOME key is to move the cursor to the upper left-hand corner of segment one (Figure 13). The entire contents of segment one are displayed on the display monitor (Figure 10).

3.4.1.12 CLEAR

The function of the CLEAR key is to clear data and control status (except tabs) from the cursor position to the end of available memory.

If the system is in the Form Enter mode all data and control (except tabs) are cleared.

If the system is not in Form Enter mode, only unprotected data and control (except tabs) are cleared.

3.4.1.13 SEGMENT ADVANCE/SCROLLING

NOTE

This procedure is used only when the memory expansion (segment 2 or 3) option is installed in the terminal.

The function of the SEGMENT ADVANCE key is to advance the display on the display monitor so that the next 24 lines (segment) of text can be displayed (Figure 11 and Table 9).

If line scrolling caused portions of two memory segments to be displayed, initiation of this function (segment advance) would advance the display to the beginning of the segment that is partially displayed on the lower portion of the screen. The operation of this function includes a wrap around feature that allows segment one to follow segment two in a two segment system. Also, in a three segment system, segment one follows segment three.

The procedure used to perform the Segment Advance and Scrol Up/Scrol Down (Figure 12) operations is as follows:

- (1) Press the HOME key.
- (2) Type SEGMENT ONE and press SEGMENT ADV.

- (3) Type SEGMENT TWO and press SEGMT ADV.
- (4) Type SEGMENT THREE and press SEGMT ADV.
- (5) Press SCROL UP pushbutton key (notice the appearance of SEGMENT TWO on the last line).
- (6) Hold SCROL UP in the down position until SEGMENT TWO moves to the first line (position of cursor).
- (7) Press SCROL UP key (notice the appearance of SEGMENT THREE on the last line).
- (8) Hold SCROL UP in the down position. SEGMENT THREE moves to the first line and an alarm sounds (the scrolling operation does not include a wrap around feature).
- (9) Perform a similar operation for the SCROL DOWN function.

3.4.1.14 HIGHLIGHT AND UNDERLINE

The function of the HIGHLIGHT key is to place the system in a mode where any data (protected or unprotected) entered is blinked from full intensity to half intensity. This permits the operator to place emphasis on certain parts of the text.

The function of the UNDERLINE key is to cause all subsequent entered characters to be underlined. Perform the following steps:

- (1) Insure that FORM ENTER light is off.
- (2) Press the HIGHLIGHT key. (Indicator light goes ON.)
- (3) Press the UNDERLINE key. (Indicator light goes ON.)
- (4) Type THIS LINE IS HIGHLIGHTED AND UNDERLINED.
- (5) Press the CLEAR key (all but underline are erased).
- (6) Press the FORM ENTER key (Indicator light goes ON).
- (7) Press the CLEAR key (underlines are erased).

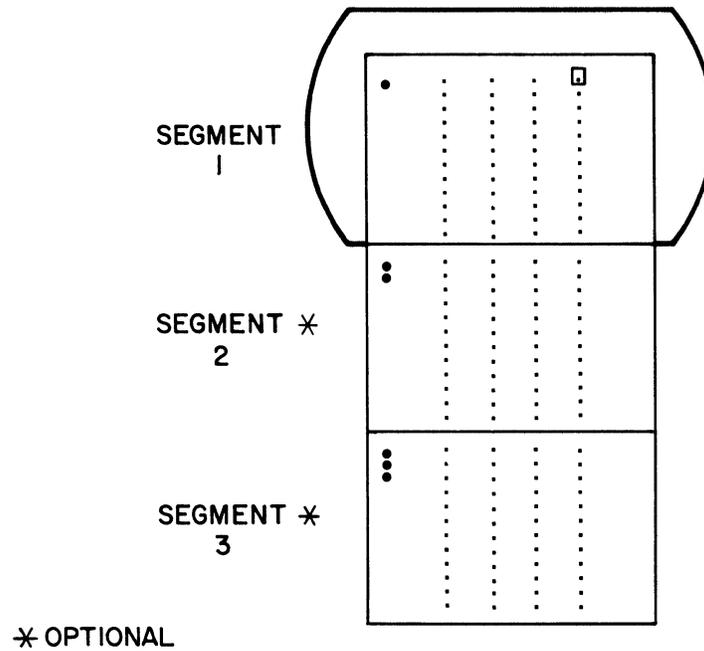
3.4.1.15 FORM ENTER

The function of the FORM ENTER key is to place the system in a mode where text appearing on the screen (and entered into memory) is protected. Perform the following steps.

- (1) Press the FORM ENTER KEY. (Indicator light goes on.)
- (2) Type THIS IS PROTECTED DATA.
- (3) Press the FORM ENTER key. (Indicator light goes off.)
- (4) Move the cursor over one of the protected characters and attempt to use the editing controls to alter data. (Any attempt to alter data fails and an alarm sounds indicating an invalid operation).
- (5) Press the NEW LINE key.
- (6) Type THIS IS UNPROTECTED DATA.
- (7) Use any of the editing controls to alter the unprotected text. (Note that the operation selected is performed.)
- (8) Press the CLEAR key. (All data except protected are removed from the screen.)
- (9) Press FORM ENTER key.
- (10) Move the cursor over one of the protected characters and attempt to use the editing controls to alter the data. As long as the Form Enter mode is entered, the protected data can be changed.

3.4.1.16 TAB SET

The function of the TAB SET key is to place a column of tab stops from the cursor position to the end of memory (single tab set can only be set remotely). Figure 23 shows four columns of tabs being set.



- Move cursor to desired top stop location.
- Press the TAB SET key.
- Tab stops are set where the cursor is positioned and to the end of memory.

Valid Tab Stops are:

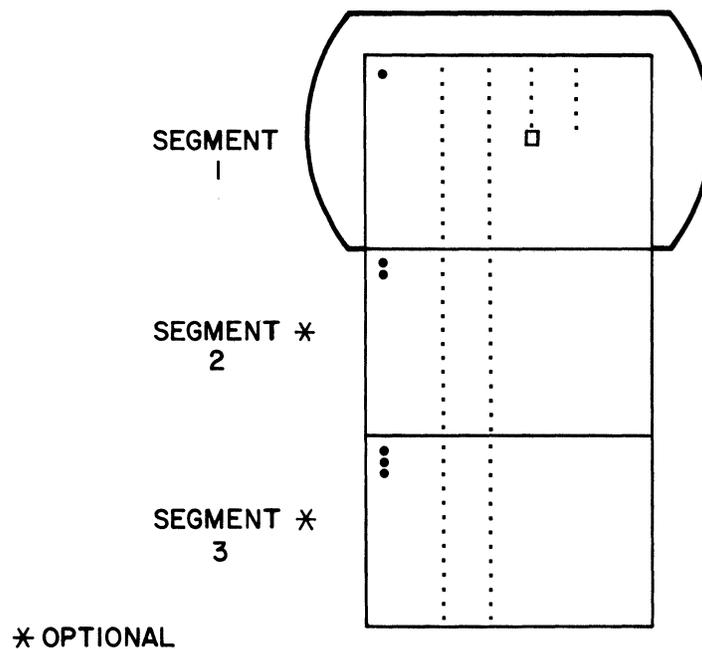
- Tab mark in variable field.
- First variable character following a protected field.
- Character position 1 of a line if unprotected.
- Character position 80 of the last line of memory.

Figure 23: Entering Tab Stops.

3.4.1.17 TAB CLEAR

The function of the TAB CLEAR key is to clear all tab stops to the right and below the cursor position.

Since the tab set function placed a column of tabs to the end of memory, the Tab Clear function is used to clear unwanted tabs. (Figure 24 shows the deletion of tab stops.)



- Tab stops at the cursor position and to the right and below are cleared when the TAB CLEAR key is pressed.
- All other tab stops remain.

Figure 24: Deleting Unwanted Tab Stops.

3.4.1.18 CURSOR TAB

The function of the CURSOR TAB key is to advance the cursor to the next tab stop set by the TAB SET key. Each time CURSOR TAB is pressed, the cursor moves to the next tab stop.

If no tab stops are set, the cursor stops at the first character position of the next line.

When the last line of memory is encountered, the cursor remains at the 80th character position and an audible alarm sounds.

3.4.1.19 TAB

The function of the TAB key is identical to the Cursor Tab function with the exception that the HT symbol (▼) is displayed and variable text between the HT symbol and the next tab stop is changed to blanks. If protected text (all characters and spaces) is between the HT symbol and next tab stop and the FORM ENTER mode is not entered, the protected text is not changed. The cursor stops at the end of the protected field.

3.4.1.20 FORM SEND

The function of the FORM SEND key is to override the options (Table 6) that are associated with the SEND key and causes all text to be sent as it is displayed on the display monitor.

3.4.2 TEXT FORMATTING

Protected field and variable field are terms used to describe the type of text displayed on the display monitor. Protected text is analogous to the information on a pre-printed form (Figure 25) which contains the title and headings but is not completed. Variable text is analogous to the information that is entered onto the form to complete it (Figure 26). Figure 25 illustrates the preparation of a typical business form. The information is displayed at half intensity and must be entered in the FORM ENTER mode.

The following steps describe the procedure for preparing the form in fixed (protected) format.

- (1) Press the FORM ENTER key.
- (2) Press the CLEAR key.
- (3) Enter the text in the desired format.

NOTE

To space between title fields
use the cursor motion keys. If
the space bar is used, the inter-
vening blanks will be protected.

- (4) Use the cursor and editing controls to correct any errors.
- (5) If required, set tab stops.
- (6) Once the form is typed to the satisfaction of the operator, press the FORM ENTER key. (All subsequent entry onto the display will be unprotected text).
- (7) Press the HOME key.
- (8) Press the CURSR TAB key. (The cursor moves to the start of the next variable field or tab setting).

Figure 26 illustrates variable text entry. The variable text is displayed at full intensity. This information is entered using the CURSR TAB (to position the cursor to the next variable text entry) and typing the variable text (Figure 25).

Enter all text as if typing text onto a pre-printed form via a typewriter.

ALPHA VACUUM COMPANY

SALES ANALYSIS

DEPARTMENT SALES FOR THE WEEK ENDING: _ _ / _ _ / _ _

DEPARTMENT	NAME	SALES	RETURNS
------------	------	-------	---------

DIVISION TOTAL:

Figure 25: Entering Protected (Fixed) Data.

ALPHA VACUUM COMPANY

SALES ANALYSIS

DEPARTMENT SALES FOR THE WEEK ENDING: 06 / 07 / 74

DEPARTMENT	NAME	SALES	RETURNS
SLOW DEP	SMITH, J.	820.00	- 20.00
BETTER DEP	JONES, G.	10,000.32	-150.13
BEST	DOE, J.	20,000.00	-1000.00
DIVISION TOTAL:		(28,650.19)	

Figure 26: Entering Unprotected (Variable) Data.

Correct any errors by using the cursor and editing controls.

The subsequent paragraph describes the procedure used to transmit the data.

After transmission, the variable data can be cleared (Press CLEAR) and new variable data entered into the form.

NOTE

The tabs and protected data will not be cleared from the display when the variable data is cleared.

3.4.3 TEXT TRANSMISSION

Once the text has been entered onto the display and edited, it is ready for transmission. To send the data to the remote location, perform the following;

- (1) Enter the End-of-Text (or any valid ASCII termination character) after the last character that is to be transmitted (Table 6, option 22).
- (2) Return the cursor to the first character that is to be transmitted (Table 6, option 13).
- (3) Press the SEND key.

The cursor moves left to right and line-by-line over the character as it is being transmitted. The cursor continues in this manner until the ASCII control character used to halt transmission has been reached. At the completion of transmission, the cursor is positioned over the end-of-message character.

During transmission of a message consisting of more than one line of text, the code for carriage return and line feed (NEWLINE) is transmitted at the end of each line.

Immediately after the operator presses the SEND pushbutton, any keyboard entry except the LOCAL key is ignored until message transmission is complete.

NOTE

If the LOCAL pushbutton key is pressed during transmission, the transmit carrier is dropped, thereby aborting the message.

3.4.4 TEXT PRINTING (OPTIONAL)

The operator can elect to print the text before transmission.

To print the text before transmission, press the PRINT LOCAL key. All data stored in the terminal's memory is transferred and printed on the associated local printer.

3.4.5 TEXT RECEPTION

The terminal enters this mode of operation when the REC pushbutton is pressed. In this mode, the terminal is conditioned to receive the data from the remote site via the communication link.

Received data starts loading at the position of the cursor and proceeds sequentially from there with each character entry.

The cursor moves on the display left-to-right and line-by-line, positioning over the character as it is being received. The cursor continues in this manner until a valid ASCII control character used to halt transmission has been reached.

3.4.6 INTERACTIVE COMMUNICATIONS

The ICC 40 + DDS terminal can be placed in the SEND/RECEIVE (S/R) interactive mode of operation (if option is available). In this mode, communication with a remote device is made on a line basis or a multiple line basis without the requirement of switching from Send-to-Receive or Receive-to-Send modes of operation.

3.4.6.1 SINGLE LINE CONVERSATIONAL MODE

- (1) Press S/R pushbutton. The S/R and LOCAL indicators light.
- (2) Enter one line of text, ending message by pressing the CR (RETURN) key.

NOTE

The cursor automatically returns to the beginning of the line and transmission of the text and CR character occurs.

- (3) The terminal is automatically placed in the receive mode.
- (4) The terminal remains in this mode until a reply message is received from the other source. (Normally a line feed character.)

- (5) After the reception of the reply message, the terminal automatically enters the S/R and local mode of operation.
- (6) The terminal switches back and forth from one mode to the other until the conversation is completed.

3.4.6.2 MULTI-LINE CONVERSATION MODE

Paragraph 3.4.6.1 described the operation for a single line text transmission. For a multi-line transmission, the message must begin with the DC2 control character and end with the DC4 control character. The procedure is:

- (1) Press S/R pushbutton. The S/R and LOCAL indicators light.
- (2) Press the DC2 control character (indicates more than one line of text follows).
- (3) Enter text.
- (4) End message by pressing the DC4 control character.
- (5) Manually return the cursor over the DC2 control character. (In single line transmission, the cursor is automatically returned to the first character).
- (6) Press the SEND pushbutton. The cursor is positioned over each character as it is transmitted and stops over the DC4 control character. Then, the terminal automatically goes into the RECEIVE mode of operation.

NOTE

DC2 control character starts the line of text for a multi-line text transmission. In this mode of operation, the text must be terminated with the control character DC4.

3.4.7 TYPES OF OPERATION

The ICC 40 + DDS terminal operates over dial (DDD) or dedicated networks. The terminal control circuits

eliminate any operator involvement with communications, unless specific calls are originated via the DDD lines by the operator-

3.4.7.1 LINE OPERATION

When in the SEND mode, the data from the cursor Table 6, (option 13) to the end of message character is read out of memory. The system then enters the receive or local mode (optional). If the system has been placed in the PRINT ON LINE mode, received data is printed and the system remains in receive (unattended receive).

3.4.7.2 MULTIPOINT OPERATION

The terminal can be configured (optional) to operate in a multi-station environment. This method permits several terminals to share one communication line. Each terminal is allocated an unique address code and contains decoding circuits to make automatic responses when its address appears on the line. In this way, the computer can poll and/or select each terminal in turn by issuing the address code and then waiting for the terminal's response.

3.4.7.3 PRINT LOCAL

If a hard copy of the text displayed on the display module is desired, it can be obtained by pressing the PRINT LOCAL key.

3.4.7.4 FORMAT (PRE-STORED FORMS) FEATURE

Format information can be entered either from the keyboard or from the remote site. Paragraph 3.4.2 described the procedure for preparing the pre-stored forms.

As a strap option (Table 6), the variable text (unprotected) can be transmitted either with the form (protected) or without the form. Selection of this option would depend upon whether or not the receiving terminal or receiving printer requires the pre-stored form.

3.4.7.5 ESCAPE SEQUENCES

The terminal incorporates a number of editing functions that can be used from a remote device via the communication line. Table 10 provides a listing of the various functions and describes their usage. To use the escape codes, simply enter the ESC character and the applicable escape code.

Table 10: Remote Escape Sequences

FUNCTION	ESCAPE CODE	DESCRIPTION
TAB SET (SINGLE)	0	Sets a single tab stop at the cursor position (line of cursor only).
TAB SET (COLUMN)	1	Sets a column of tab stops at the cursor character position of the line and all subsequent lines to the end of memory.
TAB CLEAR	2	Clears all tabs that are to the right and below the cursor on all lines to the end of memory.
HIGHLIGHT ON	3	All text protected or unprotected are blinked from full to half intensity.
HIGHLIGHT OFF	4	Resets the Highlight On function.
UNDERLINE ON	5	All text entered are underlined.
UNDERLINE OFF	6	Resets underline function.
CURSOR UP	7	Moves cursor up one line. When the top boundary is encountered, scroll down 1 line occurs. If cursor is positioned at line 1, segment 1, the cursor will not move.
CURSOR DOWN	B	Moves cursor down one line. When the bottom boundary is encountered, scroll up 1 line occurs. If cursor is positioned at last line, last segment, the cursor will not move.
CURSOR RIGHT	C	Moves cursor right one character. Movement stops when right boundary is encountered.
CURSOR LEFT	D	Moves cursor left one character. Movement stops when left boundary is encountered.

Table 10: Remote Escape Sequences (cont'd)

FUNCTION	ESCAPE CODE	DESCRIPTION
LINE ERASE	E	Deletes unprotected text from cursor inclusive to end of line. Used with FORM ENTER to delete protected data.
CURSOR RETURN	G	Moves cursor to first character position of the current line.
CURSOR HOME	H	Positions cursor to the upper left corner (character position 1) of segment 1.
CLEAR COND.	J	If the system is in FORM ENTER mode, all data except tabs are cleared. If the system is not in FORM ENTER mode, only unprotected data except tabs are cleared.
RETURN TO LOCAL	L	Used only in turn-around test mode. The data link remains connected and the terminal is placed in LOCAL mode.
CURSOR NEW LINE	N	Moves cursor to character position 1 of the subsequent line.
DEVICE RESET	R	Clears all text (protected, unprotected, and tabs) from memory. Moves cursor to HOME position and displays segment 1.
FORM ENTER ON	W	Places terminal in protected mode.
FORM ENTER OFF	X	Resets protected mode.
CURSOR TAB	@	Moves cursor to first tab stop. If tabs are not set, cursor moves to start of next line.

4.0 SYSTEM FAULT ISOLATION

Before performing the more detailed procedures of this paragraph to isolate an apparent system fault, insure that the following superficial checks are made.

- (1) Check that the LOCAL indicator (located on the keyboard) is lit. If not,
- (2) Ensure that the POWER switch (located at the rear of the logic module) is set to ON.
- (3) Check for loose cable connections. Secure if necessary.
- (4) Verify correct ac voltage and frequency.
- (5) Check for blown ac fuse (located at rear of the logic module). Replace, if necessary.

If a superficial check of the terminal and connections fails to correct the fault, a systematic check of the system should be performed to determine if the fault is within the terminal, modem, or line.

NOTE

Diagnostic information will be supplied at a later date.