

2511 COMMUNICATIONS DISPLAY TERMINAL (CDT)
 WITH CDDC802 MODULE
 INSTALLATION AND CHECKOUT PROCEDURES

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1. GENERAL	1	1.01 This section provides the installation and checkout procedures for the Series 2511 Communications Display Terminal (CDT). Issue 1 of this section was a limited printing edition that did not receive general system wide availability nor distribution. This reissue of this section incorporates the latest engineering design changes and is the first standard printing available for general Bell System distribution. Field change notice information has been included into this section, wherever applicable, up to and including TCN1582.
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PRELIMINARY	14	(a) There should be adequate space allowed in back of and in front of the unit for ease of operation and maintenance. At least 14 inches are required in back of the unit so that the cabinet top can be unlatched and pivoted to the open position.
POWER-ON	14	(b) There should be a 115 v ac $\pm 10\%$ 60 hertz polarized (3-wire) outlet within easy reach for the CDT power cord. The wall outlet (receptacle) must have provision to provide earth ground or equivalent to the ground terminal of the CDT power cord.
DISPLAY	14	(c) The customer ac power source (wall or floor receptacle) must have adequate wiring and fuse protection capable of managing the CDT current load requirements.
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2.02 Remove the metal strap from the bottom of the shipping carton and discard. Remove the outer shipping container and the inside liner and discard. Carefully remove all packing detail and tape from the CDT cabinet. Take off the front and rear panels, remove the inner packing detail, and replace the panels. Remove the four brackets that secure the CDT to the skid. Remove the CDT from the skid (3.02) and place in desired operating area.

Note: The plywood packing detail found between the left side panel and right side panel need not be removed. It acts as extra support between the side panels and the framework.

3. INSTALLATION

CAUTION: EXTREME CARE SHOULD BE EXERCISED WHEN INSPECTING OR WORKING AROUND THE CATHODE RAY TUBE (CRT) AND THE HIGH VOLTAGE SUPPLY.

3.01 After the unit is unpacked, it should be visually checked for damaged parts, loose connectors, broken wires, and shorted terminals.

3.02 Do not attempt to lift the CDT set by the cabinet cover or by the keyboard shroud when unpacking or installing the set. The cabinet cover does not solidly latch and the keyboard shroud is not designed for lifting of the terminal. Always lift the terminal using the slide-out handles provided in the legs of the cabinet. Pull the handles out from the legs for transporting the set and push in when not in use. A carrier set may be ordered for transporting the set as described in Section 578-100-702.

3.03 External connections to and from the CDT display controller module or optional buffer and/or interface module should be made via the cable duct located at the center rear of the cabinet bottom.

3.04 When the CDT is in the proper location for installation, remove the cabinet front panel by loosening the 1/4-turn fasteners securing it in place. Loosen the two screws securing the module shelf and slide the shelf forward to the extended position. It may be necessary to loosen the mounting screws and move the module hold-down bar upward before the shelf will move forward.

3.05 When the CDT interconnects with devices other than the Series 2550 Cluster Controller terminal, a TP335600 Set of Parts (SOP) is furnished with the A module for use with customer-provided cabling. P-17E903 Western Electric cable, 24 conductor, 24 AWG stranded wire is recommended for customer use. Minimum usable wire size is 27 AWG.

3.06 When the CDT is used with a Series 2550 Cluster Controller terminal, connect one end of the TP335523 cable (5 feet approximate length) supplied with the terminal to JA301 (TRANSMIT), JA303 (RECEIVE), and JA401 (EXTERNAL CONTROL) and route the other end out of the cabinet by means of the cable duct in the bottom of the cabinet. The interconnecting cord to connect the CDT to the cluster controller is customer-provided — Chart 1 provides information regarding D50AB-type cords.

Note: It is suggested that all cords be ordered from Western Electric Company well in advance of the installation date to insure of their availability.

WARNING: BEFORE ATTEMPTING INSTALLATION OF THE CDT AND PROGRAMMING THE DISPLAY CONTROLLER-A-MODULE, BE CERTAIN THAT THE SET POWER ON/OFF SWITCH IS ROTATED TO THE OFF POSITION. ALSO MAKE CERTAIN THAT ALL CONNECTIONS TO EXTERNAL POWER HAVE BEEN REMOVED. FAILURE TO COMPLY WITH THIS INSTRUCTION COULD RESULT IN SERIOUS DAMAGE TO THE SET. IMPROPER REMOVAL AND REPLACEMENT OF CIRCUIT CARDS, OR COMPONENTS WITH POWER ON COULD RESULT IN A CHAIN REACTION TYPE DESTRUCTION OF THE NUMEROUS INTEGRATED CIRCUIT PACKAGES IN THE SET LOGIC CIRCUITS.

PROGRAMMING CDDC802 MODULE

3.07 JA402 and JA403 connectors on the CDDC module provide two wiring option fields for programming operation of the terminal. Use TP193220 straps or equivalent to interconnect the matrix terminals. The wired options available are listed in Table A and may be checked for proper operation using the descriptions given in Section 578-101-100.

TABLE A
CDDC STRAPPING OPTIONS

OPTION	OPTION FUNCTION	FIELD MATRIX CONNECTIONS		TO ENABLE OPTION		NOTES
		FIELD — PIN-TO-PIN		ADD OR DELETE	TP193220 STRAP	
1.	Reject Delete	JA403	A1 to B1	Add	Strap	1
2.	Reject Null	JA403	A2 to B2	Add	Strap	1
3. a.	End on ETX	JA403	A3 to B3	Add	Strap	1
b.	End on ETX	JA403	A5 to B5	Add	Strap	1
4. a.	End on FF	JA403	A4 to B4	Add	Strap	1
b.	End on FF	JA403	A6 to B6	Add	Strap	1
5.	Home on Transmit	JA403	A7 to B7	Add	Strap	1
6.	Home on Clear	JA403	A8 to B8	Add	Strap	
7.	Display Control Characters	JA403	A9 to B9	Add	Strap	
8.	Write Space on Horizontal Tabulate	JA403	A10 to B10	Add	Strap	1, 5
9. a.	End on EOT	JA402	A8 to B8	Add	Strap	1
b.	End on EOT	JA402	A9 to B9	Add	Strap	1
10.	View While Receive	JA402	A1 to B1	Delete	Strap	2
11.	View While Transmit	JA402	A2 to B2	Delete	Strap	2
12. a.	On-Line Edit	JA402	A3 to B3	Delete	Strap	3
b.	On-Line Edit	JA402	A6 to B6	Delete	Strap	3
c.	On-Line Edit	JA402	A7 to B7	Delete	Strap	3
13.	Protected Format and Highlight	JA402	A4 to B4	Delete	Strap	4
		JA402	A5 to B5	Delete	Strap	4
14.	Reject Carriage Return	JA402	A10 to B10	Add	Strap	1

NOTES

Note 1: Factory programmed (strap in) for option enabled.

Note 2: To enable the option, the TP322645 (MC645) circuit card in position XZA304 must be removed and replaced with a TP322646 (MC646) circuit card.

Note 3: This strap is required only when the on-line edit option is omitted from the CDDC module. See Table B option 13.

Note 4: This strap is required only when the protected format and highlight option is omitted from the CDDC module. See Table B option 7.

Note 5: Option is applicable only when TP322675 horizontal tabulate circuit card is provided in display controller module. See Table B option 5.

3.08 Other programming options affecting CDT operation are located on circuit cards in the CDDC802 module. Table B lists both the circuit card programming applicable to the basic set operation and also programming instructions for the optional features that may or may not be provided on the terminal. The shaded areas in the illustration for Figure 1 indicate the circuit

cards used in the display controller module if the associated optional feature is provided.

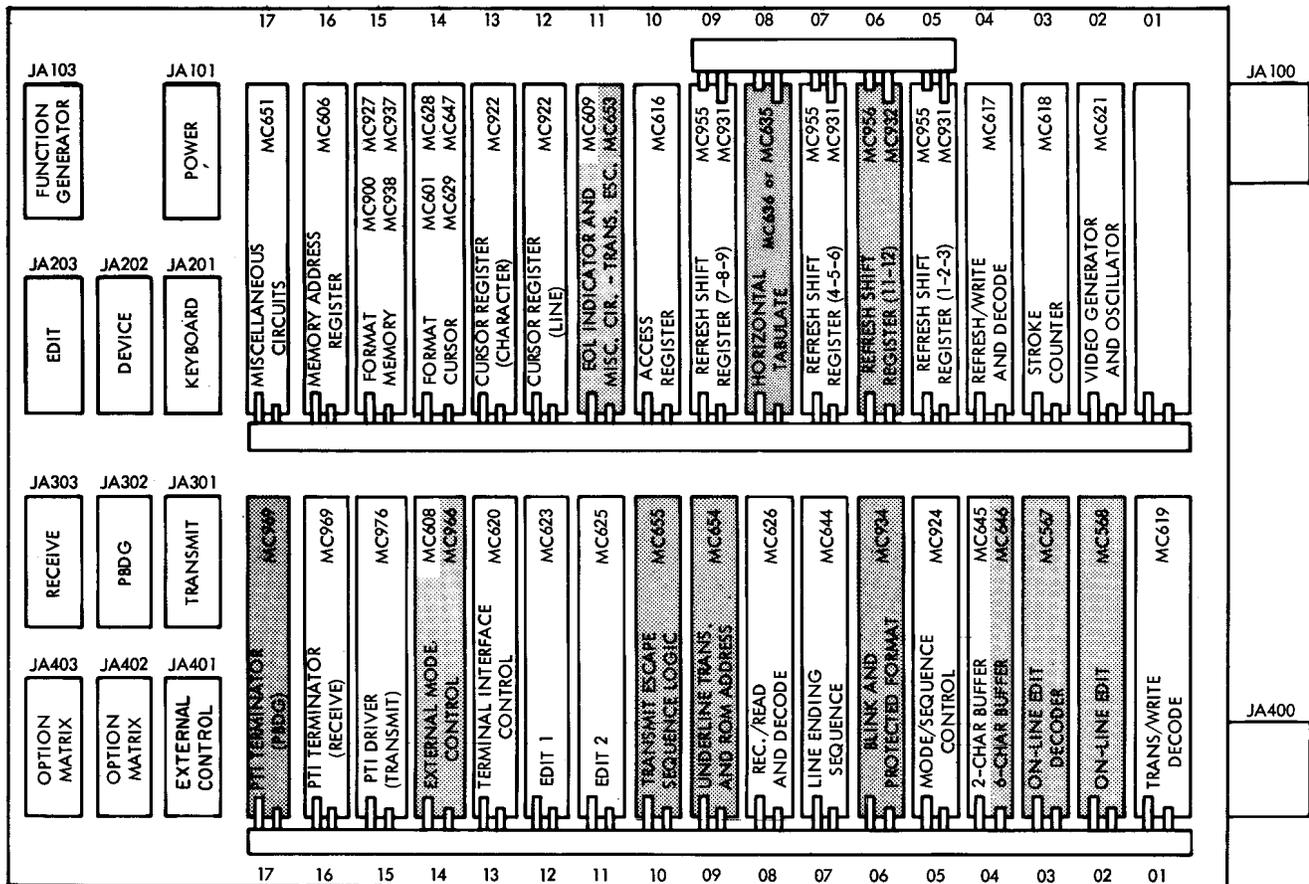
3.09 Spare circuit card programming screws (TP328022) may be stored in the spare positions on TP322608 (MC608) circuit card located in position XZA314.

CHART 1

D50AB-TYPE CORDS

Fifty-conductor vinyl jacketed cords. Conductors are No. 27 AWG stranded copper wire having vinyl insulation.
 The connector end is equipped with a KS-16690 L3 connector.
 The plug end is equipped with a KS-16689 L1 plug.
 Plugs are provided with nonreturnable dust covers.
 Length of cord must be specified in cord order; each cord must not exceed 1000 feet in length (maximum length allowed for Teletype PTI signals).
 Intended for use as a cord for the No. 2671B1M Telephone Set.

Code	Color of Jacket	Rating
D50AB-3	Black	AT&TCo Std
D50AB-51	Green	AT&TCo Std
D50AB-56	Yellow	AT&TCo Std
D50AB-58	White	AT&TCo Std
D50AB-59	Rose pink	AT&TCo Std
D50AB-60	Light beige	AT&TCo Std
D50AB-61	Light gray	AT&TCo Std
D50AB-62	Aqua blue	AT&TCo Std
D50AB-64	Turquoise	AT&TCo Std



- Shaded areas indicate optional feature.

Figure 1 - CDDC802 Circuit Card Arrangement (View From Wired Side)

TABLE B

CDDC MODULE OPTIONS AND CIRCUIT CARD PROGRAMMING

OPTION	OPTION FUNCTION	CIRCUIT CARD(S)	LOCATION	TO ENABLE OPTION	NOTES
1. a.	Automatic Line Ending Consisting of LF	TP322644	XZA307	Insert TP328022 screw (1) in J and remove screws (5) from H, G, P, L, and K.	2
b.	Automatic Line Ending Consisting of CR LF		XZA307	Insert TP328022 screws (2) in H and K and remove screws (4) from G, P, J, and L.	2
c.	Automatic Line Ending Consisting of CR CR LF		XZA307	Insert TP328022 screws (3) in H, G, L and remove screws (3) from J, P, and K.	1, 2
d.	Disable Line Ending Sequence—on LF		XZA307	Insert TP328022 screws (2) in P and J and remove screws (4) from H, G, K, and L.	3
e.	—on CR LF		XZA307	Insert TP328022 screws (3) in P, H, and K. Remove screws (3) from G, J, and L.	3
f.	—on CR CR LF		XZA307	Insert TP328022 screws (4) in P, H, G, and L. Remove screws (2) from J and K.	3
2.	Automatic Go Receive after Transmit	TP322620	XZA313	Insert TP328022 screw. (If option 6 is used, this screw should be removed.)	
3. a.	Check for End on Character Before Transmit	TP322924	XZA305	Program for either or all 3 b through d.	
b.	End On EOT		XZA305	Insert TP328022 screw (1) in Z.	1
c.	End On FF		XZA305	Insert TP328022 screw (1) in Y.	1
d.	End On ETX		XZA305	Insert TP328022 screw (1) in X.	1
4.	Underline Display	TP322617	XZA104	Insert TP328022 screw.	1

TABLE B

CDDC MODULE OPTIONS AND CIRCUIT CARD PROGRAMMING (Continued)

OPTION	OPTION FUNCTION	CIRCUIT CARDS (S)	LOCATION	TO ENABLE OPTION	NOTES
5.	Horizontal Tabulate	TP322635 or TP322636	XZA108	Enabled if the MC635 or MC636 circuit card is present in display controller.	6
6.	Stop Transmission on ETX, FF, or EOT			Install TP193220 wire straps to the display controller field matrix according to the programming listed in Table A.	
7.	Protected Format and Highlight	TP322934 TP322943 TP322956 TP322612	XZA306 MC612 XZA106 Cabinet	(Enabled if MC934, MC956, and MC943 circuit cards and associated parts are provided in the CDT.) When MC943 is plugged into MC612 function generator, screw option A must be removed from MC612 for highlight (Screw options B and C should also be removed on 2511 CDT sets).	5
8.	Transmit Unprotected Data Only	TP322653 TP322654 TP322655	XZA111 XZA309 XZA310 XZA310	Remove TP328022 screw (1) from T. Install TP328022 screw (1) in U. Remove TP328022 screws (3) from V, X, and Z. Install TP328022 screws (2) in Y and W. Remove TP328022 screw (1) from Z. Install TP328022 screw (1) in Y.	9
9.	Transmit Protected and Unprotected Data without Protected Data Delimiters	TP322653	XZA111	Remove TP328022 screw (1) from T.	1

— Shaded Areas Indicate Optional Feature Programming

TABLE B

CDDC MODULE OPTIONS AND CIRCUIT CARD PROGRAMMING (Continued)

OPTION	OPTION FUNCTION	CIRCUIT CARD(S)	LOCATION	TO ENABLE OPTION	NOTES
9. (contd)		TP322654	XZA111	Install TP328022 screw (1) in U. Remove TP328022 screws (3) from V, Y, and Z. Install TP328022 screws (2) in X and W. Install TP328022 screws (2) in Y and Z.	1
			XZA309		1, 9
		TP322655	XZA309		1
			XZA310		1
10. a.	Transmit Unprotected Data With Space Conversion on Protected Data (Space Fill)	TP322611	XZA111	Remove TP328022 screws (2) from T and U. Remove TP328022 screws (3) from V, Y, and W. Install TP328022 screws (2) in X and Z. Remove TP328022 screws (2) from Y and Z.	9, 10
			TP322654		
		TP322655	XZA309		
			XZA310		
10. b.	Transmit Unprotected Data with Delete Conversion on Protected Data (Delete Fill)	TP322653	XZA111	Remove TP328022 screws (2) from T and U. Install TP328022 screws (3) into V, X, and Z. Remove TP328022 screws (2) from Y and W. Remove TP328022 screws (2) from Y and Z.	9, 10
			TP322654		
		TP322655	XZA309		
			XZA310		
11. a.	Underline Lock	TP322934	XZA306	Install TP328022 screws (2) in X and Y.	
b.	Underline Lock with Form Fill		XZA306	Install TP328022 screw (1) in X and remove screw from Y.	
12. a.	End-of-Line Indicator	TP322653	XZA111	Enabled if MC653 circuit card and associated parts are provided in CDT; program for one of the following: 12 b through g.	4

— Shaded Areas Indicate Optional Feature Programming

TABLE B

CDDC MODULE OPTIONS AND CIRCUIT CARD PROGRAMMING (Continued)

OPTION	OPTION FUNCTION	CIRCUIT CARD(S)	LOCATION	TO ENABLE OPTION	NOTES
12. b.	If options 8, 9, 10 a, or 10 b are not provided		XZA111	Install a TP328022 screw in T and U.	
c.	If the CRT display is the 46 Line Format		XZA111	Install TP328022 screw in V.	
d.	If the CRT display is the 39 Line Format		XZA111	Install TP328022 screw in W.	
e.	If the CRT display is the 25 Line Format (Tone at 67 and 67 through 80 counts)		XZA111	Install TP328022 screw in X.	
f.	If the CRT display is the 25 Line Format (Tone at 72 and 80 counts only)		XZA111	Install TP328022 screw in Y.	
g.	If the CRT display is the 50 Line Format		XZA111	Install TP328022 screw in Z.	
13.	On-Line Edit (Reference 6.31 in Section 578-101-100)	TP322568 TP322567	XZA302 XZA303	Enabled if MC568 and MC567 circuit cards are present in display controller module (A).	
14. a.	External Mode Control	TP322966	XZA314	(Control signals furnished by external device or 2550 Cluster Controller) program for b, c, d or e, or f.	7
b.	Incoming Message Overwrite		XZA314	Install TP328022 screw in X.	8, 12
c.	Home Cursor upon Receipt of TDA Signal		XZA314	Install TP328022 screw in Z.	12
d.	CDT Go Local upon Receipt of TDA Signal		XZA314	Install TP328022 screw in V and remove screw from W.	13
e.	CDT Go Receive upon Receipt of TDA Signal	TP322966	XZA314	Install TP328022 screw in W, and remove screw from V.	13

■ — Shaded Areas Indicate Optional Feature Programming

TABLE B

CDDC MODULE OPTIONS AND CIRCUIT CARD PROGRAMMING (Continued)

OPTION	OPTION FUNCTION	CIRCUIT CARD(S)	LOCATION	TO ENABLE OPTION	NOTES
14. f.	Form Fill (Write NULL inhibit)	TP322966	XZA314	Install TP328022 screw in Y.	12
15.	Form Fill without Underline Lock	TP322934	XZA306	Remove TP328022 screws (2) from X and Y. Install TP328022 screw in Y. Install TP328022 screw.	10
		TP322966	XZA314		
		TP322568	XZA302		
16.	Keyboard Upper Case Only	TP322135	Cabinet	Remove screw from A and install into B.	
17.	Keyboard Upper Case and Lower Case	TP322135	Cabinet	Remove screw from B and install into A.	
18.	PTI Terminator	TP322969	XZA316	Reference 3.10	
19. a.	3000 WPM Receive or Transmit	TP322645	XZA304	Install circuit card.	
b.	12000 WPM Receive or Transmit	TP322646	XZA304	Install circuit card.	

NOTES

Note 1: Factory programmed (coded) with option enabled.

Note 2: Only one Automatic Line Ending Sequence 1 a through 1 c, may be selected at any one time.

Note 3: When Option 8, 9, 10 a, or 10 b is used, option 1 d must be removed from P.

Note 4: MC609 is used in XZA111 when End-of-Line Indicator Option is not provided.

Note 5: Horizontal Tabulate (Option 5) is a prerequisite for Protected Format and Highlight.

Note 6: MC635 or MC636 program screw should be positioned to the 802 position.

Note 7: MC608 is used in XZA314 when External Mode Control Option is not provided.

Note 8: If the CDT is operated with a cluster controller and pre-empt to receive of the CDT is desired, RS option on the respective CDT I/O port should be enabled. For controller programming, refer to Section 578-150-200.

 — Shaded Areas Indicate Optional Feature Programming

TABLE B

CDDC MODULE OPTIONS AND CIRCUIT CARD PROGRAMMING (Continued)

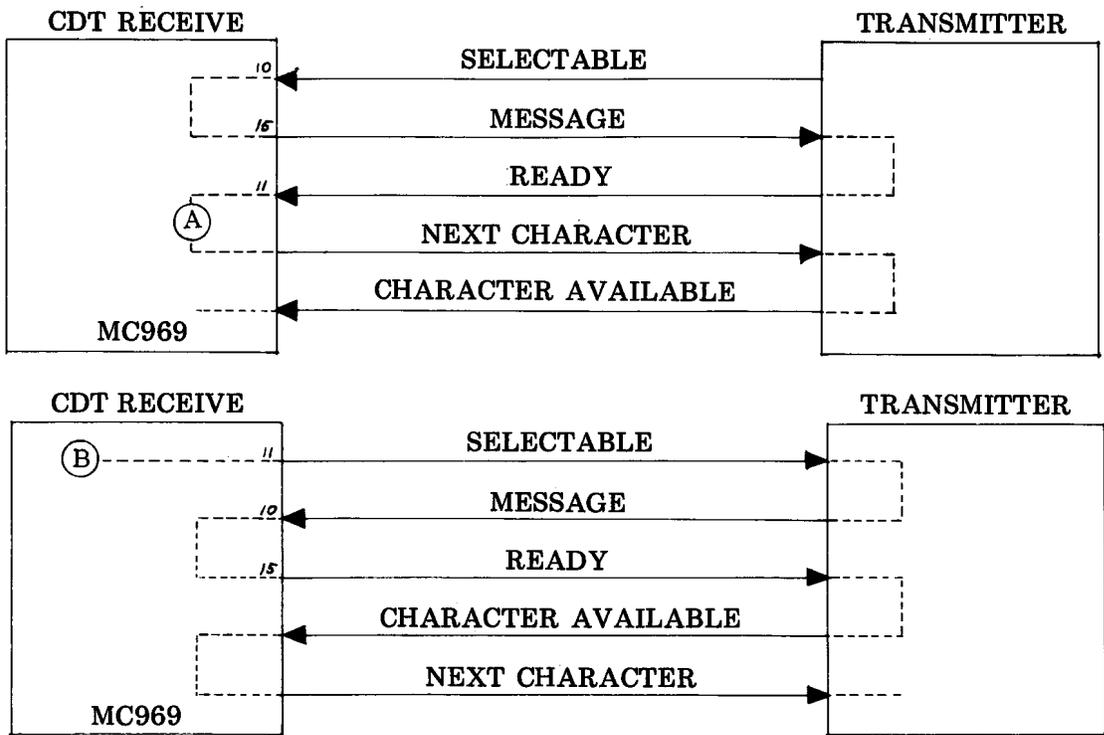
Note 9: The Delete Fill option (V) was not provided on early issue circuit boards.
Note 10: The Form Fill option was not provided on early issue circuit boards.
Note 11: Program screw should be in place on TP322617 (MC617) in position XZA104. Remove screw only if Read Only Memory (ROM) is TP335764 – Bell of Canada.
Note 12: Options 14. b., c., and f. can be programmed with either options 14. d. or e..
Note 13: Select either 14. d. or e., but not both.

Parallel Terminal Interface Terminator (MC969) Programming

3.10 The PTI terminator (MC969) interfaces the receive port of the CDT display controller module to a PTI compatible transmitter device located a maximum of 1000 feet of interconnecting cable length away. Remove the MC969 circuit card from the CDDC module, position XZA316, and program it (either option A or B) accordingly to the interface requirements of the terminal application using the following instructions. The point or arrowhead in the illustrations for A and B options indicates the

origination and direction of control signals between the terminal equipment.

- (a) Program the CDT terminal MC969 for option A, if the CDT interfaces with a parallel terminal interface (PTI) compatible transmitter that requires the following direction of control signals between the sender and receiver.
- (b) Program the CDT terminal MC969 for option B, if the CDT interfaces directly to PTI compatible station controller equipment that requires the following direction of control signals (noncontention station arrangement).



Note: CDT arrangements operating with the 2550 Cluster Controller use option B programming on the TP322969 (3.10) circuit card.

3.11 After completing programming of the CDDC module, reverse the removal procedure given in 3.04.

the copyholder mounting bracket to the holes provided in the opposite end and mount as shown in Figure 3.

CAUTION: CORD AND CABLE ROUTING PERFORMED WITHIN THE CDT DEVICE DURING INSTALLATION MUST BE PREVENTED FROM PRESSING AGAINST THE SCREEN GRILL OF THE CABINET VENTILATING FANS. ALWAYS MAKE CERTAIN THAT THE VENTILATING FANS IN THE CDT DEVICE OPERATE WHEN INSTALLATION IS COMPLETED.

Note: The information provided in this section is not intended to be used for ordering purposes. For instance, the character generator (ROM) and display format circuit cards and associated plug-in crystal (Chart 2) are used in the CDDC802 module but are not part of the module factory ordering code. Therefore, check with the appropriate ordering document or factory before placing orders.

4. STANDARD CHECKOUT PROCEDURES

3.12 The CRT display screen format used on the 2511 CDT terminal is contingent upon the display screen format ordered from the factory. Chart 2 lists the differences between display format circuitry and is provided for identification and reference purposes only.

4.01 The location of the various attendant controls, buttons, and keys referred to in the following procedures, can be found in Figures 4, 5, and 7 unless specifically stated otherwise.

3.13 The copyholder supplied with the CDT terminal is designed to mount on the left side of the cabinet cover, (Figure 2). If mounting on the right hand side is desired, reverse

CAUTION: ADJUSTMENT OF THE CONTROLS LOCATED BEHIND THE FRONT AND REAR PANELS OF THE CDT ARE TO BE PERFORMED ONLY BY QUALIFIED MAINTENANCE PERSONNEL.

CHART 2

2511 DISPLAY FORMAT OPTIONS

CRT DISPLAY FORMAT	CIRCUIT CARDS REQUIRED — POSITION	PLUG-IN CRYSTAL ON MC621 (XZA102)	NOTE
25 Line (Horizontal Tube)	TP322938 — XZA115 TP322647 — XZA114	TP335685 (16.63200 MHz)	1, 2
39 Line (Vertical Tube)	TP322937 — XZA115 TP322629 — XZA114	TP335686 (17.47872 MHz)	1, 2
46 Line (Vertical Tube)	TP322900 — XZA115 TP322601 — XZA114	TP335687 (17.90208 MHz)	1, 2
50 Line (Vertical Tube)	TP322927 — XZA115 TP322628 — XZA114	TP335688 (18.14400 MHz)	1, 2
<p>Note 1: MC601, MC628, MC629, and MC647 circuit card program screw should be positioned for CDDC802 operation.</p> <p>Note 2: Plug-in crystal on MC621 is provided on a factory ordered set. A replacement crystal must be ordered separately.</p>			

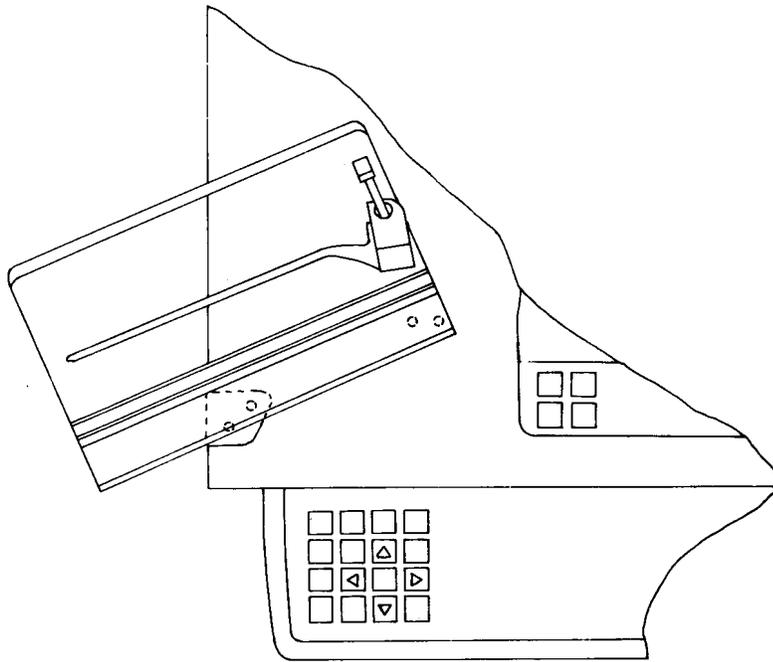


Figure 2 - Copyholder Mounting (Left Hand Side)

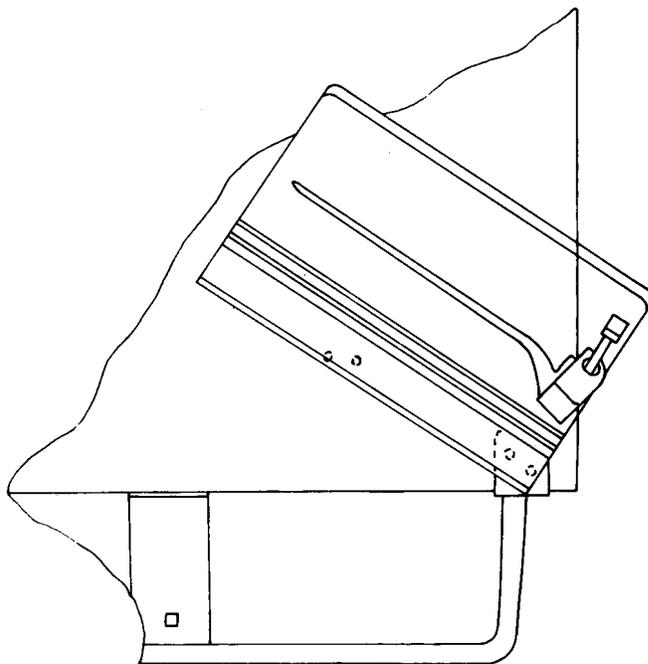


Figure 3 - Copyholder Mounting (Right Hand Side)

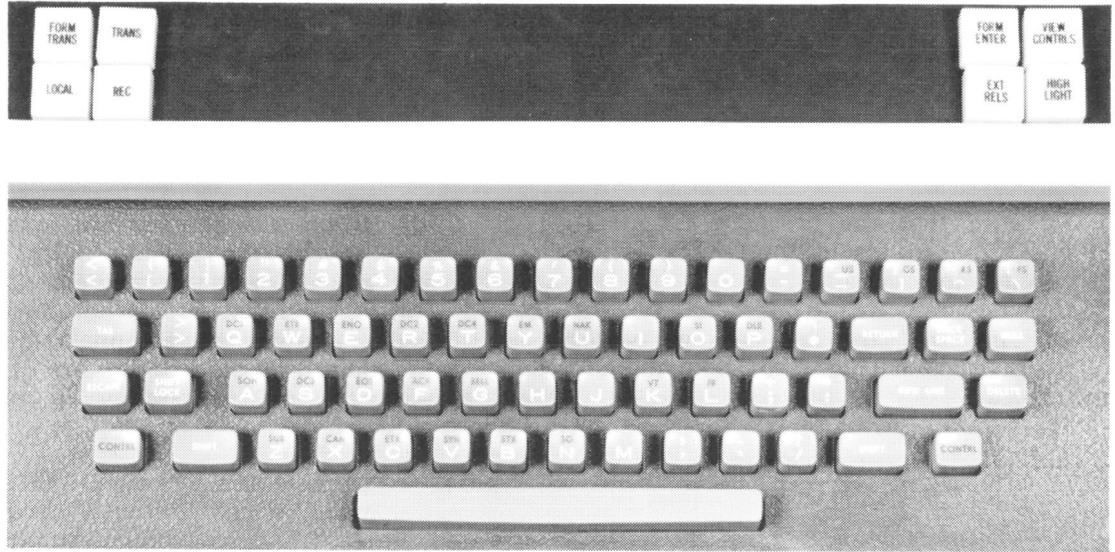


Figure 4 - Keyboard and Operating Controls

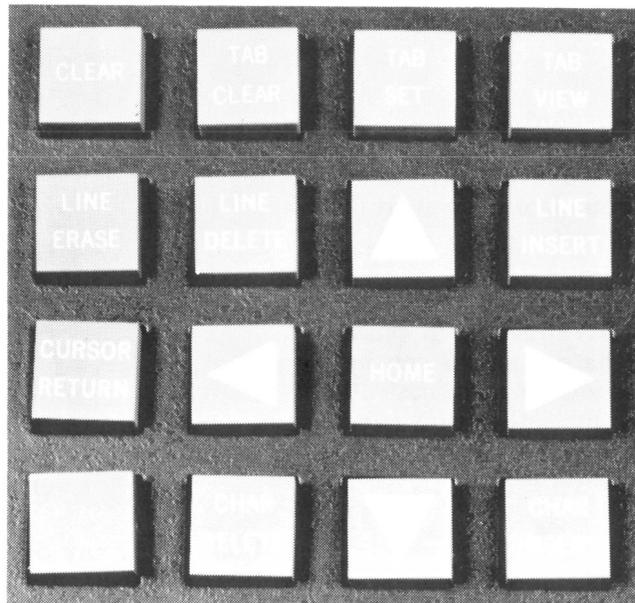


Figure 5 - Editing Cluster

PRELIMINARY

4.02 The following conditions must be met before power is turned on.

- (a) All internal cable connections must be secure.
- (b) Be sure that the ON/OFF BRIGHTNESS control is in the OFF position (full counterclockwise).
- (c) Be sure that the high voltage power supply switch (Figure 6) is in the ON position.

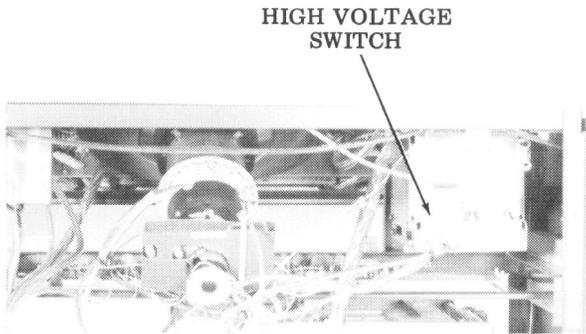


Figure 6 - High Voltage Power Supply

(d) Check that the power switch for the low-voltage power supply is in the ON position. If two low-voltage power supplies are used, both power switches must be in ON position.

(e) Connect the power cord to a standard 3-conductor, 115 v ac 60 Hz outlet. Be sure that the outlet is wired correctly and the third wire earth ground or equivalent is provided.

Note: Because of the interlock switches, the front and rear panels must be in place and the cover closed before power can be applied. It is recommended that at least 30 seconds be allowed for the cathode ray tube filaments to heat up before the ON/OFF BRIGHTNESS control is turned on.

POWER-ON

4.03 When the ON/OFF BRIGHTNESS control is rotated clockwise (ON), the following actions should take place.

- (a) The terminal LOCAL button lights.
- (b) The cabinet fans rotate.
- (c) A cursor (white rectangle) will appear at the upper left hand corner of the display.
- (d) If the cursor does not appear, rotate the BRIGHTNESS control clockwise and adjust for the desired intensity. If the correct intensity cannot be obtained, qualified maintenance personnel should adjust the main BRIGHTNESS control on the high voltage power supply using Section 578-101-700.

4.04 Depress the VIEW CONTRLS button, which should instantly become illuminated. A NULL (dot) should be displayed in every character position of the format.

DISPLAY

4.05 The displayed format should be centered both horizontally and vertically within the viewing area, and should be bright enough to be seen in a normally lighted room.

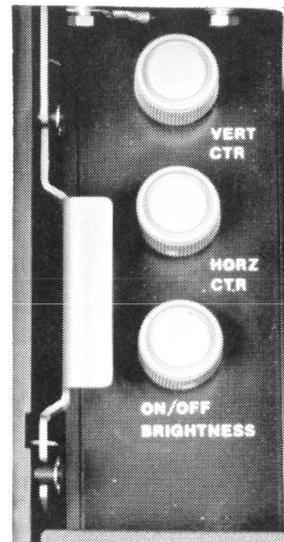


Figure 7 - Display Adjustment and ON/OFF Controls

4.06 If any of the conditions in 4.05 do not exist, they should be corrected by use of the display adjustment controls (Figure 7). If the condition still exists, refer to Section 578-101-700 for further adjustments.

4.07 The displayed format should be 8-1/2 inches by 11 inches. The CRT may be mounted into the set with the larger dimension either vertical or horizontal. If any adjustment is necessary, refer to Section 578-101-700.

KEYBOARD

4.08 Perform all of the keyboard functions, see Figure 4 for all characters, symbols, and control characters to be displayed. Make sure that the correct character or symbol is displayed. An abbreviation list and symbols are shown as displayed on the screen within the parentheses in the ASCII chart in Section 578-101-100.

4.09 All characters for a vertically mounted CRT should be approximately 0.140 inches high by 0.108 inches wide and in focus. For a horizontally mounted CRT, all characters should be 0.150 inches high by 0.113 inches wide. There should be some equal spacing between all the lines of the display. If adjustment is necessary, refer to Section 578-101-700.

4.10 Check that the following keyboard functions repeat when their appropriate key is held completely depressed.

- (a) NEW LINE (Line Space)
- (b) SPACE (Bar)
- (c) NULL
- (d) DELETE
- (e) BACK SPACE
- (f) X (upper and lower case)
- (g) * (upper case asterisk)
: (lower case colon)
- (h) = (upper case equal sign)
- (lower case hyphen)
- (i) _ (upper and lower case underscore)
- (j) . (upper and lower case period)

4.11 Depress the VIEW CONTRLS (View Controls) button (Figure 4). If the button was illuminated, it should go out and all control characters generated by the keyboard and shown on the display should be removed. If the button was not illuminated, it should light up and all control characters generated by the keyboard should be displayed. If the Display Control Characters option listed in Table A is enabled, control characters will always be displayed regardless of the on-off condition of the view controls switch.

EDITING CONTROLS

A. Keyboard

4.12 Check that the following editing functions are performed correctly by the keyboard (Figure 4).

(a) Depressing the spacebar should cause the cursor to move one character position to the right. This action can be continued until the end of the line is reached. Since this is a destructive function, all characters overlaid by the cursor will be replaced by a space when the spacebar is depressed.

(b) Depressing the BACK SPACE key should cause the cursor to move one character to the left. This action can be continued until the first character position of the line is reached. This is a nondestructive function, therefore, any characters backspaced over by the cursor will remain unchanged.

(c) Depressing the NEW LINE key should move the cursor to the first character position of the next line of the display. Should any characters be to the right of the cursor when NEW LINE key is depressed, they will be replaced by NULL characters. Since the NEW LINE function does not occur in the last line of the display, the entire last line may contain NEW LINE characters.

(d) Depressing the RETURN key should move the cursor one character position to the right and replace an existing character with a RETURN character.

(e) With the cursor located over a character in a line containing several characters, any characters generated from the keyboard should replace the existing characters that the cursor is positioned over.

B. Editing Cluster

4.13 Check that the following editing functions are performed correctly by the editing cluster (Figure 5).

4.14 Depressing the HOME button should place the cursor in the first character position of the first line regardless of its previous position.

4.15 Momentarily depressing the ► (Cursor Right) button should move the cursor one character position to the right, without disturbing any existing characters. Holding the button fully depressed should cause the action to repeat until the end of the line is reached. Further operation of the button should not cause changes in the cursor position.

4.16 Momentarily depressing the ◀ (Cursor Left) button should move the cursor one character position to the left, without disturbing any existing characters. Holding the button fully depressed should cause the action to repeat until the beginning of the line is reached. Further operation of the button should cause no change in the cursor position.

4.17 Momentarily depressing the ▼ (Cursor Down) button should move the cursor along a vertical axis downward one line position, without disturbing any existing characters. Holding the button fully depressed should cause the action to repeat until the bottom line of the display is reached. Further operation of the button should cause no change in the cursor position.

4.18 Momentarily depressing the ▲ (Cursor Up) button should move the cursor along a vertical axis upward one line position, without disturbing existing characters. Holding the button fully depressed should cause the action to repeat until the top line of the display is reached. Further operation of the button should cause no change in the cursor position.

4.19 With the cursor positioned somewhere near the middle of a full line of characters, depress the LINE ERASE button. The cursor should not move. All characters including the one that the cursor is positioned over to the end of the line should be replaced by NULLs. Those characters to the left of the cursor position should not be disturbed.

Note: The LINE DELETE and LINE INSERT functions described in 4.20 and 4.21 respectively, are inoperative in the first 6 lines of the 50 line format, the first 4 lines of the 46 line format, and the first line of the 39 line format.

4.20 Write characters in each line of the display format until all character positions are filled. Using the edit controls, position the cursor to the approximate center of the display. Depress the LINE DELETE button. The entire line in which the cursor is located should

be removed, and all lines below it should move up one line position. The cursor will remain on the same line but should go to the first character position in the line. The bottom line of the format should contain all NULL characters.

4.21 With the cursor located near the center of a line of characters, and the bottom line of the format containing either nulls or spaces, depress the LINE INSERT button. The line in which the cursor is located, and all lines below it, should move down one line position. The cursor should remain in the same line and go to the first character position of the line. The line should now contain all NULL characters. LINE INSERT is electronically prevented from operating if the last line of the display contains any character other than NULL or SPACE.

4.22 With the cursor near the center of a line filled with characters, momentarily depress the CHAR DELETE (Character Delete) button. All characters in the line to the right of the cursor should move one character position to the left. The character under the cursor should be deleted and a NULL character should be added at the end of the line. Holding the button depressed should cause the action to repeat until all characters, to the right of and including the cursor position, are deleted. If the horizontal tabulation option is installed, the character delete function will only occur between the horizontal tabulate markers located within the line.

4.23 Position the cursor over a character that has no other characters to the right (end of the line), and momentarily depress the CHAR INSERT (Character Insert) button. The character overlaid by the cursor should move one position to the right and a NULL character should take its place. Holding the button depressed should cause the action to repeat until the character originally under the cursor reaches the last character position of the line.

Note: The character insert function is operative until a character other than NULL or SPACE appears in the last character position.

4.24 Position the cursor near the middle of any line. Depress the CURSOR RETURN button. The cursor will move to the first character position in the line without disturbing any existing information.

4.25 With the cursor located near the center of a display that has some characters in every line, depressing the CLEAR button should

cause all characters from the cursor position to the end of the display to be changed to NULL characters. The cursor should not move during the entire operation. However, if the HOME or CLEAR option is enabled, the cursor will return to home position prior to the clear function.

5. OPERATIONAL CHECKOUT

TRANSMIT

Note: The following checkout procedure is applicable only if a receiving device is used to properly verify the data and parity transmitted by the CDT.

5.01 Prepare a message on the CDT using no line feeds or message ending character (EOT, ETX, or FF).

5.02 Depress the HOME button. The cursor should immediately go to the first character position of the first line without disturbing any displayed information.

5.03 Depress TRANSMIT button; no operation should be observed (button does not light).

5.04 Insert a message ending character at the end of the message and place the cursor in home position.

5.05 Depress the TRANSMIT button. The TRANS button should light, the CDT screen should go blank and transmission should occur. All keyboard and editing controls should be blinded during transmission. If the View While Transmit option is enabled, the CDT will not blank during transmission.

5.06 When transmission has been completed, the CDT should automatically go into the local mode, the transmitted message should reappear on the CDT screen, and the cursor should be located in the first character position after the message ending character (EOT, FF, or ETX).

5.07 Observe that the data at the receive device is the same as that transmitted with exception that an automatic line ending sequence is included following each line. The ending sequence is customer programmable for either CR CR LF, CR LF, or LF.

5.08 When transmission has completed, the CDT returns to local mode or to the receive mode if the Go Receive after Transmit option is enabled.

5.09 Prepare another message on the CDT and this time include a line feed at the end of each line. Also include the message ending character.

5.10 Depress the HOME button and then depress the TRANS button. If the Home on Transmit option is used, the cursor will automatically move to home position when only TRANS button is depressed.

5.11 Observe that the line ending sequence was generated for each line feed in the message at the receive terminal. If the option for inhibiting the line ending sequence upon detecting a LF CR LF or CR CR LF is enabled, see that only the ending sequence in the display was transmitted and not the ending sequence.

Note: When the CDT is equipped with FORM TRANSMIT button, Transmit mode can be programmed using one of three possible options for sending a message on-line when TRANSMIT button alone is operated. Transmit operation for these options is explained in Section 578-101-100.

RECEIVE

Note: The following checkout procedure is applicable only if the transmitting device used sends data that can be properly received and displayed by the CDT.

5.12 With the CDT in the Local, depress the HOME button and CLEAR button. All characters should be removed from the display and the cursor should go to the first character position of the first line.

5.13 Depress the RECEIve button. The REC button should light up, the CDT screen should go blank, and the message should be received without error. All keyboard and editing controls should be blinded while the message is being received.

5.14 The CDT screen will blank during receive unless the View While Receive option is applied.

5.15 When the message has been received, the CDT should automatically go into the local mode, and the received message should be displayed on the CDT screen.

5.16 The CDDC module is customer programmable for rejecting null, delete, or carriage return characters, either one or all, from

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being stored into the set memory when received from the line. They may, however, be stored in the memory by using the keyboard. If the respective reject character option is enabled, that character must be deleted from the received message displayed on the screen.

Note: Carriage return and line feed characters are automatically rejected from storage in the memory if they are received in the last character position of a line.

DISPLAY CONTROLLER OPTIONAL FEATURE CHECKOUT

A. Horizontal Tabulation

5.17 The horizontal tabulation feature is provided when the appropriate circuit card is added into a prewired connector in the display controller module. This feature may be checked out according to the operational procedure given in Section 578-101-100.

B. End-of-Line Indicator

5.18 This feature provides for sounding a short audible tone; when the keyboard is operated with the cursor positioned six characters from the end of a line, the last character on a line, or when the cursor is positioned over data that is protected format.

Note: The tone will not sound when the cursor is moved over these positions using the editing controls.

C. Protected Format

5.19 Protected Format insertion procedure:

- (a) Depress the FORM ENTER button (it lights).
- (b) Place the cursor in home position and operate the CLEAR button and TAB CLEAR button. All displayed data including tabulate marks should be cleared.
- (c) Write a message on the CDT using the keyboard. Use the edit controls to move the cursor across positions that are not to be protected. The following is a sample message:

```
NAME § . . . . . § ADDRESS § . . . . . ≡≡≡
CITY § . . . . . § STATE § . . . . . ≡≡≡
TELNO § . . . . . § ≡≡≡
```

(Note: Space characters appear as blank positions on the display.)

(d) After the message is prepared, operate the FORM ENTER button to off (button lamp extinguished). The data on the screen is now protected from overwrite, deletion, or movement during normal message preparation (5.20).

5.20 Operation with Protected Data Stored on the Display:

- (a) Position the cursor to home position and operate CLEAR button. All unprotected positions should be cleared and protected character positions should not be affected.
- (b) Keyboard characters into the unprotected fields and then depress CHAR DELETE button. The delete function should only occur in unprotected fields. Protected characters must not move.
- (c) Depress CHAR INSERT button with the cursor positioned within a nonprotected field. From the character position the cursor is positioned over, all characters in that field move one character position to the right.
- (d) The LINE INSERT and LINE DELETE buttons are nonfunctional.
- (e) Position the cursor to home position and operate the TAB keytop on the keyboard. The cursor will move to the first unprotected character position following a protected position (no tab marker needed). If a line feed is in the protected character group, the cursor will stop on the first unprotected character position on the next line.

Note: If the Write Space on Tabulate options is enabled, space characters are written into the unprotected character positions over which the cursor passes during the TAB function.

- (f) Move the cursor to an unprotected character position following ADDRESS and then depress TAB keytop. The cursor should move to the next line and to the first unprotected position following CITY.
- (g) If the Audible End-of-Line indicator is provided, a short tone should sound if an attempt is made to overwrite a protected character position.

(h) If the Underline Lock option is enabled, place the cursor in home position and then hold underline key on the keyboard depressed until the message ending character is reached. All unprotected character positions should now be underlined.

(i) Move the cursor to home position and then depress CLEAR button. All unprotected positions are cleared. If Underline Lock option is enabled, underlines will not clear but will be retained along with protected data.

Note: Underline characters are not transmitted on-line unless the Automatic Transmit of Escape Sequence (FORM TRANS button) option is provided.

(j) Depress FORM ENTER button (lighted); position the cursor to home position and then depress CLEAR button. All data should be cleared from the screen.

(k) Depress FORM ENTER to off (not lighted).

D. Highlight

5.21 To highlight characters on the display use the following:

(a) Depress HIGH LIGHT button to on (lighted).

(b) Type characters using the keyboard. The characters should blink from normal to half brightness at one hertz.

(c) Depress HIGH LIGHT button to off (not lighted).

(d) Overwrite the highlighted characters using the keyboard. Overwritten characters should not be highlighted.

E. On-Line Edit

Note: The following checkout procedure is applicable when a transmitting device is used to input data to the CDT. Escape character sequences are not stored into the CDT memory when received from the line.

5.22 To test the CDT on-line edit use the following:

(a) Prepare a message on the device to be used to transmit to the CDT consisting of the following:

```
E E DDD      L E                E L E
S H S J E E E ABC F S Y UNDERLINED S Z F O
C C L L L      C                C T
```

(b) With the CDT in local, write random characters on the display and leave the cursor positioned randomly on the display screen.

(c) Depress the CDT RECEIVE button (lights); LOCAL button extinguishes.

(d) Condition the transmitting device for sending to the CDT.

(e) The CDT upon receiving ESC H places the cursor to home position. The ESC J clears the screen. The ESC Y causes all subsequent characters received to be underlined. The ESC Z causes underlining to stop. The message received on the display should appear as follows:

```
ABC ≡≡
UNDERLINED ≡≡
ET
```

Note: A minimum of three delete or null characters are required following an ESC H, ESC J, or ESC Y character sequences at 2400 baud operation. If the View While Receive option is enabled, a minimum of 11 delete or null characters are required. To prevent these characters from storing in the CDT memory, the appropriate Reject Delete and Reject Null options should be enabled.

5.23 If the CDT set is equipped with the Horizontal Tabulate option, the FORM ENTER button (Protected Format option), or HIGH LIGHT button (Character Highlight option), the escape character sequences for testing these features are listed in Section 578-101-100.

F. Form Transmit (Automatic Transmit of Escape Sequences)

Note: The Form Transmit checkout procedure is only applicable if a receiving device is used to verify data transmitted by the CDT.

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5.24 The FORM TRANSMIT button and feature may be checked out using the following procedure:

- (a) With the CDT in local, prepare a message on the display and underline some of the data.
- (b) Depress FORM TRANSMIT button (it lights) and then depress TRANSMIT button. LOCAL button extinguishes and the message is sent to the receiving device.
- (c) The message at the receiving device should contain the sent message and each underlined character should be followed by backspace and underline characters.

Note 1: No backspace underline characters or escape sequences are transmitted following the message ending character (ETX, FF, or EOT). Also, underlines associated with line feed characters or in the last character position on a line are not transmitted.

Note 2: If Underline Lock option (Table B Option 11) is enabled, check that underline characters are not transmitted to the receiving device when only TRANSMIT button is operated.

Note 3: Underlines in character positions that are programmed for rejection from storing into the memory (id est Null, Delete, or Carriage Return) will locate to the preceding character position. Therefore, underlines either should not be written under characters programmed for rejection or the character should not be programmed for rejection. The user must be aware of this operation; otherwise, underlines in rejected character positions will be mislocated.

5.25 The CDT is equipped with the Highlight option if Form Transmit is provided. Use the following procedure to check operation:

- (a) With the CDT in local, prepare a message on the display that includes highlighted data (5.21).
- (b) Depress FORM TRANSMIT button and then TRANSMIT button on the CDT.

(c) The message at the receiving device should contain all the sent data. The highlighted data should be preceded by an ESCAPE 3 sequence. An ESCAPE 4 sequence should immediately follow the highlighted data.

5.26 When the CDT is equipped with the FORM ENTER button (Protected Format option) read 5.27 and 5.28 and then use the following procedure:

- (a) With the CDT in local, prepare a message on the display that includes some protected data (5.19).
- (b) Depress FORM TRANSMIT button, then TRANSMIT button on the CDT.
- (c) The message at the receiving device should contain all the sent data. Protected data in the message should be preceded by an ESCAPE W sequence and followed by the ESCAPE X sequence.

5.27 There are three customer programmable options for this feature (Form Transmit) that affect transmit operation as described in the following. Only one option can be programmed at a time. Read the operating descriptions in (a), (b), and (c) along with the notes and then test the CDT for only the operation that the set is programmed for.

- (a) **Transmit Unprotected Data Only** —
When this option is used, only unprotected character positions will be automatically preceded by ESCAPE and delimiter sequences to identify highlighted or underlined data in the sent message. Do not highlight or underline protected fields.
- (b) **Transmit Protected and Unprotected Data without Protected Data Delimiters** —
When this option is used, all unprotected and protected data character positions are transmitted without ESCAPE and delimiter character identification. However, backspace, underline, and highlight delimiter sequences (ESCAPE and delimiter) will precede all data in the message requiring the respective identification.
- (c) **Transmit Unprotected Data Only with Space Fill or Delete Fill** —
If this option is used, all unprotected data positions are transmitted; protected data positions are automatically converted to a SPACE or DELETE character (optional) during trans-

mission for each protected character. ESCAPE and delimiter character sequences to identify highlighted, protected, or underlined data in the message are not transmitted.

Note 1: Regardless of which Form Transmit option is selected, 5.27 (a), (b), or (c), the automatic line ending sequence is always transmitted at the appropriate time (end of each line) along with the message.

Note 2: If FORM TRANSMIT and then TRANSMIT buttons are depressed to initiate message transmission, all message data will be transmitted including the appropriate ESCAPE and delimiter characters to identify sent highlighted, protected, or underlined data in the message regardless of whether 5.27 (a), (b), or (c) is used.

5.28 During CDT transmit operation to the receive monitor device, the following transmit operation of the CDT may be noticed.

- (a) After the CDT completes transmit operation and if the end of message (EOM) character is protected or highlighted, the cursor may stop two character positions after the EOM character.

Note: The EOM character will not be recognized by the CDT during transmit if the unprotected only with Space or Delete fill option is used on protected

data character positions, and if the EOM character is protected, and if it is in the last character position of a line. EOM character should not be entered into the last character positions of any line if this option is used.

- (b) If the first character in a line is protected, or highlighted and underlined, and all subsequent characters are the same up to and including the line feed character, the line feed will not be recognized by the CDT during transmit. However, a line feed will automatically be generated by the automatic line ending sequence circuits in the CDT upon sensing the end of a transmitted line.

6. CLEANING THE TERMINAL

6.01 After the CDT terminal is installed, the cabinet cover may be cleaned using an ordinary type household product made for cleaning plastic countertops or equivalent.

6.02 The black colored shield around the face screen of the CRT may be cleaned of lint by using a piece of sticky masking tape to wipe the shield.

6.03 The cabinet housing the CDT terminal may be cleaned using the same compounds and techniques that are used on other office furniture.

6.04 The CRT face screen may be cleaned using a soft cloth and ordinary glass cleaner.