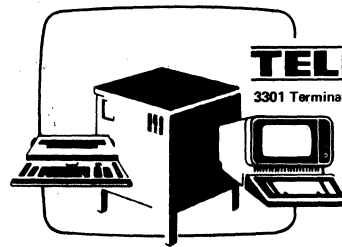


# PROBLEM DETERMINATION GUIDE

## TC 278 DISPLAY TERMINAL



**TELEX<sup>®</sup> TERMINAL COMMUNICATIONS**

3301 Terminal Drive Raleigh, North Carolina 27604 919/834-5251


700818-002

## ISSUE/REVISION SCHEDULE

Comments	Rev. No.	Date
<b>Initial Release</b> <b>Complete Reissue</b>	<b>001</b> <b>002</b>	<b>5-18-79</b> <b>3-20-81</b>

## SECTION 1. POWERING THE DISPLAY TERMINAL

The following procedure assumes that the TC 278 Display Terminal has been installed according to the Customer Installation section of the TC 278 Operator's Manual.

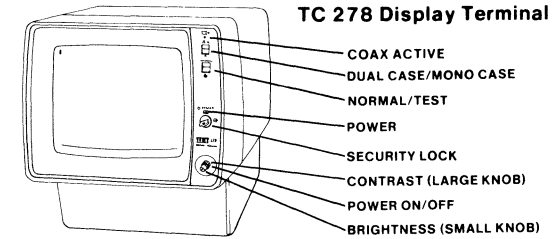
1. If terminal is equipped with security lock, insert key and turn to 
2. Set NORMAL/TEST switch to **Normal**.
3. Pull POWER ON/OFF switch out to power terminal.

## CLEANING THE DISPLAY SCREEN

1

1. Turn off power to terminal.
2. Clean with non-abrasive cleaning solution and dry with lint-free cloth.
3. Do **not** use acids or abrasive cleaning agents; these can damage display screen surface.

4. Check that POWER and COAX ACTIVE indicators are lit. If indicators fail to light, refer to Section 6.
5. Turn BRIGHTNESS control clockwise to increase brightness on display screen; turn counterclockwise to dim.
6. Turn CONTRAST control clockwise to increase level of contrast between intensified and normal characters on display screen; turn counterclockwise to reduce.
7. Set DUAL CASE/MONO CASE switch to **A** to display uppercase characters only; set switch to **A,a** to display both upper and lowercase characters.



## SECTION 2. KEYBOARD FUNCTIONS

This section describes keys on the TC 278 Display Terminal that control keyboard functions, positioning the cursor, editing, system commands, and print and test commands. These keys are alternate action; if function is on, depressing key will turn function off and vice versa.



CLICK. Turns keyboard clicker on and off.



CURSOR BLINK. Turns cursor blinking on and off.



SHIFT LOCK (on Typewriter keyboards only). Locks keyboard into Shift Mode. 3



NUMERIC LOCK (on Data Entry keyboards only). Locks keyboard into Numeric Mode; second depression of key returns keyboard to Alphabetic Mode.



ALPHA (on Data Entry keyboards only). Returns keyboard to Alphabetic Mode while cursor is in a numeric field.



ALTERNATE. Activates function specified on front face of some keys.



SHIFT (on Typewriter keyboards only). Selects upper character on dual-character keys; selects uppercase character for alphabet keys, in either position, switch does not inhibit lowercase from being stored in video buffer.



NUMERIC SHIFT (on Data Entry keyboards only). Selects upper character on dual-character keys; selects numeric characters.



UP. Moves cursor up.



DOWN. Moves cursor down.



LEFT. Moves cursor left.



RIGHT. Moves cursor right.



BACKSPACE. Moves cursor left.



TAB. Moves cursor to first entry position of next entry field.



BACKTAB. Moves cursor back to first entry position in current or preceding entry field.



NEW LINE. Moves cursor to first entry position in next line.



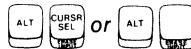
SKIP (on Data Entry keyboards only). Moves cursor to first entry position in subsequent entry field.



DELETE. Deletes character at cursor's current position.



ERASE TO END OF FIELD. Erases all entry field positions from cursor to end of field. Cursor does not move from current position.



ERASE INPUT. Erases all entry field positions and moves cursor to first entry position in first entry field on screen.



DUPLICATE. Duplicates previously entered data and then moves cursor



RAPID LEFT. Moves cursor left at double speed.



RAPID RIGHT. Moves cursor right at double speed.



HOME. Moves cursor to first entry position on screen.



INSERT. Inserts subsequently entered characters at cursor's current position. Depress RESET key to end character insertion.



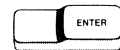
to first entry position of subsequent entry field. Displays overscored asterisk ( $\bar{*}$ ) when DUAL CASE/MONO CASE switch is set to **A,a**; displays asterisk (\*) when DUAL CASE/MONO CASE switch is set to **A**.



or



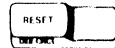
FIELD MARK. Marks end of input field. Displays overscored semicolon ( $\bar{;}$ ) when DUAL CASE/MONO CASE switch is set to **A,a**; displays semicolon (;) when DUAL CASE/MONO CASE switch is set to **A**.



ENTER. Requests communications line for sending displayed data to



central processor unit (CPU). Although the ENTER key is an autorepeat key, holding it depressed results in errors.



RESET. Resets error conditions indicated by X (input inhibited) in the operator status row; ends character insertion and printer identification operations.



ATTENTION. Requests attention of the system (if B is displayed in operator status row).



or



or




PROGRAM FUNCTION (1 through 24). Initiates functions determined by application program.

7



PRINT. Sends data from display to assigned printer.



PRINTER IDENTIFICATION. Allows operator to assign printer by entering two-digit printer ID after  symbol in operator status row. Depress RESET key to end printer identification.



**CURSOR SELECT.** On formatted screen, selects field containing cursor for processing. (Performs same functions as optional light pen.)



or



**CLEAR.** Erases display and signals system that a "clear" operation has occurred.




or

**PROGRAM ACCESS (1 through 3).** Initiates functions determined by application program.



or



**DEVICE CANCEL.** Cancels pending request by PRINT key and restores keyboard operation; if assigned printer is not operating, restores keyboard operation and resets  condition symbol.



**SYSTEM REQUEST.** If operator status row contains A symbol, signals system that test request message is on display screen; if operator status row contains B symbol, switches TC 278 terminal between application and control programs and clears display.

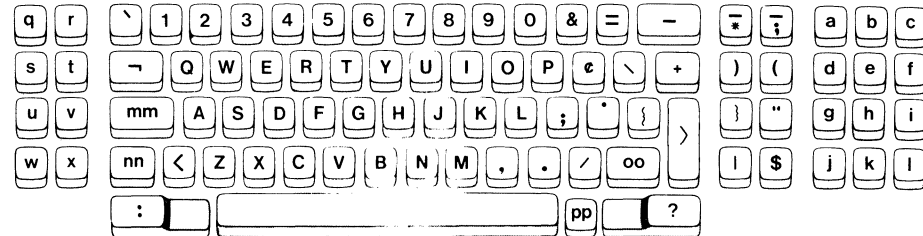


**TEST.** Initiates and ends on-line diagnostic tests.

### SECTION 3. DIAGNOSTIC TESTING (OFF-LINE)

This section describes a procedure for performing diagnostic tests on the TC 278 Display Terminal that do not require interaction with the attached control unit.

1. Set DUAL CASE/MONO CASE switch to **A,a**.
2. Set NORMAL/TEST switch to **Test**. [COAX ACTIVE indicator turns off and screen displays all previously displayed characters; control codes as overscored num-



**TC 278 Keyboard Check Symbols**


**NOTE:** Some keyboards have extra key here (e.g., single key clear).


bers; unentered spaces as nulls (␣); and entered space characters, attributes and nondisplayed fields as blanks.]

**NOTE:** If Program Check Symbols do not match refer to Operator's Manual for possible keyboard variations.

3. Depress each key and check that screen displays the corresponding letter or symbol from the following diagram:

COAX ACTIVE indicator flashes on as each key is tested. Diagnostic program verifies entry by displaying a null character (␣) after each keyboard check symbol. Differing results could indicate terminal malfunction; contact Supervisor.

4. If terminal is equipped with optional security lock, turn key to 

(Display erases all characters except cursor, separator line and operator status row.) Turn key to  for characters to reappear on screen.

5. Reset NORMAL/TEST switch to **Normal**. (COAX ACTIVE indicator lights.) Off-line diagnostic tests are completed.

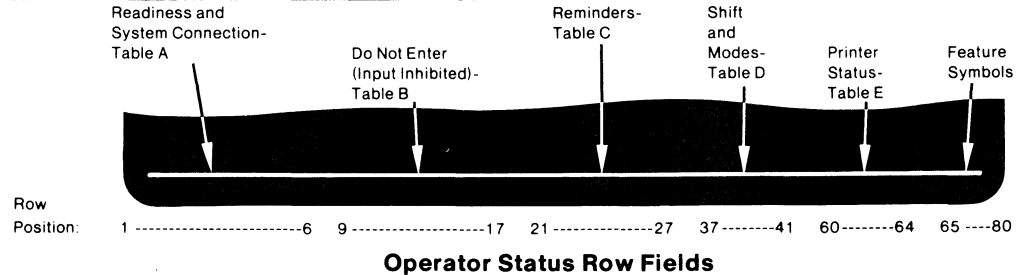
## SECTION 4. DIAGNOSTIC TESTING (ON-LINE)

This section describes a procedure for performing a diagnostic test on the TC 278 Display Terminal and its attached control unit.

1. Check that both TC 278 Display Terminal and control unit are powered.
  2. Set NORMAL/TEST switch to **Normal**. (COAX ACTIVE indicator is lit.)
  3. Simultaneously depress  
  4. If COAX ACTIVE indicator fails to light or other testing errors occur, perform the off-line diagnostic tests or contact Supervisor.
  5. Refer to control unit's Problem Determination Guide for on-line diagnostic tests.
  6. At end of on-line testing, depress  
-

## SECTION 5. OPERATOR STATUS ROW INDICATORS

The operator status row contains symbols that indicate current operating conditions of the terminal; these symbols appear in specific fields of the operator status row as shown in the following figure:




The tables that follow define condition symbols according to the status row fields in which they appear.

**TABLE A. READINESS AND SYSTEM CONNECTION SYMBOLS**

Symbol	Name	Message
[6] or [4]	TC 276, IBM 3276, or IBM 3274 Ready	TC 276 Control Unit/Display Terminal ([6]), or IBM 3276 Control Unit Display Station ([6]), or IBM 3274 Control Unit ([4]) is con- nected to terminal.

"?" for connection to 4331 system

**TABLE A. READINESS AND SYSTEM CONNECTION SYMBOLS  
(Continued)**

Symbol	Name	Message
	System Operator	Display terminal is connected to sys- tem operator (control program).
[?]	Unowned	Display terminal is connected to host sys-

A or B

On-Line A or B

Control unit is connected (on-line) to host system under rules A (A) or rules B (B).



On-Line

TC 276 Control Unit/Display Terminal or IBM 3276 Control Unit Display Station is connected (on-line) to host system. Either rules A or B apply.



My Job

Display terminal is working with application program.

TEST



Test

tem, but not to the application or control program.



Display terminal is running a test.













**TABLE B. "DO NOT ENTER" (INPUT INHIBITED) SYMBOLS**


Symbol	Name	Message
X 	Time	Host system requires time to perform function.
X ? +	What?	Depress RESET key and retry operation.
X SYSTEM	System Lock	Host system has locked keyboard. Look for message or depress RESET key.
X 	Go Elsewhere	Go to another position to take action. De-

**TABLE B. "DO NOT ENTER" (INPUT INHIBITED) SYMBOLS  
(Continued)**







Symbol	Name	Message
X - f	Minus Function	Requested function is unavailable. Depress RESET key and enter a valid function.
X  nn or X  nnn	Machine Check	Display terminal is not operating properly. Refer to Section 6.





		press RESET key, move cursor and take action.			
X  >	More Than	Too much data for this field. Depress RESET key and correct the entry.	X  nn or X  nnn	Communications Check	Problem with communications line between control unit and host system. Refer to Section 6.
X  NUM	Numeric	Only numeric characters may be entered in this field. Depress RESET key and correct the entry.	X PROG nn or X PROG nnn	Program Check	Control unit detected programming error in data from host system. Depress RESET key. Refer to Section 6.
X  #?	What Number?	Only certain numeric characters may be entered in this field. Depress RESET key and correct entry.	X   	Printer Busy	Printer selected by display terminal is busy. If   is displayed, the printer is engaged in a print operation. Wait for the

**TABLE B. "DO NOT ENTER" (INPUT INHIBITED) SYMBOLS**  
(Continued)




Symbol	Name	Message
X 	Printer Very Busy	operation to finish or depress DEV CNCL key to cancel a pending print operation. (A current print operation cannot be cancelled by depressing DEV CNCL key.) Same as above, except that print operation requires additional time to finish.

**TABLE B. "DO NOT ENTER" (INPUT INHIBITED) SYMBOLS**  
(Continued)



Symbol	Name	Message
X 	Message Received	Message from control operator was received and rejected. Depress RESET key.
X  / +?	Accent Plus	(On terminals configured for French applications only.) Invalid accent and character combination. Depress RESET key, and enter character and accent again.
X  \ +?	What?	
X  ^ +?		
X  " +?		
X  , +?		

X 	Printer Not Working	Printer selected by display terminal is not working. If  is displayed, the printer stopped during a print operation.
X  X	Operator Unauthorized	Unauthorized function. Depress RESET key.
X 	Security Key	Security lock is on. Unlock terminal with key.
X-S	Minus Symbol	Symbol key is not available. Depress RESET key.



**TABLE C. REMINDER SYMBOLS**

Symbol	Name	Message
 nn or  nnn	Communications Reminder	Control unit/host system communications link is producing errors.
	Reserved	Reserved for future use. (Ignore.)

**TABLE D. SHIFT AND MODE SYMBOLS**

Symbol	Name	Message
NUM	Numeric	Keyboard is in Numeric Mode. (Only numeric, period, minus, and DUP keys operate.)
	Shift	Keyboard is in Shift Mode (in upper case).
	Insert	Display terminal is in Insert Mode.

**TABLE E. PRINTER STATUS SYMBOLS  
(Continued)**

Symbol	Name	Message
 nn	Printer Printing	Selected printer is currently printing.
 nn	Printer Failure	Selected printer has stopped during print operation.

**TABLE E. PRINTER STATUS SYMBOLS**

Symbol	Name	Message			
<input type="checkbox"/> <input type="checkbox"/> _ _	Assign Printer	When printer ID/Class is changed, the two-numeral ID that has been entered from the keyboard is displayed in the underlined positions.	<input type="checkbox"/> <input type="checkbox"/> ??	What Printer?	Printer assignment has changed. (This symbol only appears on TC 278 Display Terminals attached to an IBM 3274 Control Unit.)
<input type="checkbox"/> <input type="checkbox"/> nn	Printer Assignment	Display terminal is authorized to use printer nn.			

## SECTION 6. OPERATING PROBLEMS

21




This section describes symptoms of various on-line terminal problems and gives steps to follow that help correct or record the problem.

- | <b>SYMBOL</b>                              | <b>FIRST ACTION</b>   | <b>SECOND ACTION</b>           |
|--|---|--------------------------------|
| 1. Nothing displayed and neither light on. | Ensure that:<br>a. Power is available to TC 278 terminal.<br>b. TC 278 ON/OFF switch is on. | If no changes, record problem. |

2.	Nothing displayed and both lights on.	Turn brightness control clockwise.	If nothing displayed, record problem. If screen brightens, perform off-line diagnostic tests (Section 3).
3.	Something displayed and COAX ACTIVE indicator not on.	Check coax connections.	Check control unit power.
4.	Illegible display (slanted or torn lines).	Record problem.	



**SYMBOL**

5.  or  not displayed.
6. Cannot adjust screen brightness.
7. Cannot adjust screen contrast.
8. Display area shrinks or expands.
9. Erroneous or missing characters and no  in operator status row.

**FIRST ACTION**

Ensure that:

- a. Terminal is connected to control unit.
- b. Other terminals on same control unit are working.

Record problem.

Record problem.

Record problem.

Refer to Section 3.

**SECOND ACTION**

- a. If other terminals are working, perform off-line diagnostic tests (Section 3).
- b. If other terminals are not working, refer to Control Unit Problem Determination Guide.



Display may be used, if legible.




Display may be used, if legible.



Display may be used, if legible.

10. Keyboard inoperative; display operating.

11. Selector pen inoperative.

12. X  Z % % or X  % %

13. X  nn, X  nnn,  
or X  nn,nnnn-nnnn

14. X  nn or  
X  nnn

Ensure keyboard cable is plugged in.

Refer to Section 4.

Press RESET key.

Press RESET key and retry operation  
that failed. (NOTE: n indicates digits 0  
through 9.)

Press RESET key and retry operation that  
failed. (NOTE: n indicates digits 0 through 9.)

If symptom continues, refer to Section 3.

CURSR SEL may be used in place of selector  
pen.

If symptom continues, record numbers and no-  
tify Supervisor.

If symptom continues, record numbers and no-  
tify Supervisor.

## SECTION 6. OPERATING PROBLEMS (Continued)

25

SYMBOL	FIRST ACTION	SECOND ACTION
15. X PROG nn or X PROG nnn	Report problem to Supervisor or System Programmer. Record number. (NOTE: n indicates digits 0 through 9.)	If symptom continues, record problem in as much detail as possible.
16. Any other symptom.	Press RESET key and retry operation.	



## SECTION 7. USING SELECTOR PEN OR CURSOR SELECT KEY (FORMATTED DISPLAYS ONLY)

### ACTION

Display selection and exit fields.

Select field.

### METHOD

Depress tip of light pen against palm of hand.

Depress tip of light pen over any character in field to be selected.

*or*

Cover ? or any character in field with cursor and depress CURSOR SELECT key.

### RESULT

Intense line appears through all characters of light pen fields.

? changes to > , indicating field has been selected.

Deselect field.

Depress tip of light pen over any character in field to be deselected.

*or*

Cover > or any character in field with cursor and depress CURSOR SELECT key.

Depress tip of light pen over any character in exit field.

*or*

Cover & or any character in field with cursor and depress CURSOR SELECT key.

> changes to ?, indicating field has been deselected.

Approve selections.

Entered selections sent to CPU.

