

SYNCHRONOUS "DATASPEED\*" 40/4  
SINGLE DISPLAY STATION ARRANGEMENTS  
TESTING AND TROUBLESHOOTING

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1. GENERAL		
1.01 This section includes all testing of the DATASPEED 40/4 Single Display Station (hereafter referred to as 40/4 type). It also includes trouble analysis.		<i>Note:</i> When ordering replaceable parts or components, unless otherwise specified, prefix each part number with the letters "TP" (ie, TP410055).

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1.06 Test switches and indicators are shown in Fig. 1 and 2.

Note: The operation of test switches and indicators should be done under the direction of parts 2. TESTS and 3. TROUBLESHOOTING of this section or referenced sections.

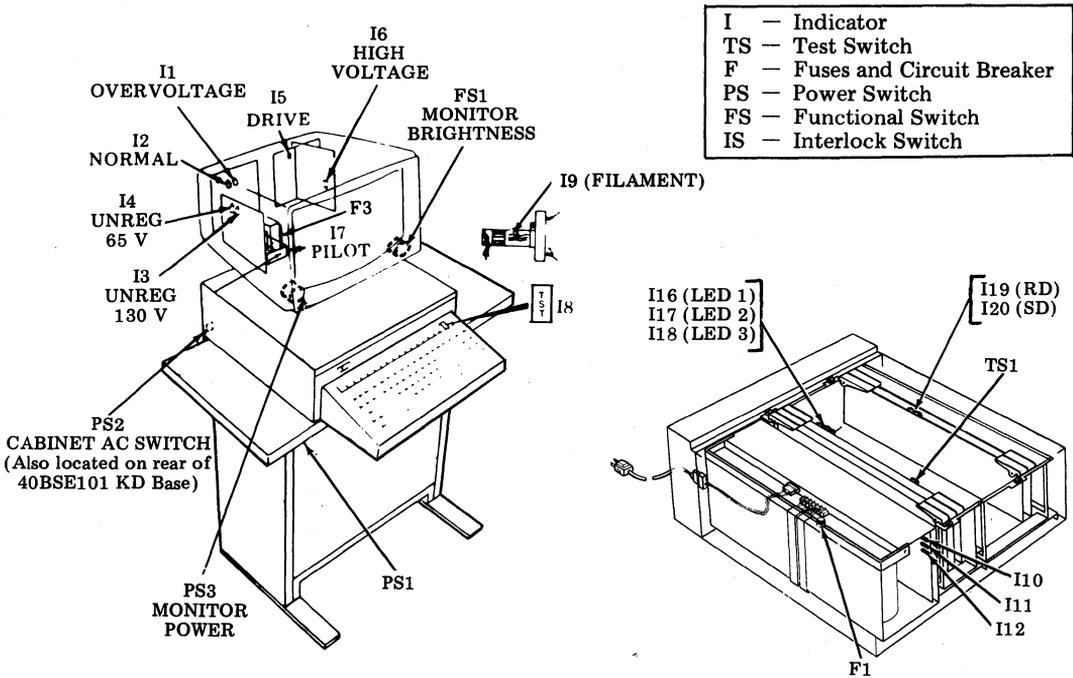


Fig. 1—Test Switches and Indicators (Controller and KD)

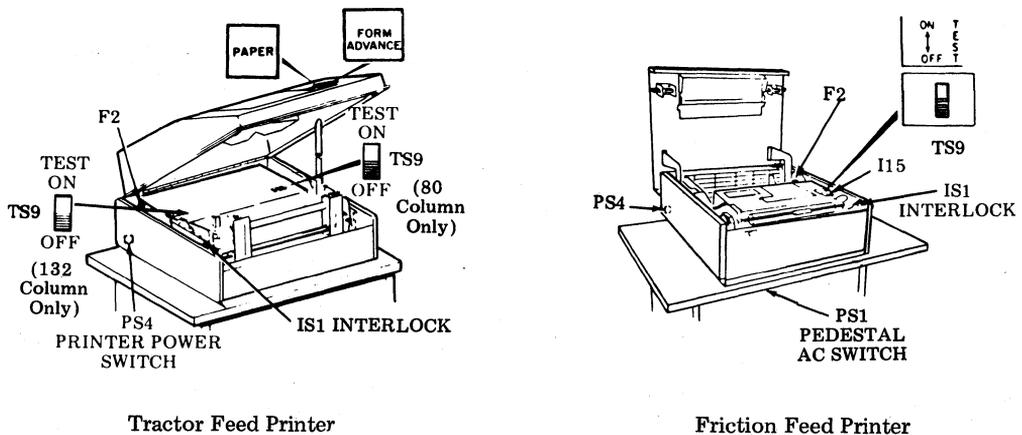


Fig. 2—Test Switches and Indicators (Printer)

## 2. TESTS

## SELF-TEST

## Controller Self-Test

- 2.01 The Controller Self-Test should be performed. The test requires the use of the appropriate Controller Arrangement Form (copies are shown in Section 582-200-205).
- 2.02 If during a controller self-test, a circuit card is indicated to be defective per the self-test trouble pattern, perform the following before replacing the circuit card:
- Remove card and check for bent connector pins.
  - If circuit card contains sockets, make sure all I. C. packs are firmly seated.
  - Reinstall circuit card and make sure card is firmly seated in connector.
  - Re-perform the self-test.

If the circuit card is still indicated as defective, then replace.

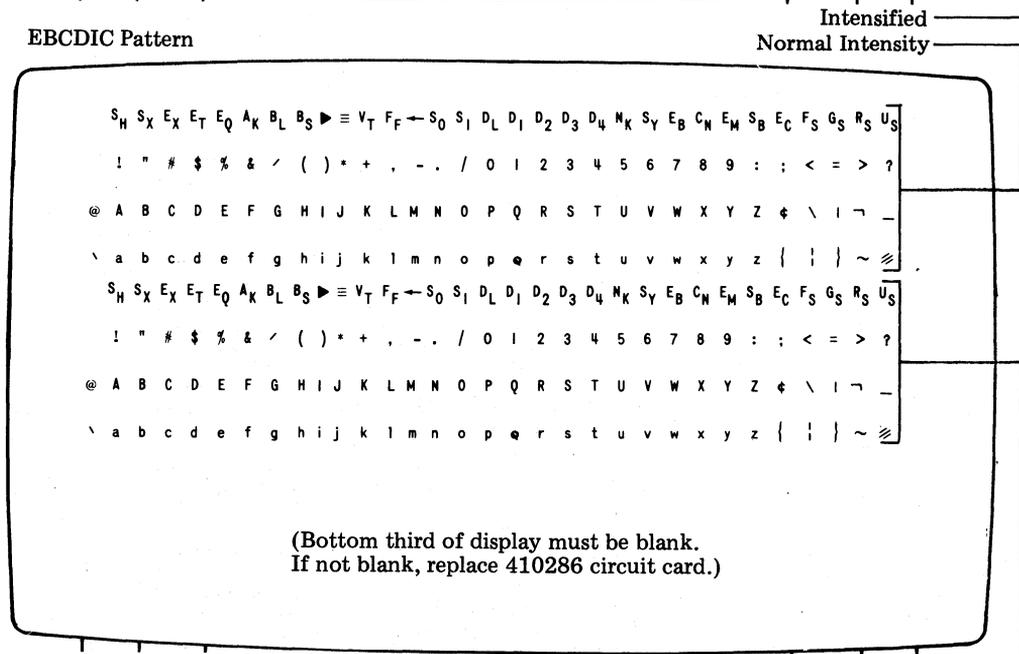
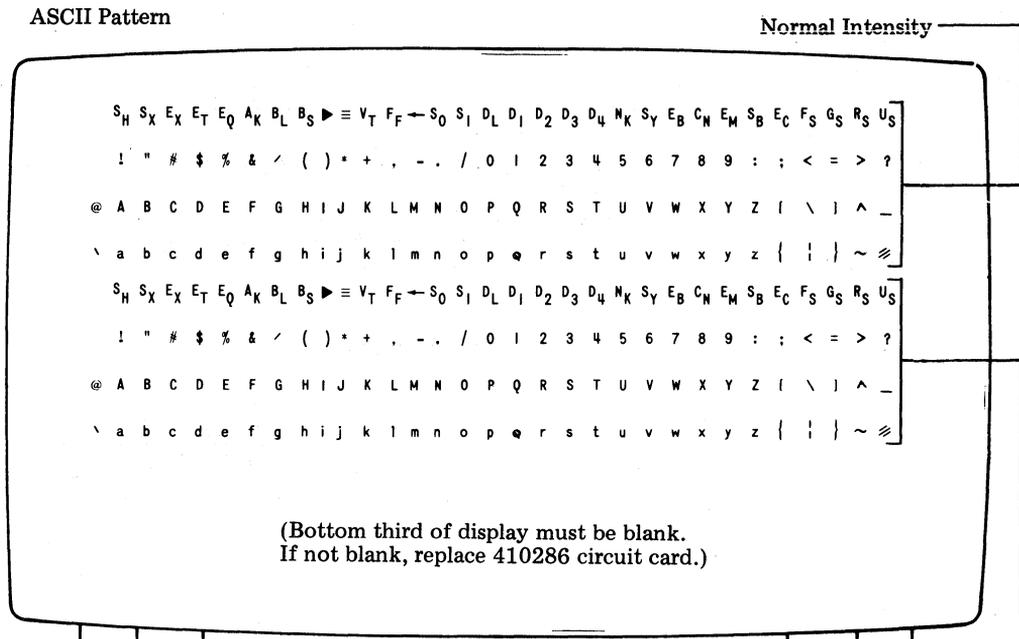
**Warning:** The ac power must be OFF before removing or replacing a circuit card.

CHART 1  
CONTROLLER SELF-TEST PROCEDURES

STEP	PROCEDURE	CORRECT RESPONSE	ANALYSIS
1	Connect ac cable(s) from cabinet(s) to power source. Turn on cabinet power switch(es).	All power supply voltage lamps light.	40PSU101, see Chart 10.
2	Depress and hold down on SELF-TEST switch on 410251 circuit card for at least four seconds or until one lamp goes out. (TS1 on Fig. 1)	All three indicators (pattern lamps) on 410251 circuit card light while switch is depressed.	<ul style="list-style-type: none"> <li>• 40PSU101, see Chart 10.</li> <li>• 410251.</li> <li>• 410261 or 410264 (Private Line Version.)</li> <li>• 410262 (Dial Up Version)</li> <li>• Refer to Chart 7, Step 2.</li> </ul>
3	Release SELF-TEST switch.	<p>Pattern lamps may flicker during this step.</p> <p>After a short time, the pattern lamps should blink sequentially.</p> <p><i>Note:</i> If switch is not held down long enough, the option menu will appear. Reset by depressing LOCAL or RESET and repeat Step 2.</p>	<p>If a light pattern (shown on controller arrangement form) appears and remains; power down, replace indicated card, power up and retest.</p> <p>If the indicated card is replaced and the problem remains; refer to Chart 7, Step 3.</p>
4	When the pattern lamps blink sequentially, check the display on the monitor. Also, check that the cursor moves through the whole display.	<p>See Fig. 3. The ASCII* pattern is displayed for about 30 seconds, then the EBCDIC† pattern is displayed for about 30 seconds, then the controller will return to the normal operating mode.</p> <p><i>Note:</i> Depress switch and rotate it 1/4 turn clockwise to retain the Fig. 3 display (actually the self-test runs and the display cycles through ASCII followed by EBCDIC repeatedly). Depress switch and rotate it 1/4 turn counterclockwise to end test. Normal operation returns after the EBCDIC display.</p>	<ul style="list-style-type: none"> <li>• Monitor support cabinet ac switch off.</li> <li>• Monitor power switch off (turn counterclockwise for on).</li> <li>• Monitor brightness low (turn counterclockwise for on).</li> <li>• 410286 circuit card.</li> <li>• 410287 circuit card.</li> <li>• Monitor cable.</li> </ul>

\*American National Standard Code for Information Interchange.

†Extended Binary Coded Decimal Interchange Code.



Note: This figure is used with Step 4 of Chart 1.

Flashing Half to Intensified

Fig. 3—Self-Test Mode Displays

LOCAL TESTS

A. KD/Controller Local Test

2.03 Perform the Chart 2 procedures on the KD opcon.

CHART 2

KD/CONTROLLER LOCAL TEST PROCEDURES

STEP	PROCEDURE	CORRECT RESPONSE	LOCAL TEST ANALYSIS												
<p><i>Note:</i> Start with Step 1 if the KD has a typewriter style opcon, start with Step 7 if the KD has an internal numeric cluster style opcon (see Fig. 5, if required).</p>															
<p>1</p>	<p><b>TYPEWRITER STYLE OPCON (Steps 1-6)</b></p> <p>Depress LOCAL if the key is not lighted. Request a local test by depressing the L/TST key while CONTROL key is held down.</p> <div data-bbox="219 624 921 1078" style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">LOCAL TEST MODE</p> <p>TEST MESSAGE:</p> <p>THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 0123456789 TIMES.</p> <p>TO TEST PRESS ENTER OR S/R TO RESET PRESS CLEAR SEE MANUAL FOR DETAILS</p> <p>(    )    <input type="text"/></p> <p>Depending on the line code chosen, the word ASCII or EBCDIC will appear in this area.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">PRIVATE LINE VERSION</td> <td style="width: 10%; text-align: center;">or</td> <td style="width: 40%; text-align: center;">DIAL-UP VERSION</td> </tr> <tr> <td style="text-align: center;">DEVICE ADDRESS</td> <td></td> <td style="text-align: center;">4th ID CHARACTER</td> </tr> <tr> <td style="text-align: center;">STATION SELECT ADDRESS</td> <td></td> <td style="text-align: center;">3rd ID CHARACTER</td> </tr> <tr> <td style="text-align: center;">STATION POLL ADDRESS</td> <td></td> <td style="text-align: center;">2nd ID CHARACTER</td> </tr> </table> </div>	PRIVATE LINE VERSION	or	DIAL-UP VERSION	DEVICE ADDRESS		4th ID CHARACTER	STATION SELECT ADDRESS		3rd ID CHARACTER	STATION POLL ADDRESS		2nd ID CHARACTER	<p>The following message is displayed on the monitor.</p>	<ul style="list-style-type: none"> <li>• Cable to opcon.</li> <li>• Opcon.</li> <li>• Refer to Chart 7, Step 4.</li> </ul> <p>See Note 2.</p> <p>See Note 1.</p> <p>See Note 3.</p> <p>If the wrong line code appears, check the OPT 4 selection.</p> <p>See Note 4.</p>
PRIVATE LINE VERSION	or	DIAL-UP VERSION													
DEVICE ADDRESS		4th ID CHARACTER													
STATION SELECT ADDRESS		3rd ID CHARACTER													
STATION POLL ADDRESS		2nd ID CHARACTER													
<p><i>Note 1:</i> If the message is not responded to within 20 seconds; the display will clear, the test will be automatically canceled, and S/R will flash repeatedly. Depress LOCAL to stop S/R from flashing.</p>															
<p><i>Note 2:</i> The QUICK BROWN FOX . . . message may be changed provided that the first character remains a "T". If "T" is changed to any other character, the display will clear and the test will be canceled when S/R is depressed.</p>															
<p><i>Note 3:</i> Besides CLEAR, depression of any PA or PF key will clear display and cancel test.</p>															
<p><i>Note 4:</i> When the SPACE character is selected, it is represented by a blank space. If characters are incorrect per customer order and Fig. 4, check OPT 1 selection for station poll address and select address or OPT 2 selection for KD device address (Private Line Version) or Check OPT 1, OPT 2 or OPT 3 selection for 2nd, 3rd or 4th character of ID sequence respectively (dial-up version).</p>															

## CHART 2 (Cont)

## KD/CONTROLLER LOCAL TEST PROCEDURES

STEP	PROCEDURE	CORRECT RESPONSE	LOCAL TEST ANALYSIS
2	Depress S/R.  <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 0123456789 TIMES.</p> </div> <p><i>Note:</i> If any characters in the QUICK BROWN FOX . . . message were changed before depressing S/R, those characters will appear in the above message.</p>	If received without error, the following message will appear on the monitor.	<ul style="list-style-type: none"> <li>• If S/R is flashing, go to Step 4, Local Test Analysis.</li> <li>• If "test failed" message is received, go to Step 4, Procedure.</li> </ul>
3	Depress CLEAR. Depress LOCAL if station is not connected to LCU.	Test is completed. Display is cleared. Proceed to Step 6.	
4	If message is received with an error in Step 2, the following message will be displayed on the monitor.  <div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;"><b>**TEST FAILED**</b></p> <p>TEST MESSAGE:</p> <p>THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 0123456789 TIMES'</p> <p>RETEST PRESS ENTER OR S/R TO RESET PRESS CLEAR SEE MANUAL FOR DETAILS</p> <p>( _ _ _ ) <input style="width: 40px; height: 15px;" type="text"/></p> </div>	Go to Step 5.	<ul style="list-style-type: none"> <li>• Normal Local Test: Replace 410290 or 410291.</li> <li>• Analog Loopback Test: Check data set or data set cable. Replace controller back panel. (Data set DSR not "on" in AL mode can cause this failure.)</li> <li>• Far-End Digital Loopback Test: Check far-end data set or check facilities between data sets.</li> </ul> <p><i>Note 1:</i> Local test is canceled by symptom.</p> <p><i>Note 2:</i> Depress LOCAL to stop flashing S/R.</p>
5	Depress LOCAL if station is not connected to LCU. Retry Steps 1 and 2 once then cancel test by depressing CLEAR key.		If test still fails, run controller self-tests.
6	If the local test of the KD is successfully completed, go to Chart 3 and 4.		

CHART 2 (Cont)

KD/CONTROLLER LOCAL TEST PROCEDURES

STEP	PROCEDURE	CORRECT REPOSE	LOCAL TEST ANALYSIS												
7	<p><u>INTERNAL NUMERIC CLUSTER STYLE OPCON (Steps 7 through 15)</u></p> <p>Request a local test by depressing the L/TST key and the ALPHA key simultaneously.</p> <div data-bbox="244 456 942 911" style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">LOCAL TEST MODE</p> <p>TEST MESSAGE:</p> <p>THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 0123456789 TIMES.</p> <p>TO TEST PRESS ENTER OR S/R TO RESET PRESS CLEAR SEE MANUAL FOR DETAILS</p> <p>( _ _ _ )</p> <p style="text-align: center;">The word EBCDIC will appear in this area.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 2px;">PRIVATE LINE VERSION</td> <td style="padding: 2px;">or</td> <td style="padding: 2px;">DIAL-UP VERSION</td> </tr> <tr> <td style="padding: 2px;">DEVICE ADDRESS</td> <td></td> <td style="padding: 2px;">4th ID CHARACTER</td> </tr> <tr> <td style="padding: 2px;">STATION SELECT ADDRESS</td> <td></td> <td style="padding: 2px;">3rd ID CHARACTER</td> </tr> <tr> <td style="padding: 2px;">STATION POLL ADDRESS</td> <td></td> <td style="padding: 2px;">2nd ID CHARACTER</td> </tr> </table> </div>	PRIVATE LINE VERSION	or	DIAL-UP VERSION	DEVICE ADDRESS		4th ID CHARACTER	STATION SELECT ADDRESS		3rd ID CHARACTER	STATION POLL ADDRESS		2nd ID CHARACTER	<p>The following message is displayed on the monitor.</p>	<ul style="list-style-type: none"> <li>• Cable to opcon.</li> <li>• Opcon.</li> <li>• Refer to Chart 7, Step 4.</li> </ul> <p>See Note 2.</p> <p>See Note 1.</p> <p>See Note 3.</p> <p>If the wrong line code appears, check the OPT 4 selection.</p> <p>See Note 4.</p>
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<p><i>Note 1:</i> If the message is not responded to within 20 seconds; the display will clear, the test will be automatically canceled, and S/R will flash repeatedly. Depress LOCAL to stop S/R from flashing.</p> <p><i>Note 2:</i> The QUICK BROWN FOX . . . message may be changed provided that the first character remains a "T". If "T" is changed to any other character, the display will clear and the test will be canceled when S/R is depressed.</p> <p><i>Note 3:</i> Besides CLEAR, depression of any PA or PF key will clear display and cancel test.</p> <p><i>Note 4:</i> When the SPACE character is selected, it is represented by a blank space. If characters are incorrect per customer order and Fig. 4, Check OPT 1 selection for station poll address or OPT 2 selection for KD device address (Private Line Version) or check OPT 1, OPT 2, or OPT 3 selections for 2nd, 3rd or 4th characters of ID sequence respectively (dial-up version).</p>															

## CHART 2 (Cont)

## KD/CONTROLLER LOCAL TEST PROCEDURES

STEP	PROCEDURE	CORRECT RESPONSE	LOCAL TEST ANALYSIS
8	Depress ENTER.  <div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 10px auto;"> <p>THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 0123456789 TIMES.</p> </div> <p><i>Note:</i> If any characters in the QUICK BROWN FOX. . . message were changed before depressing ENTER, those characters will appear in the above message.</p>	If received without error, the following message will appear on the monitor.	<ul style="list-style-type: none"> <li>• If S/R is flashing, go to Step 13, Local Test Analysis.</li> <li>• If "test failed", message is received, go to Step 13, Procedure.</li> </ul>
9	Depress CLEAR.	Display is cleared.	
10	Request a local test by depressing the L/TST key and the NUMERIC key simultaneously.	The message of Step 7 is displayed.	Replace opcon.
11	Depress ENTER.	As given in Step 8.	As given in Step 8.
12	Depress CLEAR.	Test is completed. Display is cleared. Proceed to Step 15.	
13	If message is received with an error, the following message will be displayed on the monitor.  <div style="border: 1px solid black; border-radius: 15px; padding: 10px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;"><b>**TEST FAILED**</b></p> <p>TEST MESSAGE:</p> <p>THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 0123456789 TIMES.</p> <p>RETEST PRESS ENTER OR S/R TO RESET, PRESS CLEAR SEE MANUAL FOR DETAILS</p> <p>( _ _ _ )      <input type="text"/></p> </div>		<p>Symptom — Flashing S/R.</p> <p>Step 4 "Local Test Analysis" applies.</p> <p style="text-align: right;">Go to Step 14.</p>
14	Depress RESET if station is not connected to LCU.  Retry Steps 7 and 8 once then cancel test (depress CLEAR key).		If test still fails, run controller self tests of Chart 1.
15	If local test of KD device is successfully completed, proceed to Chart 3.		

Stn or Dvce No.	S P A	S S A	D A	Stn No.	S P A	S S A
00	SP	—	SP	18	K	2
01	A	/	A	19	L	3
02	B	S	B	20	M	4
03	C	T	C	21	N	5
04	D	U	D	22	0	6
05	E	V	E	23	P	7
06	F	W	F	24	Q	8
07	G	X	G	25	R	9
08	H	Y	H	26	](!)	:
09	I	Z	I	27	\$	#
10	[(€)	!	[(€)	28	*	@
11	.	,	.	29	)	'
12	<	%	<	30	;	=
13	(	—	(	31	^(¬)	"
14	+	>	+			
15	!( )	'	!( )			
16	&	0				
17	J	1				

(Private Line Version Only)

*Note:* This figure is used with Step 1 or Step 7 of Chart 2. The figure indicates all station and device identification for ASCII or EBCDIC coded stations. EBCDIC characters are shown in parentheses. Device numbers 00 through 15 can apply.

Fig. 4—ASCII or EBCDIC Station and Device Identification (Private Line Version)

B. Printer Local Tests

2.04 If a printer is not part of the station, proceed to 2.05. If a printer is part of the station, perform the Chart 3 procedures.

CHART 3

PRINTER LOCAL TEST PROCEDURES

*Note:* If a printer is not part of the station, proceed to Chart 4.

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
1	Preliminary requirements of printer: a. Ribbon and paper loaded. b. Switches (top right or left of printer, cabinet cover raised). LF-1 Test-Off Forms (Tractor Feed Only) — On c. Cabinet cover closed and ac power switched ON.	Printer motor is off.  <i>Note:</i> Fan in tractor feed printer cabinet must be ON (air flows).	Refer to Section 582-210-500.

## CHART 3 (Cont)

## PRINTER LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
2	Momentarily depress PAPER button (red) on cover of printer cabinet.	Paper feeds out as long as button is depressed.	<ul style="list-style-type: none"> <li>• Check for: <ul style="list-style-type: none"> <li>a. Printer cable not connected.</li> <li>b. Printer cable defective.</li> <li>c. Defective 410290 circuit card.</li> </ul> </li> </ul> <p>Refer to Section 582-210-500.</p>
3	<p><b>TRACTOR FEED PRINTER ONLY:</b></p> <p>Depress and release FORMS ADVANCE button (black) on printer cabinet cover. (See Note in Trouble Analysis column.)</p>	<p>Paper feeds out until first line of next form is reached, then stops.</p> <p><i>Note:</i> See chart on top of printer to determine the correct form out selection.</p>	<p>Refer to Section 582-210-500.</p>
4	Unlatch and raise printer cabinet cover.	None	<p><i>Note:</i> Continuous feedout will occur if form selector lever not fully seated in slot 1, 2, 3, or 4.</p>
5	Raise cover interlock switch to maintenance position.	None	
6	<p>Set test switch to ON, allow printer to print several lines, then turn test switch OFF.</p> <p><i>Note:</i> On printers which have later version 410071, 410072 and 410076 circuit cards, the font identification symbol will be printed in the columns margined per Option 17.</p>	<p>Printer turns on and prints font identification symbol repeatedly in all columns until switch is turned off. (See Note)</p> <p>See Section 582-200-101 for font ID symbols.</p>	Refer to Section 582-210-500.
7	<p><b>FRICION FEED PRINTER:</b></p> <p>Lift paper roll to simulate a paper alarm. Lower paper roll, guide paper through window, and close cabinet cover.</p>	<p>Paper indicator lights.</p> <p>Paper indicator goes out.</p>	Refer to Section 582-210-500.

## CHART 3 (Cont)

## PRINTER LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
7 (Cont)	<p><b>TRACTOR FEED PRINTER:</b></p> <p>Tear off next form at perforations under pedestal top, then depress PAPER button on cabinet top until last form passes through printer.</p> <p>Reload forms, guide first form through window, and close cabinet cover.</p>	<p><u>80-Column Printer With 410640 Circuit Card</u> — PAPER indicator lights and printer motor turns off.</p> <p><u>80-Column Printers With 410076 or 410071 Circuit Cards And All 132-Column Printers</u> -- If Option 48a is selected, PAPER indicator lights and printer motor turns off when last form is partly through printer. If Option 48b is selected, PAPER indicator does not light and printer motor does not turn off until form is completely out of printer and end of form contact is sensed.</p> <p>PAPER indicator goes out.</p>	
8	<p>Type some text on the display (lower case and capitals if possible) and then depress PRINT LOCAL key.</p>	<p>LOCAL indicator extinguishes and PRINT LOCAL indicator lights and then goes off when printer buffer receives the message; LOCAL indicator lights.</p> <p>Printer copies entire display (24 lines):</p> <p><u>Monocase Printer</u> — All display characters print as capitals. See Note following Step 5 of Chart 4.</p> <p><u>Up-Low Printer</u> — All display characters are copied as displayed.</p> <p>(Continued on next page)</p>	<p>Flashing PRINT LOCAL indicator indicates:</p> <ul style="list-style-type: none"> <li>a. Printer cabinet lid open.</li> <li>b. Form or paper-out condition.</li> <li>c. Printer ac power is off.</li> <li>d. Printer is not print local to the KD.</li> <li>e. Printer cable defective or miswired.</li> </ul> <p>Refer to Section 582-210-700</p>

CHART 3 (Cont)

PRINTER LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
8 (Cont)		<p><i>Note 1:</i> Friction feed printer may or may not feed out 16 lines of paper before turning off, depending on Option 18. Tractor feed printer may or may not form feed before turning off depending on Options 18 and 39.</p> <p><i>Note 2:</i> After printer is finished copying, the motor will remain on for approximately 10 seconds before turning off. Later version printer circuit cards will allow printer motor to remain on for 40 seconds or indefinitely, depending on Option 58.</p>	<p>Option 18c not installed in monospace printer.</p> <p>Character set of type carrier in printer does not match Option 19.</p> <p>Option 19c not installed in printer.</p> <p>Refer to Section 582-210-700.</p>

C. KD Local Test

2.05 Check the KD using the procedure given in 2.06 and Chart 4. The locations of the various control and data keys referred to in Chart 4 are given in Fig. 5. The SDS has only one KD and therefore, only one opcon and one monitor.

2.06 Follow these instructions before beginning Chart 4:

- (a) Turn on power to the set or station (LOCAL indicator lights on the opcon).
- (b) Turn on power to the display and adjust brightness.
- (c) Perform Steps 1 through 41 of Chart 4, KD Local Test Procedures.

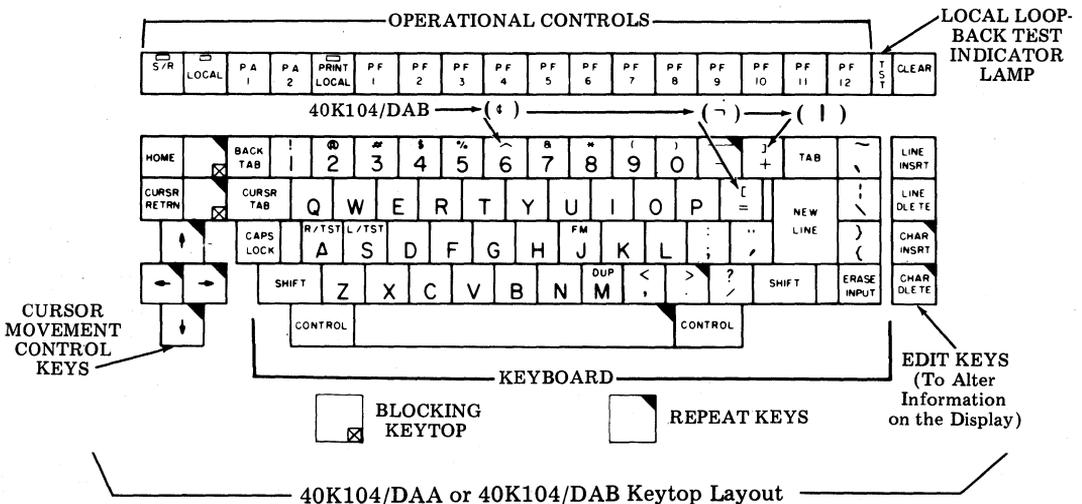
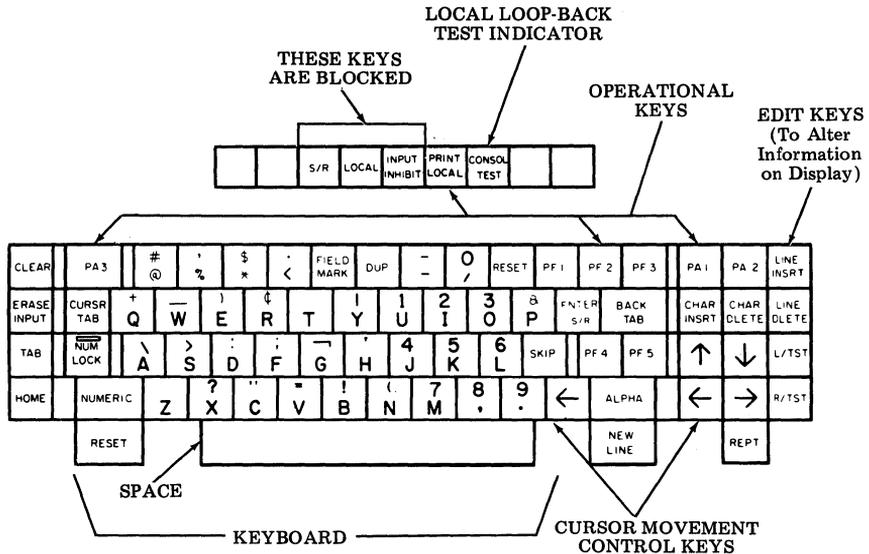


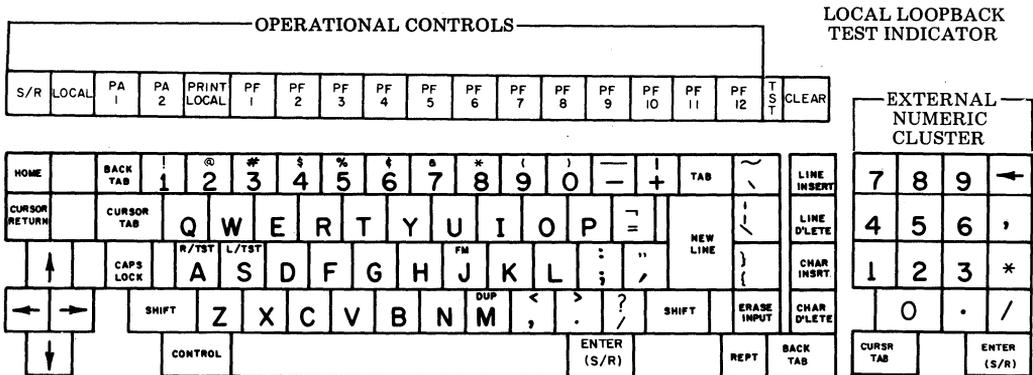
Fig. 5—Opcon Keypop Layouts



Note: The only locking keytop is NUM LOCK, depress to set (lights), depress to release (light goes out).

40K105/CAA Keytop Layout

Fig. 5—Opcon Keytop Layouts (Cont)



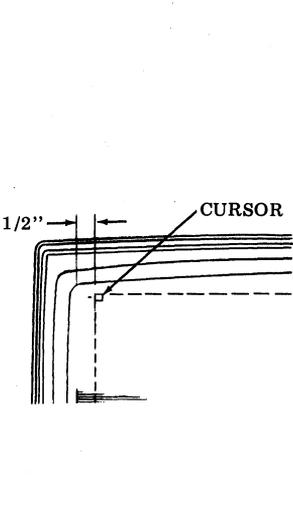
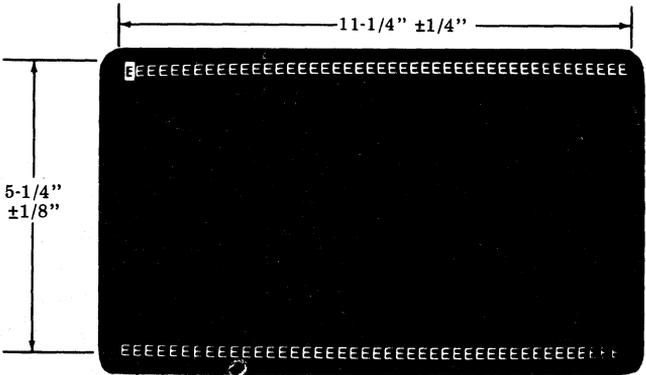
Note: The, (comma), \*, and / keys located within the External Numeric Cluster are not functional with SDCs (Private Line Version Only) which employ the 410261 circuit card and, therefore may be covered with blocking keys.

40K203/GAB Keytop Layout

Fig. 5—Opcon Keytop Layouts (Cont)

CHART 4

KD LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
1	<p><i>Note:</i> Start with Step 1 if KD of the station has typewriter style opcon. Start with Step 21 if KD has a internal numeric cluster style opcon.</p> <p>a. Place typewriter style opcon into the caps mode by depressing and latching the CAPS LOCK key. (Opcons with no CAPS LOCK key require no action.)</p> <p>b. On the monitor:</p> <ul style="list-style-type: none"> <li>• Observe that the raster is barely present when brightness control is turned up fully.</li> <li>• When cursor is in home position, it is approximately 1/2" from left side of display.</li> <li>• Enter a line of Es at top and bottom of display, then HOME cursor. Requirements are met.</li> </ul>	  <p>Requirements:</p> <ul style="list-style-type: none"> <li>• Raster aligned vertically and horizontally.</li> <li>• All Es sharply defined.</li> <li>• Height and width of display as indicated.</li> <li>• Es uniform across full width.</li> <li>• Height of Es same at top and bottom lines.</li> </ul>	<ul style="list-style-type: none"> <li>• If raster is not present go to Chart 8.</li> <li>• If a requirement is not met, refer to adjustments of monitor in Section 582-213-700 to meet requirement.</li> <li>• If E cannot be entered, go to Chart 9.</li> </ul>

## CHART 4 (Cont)

## KD LOCAL TEST PROCEDURES

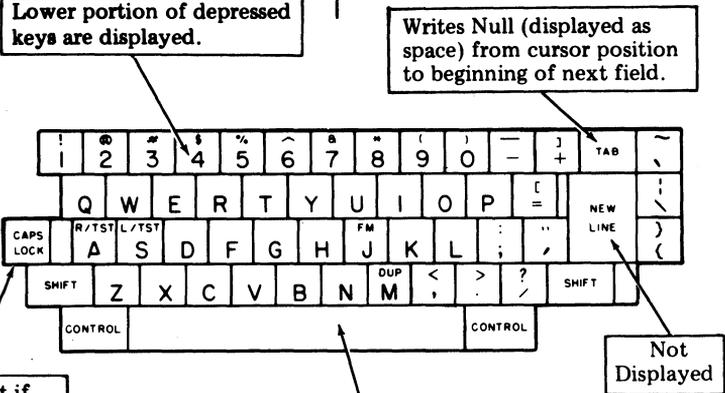
STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
2	<p>Home the cursor and depress a few keys on the keyboard portion of the opcon.</p> <p>Lower portion of depressed keys are displayed.</p>  <p>Not present if blocking keytop is used.</p> <p>Writes a space and causes cursor to move to right.</p> <p>Not Displayed</p>	<p>Upper case alpha characters and numeric characters can be displayed.</p> <p><i>Note:</i> Each keytop need not be checked except for a trouble call. Each keytop shall function each time it is depressed.</p>	
3	<p>Disengage the <b>CAPS LOCK</b> key by depressing it again momentarily. Again depress a couple of keys on the keyboard portion of the opcon. (Opcons with no CAPS LOCK key require no action; go to Step 4.)</p>	<p>The alpha characters described in Step 2 are displayed in lower case (ie, abcdef, etc).</p>	

CHART 4 (Cont)

KD LOCAL TEST PROCEDURES

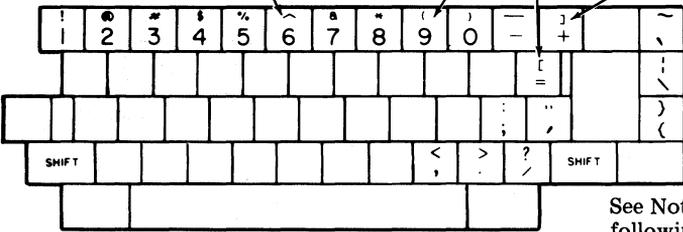
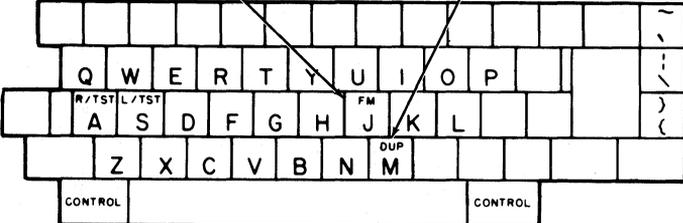
STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
4	<p>Depress the left then the right <span style="border: 1px solid black; padding: 2px;">SHIFT</span> key while depressing and checking operation of one of the following alpha keys (ie, !@#\$, etc).</p> <p>(Or <math>\text{c}</math>)</p>	<p>Upper portion of the depressed keys are displayed.</p> <p>(Or <math>\text{~}</math>)</p> <p>(Or <math> </math>)</p>  <p>See Note following Step 5.</p>	
5	<p>Depress the left <span style="border: 1px solid black; padding: 2px;">CONTROL</span> key together with the <span style="border: 1px solid black; padding: 2px;">FM</span> <span style="border: 1px solid black; padding: 2px;">J</span> key; then depress the right <span style="border: 1px solid black; padding: 2px;">CONTROL</span> key together with the <span style="border: 1px solid black; padding: 2px;">DUP</span> <span style="border: 1px solid black; padding: 2px;">M</span> key.</p>	<p>See Note following Step 5.</p> <p>Displayed as <math>F_S</math></p> <p>Displayed as <math>D_L</math></p> 	

CHART 4 (Cont)

KD LOCAL TEST PROCEDURES

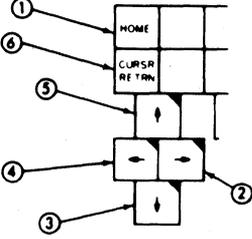
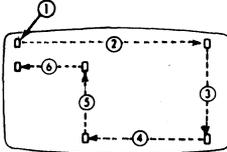
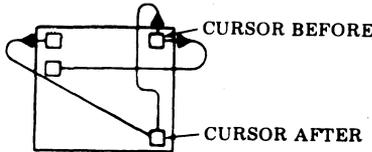
STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
<p><i>Note:</i> Some characters may be displayed as a character other than the character received on-line or entered from the opcon. See the table below which also provides printer actions for applicable characters.</p>			
Application of Type of 40K104 Opcon		'/DAA or '/DAB	'/DAA '/DAB '/DAB '/DAA or '/DAB
Character Received From LCU or Entered on 40K104 Type Opcon		~ \   { } ^ ] [ ¢   ~	D U P FM
Character Displayed Using:	ASCII UP-LO	~ \   { } ^ ] [ ^ ] [	DL FS
	ASCII MONO	^ @ \ [ ] ^ ] [ ^ ] [	DL FS
	EBCDIC UP-LO	~ \   { } ¢   ~ ¢   ~	DL FS
	EBCDIC MONO	~ @ \ ¢   ¢   ~ ¢   ~	DL FS
Character Printed Using Type Carrier:	400629 80C ASCII UP-LO	~ \   { } ^ ] [ ^ ] [	SP SP
	400645 80C ASCII MONO	^ @ \ [ ] ^ ] [ ^ ] [	SP SP
	400777 132C ASCII UP-LO	~ \   { } ^ ] [ ^ ] [	SP SP
	400780 132C ASCII MONO	^ @ \ [ ] ^ ] [ ^ ] [	SP SP
	400783 132C EBCDIC UP-LO	~ \   { } ¢   ~ ¢   ~	SP SP
	400784 80C EBCDIC UP-LO	~ \   { } ¢   ~ ¢   ~	SP SP
	400785 80C EBCDIC MONO	¢ @ \ ~   ¢   ~ ¢   ~	SP SP
	400887 132C EBCDIC MONO	¢ @ \ ~   ¢   ~ ¢   ~	SP SP

LEGEND:

Will print with fold-over option in printer enabled. Error symbol will print if fold-over option is not enabled.

CHART 4 (Cont)

KD LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
6	Depress one of the following keys with additional force,   	..... ..... The space key repeatedly moves the cursor.	
7	Depress the  key. Then in sequence depress momentarily with more force than normally required, each cursor movement key shown. 	 Note: In local opcon operation, attempts to move the cursor off the display will result as shown: 	
8	Depress ERASE INPUT key.	Display clears and cursor goes to home position. LOCAL key remains lighted.	
9	Type the alpha characters A through J on the display. Place the cursor over the character E and depress the  key once, then depress it fully — releasing it after the characters move to the next line.	① ABCD  FGHIJ ② ABCD  EFGHIJ ③ ABCD  EFGHIJ Note: CHAR INSRT and CHAR DLETE affect all 24 lines.	

## CHART 4 (Cont)

## KD LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
10	Depress the  key momentarily, then depress it fully.	ABCD  EFGHIJ ABCD  FGHIJ Characters delete one at a time or repeatedly when key is held depressed.	
11	Depress the  key three times.	The cursor moves to start of present line, and the line of data moves down three lines.	
12	Depress the  key three times.	The line of data moves up one line, then stops on the first line.	
13	Depress  key, (if printer is not provided, go to Step 14).	LOCAL indicator extinguishes, PRINT LOCAL indicator lights and then goes off when printer buffer receives the message; LOCAL indicator lights.  Printer copies entire display (24 lines):  <u>Monospace Printer</u> — All display characters print as capitals.  <u>Up-Low Printer</u> — All characters are copied as displayed.	<ul style="list-style-type: none"> <li>•Flashing PRINT LOCAL indicates printer: <ul style="list-style-type: none"> <li>a. Cabinet lid is open.</li> <li>b. Is in form-out or paper-out condition.</li> <li>c. The ac power is off.</li> <li>d. Printer SSI connection is not made.</li> </ul> </li> </ul> <p><i>Note:</i> Depress LOCAL to clear flashing PRINT LOCAL.</p>
14	Place the cursor away from home position and depress the  key.	The cursor returns to home position.  <i>Note:</i> Displayed data is not affected by CURSOR TAB and BACK TAB keys.	
15	Place the cursor away from home position and depress the  key.	The cursor returns to home position.	
16	Place the cursor away from home position and depress the  key.	Cursor returns to home position. Any characters below cursor will be cleared.  <i>Note 1:</i> Null displayed as space. <i>Note 2:</i> Cursor will not move if option 402c or d is chosen.	

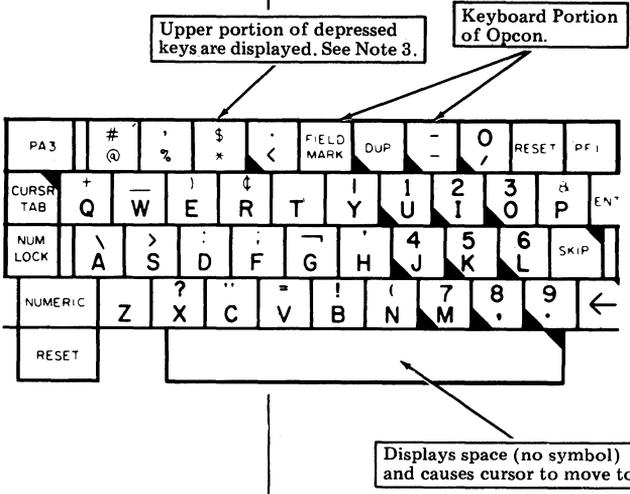
## CHART 4 (Cont)

## KD LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
17	Type some text on the opcon and then depress  .  Attempt to type some text on the opcon.	Text is displayed. LOCAL indicator extinguishes when S/R is depressed.  Attention bell sounds each time a key is depressed (provided typing rate does not exceed maximum repeat bell rate).	
18	Alternately depress LOCAL then depress  key, then  key and  ,  ,  through  ,  and  keys in the same manner.	 is lit and extinguishes when a key is depressed (same for each key). Data on display remains unchanged, except when CLEAR is depressed; all data clears from display and cursor goes to home position.	
19	This step applies only to monospace opcons (blocking keytop over CAPS LOCK position). a. Depress ERASE INPUT and QUOTES keys together with additional force. b. Depress A (do <u>not</u> depress SHIFT). c. Depress ERASE INPUT and P keys together with additional force.	TST indicator lights and remains lighted.  S/R key lights. If S/R key does not light, see Trouble Analysis column entry.  TST indicator light goes out.	Chart 9  •Remove blocking keytop, check that plunger is in lower position.  •Replace opcon.  Chart 9
20	When typewriter style opcon has successfully passed Steps 1 through 19, go to Chart 5.		
21	<u>INTERNAL NUMERIC CLUSTER STYLE OPCON (Steps 21 through 41)</u>		
	a. Place internal numeric cluster style opcon into the NUM LOCK mode by depressing and latching the NUM LOCK key.  b. Perform Step 1b.	The indicator lights.  Results and Trouble Analysis of 1b apply.	

CHART 4 (Cont)

KD LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
22	<p>Home the cursor and depress a few keys on the keyboard portion of the opcon.</p> <div style="text-align: center;"> <p>Upper portion of depressed keys are displayed. See Note 3.</p>  </div>	<p>Upper case alpha characters and numeric characters can be displayed.</p>	
23	<p>Hold down the <span style="border: 1px solid black; padding: 2px;">ALPHA</span> key while depressing an alphanumeric key (ie, A, B, C, etc).</p>	<p>The corresponding alpha character (ie, A, B, C, etc) is displayed.</p>	
24	<p>Disengage the <span style="border: 1px solid black; padding: 2px;">NUM LOCK</span> key by depressing it again momentarily. The indicator light goes out.</p> <p>Depress a couple of keys (ie, A, B, C, D, etc) on the keyboard portion of the opcon.</p>	<p>The alpha characters shown in the figure of Step 2 (lower portion of keytops) are displayed (ie, A, B, C, D, etc).</p>	

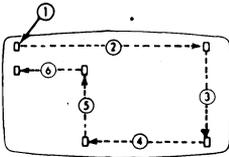
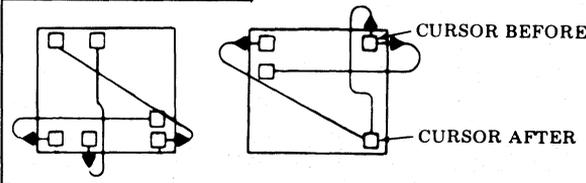
*Note 1:* Each key need not be checked except for a trouble call. Each shall function each time it is depressed. Depressing Z or T will display space (no symbol) and cause cursor to move to right.

*Note 2:* TAB writes Nulls (displayed as space) from cursor position to beginning of next field. NEW LINE is not displayed.

*Note 3:* If Option 407a is installed (Numeric Lock Special Feature enabled) in the SDC, NUMERIC must be depressed (or NUM LOCK key lighted) to enter characters outside the numeric cluster (keys in cluster are marked:  ).

## CHART 4 (Cont)

## KD LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
25	Hold down the  key while depressing and checking operation of one of the following alpha keys: (#, +, \, etc.).	Upper portion of depressed keys are displayed.	
26	Depress the  key, then depress the  key.	FIELD MARK is displayed as FS. DUP is displayed as DL.	
27	Fully depress the  key.	The space key repeatedly moves the cursor.	
28	Hold down the  key while depressing any alphanumeric key.	The alphanumeric character is repeated.	
29	<p>① Depress  key.</p> <p>② Depress #  key.</p> <p>③ Depress #  key.</p> <p>④ Depress #  key. (Try both  keys.)</p> <p>⑤ Depress #  key.</p> <p>*With more force than normally required.</p> <p><i>Note:</i> There is no CURSR RTRN key on this opcon.</p>	 <p><i>Note:</i> In local opcon operation, attempts to move the cursor off the display will result as shown:</p> 	

## CHART 4 (Cont)

## KD LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
30	Depress ERASE INPUT key.	Display clears and cursor goes to home position. LOCAL key remains lighted.	
31	Type the alpha characters A through J on the display. Place the cursor over the character E and depress the  key once, then also depress  -- releasing both after the characters move to the next line.	<p>① ABCD </p> <p>② ABCD </p> <p>③ ABCD </p> <p>EFGHIJ</p> <p><i>Note:</i> CHAR INSRT and CHAR DLETE affect all 24 lines. Characters move slowly.</p>	
32	Depress the  key momentarily.	<p>ABCD </p> <p>ABCD </p> <p>Characters EFGHIJ move one position to the left as shown.</p>	
33	Depress the  key three times.	The cursor remains at its present location, and the line of data moves down three lines.	
34	Depress the  key once.	The line of data moves up one line.	
35	Depress  key, (if printer is not provided, go to Step 36).	LOCAL extinguishes, PRINT LOCAL key lights and then goes off when printer buffer receives the message; LOCAL lights. Printer copies entire display (24 lines).	<ul style="list-style-type: none"> <li>•Flashing PRINT LOCAL indicates printer: <ul style="list-style-type: none"> <li>a. Cabinet lid is open.</li> <li>b. Is in form-out or paper-out condition.</li> <li>c. Ac power is off.</li> <li>d. Printer SSI connection is not made.</li> </ul> </li> </ul> <p><i>Note:</i> Depress RE-SET to clear flashing PRINT LOCAL.</p>
36	Place the cursor away from home position and depress the  key. Repeat Step 36 but depress the  key.	<p>The cursor returns to home position.</p> <p><i>Note:</i> Displayed data is not affected by CURSOR TAB, SKIP and BACK TAB keys.</p>	

## CHART 4 (Cont)

## KD LOCAL TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
37	Place the cursor away from home position and depress the  key.	The cursor returns to home position.	
38	Place the cursor away from home position and depress the  key.	Cursor returns to home position. Any characters below cursor will be cleared. <i>Note 1:</i> Null displayed as space. <i>Note 2:</i> When OPT6 is "I" or "A", cursor will not move.	
39	Type some text on the opcon and then depress  .	Text is displayed when ENTER key is depressed, LOCAL indicator extinguishes, INPUT INHIBIT indicator lights.	
40	Type some text on the keyboard portion of the opcon.	Attention bell sounds each time a key is depressed. No more text is displayed. <i>Note:</i> The audible alarm control on the opcon should be adjusted to allow bell to be heard.	
41	Alternately depress  (next to PF1) then depress  key, then  key and  ,  ,  through  and  keys in the same manner. Depress  , then depress  at the same time as  . Depress  (next to NUMERIC). <i>Note:</i> The PF6 through PF12 are not present on this opcon.	 is lit and extinguishes when PA1 key is depressed (same for each key). Data on display remains unchanged, except when CLEAR key is depressed; all data clears from display and cursor goes to home position.	
When the KD has successfully completed these tests, proceed to Chart 5.			

D. Data Set Analog Loop-Back Self Test

2.07 Check the data set using Chart 5.

CHART 5

DATA SET ANALOG LOOP-BACK SELF-TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
<p><i>Note:</i> If Station has a Data Set 208A or 208B, go to Step 2. If a Data Set 212A is used, go to Step 3. If a 251A1TDU is used, go to Step 4. If a 500A Type DSU is used, go to Step 5.</p>			
<p>1</p>	<p>Data Set 201C</p> <p>Apply ac power to data set.</p> <p>Perform Analog Loopback Self-Test as follows:</p> <ul style="list-style-type: none"> <li>• Depress AL button.</li> <li>• Depress ST button.</li> <li>• Observe MC lamp for 30 seconds.</li> <li>• Depress RO button.</li> <li>• Release RO, ST, and AL buttons.</li> </ul>	<p>ON, MR, and MC are lit.</p> <p><i>Note:</i> TR lamp may or may not be on depending on the state of the stations DTR lead.</p> <p>AL button latches, TM lights and MR goes off.</p> <p>All lamps except MC should be ON.</p> <p>MC lamp should not blink on.</p> <p>RS, and CS lamps should be off; MC lamp should be on. CO lamp extinguishes if switched carrier option is used and lights if continuous carrier option is used.</p> <p>TM lamp should be off. This completes the data set self-test; go to Step 5.</p>	<ul style="list-style-type: none"> <li>• Check Data Set Options.</li> <li>Replace Data Set.</li> </ul>



## CHART 5 (Cont)

## DATA SET ANALOG LOOPBACK SELF-TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
3	<p>Data Set 212A:</p> <p>Apply ac power to data set. Perform the Analog Loopback Self-Test as follows:</p> <p><i>Note:</i> HS button should be in depressed position.</p> <ul style="list-style-type: none"> <li>• Depress AL and ST buttons.</li> </ul> <ul style="list-style-type: none"> <li>• Observe the MC indicator for one minute.</li> </ul> <ul style="list-style-type: none"> <li>• Release AL and ST buttons.</li> </ul>	<p>The MB, HS, MR and TM indicators should be lit. The MC indicator light goes off after SD and RD indicators light. See Section 582-201-200 for data set optioning.</p> <p><i>Note:</i> The TR indicator may or may not be on depending on the state of the stations DTR lead.</p> <p>MC indicator does not blink on.</p> <p>MB, TM, SD and RD indicators go out, MC will light if no carrier is being received.</p> <p>Go to Step 5.</p>	<p>Replace Data Set.</p>
4	<p>Internal Modem 251A1 TDU.</p> <p>Depress and hold down the switch on the 251A1 for 5 seconds.</p>	<p>MC lamp on 251A1 flashes once immediately and then remains off.</p> <p>Go to 2.08.</p>	<p>Replace 251A1.</p>
5	<p>Data Sets 201C, 208A or B, or 212A or 500 Only.</p> <p>With all equipment power switches on and conditioned for operation (paper installed in printer; cabinet lid closed, etc), check for the correct data set indicator lights.</p> <p><i>Note:</i> CO should be lit (MC not lit on 201C, ER not lit on 208) when the distant end (CPE) is providing carrier on condition. Before beginning on-line test with STC/DTC notify customer of intended</p>	<p>Data Set 201B3 None</p> <p>Data Set 201C  ON — Lighted  TR — Lighted  MR — Lighted  RS — Off  CS — Off  CO — Off (See Note)  MC — Lighted  TM — Off</p>	

## CHART 5 (Cont)

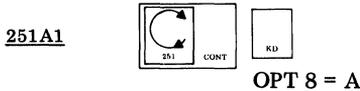
## DATA SET ANALOG LOOPBACK SELF-TEST PROCEDURES

STEP	PROCEDURE	RESULTS	TROUBLE ANALYSIS
5 (Cont)	test and that 40 type station test will take approximately 5 minutes per device.	Data Set 208 ON — Lighted TR — Lighted (208B Only) MR — Lighted RS — Off CS — Off CO — Off ER — Lighted } (See Note)  Data Set 212A MB — Off TR — Lighted MR — Lighted SD — Off RD — Off HS — Off MC — Lighted TM — Off  Data Service Unit 500A PWR — Lighted NS — Off LL — Off RT — Off  Go to 2.08.	

ON-LINE TESTS

A. Preliminary On-Line Testing

2.08 Preliminary Requirements — the data set must pass the requirements of Chart 5. Chart 5 makes this test:



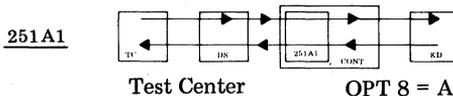
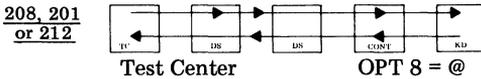
B. On-Line Test Methods

2.09 On-Line tests require access to a Data Test Center (DTC) by way of a Servicing Test Center (STC). Hereafter, the DTC is called the Test Center in Private Line Applications. Access to the Test Center may require a four-wire DDD backup connection at the STC or installation site. This connection is beyond the scope of this section (refer to Section 598-082-201, if required).

*Note:* All on-line tests require that the KD/Controller Local Test of Chart 2, and Data Set Analog Loopback Test of Chart 5 have been successfully performed first.

2.10 On-line testing requires that the End-to-End Installation Test of 2.11 be performed first. If this test is performed satisfactorily, the station should be put into service. If this test cannot be performed because of failures in being able to gain access to the DTC, then the Near-End Analog Loopback and/or Far-End Digital Loopback Tests of 2.12 and/or 2.13 or 2.14 should be performed.

2.11 An End-to-End Installation Test is performed with the assistance of the DATA-SPEED Test Center.

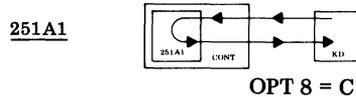
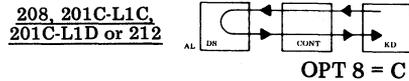


This test must be requested from a local area DATASPEED Test Center. In situations where access to a Test Center is not provided for in the

customer's system, the required End-to-End Installation Test can be omitted if correct in-service operation testing with the customer equipment or system can be verified by the craftsperson and is customer accepted. If trouble does occur in an in-service operation test, refer to trouble analysis or request a Test Center to perform a line monitor test.

Perform the tests in Chart 6, End-to-End Installation Test Procedures.

2.12 The Near-End Analog Loopback Test as follows:



This test provides a craftsperson with a local test method to check station and local data set operation when access to the DTC cannot be attained. This test cannot be performed if station is equipped with a Data Set 201C-L1 or 500A-Type DSU.

This test applies only to Data Sets 201C-L1C, 201C-L1D, 212A, 208, and 251A1 TDU. If another type of data set is present, go to 2.13. If a 251A1 is present, go to 2.12 (b).

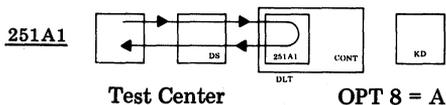
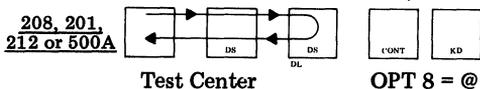
- (a) For 208, 201C-L1C, 201C-L1D or 212A Only: Depress AL button (locking) on the data set (all other buttons released).
- (b) Enter the "OPT" mode by depressing the controller SELF-TEST switch for one to two seconds.
- (c) Move the cursor to the character following "OPT 8" by depressing CURSR TAB repeatedly.
- (d) Depress "C".
- (e) Return to operating mode by depressing LOCAL (or RESET).
- (f) Perform Local Tests using the same test routine given in Chart 2, KD/Controller Local Test Procedures (up to Step 5 only). The test occurs when S/R key is depressed.

(g) If test is not successfully completed, the controller or data set is at fault. If test is successfully completed, perform (b) and (c) above, then: (208, 201C-L1C, 201C-L1D or 212A only) depress @, or (251A1 only) depress A.

(h) Release AL button on data set.

**Caution 1:** Do not release AL button (208, 201C-L1C, 201C-L1D or 212A only) during this test. If AL is released while OPT 8C is installed, data sent by S/R key depression can be sent into the customer's data system during the test; any data operation occurring at that time would be scrambled.

2.13 A Far-End Digital Loopback Test is performed as follows:



**Caution 2:** Do not perform the digital loopback test if the customer data channel is on the same circuit with other stations which are actively sending or receiving data. If this test is performed on an active circuit, data transmissions on that circuit will be scrambled and possibly halt the data system operation. BEFORE TESTING, REQUEST PERMISSION FROM CUSTOMER AND DATA TRANSMISSION CENTER FOR TIME AND COOPERATION TO TEST.

If station is dial-up version, establish line connection first. For 201, 212, and 208 only: Depress the data set DL key (locking) when directed by the attendant at the far end. When the test is complete, the attendant at the far end will tell you to release the DL key to the released position.

**Note:** (212A Data Set only) If station Data Set 212A is optioned for automatic answer, the DTC may force the station data set into DL by depressing RDL on the 212A Data Set at the DTC.

For 500A only: When directed by the far-end attendant, place the DSU into DL (see Section 595-200-200).

For 251A1 TDU only: When directed to go into "DL" by the far-end attendant, perform the following:

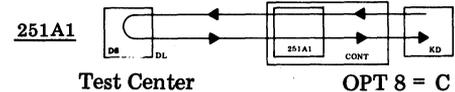
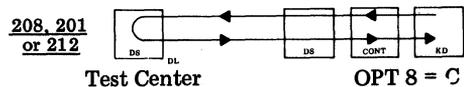
(a) Depress CONTRL and L/TST (or ALPHA and L/TST as applies) at a KD.

(b) Type "DLT" over the "THE" in the test message. Depress S/R. "DTL MODEM IN DIGITAL LOOPBACK TO RESET PRESS CLEAR" will be displayed.

(c) The 251A1 is now in "DL". Each minute, depress S/R to keep the 251A1 in loop-back. The 251A1 will automatically come out of loop-back in approximately 2 minutes if S/R is not depressed.

(d) When directed to terminate "DL", depress CLEAR.

2.14 A Far-End Digital Loopback Test is performed as follows:



**Note:** This test should only be performed when the Digital Loopback test of 2.13 cannot be performed.

**Caution:** Caution 2 of 2.13 applies.

If a multistation arrangement shares the same data communications circuit, all communications on that circuit must cease during the test period. This test can be performed with the assistance of the DATASPEED Test Center (ie, similar type of data set patched into customer circuit to facilitate the test). If station is a dial-up version, establish line connection first.

(a) Have the far-end attendant depress DL.

**Note:** If far-end data set is 212A and optioned for automatic answer, far-end data set can be forced into DL by depressing RDL at station Data Set 212A.

(b) Perform Steps 2.12 (b) through (f).

(c) If the test is not successfully completed, trouble is in transmission lines, far-end data set or near-end data set. If the test is successfully completed, then after performing 2.12 (f), (201, 208 or 212A only) depress @, (or 251A1 only) depress A.

CHART 6

## END-TO-END INSTALLATION TEST PROCEDURES

STEP	PROCEDURE	RESULT	TROUBLE ANALYSIS										
1	Depress LOCAL (or RESET) and ERASE INPUT keys on the opcon.	LOCAL lights. Cursor returns to row 1 and column 1. Display is cleared of all data.	Go to Chart 2.										
2	Depress PA1 key on the opcon.	LOCAL key lamp extinguishes. (Also, see Notes 1 and 2 following Chart 6.) Internal Numeric Cluater Opcon: INPUT INHIBIT lights.	Go to Chart 2.										
3	Contact the Test Center and request End-to-End Installation Test.  • Establish line connections per Test Center instructions, then observe carrier on indicators indicating line established to the Test Center.	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"><u>201C</u></td> <td style="text-align: center;"><u>208</u></td> </tr> <tr> <td>MC — Goes off</td> <td>ER — Goes off</td> </tr> <tr> <td>CO — Lights</td> <td>CO — Lights</td> </tr> <tr> <td style="text-align: center;"><u>251A1 TDU</u></td> <td style="text-align: center;"><u>212A</u></td> </tr> <tr> <td>no indication</td> <td>MC — Goes off</td> </tr> </table>	<u>201C</u>	<u>208</u>	MC — Goes off	ER — Goes off	CO — Lights	CO — Lights	<u>251A1 TDU</u>	<u>212A</u>	no indication	MC — Goes off	Go to Chart 5. Perform Near-End Analog Loopback Test of 2.12. Perform Far-End Digital Loopback Test of 2.13 or 2.14.
<u>201C</u>	<u>208</u>												
MC — Goes off	ER — Goes off												
CO — Lights	CO — Lights												
<u>251A1 TDU</u>	<u>212A</u>												
no indication	MC — Goes off												
4	For Test Center only.	Proceed to Step 5. (Also see 2.17.)											
5	If talk line to the Test Center is not available after test is requested, verify that the test has started by observing the RS/CS LEDs on the front of a 201 or 208 Data Set or the SD/RD LEDs on the front of 212 Data Set.  <i>Note:</i> For 251A1, see Note in result column.	RS/CS or RD/SD lights, on the front of the data set should flash ON then OFF during testing.  <i>Note:</i> If RS and CS or RD and SD are on constantly, observe the LEDs on 410290 or 410291 circuit card. The RD and SD LEDs are normally off, indicating a mark. They turn on for space. Flashing of RD indicates received data. Flashing of SD indicates sent data. Go to Step 6.	Inform Test Center of problem.										
6	The Test Center will perform the remainder of the test. Proceed to devices and check for correct test results; Fig. 6. and 7.	Test Center will inform of test acceptance or trouble. Call Test Center back if required. See Note 3 following Chart 6. Proceed to 2.15.											

*Note 1:* If the KD device is observed during this test, the S/R key must operate as follows:

S/R key flashing continuously (aborted condition) should be reported to the Test Center.

S/R key flashes once when KD has sent data.

S/R key lights when KD is selected to receive data.

*Note 2:* If a tractor feed printer is part of station, check that the forms switch is in ON position.

*Note 3:* If you are not in "talk" communication with the test center during this test, be sure to "call back" test center for verification of correct operation. After verification of correct operation using this test procedure (including test center approval), depress LOCAL (or RESET) then CLEAR keys on all KDs to normalize station. Verify correct operation in customer system before leaving site.

C. Checkout of Received Printer Message

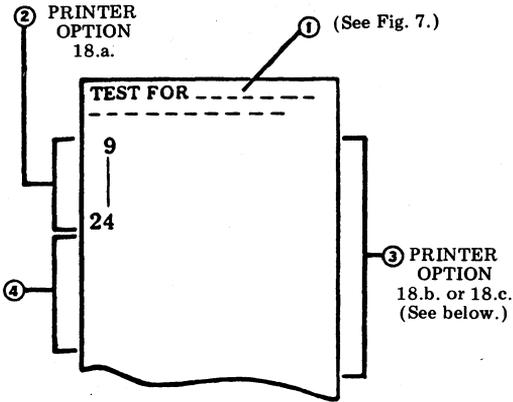


Fig. 6—Printed Test Message

2.15 If a printer is part of the station, check for correctness of printed test message, see ① above. If printer is not part of station, proceed to 2.19.

2.16 The printer motor will remain on for approximately 5 to 40 seconds after the test message is received.

Note: Paragraphs 2.17 and 2.18 check the options that are located on the printer circuit card.

2.17 Option 18a (No Feedout) — The blank lines ② are determined only by message length and column format sent to the printer. This test uses an 80-column format, therefore, lines 9 through 24 feed out (total of 1920 characters).

2.18 Options 18b or 18c (16-line feedout on RM loss or 16-line feedout on RM loss or ETX). This option illustrated as ③, operates the same as for Option 18a with the exception that after the blank lines 9 through 24 a 16-line

feed out (friction feed printer only) will occur. If Option 39a is installed, tractor feed printer will form feed out to the length of ④, if the printer forms switch is ON. Refer to the Form Selector Pointer Setting and the Belt and Form Length table on the printer to determine proper forms operation.

D. Checkout of Received KD Message

2.19 Check for correctness of display and station options (Fig. 7):

Option 402.a. — Continuous attention (the option bell repeatedly sounds if volume is turned up) until LOCAL is depressed; depress LOCAL. Bell silences.

Option 402.b. — One second attention (the option bell sounds if volume is turned up) and LOCAL key lights.

Option 406.a. — Alpha characters can be typed over periods in the numeric field (bell sounds) — line 5. This entry applies if OPT 4G is displayed (hold down ALPHA key while type characters).

Option 406.b. — Bell sounds when alpha is typed over numeric field; only numeric data can be entered into field — line 5.

Option 406.c. — Bell sounds when alpha is typed over numeric field; only numeric data can be entered into field — line 5.

Line 1 is copied as shown (Fig. 7). Line 2, the word PROTECTED begins in the fifth character position and is followed by the word INTENSIFIED. INTENSIFIED is brighter than normal for Option 403a (OPT 5@ displayed) or Option 403c (OPT 5B displayed). INTENSIFIED blinks for Option 403b (OPT 5A displayed) or Option 403d (OPT 5D displayed). Lines 3 through 8 are as shown below; the cursor must be positioned over "C" on line 8.

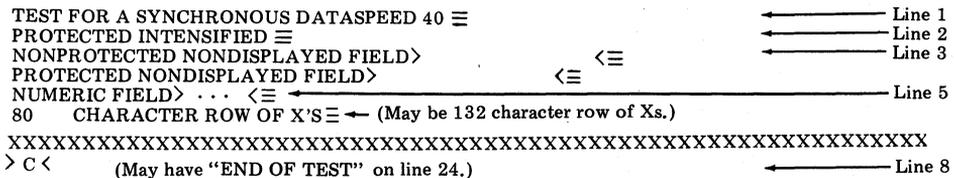


Fig. 7—SYNC 40 Test Message

### 3. TROUBLESHOOTING

3.01 The troubleshooting procedures for the controller are included in the controller self-test procedure.

3.02 A brief troubleshooting reminder on the monitor is provided in Chart 8. For detailed analysis, refer to Section 582-213-500.

3.03 Limited troubleshooting for the opcon is provided in Chart 9. For detailed analysis, refer to Section 582-211-500.

3.04 Trouble analysis for the printer is not given in this section. Refer to Section 582-210-500.

3.05 The use of a controller arrangement form (Section 582-200-205) is necessary to troubleshoot using the controller self-test.

## CHART 7

### STATION ANALYSIS

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
1. Are all power supply voltage indicators lit?	Go to 2.	Go to Chart 10, 40PSU101 Power Supply Analysis.
2. Depress and hold SELF-TEST switch.  Do all three pattern lamps (LEDs) on 410251 light?	Go to 3.	40PSU101, see Chart 10.  If power supply voltages are correct with all controller cards installed, replace 410251 circuit card.  If problem remains, replace controller cards one at a time and repeat Step 2 until defective card is found.  If all replacement cards together do not allow LEDs to light, disconnect opcon, monitor, data set (or data auxiliary set), and printer cables from back panel. then repeat Step 2.  If disconnecting a cable corrects problem, cable or device at other end is at fault.  If LEDs still do not light, replace 410276 (early version) or 410277 (later version) back panel. See Note 2 in Step 3.

CHART 7 (Cont)

STATION ANALYSIS

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>3. Release SELF-TEST switch.</p> <p>Does controller pass self-test? (See Note below.)</p> <p>This includes display patterns of Fig. 3 (see Note in "Yes" column.)</p> <p><i>Note 1:</i> Trouble patterns of controller arrangement forms are given in Section 582-200-205. When the card indicated by the trouble pattern in Section 582-200-205 is replaced, but the trouble remains, then the patterns given in the "NO" RESPONSIVE DIRECTIVE column of this question apply.</p> <p><i>Note 2:</i> Whenever it becomes necessary to replace a 410276 back panel with a 410277 back panel, or a 410290 circuit card with a 410291 circuit card or a 410261 circuit card with a 410264 circuit card, it may be necessary to also consult Section 582-200-205, Controller Arrangements for other affected circuit card positions.</p>	<p>Go to 4.</p> <p><i>Note:</i> If display pattern appears with errors or is distorted, replace 410286 circuit card and repeat Steps 2 and 3. If 410286 circuit card does not correct a display pattern, replace 410287 circuit card and repeat Steps 2 and 3.</p> <p>Legend for trouble patterns:</p> <ul style="list-style-type: none"> <li>● LED 1</li> <li>● LED 2</li> <li>● LED 3</li> </ul> <p>↓</p> <p>Front of 410251 circuit card</p>	<p>Replace circuit card indicated by trouble pattern of applicable controller arrangement form. If more than one trouble pattern appears, replace card indicated by last trouble pattern first. Repeat Steps 2 and 3.</p> <p>If indicated card does not pass, repeat Steps 2 and 3, then follow applicable procedure below:</p> <ul style="list-style-type: none"> <li>● [ a. Replace 41026N* circuit card, repeat Steps 2 and 3.</li> <li>● [ b. Remove all circuit cards, except 410251 and 41026N*. repeat Steps 2 and 3. If only middle LED is lit, then replace 410251 and 41026N* circuit card, otherwise replace back panel.</li> <li>○ [ a. Replace 410251 circuit card, repeat Steps 2 and 3.</li> <li>○ [ b. Follow b. entry of ● .</li> <li>○ [ a. Replace 410251 circuit card, repeat Steps 2 and 3.</li> <li>○ [ b. Replace back panel.</li> <li>○ [ a. Replace 410251 circuit card, repeat Steps 2 and 3.</li> <li>○ [ b. Replace back panel.</li> </ul> <p>*See Note 2.</p> <ul style="list-style-type: none"> <li>● [ a. Replace 410287 circuit card, repeat Steps 2 and 3.</li> <li>○ [ b. Replace back panel.</li> </ul>

## CHART 7 (Cont)

## STATION ANALYSIS

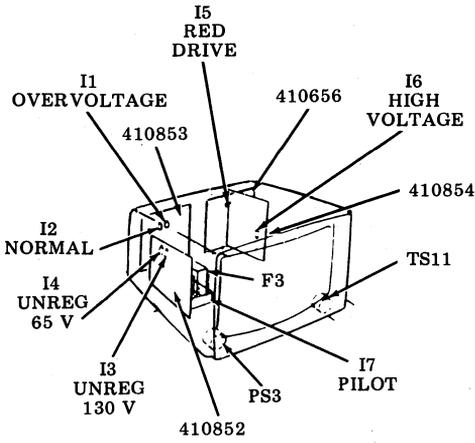
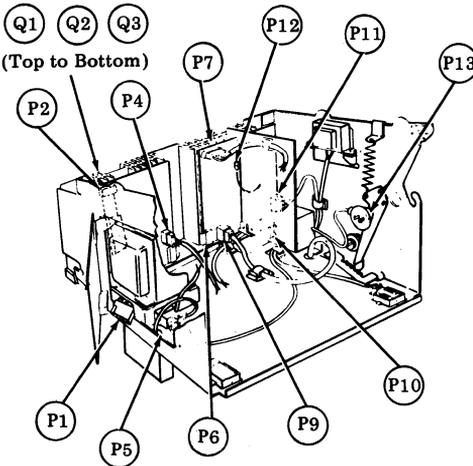
ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
4. Does the local test work? (CTRL and S keys or L/TST and ALPHA).	Go to 6.	Go to 5.
5. Depress the LOCAL key on the opcon.  Is the local lamp lit?	Check the cable between the controller and opcon. Refer to Section 582-200-205.	Go to Chart 9, Opcon Analysis.
6. In the local mode, do all keys on the opcon function properly? Refer to C. KD Local Tests,(2.05).	Go to 7.	Replace opcon. Replace 41029N* circuit card.
7. Input data on the monitor. Depress PRINT LOCAL.  Does the print local printer print data properly?	Go to 8.	Check cable between the controller and printer. Replace printer. Replace 41029N* circuit card. Also see Step 8 of Chart 3.
8. Does the station pass the on-line checkout?	Place in service.	Go to 9.
9. Does RD LED on 41029N circuit card flash during polling or selecting?	Go to 10.	Check data set (or 251A1) options. Check data set cable (EIA pin 3 <sup>¶</sup> ) or data auxiliary set cable. Replace data set (or 251A1).
10. Does RS LED (201 or 208) or SD LED (212) on data set light after polling or selecting?	Go to 11.	Check data set cable (EIA pin 4 <sup>¶</sup> ) or data auxiliary set cable. Replace 41029N* circuit card.
11. Does CS LED (201 or 208) on data set light after polling or selecting?	Go to 12.	Check data set (or 251A1) options. Replace data set (or 251A1).
12. Does SD LED on 41029N circuit card flash after polling or selecting?	a. Check data set or 251A1.  b. Check data set cable (EIA pin 2 <sup>¶</sup> ) or data auxiliary set cable.  c. Replace 41029N* circuit card.	Check data set cable (EIA pin 5 <sup>¶</sup> ) or data auxiliary set cable. Replace 41029N* circuit card.

<sup>¶</sup>EIA pin number applies to the data set end.

\*See Note 2 in Step 3.

CHART 8

40MN101 MONITOR ANALYSIS

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
		
<p>1. Is red drive lamp I5 lit?</p>	<p>Go to 2.</p>	<p>Check cable between controller and monitor. 410286 circuit card in controller. 410656 circuit card in monitor.</p>
<p>2. With PS1 and PS2 (see Fig. 1) on, is pilot I7 lit?</p>	<p>Go to 3.</p>	<p>Check 341578 fuse, F3 (1.4 SL-BL) and cables.</p>
<p>3. Are I4 and I3 lit?</p>	<p>Go to 4.</p>	<p>Replace 410852 circuit card.</p>
<p>4. Is I2 lit?</p>	<p>Go to 5.</p>	<p>Replace 410853 circuit card. Replace Q1.</p>
<p>5. Is I1 lit?</p>	<p>410853</p>	<p>Go to 6.</p>
<p>6. Is I6 lit?</p>	<p>See Note below.</p>	<p>Replace 410854 circuit card. Replace 410656 circuit card.</p>

Note: If I9 (CRT filament) is not lighted or if problem still exists in the monitor, go to Section 582-213-500 for detailed trouble analysis.

CHART 9

OPCON ANALYSIS

*Note:* Start with Question 1, if typewriter style opcon is present. Start with Question 4 if internal numeric cluster style opcon is present.

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE																																				
<p>TYPEWRITER STYLE OPCON</p>																																						
<p>1. Depress ERASE INPUT and QUOTES keys together (see above Note). Does TST indicator remain lit when keys are released?</p>	<p>Go to 2.</p> <p><i>Note:</i> If lamps flash, clear by depressing ERASE INPUT T and P keys, then repeat no. 1.</p>	<p>Check for +12 V and -12 V to opcon. Refer to Section 582-200-405.</p> <p>Replace opcon.</p>																																				
<p>2. Do the following: (See Note 1 at right.)</p> <table border="1" data-bbox="262 644 647 895"> <thead> <tr> <th colspan="2">Depress Keys</th> <th colspan="2">Indicator</th> </tr> <tr> <th></th> <th></th> <th>Key</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>SHIFT</td> <td>A</td> <td rowspan="2">S/R</td> <td>ON</td> </tr> <tr> <td>CTRL</td> <td>R/TST</td> <td>OFF</td> </tr> <tr> <td>SHIFT</td> <td>C</td> <td rowspan="2">LOCAL</td> <td>ON</td> </tr> <tr> <td>CTRL</td> <td>C</td> <td>OFF</td> </tr> <tr> <td>SHIFT</td> <td>F</td> <td rowspan="2">PRINT</td> <td>ON</td> </tr> <tr> <td>CTRL</td> <td>\</td> <td>OFF</td> </tr> <tr> <td></td> <td>→</td> <td rowspan="2">LOCAL</td> <td>FLASH</td> </tr> <tr> <td>CTRL</td> <td>C</td> <td>OFF</td> </tr> </tbody> </table> <p>(See Note 2 at right.)</p> <p>a. Is the opcon a late design 40K104 or a 40K203?</p>	Depress Keys		Indicator				Key	Condition	SHIFT	A	S/R	ON	CTRL	R/TST	OFF	SHIFT	C	LOCAL	ON	CTRL	C	OFF	SHIFT	F	PRINT	ON	CTRL	\	OFF		→	LOCAL	FLASH	CTRL	C	OFF	<p><i>Note 1:</i> Ignore any characters that may be displayed during this test.</p> <p><i>Note 2:</i> If opcon has CAPS LOCK key, when depressing A, C or F, CAPS LOCK key must be in latched position (ON) or SHIFT must be depressed. If opcon has no CAPS LOCK key, do not depress SHIFT.</p> <p>Interface/bell card not present on 40K104, or 40K203 present.</p> <p>Go to 2b.</p>	<p>Interface/bell card present on 40K104.</p> <p>Go to 2c.</p>
Depress Keys		Indicator																																				
		Key	Condition																																			
SHIFT	A	S/R	ON																																			
CTRL	R/TST		OFF																																			
SHIFT	C	LOCAL	ON																																			
CTRL	C		OFF																																			
SHIFT	F	PRINT	ON																																			
CTRL	\		OFF																																			
	→	LOCAL	FLASH																																			
CTRL	C		OFF																																			
<p><i>Note:</i> Late design 40K104 opcons are sometimes called OPCON II and have a single card of new design. To check the vintage of an opcon, it is sufficient to remove opcon from cabinet (or base) and look through the slot at the rear for the interface/bell card.</p>																																						

CHART 9 (Cont)

OPCON ANALYSIS

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE																							
<p>2. (Cont)</p> <p>b. On late design 40K104 opcon (interface/bell card not present) or 40K203 opcon, fully depress ERASE INPUT. Does the alarm sound repeatedly as long as the key is depressed?</p> <p><i>Note:</i> The alarm loudness control may require adjustment to hear the tone.</p> <p>c. Do all indicators operate as described?</p>	<p>Go to 3.</p> <p>Depress ERASE INPUT and P keys together to terminate test. TST indicator light goes out.</p>	<p>Replace opcon.</p> <p>Replace opcon.</p>																							
<p>3. Does the opcon fail to generate proper characters?</p>	<p>Replace opcon.</p>	<p>Opcon OK.</p>																							
<p>INTERNAL NUMERIC CLUSTER STYLE OPCON</p>																									
<p>4. Depress CONSOL TEST and LINE INSERT keys (fully depress LINE INSERT) together. Does CONSOL TEST indicator remain lit when keys are released?</p>	<p>Opcon is in loopback mode. Go to 5.</p> <p><i>Note:</i> If lamps flash or the alarm sounds more than once or continuously, clear by depressing CONSOL TEST and RESET keys, then repeat Question 4 (use RESET adjacent to PF1).</p>	<p>Check for +12 V and -12 V to opcon. Refer to Section 582-200-405.</p> <p>Replace opcon.</p>																							
<p>5. Do the following in the order given.</p>																									
<table border="1"> <thead> <tr> <th rowspan="2">Depress key(s)</th> <th colspan="2">Indicator</th> <th rowspan="2">Notes</th> </tr> <tr> <th>Key</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>S/R</td> <td>On</td> <td></td> </tr> <tr> <td>C</td> <td>LOCAL</td> <td>On</td> <td>If entered loopback mode from LOCAL, LOCAL is already on.</td> </tr> <tr> <td>M</td> <td>INPUT INHIBIT</td> <td>On</td> <td></td> </tr> <tr> <td>F</td> <td>PRINT LOCAL</td> <td>On</td> <td>(Question 5, continued on Page 38)</td> </tr> </tbody> </table>	Depress key(s)	Indicator		Notes	Key	Condition	A	S/R	On		C	LOCAL	On	If entered loopback mode from LOCAL, LOCAL is already on.	M	INPUT INHIBIT	On		F	PRINT LOCAL	On	(Question 5, continued on Page 38)			
Depress key(s)		Indicator			Notes																				
	Key	Condition																							
A	S/R	On																							
C	LOCAL	On	If entered loopback mode from LOCAL, LOCAL is already on.																						
M	INPUT INHIBIT	On																							
F	PRINT LOCAL	On	(Question 5, continued on Page 38)																						

## CHART 9 (Cont)

## OPCON ANALYSIS

ANALYSIS QUESTION		"YES" RESPONSE DIRECTIVE		"NO" RESPONSE DIRECTIVE
5. (Cont)				
Depress key(s)	Indicator		Notes	
	Key	Condition		
I	NUM LOCK	On		
R/TST	S/R	Flashing On & Off	Depress <u>only</u> R/TST.	
(Cursor right) →	LOCAL	Flashing On & Off		
LINE DELETE	INPUT INHIBIT	Flashing On & Off		
L/TST	PRINT LOCAL	Flashing On & Off	Depress <u>only</u> L/TST.	
NUM LOCK	NUM LOCK	Flashing On & Off		
ALPHA & A	S/R	On (no flash)		
ALPHA & C	LOCAL	On (no flash)		
ALPHA & M	INPUT INHIBIT	On (no flash)		
ALPHA & F	PRINT LOCAL	On (no flash)		
ALPHA & I	NUM LOCK	On (no flash)		
NUM & R/TST	S/R	Off	LOCAL cannot be turned off while in loopback mode.	
ERASE INPUT	INPUT INHIBIT	Off	PRINT LOCAL cannot be turned off while in loopback mode.	
TAB	NUM LOCK	Off	Depress TAB not CURSR TAB.	
R/TST	S/R	Flashing On & Off	Depress only R/TST.	
ALPHA & R/TST	S/R	Off	(Question 5, continued on Page 40)	

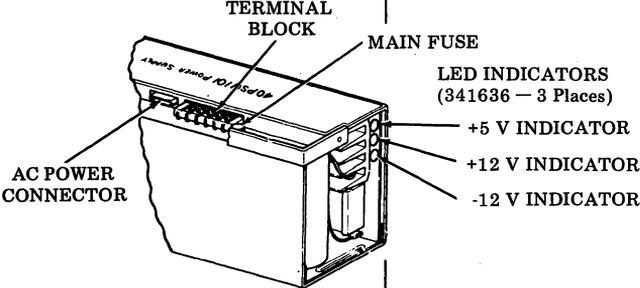
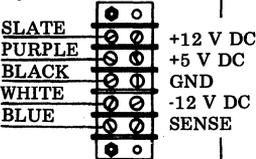
## CHART 9 (Cont)

## OPCON ANALYSIS

ANALYSIS QUESTION		"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
5. (Cont)			
Depress key(s)	Indicator		Notes
	Key	Condition	
CONSOL TEST	(See note to the right)		Opcon attention bell sounds repeatedly as long as key is depressed.
Do all indicators and bell operate as described?		Depress CONSOL TEST and RESET (adjacent to PF1) keys together to terminate test. CONSOL TEST indicator goes out. Go to 6.	Replace opcon.
6. Does the following occur?  a. CONSOL TEST indicator goes out,  b. PRINT LOCAL indicator goes out,  c. LOCAL indicator stays on.		All three conditions are met. Go to 7.	Replace opcon.
7. Does the opcon fail to generate proper characters?		Replace opcon.	Opcon is OK.

CHART 10

## 40PSU101 POWER SUPPLY ANALYSIS

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
<p>1. With the set plugged in and power ON, are all LED indicators ON?</p>  <p>TERMINAL BLOCK MAIN FUSE LED INDICATORS (341636 - 3 Places) +5 V INDICATOR +12 V INDICATOR -12 V INDICATOR AC POWER CONNECTOR</p>	<p>All LEDs are on. Go to 2.</p>	<p>At least one LED is off. Go to 3.</p>
<p>2. Are all voltages correct at the output terminal block?</p> <p>Check voltage using a voltmeter having 20,000 ohms volt sensitivity.</p>  <p>SLATE +12 V DC PURPLE +5 V DC BLACK GND WHITE -12 V DC BLUE SENSE</p>	<p>The power supply is OK.</p> <p><i>Warning: Wire colors of cable connecting to block are different from the wire colors of cable used in 40/1, 40/2, and 40/3 type.</i></p>	<p>Turn off all power. Remove all connections from back panel. Retighten all power supply connector screws (back panel is not connected to power supply now). Turn on power. Go to 6.</p>
<p>3. Are the ventilation fans in the electronics module moving air?</p>	<p>Go to 4.</p>	<p>Check ac power input power switch(es), cabinet ac wiring and ac connectors.</p>
<p>4. Turn off power. Is main fuse on the power supply blown?</p>	<p>Replace fuse, turn on power and go to 5. (129920 fuse, 5 amp SL-BL)</p>	<p>Replace power supply. If not on customer premises, go to Note following chart.</p>
<p>5. Turn off power. Did main fuse blow again?</p>	<p>Disconnect cable from back panel. Replace fuse, turn on power, and check output voltages.</p> <p>(Continued on next page.)</p>	<p>Replace power supply. If not on customer premises, go to Note following chart.</p>

## CHART 10 (Cont)

## 40PSU101 POWER SUPPLY ANALYSIS

ANALYSIS QUESTION	"YES" RESPONSE DIRECTIVE	"NO" RESPONSE DIRECTIVE
5. (Cont)	<p>If no output voltages are present and fuse blows again, replace power supply. If not on customer premises, go to Note following chart.</p> <p>If output voltages are present (power supply OK), go to 6.</p>	
<p>6. Are all voltages correct at the output terminal block?</p> <p><i>Note:</i> See Question 2 for values.</p>	<p>Turn off power. Reconnect all leads from back panel. Remove all circuit cards from back panel. Turn power on. Go to 7.</p>	<p>Replace power supply. If not on customer premises, go to Note following chart.</p>
<p>7. Are all voltages at output terminal block now correct?</p>	<p>Turn off power. Reinstall one circuit card that was removed in 6. Turn on power. Repeat 7 until voltage not correct. Card causing problem is at fault.</p>	<p>Replace back panel. Replace power supply. If not on customer premises, go to Note following chart.</p>

*Note:* When the power supply is shown to be at fault, refer to Sections 582-214-400, 582-214-500 or 582-200-405 as required.