

INTEGRATED SYNCHRONOUS "DATASPEED\*" 40 RECEIVE-ONLY PRINTER STATION  
TESTING AND TROUBLESHOOTING

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| PRELIMINARY CHECKS .....   | 2    | 1. GENERAL  |      |
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| ON-LINE CHECKOUT —<br>SWITCHED NETWORK<br>SERVICE .....                              | 2    | 1.02 Whenever this section is reissued, the<br>reason for reissue will be listed in this<br>paragraph.  |      |
| ON-LINE CHECKOUT —<br>POINT-TO-POINT AND<br>MULTIPOINT PRIVATE<br>LINE SERVICE ..... | 2    | 1.03 Troubles isolated to the data set, telephone<br>lines, or associated systems are not<br>analyzed in this section.  |      |
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2.03 If the indicated response is not obtained in any step of a checkout procedure, repeat the step to make sure that the procedure has been performed correctly. If the results are still unsatisfactory, perform the indicated trouble analysis. Always perform the checkout in the order given in the table. The trouble analysis steps are based on satisfactory results of all previous steps.

**PRELIMINARY CHECK**

2.04 Before turning on the equipment, check the following:

- (a) Is station connected to a properly grounded ac service?
- (b) Are all cable connectors fully seated?
- (c) Is cabinet lid closed?
- (d) Are printer paper and ribbon properly installed?

2.05 In addition to the above, check the wiring plan to determine the options and features present in the station. In cases where the results are affected by options, alternate results for each option are provided in the table.

**OFF-LINE CHECKOUT**

2.06 Off-line checkout (Table A) provides a check of the operating condition of the Integrated Synchronous ROP Terminal. The off-line checkout should be performed before attempting any on-line procedures.

**ON-LINE CHECKOUT — SWITCHED NETWORK SERVICE**

2.07 On-line checkout for switched network stations is performed between the station under test and a Data Test Center (DTC) equipped with a 40-Type Synchronous Test Set. The DTC operator controls the checkout using standard test procedures. Table B provides on-line checkout

for stations equipped with Data Sets 201C, 208B or 209A or equivalent.

2.08 When ready for on-line checkout, contact the DTC serving your area.

2.09 When calling a DTC, be prepared to furnish any information requested by the operator as to options and features (type of printer used, selection format, etc). To establish a standard line protocol, the DTC operator will normally request the station under test to hang up and wait for a return call. If an unplanned disconnect occurs at any time during the test, place data set in talk mode, hang up, and wait for the DTC operator to reestablish the call.

**ON-LINE CHECKOUT — POINT-TO-POINT AND MULTIPOINT PRIVATE LINE SERVICE**

2.10 Preliminary requirements: The data set must pass the data set test requirements.

2.11 On-line checkout for private line stations is performed between the station under test and a Data Test Center (DTC) through a Serving Test Center (STC). The DTC operator controls the checkout using standard test procedures. Tables B, C and E provide checkout for stations equipped with Data Sets 201C, 208A and 209A, or equivalent. These tables are arranged so that they can be reproduced and red lined to indicate the proper responses for a given customer. Red lining a copy can decrease testing time and reduce testing errors. Where responses or actions are dependent on options, the options are noted in the text. Titles within the testing paragraphs have been included as a guide to the function being tested in various steps.

2.12 Caution should be exercised that valid tests are not omitted.

2.13 In order to perform tests without interference from the line controller (data communications processor), the station under test must be disconnected from the data link to the line controller.

TABLE A  
OFF-LINE CHECKOUT

This table checks the basic operation of Integrated Synchronous 40-Type ROP Terminals.

| STEP | PROCEDURE  | RESULTS  | TROUBLE ANALYSIS   |
|------|--|--|--|
| 1    | Preliminary requirement:<br>a. Data set connected.<br>b. Ribbon and paper loaded.<br>c. Switches (top left) set as follows:<br>LF — 1 (Option 20a)<br>Test — Off<br>d. Cabinet cover closed. |  |  |
| 2    | Turn power on.   | IN SERVICE lamp turns on.<br>Fan moves air in printer cabinet. | Integrated Synchronous Controller Analysis — Table I, Page 25.<br>Opcon Analysis — Table L, Page 68.<br>Check:<br>a. PAPER lamp not lit.<br>b. Cabinet Interlock switch is closed.<br>c. Cabinet wiring. |
| 3    | Momentarily depress PAPER button (red) on cover of printer cabinet.  | Paper feeds out as long as button is depressed.                | 80-Column and 132-Column Printer Analysis — Tables J and K, Pages 29 and 49, respectively.<br>Check cabinet wiring.  |

TABLE A (Cont)  
OFF-LINE CHECKOUT

| STEP | PROCEDURE   | RESULTS  | TROUBLE ANALYSIS  |
|------|---|--|---|
| 4    | Depress and release FORMS ADVANCE button (black) on printer cabinet cover.  | Paper feeds out until first line of next form is reached, then stops.  | 80-Column and 132-Column Printer Analysis — Tables J and K, Pages 29 and 49, respectively.<br><br>Check cabinet wiring. |
| 5    | Unlatch and raise printer cabinet cover.  | IN SERVICE lamp extinguishes.  | Check cabinet wiring and Interlock switch.  |
| 6    | Raise cover interlock to maintenance position.  | IN SERVICE lamp stays off.   | If motor was on when cover was raised, depress IN SERVICE button.<br><br>Check Interlock switch and cabinet wiring.     |
| 7    | Momentarily set Test switch to ON position, then return to OFF position.  | Printer motor starts. Font identification symbol (such as $\begin{matrix} \text{E} \\ \text{A} \\ \text{E} \end{matrix}$ , $\begin{matrix} \text{E} \\ \text{A} \\ \text{E} \end{matrix}$ , etc, depending on type carrier) prints repeatedly while switch is on. Single line feed occurs. Motor turns off when switch is returned to off. | 80-Column and 132-Column Printer Analysis — Tables J and K, Pages 29 and 49, respectively.                              |
| 8    | Depress IN SERVICE button. Tear off next form on perforations (end of form) at bottom of printer cabinet, then slowly roll paper out until last form is fed completely out of printer.<br><br>Reload forms and close cabinet cover. | IN SERVICE lamp lights. PAPER lamp lights and IN SERVICE lamp extinguishes when form is partly through printer.<br><br>PAPER lamp extinguishes.  | 80-Column and 132-Column Printer Analysis — Tables J and K, Pages 29 and 49, respectively.                              |



TABLE A (Cont)  
OFF-LINE CHECKOUT

| STEP   | PROCEDURE  | RESULTS  | TROUBLE ANALYSIS   |
|--|--|--|--|
| 11   | Raise printer cabinet cover.<br>Set LF switch to position 2.<br>Close cover.<br>Depress TEST button.<br><br>While printer is printing, raise cover.  | IN SERVICE lamp remains off.<br><br>Repeated character set prints with double line spacing.<br><br>When cover is raised, printer stops. TEST lamp extinguishes.                          | 80-Column and 132-Column Printer Analysis — Tables J and K, Pages 29 and 49, respectively. |
| 12   | Restore setting of LF switch (or leave in position 2 if Option 20b required). Set Forms switch to Off (Option 39b).<br><br>Close cabinet cover.<br><br>Depress and release FORMS ADVANCE button. | IN SERVICE lamp comes ON.<br><br>Paper feeds out as long as button is depressed.   | 80-Column and 132-Column Printer Analysis — Tables J and K, Pages 29 and 49, respectively. |
| 13   | Tear form off below cabinet. Depress IN SERVICE button (OFF). Depress TEST button (ON).  | IN SERVICE lamp extinguishes. TEST lamp lights, TEST message prints.<br><br>Printing stops when end of form passes Paper-Out switch, PAPER-OUT lamp turns on and TEST lamp extinguishes. |  |
| 14   | Raise cover and restore setting of Forms switch (or leave in Off position if Option 39b required). Close cabinet cover.  |  |  |
| <b>THIS COMPLETES OFF-LINE CHECKOUT OF INTEGRATED SYNCHRONOUS ROP TERMINALS.</b> |  |  |  |

## DATA SET TESTS

## A. Data Set 201C

TABLE B

DATA SET 201C-L1, 2, 4 AND 5 (See Note 2 following this table.)

| STEP | PROCEDURE  | REQUIREMENT (Note 1)   |
|------|--|--|
| 1    | <p data-bbox="326 512 776 541"><b>ANALOG LOOPBACK SELF-TEST</b></p> <p data-bbox="326 569 667 598">Apply ac power to data set.</p> <p data-bbox="326 625 802 684">Perform Analog Loopback Self-Test as follows:</p> <p data-bbox="326 716 594 745">a. Depress AL switch.</p> <p data-bbox="326 772 589 802">b. Depress ST switch.</p> <p data-bbox="326 829 768 858">c. Observe MC lamp for 30 seconds.</p> <p data-bbox="326 886 594 915">d. Depress RO switch.</p> <p data-bbox="326 1121 768 1150">e. Release RO, ST and AL switches.</p> <p data-bbox="326 1178 521 1207">f. Go to Step 2.</p> | <p data-bbox="919 716 1490 745">AL switch latches, TM lights and MR goes off.</p> <p data-bbox="919 772 1344 802">All lamps except MC should be lit.</p> <p data-bbox="919 829 1247 858">MC lamp should not blink.</p> <p data-bbox="919 886 1219 915">RS and CS lamps go off.</p> <p data-bbox="919 947 1507 1005">MC lamp lights. With Data Set Options XA, XD or XE, CO lamp goes off.</p> <p data-bbox="919 1035 1442 1094">With Data Set Option XB or XC, CO lamp remains lit.</p> <p data-bbox="919 1121 1208 1150">TM lamp should be off.</p> |
| 2    | <p data-bbox="326 1268 1450 1297"><b>DIGITAL LOOPBACK SELF-TEST (4-Wire Private Line — If not applicable, go to Step 3.)</b></p> <p data-bbox="326 1325 586 1354">a. Depress ST switch.</p> <p data-bbox="326 1381 849 1440">b. Call STC (Serving Test Center) and have DL switch depressed at far-end data set.</p> <p data-bbox="326 1470 805 1528">c. Observe MC lamp for 10 one-minute periods.</p> <p data-bbox="326 1585 821 1644">d. Call STC and have DL switch released on far-end data set.</p> <p data-bbox="326 1673 792 1732">e. Release ST switch on near-end data set.</p>          | <p data-bbox="919 1325 1109 1354">TM lamp lights.</p> <p data-bbox="919 1381 1466 1411">All lamps lit at near-end data set except MC.</p> <p data-bbox="919 1470 1414 1558">MC lamp should not blink more than an average of two blinks per one-minute period.</p> <p data-bbox="919 1673 1141 1703">TM lamp goes off.</p>   |

TABLE B (Cont)

DATA SET 201C-L1, 2, 4 AND 5 (See Note 2 following this table.)

| STEP                             | PROCEDURE  | REQUIREMENT (Note 1)  |                 |          |         |                                  |                    |                            |                                  |                    |                         |
|----------------------------------|--|---|-----------------|----------|---------|----------------------------------|--------------------|----------------------------|----------------------------------|--------------------|-------------------------|
| 3                                | <p data-bbox="228 401 570 428"><b>END-TO-END SELF-TEST</b></p> <p data-bbox="228 459 570 487">(2-Wire Switched Network)</p> <p data-bbox="228 518 740 600">a. Establish voice communication with STC (Serving Test Center) and arrange for test.</p> <p data-bbox="228 632 760 659">b. On near-end data set, depress ST switch.</p> <p data-bbox="228 690 607 718">c. At STC, depress RT switch.</p> <p data-bbox="228 749 764 777">d. At both ends, end voice communication.</p> <p data-bbox="228 808 740 1129">e. From near-end data station, call STC. STC data set automatically answers and transmits a 2025 Hz answer tone for about two seconds, immediately followed by a block of data for about two seconds (see Note). After answer tone and the two second block of data (if present) are heard at the near-end data set, depress DATA button on the telephone set associated with the near-end data set.</p> <p data-bbox="258 1161 716 1272"><i>Note:</i> Data sets equipped with CP JB2 digital board, series 6 or higher, do not send the two-second block of data.</p> <p data-bbox="228 1304 708 1360">f. Depress RT switch on near-end data set.</p> | <p data-bbox="824 632 1273 659">TM lamp lights at near-end data set.</p> <p data-bbox="824 690 1219 718">TM lamp lights at STC data set.</p> <p data-bbox="824 808 1403 890">DATA lamp lights on telephone set associated with near-end data set; all lamps except CO light on near-end data set.</p> <p data-bbox="824 1304 1414 1415">RS, CS, CO and MC lamps on near-end data set change state about every two seconds and follow turnaround sequence indicated below. All lamps remain continuously lit.</p> <table border="1" data-bbox="889 1461 1312 1682"> <thead> <tr> <th>LAMP INDICATION</th> <th>DURATION</th> <th>MEANING</th> </tr> </thead> <tbody> <tr> <td>RS, CS, MC — lighted<br/>CO — off</td> <td>About<br/>2 seconds</td> <td>Block is being transmitted</td> </tr> <tr> <td>RS, CS, MC — off<br/>CO — lighted</td> <td>About<br/>2 seconds</td> <td>Block is being received</td> </tr> </tbody> </table> <p data-bbox="824 1730 1419 1906">If an error occurs in either direction, MC lamp remains lighted continuously or turnaround sequence stops. To clear error condition, release RT switch on near-end data set when CO lamp is lighted. Wait about five seconds and depress RT switch.</p> | LAMP INDICATION | DURATION | MEANING | RS, CS, MC — lighted<br>CO — off | About<br>2 seconds | Block is being transmitted | RS, CS, MC — off<br>CO — lighted | About<br>2 seconds | Block is being received |
| LAMP INDICATION                  | DURATION   | MEANING   |                 |          |         |                                  |                    |                            |                                  |                    |                         |
| RS, CS, MC — lighted<br>CO — off | About<br>2 seconds   | Block is being transmitted  |                 |          |         |                                  |                    |                            |                                  |                    |                         |
| RS, CS, MC — off<br>CO — lighted | About<br>2 seconds   | Block is being received   |                 |          |         |                                  |                    |                            |                                  |                    |                         |

TABLE B (Cont)

DATA SET 201C-L1, 2, 4 AND 5 (See Note 2 following this table.)

| STEP        | PROCEDURE   | REQUIREMENT (Note 1)   |
|-------------|---|--|
| 3<br>(Cont) | <p>(2-Wire Switched Network) (Cont)</p> <p>g. At near-end data set, observe lamp pattern for four 1-1/2 minute periods.</p> <p>h. Reestablish voice communication with the STC and discuss the test results.</p> <p>i. At STC data set, release RT switch.</p> <p>j. At near-end data set, release RT and ST switches.</p> <p>k. Go to Step 4.</p> <p>(2-Wire Private Line)</p> <p>a. Establish voice and data communication between the near-end data set and the STC (Serving Test Center). Arrange to conduct End-to-End Self-Test.</p> <p>b. At near-end data set, depress ST switch.</p> <p>c. At STC data set, depress ST and RO switches.</p> <p>d. At STC data set, observe MC lamp for ten one-minute periods.</p> <p>e. At STC data set, release RO switch.</p> <p>f. At near-end data set, depress RO switch (ST switch still depressed).</p> <p>g. At near-end data set, observe MC lamp for ten one-minute periods.</p> <p>h. At near-end data set, release RO switch.</p> <p>i. At near-end and STC data sets, release ST switch.</p> <p>(4-Wire Private Line)</p> <p>a. Establish voice and data communication between the near-end data set and the STC data set. Arrange to conduct an End-to-End Self-Test.</p> | <p>Error condition does not occur more than an average of once per 1-1/2 minute period.</p> <p><i>Note:</i> If an error condition occurs when RT switch is first depressed, clear error condition but do not count it.</p> <p>TM lamp goes off.</p> <p>TM lamp goes off.</p> <p>All lamps light except CO on near-end data set.</p> <p>All lamps light except RS, CS and MC at STC data set.</p> <p>MC lamp should not blink more than an average of two blinks per one-minute period.</p> <p>All lamps light except CO on STC data set.</p> <p>All lamps light except RS, CS and MC at near-end data set.</p> <p>MC lamp should not blink more than an average of two blinks per one-minute period.</p> <p>All lamps lighted except CO.</p> <p>TM light goes off at both data sets.</p> |

TABLE B (Cont)

DATA SET 201C-L1, 2, 4 AND 5 (See Note 2 following this table.)

| STEP | PROCEDURE  | REQUIREMENT (Note 1)  |
|------|--|---|
|      | <p>(4-Wire Private Line) (Cont)</p> <p>b. ST switch depressed at both data sets.</p> <p>c. At both data sets, observe MC lamp for ten one-minute periods.</p> <p>d. Release ST switch on both data sets.</p> <p>e. Go to Step 4.</p>   | <p>All lamps are lit at both data sets except MC.</p> <p>On both data sets, MC lamp does not blink more than an average of two blinks per one-minute period.</p> <p>TM lamp goes off at both data sets.</p> |
| 4    | <p>REMOTE TEST</p> <p>(2-Wire Switch Network)</p> <p>a. Call STC and request a remote test.</p> <p>b. Depress RT switch when directed by STC.</p> <p>c. STC performs remote test.</p> <p>d. Release RT switch when directed by STC.</p> <p>e. This ends Self-Tests of Data Set 201C-L1, 2, 4 and 5.</p> <p>(2-Wire Private Line)</p> <p>a. The same as End-to-End Self-Test (Step 3) for 2-Wire Private Line.</p> <p>b. This ends Self-Tests of Data Set 201C-L1, 2, 4 and 5.</p> <p>(4-Wire Private Line)</p> <p>a. Call STC and request a remote test.</p> <p>b. Depress DL switch when directed by STC.</p> <p>c. STC performs remote test.</p> <p>d. Release DL switch when directed by STC.</p> <p>e. This ends Self-Tests of Data Set 201C-L1, 2, 4 and 5.</p> | <p>TM lamp lights.</p> <p>TM lamp lamp goes off.</p> <p>TM lamp lights.</p> <p>TM lamp goes off.</p>  |

*Note 1:* If data set fails to meet any of the above requirements, it should be replaced.

*Note 2:* For a more complete description of the above tests, see Section 592-029-500.

*Note 3:* If Data Set 201C is used as a remote extension of a Data Set 209A-L1 multiplex system or as a substrate off-net extension of the digital data system (DDS), the following restrictions apply to the use of the self-tests:

- (a) The analog loopback self-test cannot be performed at a remote extension with options as installed. If the M23B cord is temporarily removed at the remote extension, this test can be performed.
- (b) The digital loopback self-test cannot be performed from a remote extension (with options as installed) in toward Data Set 201C collocated with Data Set 209A-L1. If the M23B cord is temporarily removed at the remote extension, this test can be performed.
- (c) The digital loopback self-test cannot be performed from a remote extension (with options as installed) in toward a hub office of the DDS. If the internal timing option is temporarily installed at the remote extension, this test can be performed.

B. Data Set 208A

TABLE C

DATA SET 208A-L1/L1A (See Note 2 following this table.)

| STEP | PROCEDURE  | REQUIREMENTS  |
|------|--|---|
| 1    | ANALOG LOOPBACK SELF-TEST (Data Set 208A-L1A Only)   |   |
|      | <ul style="list-style-type: none"> <li>a. Apply ac power to data set.</li> <li>b. Depress and hold the LP switch (nonlocking).</li> <li>c. Release the LP switch and depress the AL and then the ST switch.</li> <li>d. Depress, then release the AL and ST switches.</li> <li>e. Go to Step 2.</li> </ul>   | <p>All indicators on the data set are lighted.</p> <p>The ON, RS, CS and CO indicators are lighted. The MR and ER indicators are off.</p> <p><i>Note:</i> If the ER lamp is lighted or blinks, the data set has failed the Analog Loopback Self-Test.</p> |
| 2    | REMOTE LOOPBACK TEST FROM STC (Serving Test Center)  |   |
|      | <ul style="list-style-type: none"> <li>a. Call the STC and arrange to perform the Remote-Loopback Test.</li> <li>b. Place the near-end data set in the digital loopback (DL) mode.                             <ul style="list-style-type: none"> <li>(1) For Data Set 208A-L1, position the Test switch to the right (DL position) and verify that the DL indicator is lighted.</li> <li>(2) For Data Set 208A-L1A, depress the DL switch and verify that the MR indicator is off.</li> </ul> </li> </ul> |   |

TABLE C (Cont)

DATA SET 208A-L1A (See Note 2 following this table.)

| STEP        | PROCEDURE  | REQUIREMENTS |
|-------------|--|--------------|
| 2<br>(Cont) | <p>c. After receiving the test results from the STC, restore the data set to normal operating condition as follows:</p> <p>(1) For Data Set 208A-L1, position the Test switch to the center position and verify that the AL and DL indicators are off.</p> <p>(2) For Data Set 208A-L1A, depress to release the DL switch and verify that the MR indicator is off.</p> <p>d. This ends testing of Data Sets 208A-L1 and L1A.</p> |              |

*Note 1:* If data set fails to meet any of the above requirements, it should be replaced.

*Note 2:* For a more complete description of the above tests, see Section 592-027-500.

*Note 3:* If Data Set 208A-L1A is used as a remote extension of a Data Set 209A-L1 multiplex system or as a substrate off-net extension of DDS, the self-test features can be used with the following restriction: Analog Loopback Self-Test cannot be performed (at a remote extension) with options as installed. If the internal timing option is temporarily installed at the remote extension, this test can be performed.

## C. Data Set 208B

TABLE D

DATA SET 208B (See Note 2 following this table.)

| STEP | PROCEDURE  | REQUIREMENTS   |
|------|--|--|
| 1    | ANALOG LOOPBACK SELF-TEST  |  |
|      | <p>a. Apply ac power to the data set.</p> <p>b. Depress the LP switch (nonlocking).</p> <p>c. Depress the AL switch first, then depress the ST switch.</p> | <p>All lamps light while LP switch is depressed.</p> <p>ON, RS, CS and CO lamps are lighted. ER and MR lamps are extinguished. On Data Set 208B-L1 and L1A the TR lamp may be lighted or extinguished, depending on the state of the CD lead. The TR lamp is not lit on Data Sets 208B-L1B.</p> <p><i>Note:</i> The ER lamp must extinguish immediately after the CO lamp lights. If there is a delay, the data set is defective. If</p> |

TABLE D (Cont)

DATA SET 208B (See Note 2 following this table.)

| STEP        | PROCEDURE   | REQUIREMENTS   |
|-------------|---|--|
| 1<br>(Cont) | <p>d. Data Set 208B-L1B only; depress LP switch.</p> <p>e. Release AL and ST switches.</p> <p>f. Go to Step 2.</p>  | <p>the ER lamp is lighted or blinks, the data set has failed the Analog Loopback Self-Test. A blinking ER lamp which alternates with the CS lamp may indicate that circuit pack HG 19 is not series 8 or later.</p> <p>ER lamp lights. TR and MR lamps remain off when the LP switch is depressed. The TR lamp depends on the state of the CD lead and may be on or off.</p> |
| 2           | REMOTE TEST FROM STC (Serving Test Set)   |  |
|             | <p>a. Call the STC and arrange for Remote Test.</p> <p>b. Depress the RT switch, depress the "50" switch (if not already depressed), hang up.</p> <p>c. The STC will place a call to the data set. The set will answer automatically and enter the data mode. The STC will then perform the test.</p> <p>d. The STC will place a second call to the data set to report results of the test. Answer the second call.</p> <p>e. Release RT and 50 switches and hang up.</p> <p>f. Go to Step 3.</p> | MR lamp extinguished.  |
| 3           | END-TO-END SELF-TEST  |  |
|             | <p>a. Call the STC and arrange to perform the End-to-End Self-Test.</p> <p>b. Request that the ST switch and then the DATA button be depressed at the STC data set.</p> <p>c. Depress ST and RO switches and DATA button at near-end data set.</p>  | <p>ON, RS, CS and ER lamps light at STC. MR lamp extinguished. Disregard TR lamp.</p> <p><i>Note:</i> RS and CS lamps light five seconds after DATA button is depressed.</p> <p>ON and CO lamps light at near-end data set. MR, RS, CS and ER lamps extinguished. Disregard TR lamp.</p>   |

TABLE D (Cont)

DATA SET 208B (See Note 2 following this table.)

| STEP        | PROCEDURE  | REQUIREMENTS   |
|-------------|--|--|
| 3<br>(Cont) | <p>d. Conduct five one-minute error runs.</p> <p>e. Repeat the test in the opposite direction, have the RO switch depressed on the STC data set, release the RO switch on the near-end data set and return both sets to the data mode.</p> <p>f. Release the ST switches and the STC RO switch.</p> <p>g. This ends tests of Data Set 208B-L1 and L1A.</p> | <p>ER lamp extinguished and does not blink more than an average of three times in any one-minute period.</p> <p><i>Note:</i> If test fails, arrange to make another call. If the second test fails, the system has failed the End-to-End Test.</p> <p>The near-end set meets the requirements of 3b.</p> |

*Note 1:* If data set fails to meet any of the above requirements, it should be replaced.

*Note 2:* For a more complete description of the above tests, see Section 592-030-500.

## D. Data Set 209A

TABLE E

DATA SET 209A-L1 (See Note 2 following this table.)

| STEP | PROCEDURE   | REQUIREMENTS  |
|------|---|---|
| 1    | ANALOG LOOPBACK SELF-TEST   |   |
|      | <p>a. Apply ac power to the data set.</p> <p>b. Depress and hold the LP switch (nonlocking).</p> <p>c. Release the LP switch and depress the AL and then the ST switch.</p> <p>d. Depress, then release the ST and AL switches to restore the data set to normal operating condition.</p> <p>e. Go to Step 2.</p> | <p>All status lamps are lighted.</p> <p>After a brief interval, the ON, RS, CS, CO and TM lights are lighted. The ER and MR lights are off.</p> <p><i>Note:</i> If the lights do not give the above indications, or if the ER lamp continues to flash, the data set has failed the Analog Loopback Self-Test.</p> |

TABLE E (Cont)

DATA SET 209A-L1 (See Note 2 following this table.)

| STEP | PROCEDURE  | REQUIREMENTS   |
|------|--|--|
| 2    | REMOTE LOOPBACK TEST FROM STC (Serving Test Center)  |  |
|      | a. Call the STC and to arrange to perform the Remote Loopback Test.<br>b. When instructed by the STC, depress the DL switch.<br>c. STC performs test.<br>d. After receiving the test results from the STC, release the DL switch.<br>e. Go to Step 3.            | MR lamp not lit, TM lamp lighted.<br><br>MR lamp lighted.  |
| 3    | DIGITAL LOOPBACK SELF-TEST TO STC (Distant End)  |  |
|      | a. Arrange for test with STC.<br>b. STC data set to be in DL mode and ON lamp lit.<br>c. Apply ac power to local data set.<br>d. Depress ST switch.<br>e. Perform a five-minute error run.<br>f. Release ST switch.<br>g. This ends testing of data set 209A-L1. | ON, RS, CS, CO and TM lamps lighted. MR and ER lamps not lit.<br><br>30 or less blinks of the ER indicator.<br><br>TM lamp goes off. |

*Note 1:* If data set fails any of the above requirements it should be replaced.

*Note 2:* For a more complete description of the above tests, see Section 592-032-500.

## END-TO-END INSTALLATION TEST

TABLE F

## END-TO-END INSTALLATION TEST PROCEDURES

| STEP | PROCEDURE   | RESULTS | TROUBLE ANALYSIS   |
|------|---|---------|--|
| 1    | Preliminary requirements:<br>a. Data set connected. |         | If results are not as stated for a particular option, verify |

TABLE F (Cont)

## END-TO-END INSTALLATION TEST PROCEDURES

| STEP        | PROCEDURE  | RESULTS  | TROUBLE ANALYSIS  |
|-------------|--|--|---|
| 1<br>(Cont) | <p>b. Ribbon and paper loaded.</p> <p>c. Switches (top left of printer, cabinet cover raised) set as follows:</p> <p>LF — 1 or 2 (Option 20a or b.)<br/>Forms — On or Off (Option 39a or b.)<br/>Test — Off</p> <p>d. Cabinet cover closed.</p>                      |  | Installation of that option.                                    |
| 2           | Turn on power.   | IN SERVICE lamp lights, fan moves air.   | Integrated Synchronous ROP Terminal Analysis. Table H, Page 23. |
| 3           | <p>a. Go to location of station data set in building. Contact DATA-SPEED Test Center and request End-to-End Installation Test.</p> <p>b. Establish line connections per DTC instructions, then observe carrier on indicators indicating line established to DTC.</p> | <p><u>201C</u>      <u>208A, 208B, 209A</u><br/>MC — Goes Off    ER — Goes Off<br/>CO — Lights      CO — Lights</p>                                      | Go to applicable Table B, C, D or E.                            |
| 4           | If talk line to the DTC is not available after test is requested, verify that the test has started by observing the RS/CS lamps on the front of the data set.  | RS/CS lamps on the front of the data set should flash ON and then OFF during testing.  | Inform DTC of problem.  |
| 5           | <p>The DTC will perform the remainder of the test.</p> <p>On receiving the Selection sequence as specified by Option 171.</p>  | <p>DTC will inform of test acceptance or trouble. Call DTC back, if required.</p> <p>The POL/SEL will flash once for one second and then remain lit.</p> | Integrated Synchronous ROP Terminal Analysis. Table H, Page 23. |

TABLE F (Cont)

## END-TO-END INSTALLATION TEST PROCEDURES

| STEP                      | PROCEDURE   | RESULTS                                 | TROUBLE ANALYSIS  |  |
|---------------------------|---|---|---|--|
| 5<br>(Cont)               | The following controller options should be verified while the DTC is conducting the On-Line Test. |   |   |  |
|                           | Space Extension   | 170a                                    | Only one space per space character received.  | Check for proper option. Integrated Synchronous Controller Analysis, Table I, Page 25. |
|                           |   | 170b                                    | Three spaces per space character received.  |  |
|                           | Additional functions receiving one of the following characters:                                   |   |   |  |
|                           | ETB   | 173a                                    | Block terminator only.  | See Trouble Analysis for Space Extension.  |
|                           |   | 173b                                    | Block terminator, executes printing a line, executes a VT ESC sequence (or New Line if no tabs set) or terminate an HT setting sequence.                |  |
|                           | ETX   | 174a                                    | Block terminator or terminates an HT setting sequence.  | See Trouble Analysis for Space Extension.  |
|                           |   | 174b                                    | Block Terminator, terminates an HT setting sequence, executes printing a line or executes a VT ESC sequence (or New Line, if no tabs set).              |  |
|                           | ITB   | 175a                                    | Intermediate block terminator only.   | See Trouble Analysis for Space Extension.  |
|                           |   | 175b                                    | Intermediate block terminator, executes printing a line, executes a VT ESC sequence (or New Line, if no tabs set) or terminates an HT setting sequence. |  |
|                           | LF(EBCDIC)/NL   | 176a                                    | Executes printing a line, executes VT ESC sequence (or New Line, if no tabs set) or terminates an HT setting sequence.                                  | See Trouble Analysis for Space Extension.  |
|                           |   | 176b                                    | Space only.   |  |
|                           | RS/IRS (EBCDIC)   | 177a                                    | Executes printing a line, and executes a VT ESC sequence (or New Line, if no tab setting).  | See Trouble Analysis for Space Extension.  |
|                           |   | 177b                                    | Space only.   |  |
| Permanent Request to Send | 167a  | RS lamp on data set OFF when receiving. | See Trouble Analysis for Space Extension.   |  |
|                           | 167b  | RS lamp ON while sending or receiving.  |   |  |

TABLE F (Cont)  
END-TO-END INSTALLATION TEST PROCEDURES

| STEP        | PROCEDURE  | RESULTS   | TROUBLE ANALYSIS   |
|-------------|--|---|--|
| 5<br>(Cont) | <p>Immediate WACK    178a</p> <p style="text-align: right;">178b</p> <p>Check the following features:<br/>Bell characters received.</p> <p>Paper-Out — Tear form off below printer cabinet.</p> <p>Carriage Return on ESC M.</p> <p>Space Compression/Expansion<br/>ASCII — DTC sends: GSB<br/>                                  GSO<br/>                                  GSZ</p> <p>EBCDIC — DTC Sends: IGS ‡<br/>                                  IGS &amp;<br/>                                  IGS \$</p> <p>Determine from DTC where On-Line Horizontal Tabs (ESC HT) are set.</p> <p>Single Line Feed</p> <p><i>Note:</i> Single line feed assumes Printer Option 20a. Option 20b will result in a two-line movement.</p> | <p>When the buffer is full, the ROP Terminal will respond with WACK to every block of data.<br/>The ROP will respond with a WACK to every second block of data.</p> <p>Tone is heard. If Bell characters are less than one second apart, a continuous tone will be heard.</p> <p>PAPER lamp lights when end of form passes paper out switch, an EOT reply is sent if requested within 3 seconds. Following an EOT reply or if no reply is requested within three seconds of the paper out, the ALARM lamp will light and the audible alarm will sound for eight seconds. The terminal will then disconnect.</p> <p>The M is not printed; the character following the M is printed at the left-hand margin.</p> <p>The terminal receives:</p> <p style="text-align: right;">2 spaces<br/>15 spaces<br/>26 spaces</p> <p>The terminal receives: 10 spaces<br/>16 spaces<br/>27 spaces</p> <p>Horizontal Tabs set per DTC.</p> <p>An ESC Q (ASCII) or ESC/ (EBCDIC) when followed by LF (EBCDIC)/NL with Option 176a, ETB with Option 173b, ETX with Option 174b or IRS (EBCDIC)/RS with Option 177a will cause the next character to be printed at the left-hand margin in the next lower line.</p> | <p>See Trouble Analysis for Space Extension.</p> <p>Alarm volume.<br/>Opcon Analysis, Table L, Page 68.<br/>Integrated Synchronous Controller Analysis, Table I, Page 25.</p> <p>Cabinet Analysis, Table M, Page 70.<br/>Opcon Analysis Table L, Page 68.</p> <p>Integrated Synchronous Controller Analysis, Table I, Page 25.</p> <p>Integrated Synchronous Controller Analysis, Table I, Page 25.</p> <p>Integrated Synchronous Controller Analysis, Table I, Page 25.</p> <p>Check for proper options. Printer Analysis, Table J or K, Page 29 or 49.<br/>Integrated Synchronous Controller Analysis, Table I, Page 25.</p> |

TABLE F (Cont)

## END-TO-END INSTALLATION TEST PROCEDURES

| STEP        | PROCEDURE  | RESULTS   | TROUBLE ANALYSIS   |
|-------------|--|---|--|
| 5<br>(Cont) | <p>Double Line Feed</p> <p><i>Note:</i> Double line feed assumes Printer Option 20a. Option 20b will result in a four-line movement.</p> | <p>An ESC R (ASCII) or ESC S (EBCDIC) when followed by LF (EBCDIC)/NL with Option 176a, ETB with Option 173b, ETX with Option 174b or IRS (EBCDIC)/RS with Option 177a will cause the next character to be printed at the left-hand margin in the second line below the present print line.</p>   | <p>Check for proper option. Printer Analysis, Table J or K, Page 29 or 49. Integrated Synchronous Controller Analysis, Table I, Page 25.</p>   |
|             | <p>Triple Line Feed</p> <p><i>Note:</i> Triple line feed assumes Printer Option 20a. Option 20b will result in a six-line movement.</p>  | <p>An ESC S (ASCII) or ESC T (EBCDIC) when followed by LF (EBCDIC)/NL with Option 176a, ETB with Option 173b, ETX with Option 174b or IRS (EBCDIC)/RS with Option 177a will cause the next character to be printed at the left-hand margin in the third line below the present print line.</p>  | <p>Check for proper options. Printer Analysis, Tables J or K, Page 29 or 49. Integrated Synchronous Controller Analysis, Table I, Page 25.</p> |
|             | <p>Form Feed</p>   | <p>With Printer Option 39b (Forms OFF) a received FF (Form Feed) character will result in a single line feed with Printer Option 20a or a double line feed with Printer Option 20b.</p>   | <p>Check for proper options. Printer Analysis, Table J or K, Page 29 or 49. Integrated Synchronous Controller Analysis, Table I, Page 25.</p>  |
|             | <p>Vertical Tab (VT)</p>   | <p>With Printer Options 39a (Forms ON) and 20a or 20b, the paper will advance until the next form is in registration.</p> <p>A VT will cause the next character to be printed in the first printing position of the next lower line that corresponds to a preset VT position. If no stops exist between the present print location and the end of the form, then the VT will cause a form feed to be performed.</p> |  |

TABLE F (Cont)

## END-TO-END INSTALLATION TEST PROCEDURES

| STEP        | PROCEDURE   | RESULTS   | TROUBLE ANALYSIS  |
|-------------|---|---|---|
| 5<br>(Cont) | <p>ESC <math>\alpha</math> Vertical Tab <math>s</math></p> <p>ESC A — Vertical Tab No. 1<br/>           ESC B — Vertical Tab No. 2<br/>           ESC C — Vertical Tab No. 3<br/>           ESC D — Vertical Tab No. 4<br/>           ESC E — Vertical Tab No. 5<br/>           ESC F — Vertical Tab No. 6<br/>           ESC G — Vertical Tab No. 7<br/>           ESC H — Vertical Tab No. 8<br/>           ESC I — Vertical Tab No. 9<br/>           ESC J — Vertical Tab No. 10<br/>           ESC K — Vertical Tab No. 11<br/>           ESC L — Vertical Tab No. 12</p> <p><math>s</math> The above ESC <math>\alpha</math> Vertical Tab positions correspond to the 12 preset tab positions.</p> | <p>An ESC <math>\alpha</math> when followed by LF (EBCDIC)/NL with Option 176a, ETB with Option 173b, ETX with Option 174b, or IRS (EBCDIC)/RS with Option 177a will cause the next character to be printed at the first printing position of the designated vertical tab position. If the received ESC <math>\alpha</math> sequence calls for movement to a position that is above the present location on the form, the printer will be directed to advance to the indicated line on the next form.</p> <p>If the ESC <math>\alpha</math> sequence invokes a position where no preset tab stop exists, then a form feed operation will be performed. If the location corresponding to the received ESC <math>\alpha</math> is the same as the present print position, no paper movement will occur.</p> | <p>Check for proper options. Printer Analysis, Table J or K, Page 29 or 49. Integrated Synchronous Controller Analysis, Table I, Page 25.</p> |

## CHECKOUT OF RECEIVED PRINTER MESSAGE

TABLE G

## CHECKOUT OF RECEIVED PRINTER MESSAGE

| STEP | PROCEDURE   | RESULTS   | TROUBLE ANALYSIS  |
|------|---|---|---|
| 1    | After printing stops, the printer motor should turn off.                            | With Controller Option 148a approximately 30 seconds.<br>With Controller Option 148b approximately three minutes. | Integrated Synchronous Controller Analysis, Table I, Page 25. |
| 2    | Determine from DTC what message was sent. Check for correctness of printed message. |   |   |

TABLE G (Cont)

## CHECKOUT OF RECEIVED PRINTER MESSAGE

| STEP | PROCEDURE  | TROUBLE ANALYSIS  | RESULTS  |
|------|--|---|--|
| 3    | Check for left-hand margin.  | Left-hand margin must match Left-Hand Margin Option as specified by either Printer Option 17a or 17b or Controller Options 121 and 131.<br><br><i>Note:</i> Printer Option 17b and Controller Option 121b are additive.   | Printer Analysis, Table J or K, Page 29 or 49. Integrated Synchronous Controller Analysis, Table I, Page 25. |
| 4    | Check for right-hand margin.   | Right-hand margin must match Right-Hand Margin Option as specified by Printer Option 17c or d for 80-column printers or 17e or f for 132-column printers.   | Printer Analysis, Table J or K, Page 29 or 49.   |
| 5    | Check for paper feed out.<br><br>With Printer Option 18a.<br><br>With Printer Options 18c or d and 39a.<br><br>With Printer Options 18c or d and 39b.  | No feed out.<br><br>Feed out to next form feed position.<br><br>Maximum 16 lines; will be shorter if form feed position occurs before 16-line feed out.   | Printer Analysis, Table J or K, Page 29 or 49.   |
| 6    | Check for Up-Low printing.<br><br>Up-low printer with Printer Option 21a and Controller Option 162a.<br><br>Up-low printer with Printer Option 21b and Controller Option 162a.<br><br>Monospace printer with Printer Option 22a and Controller Option 162a.<br><br>Monospace printer with Printer Option 22b and Controller Option 162a.<br><br>Optimized printer with Printer Option 22a and Controller Option 162b.<br><br>Optimized printer with Printer Option 22b and Controller Option 162b. | Upper and lower case characters should appear in the text.<br><br>No lower case characters should appear in text.<br><br>Errored character symbols appear in place of lower case characters.<br><br>Only upper case characters appear in text.<br><br>Errored character symbols appear in place of lower case characters.<br><br>Only upper case characters appear in text. | Printer Analysis, Tables J or K, Page 29 or 49.  |

TABLE G (Cont)

CHECKOUT OF RECEIVED PRINTER MESSAGE

| STEP  | PROCEDURE  | TROUBLE ANALYSIS  | RESULTS   |
|---|--|---|---|
| 7   | Check for preset horizontal tab settings (Controller Option 122).  | With Controller Option 122a, no horizontal tabs set. With Controller Option 122b tabs set as specified.                 | Integrated Synchronous Controller Analysis, Table I, Page 25. |
| 8   | Check for preset vertical tab settings (Controller Option 123).  | With Controller Option 123a, no vertical tabs are set. With Controller Option 123c through 123n, tabs set as specified. | Integrated Synchronous Controller Analysis, Table I, Page 25. |
| 9   | Check printed copy for test pattern.<br><br>AMZZMAAMZZMAamzzmaAMZZ... for the Up-low printer<br>or<br>AMZZMAAMZZMAAMZZMAAMZZ... for the Monospace printer. | Repeating pattern should appear without any errors.   | Printer Analysis, Tables J or K, Page 29 or 49.               |
| THIS ENDS CHECKOUT OF RECEIVED PRINTER MESSAGE. |  |   |   |

3. TROUBLESHOOTING

GENERAL

3.01 When installing a replacement component, make certain that all options (if present) in this component are implemented for proper set operation.

*Note:* In the absence of instructions to the contrary, return all components not repairable in the field to Western Electric per local instructions.

3.02 Once the trouble has been corrected, the terminal should be checked out to be sure that it is performing properly. Refer to Part 2 for Operational Checkout.

3.03 The following caution procedures must be observed when troubleshooting a 40-Type Station or Set.

*Caution 1: Turn off all power before removing or replacing any component of the 40-Type Station or Set.*

*Caution 2: To avoid possible internal damage to MOS circuitry, use a 346392 static discharge strap as discussed in Section 582-202-200.*

3.04 To locate components, circuit cards, connectors, test switches, indicator lamps and other elements indicated in the troubleshooting information, refer to Section 582-202-700.

3.05 The troubleshooting information is divided into:

- Terminal Analysis — Table H
- Component Analysis — Tables I through M

Component Analysis is broken down into:

- A. Integrated Synchronous Controller — Table I
- B. Printer — Tables J (80-Column) and K (132-Column)
- C. Operator Console — Table L
- D. Cabinet — Table M

3.06 Recommended Procedures: If trouble is known, proceed with the appropriate Component Analysis, ie, printer, etc. If trouble is not known, begin with Terminal Analysis and then proceed with Component Analysis.

## TERMINAL ANALYSIS

TABLE H

## INTEGRATED SYNCHRONOUS ROP TERMINAL ANALYSIS

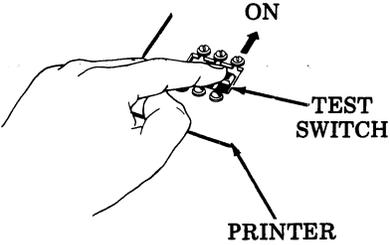
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE  |
|--|--|--|
| 1. Is IN SERVICE key lit?  | Go to 2.   | <p>Make certain that plug on power cord is properly seated in power outlet.</p> <p>Make certain that power switch is on.</p> <p>If power plug is properly connected, all switches are on, and no lamps are lit, determine whether power supply in the building has failed by checking lights in the room, etc.</p> <p>Make certain that all connectors inside cabinet are securely mated and that printer cover is closed.</p> <p>Make certain PAPER alarm light is off.</p> <p>Go to Cabinet Analysis — Table M, Page 70.</p> <p>Go to Integrated Synchronous Controller Analysis — Table I, Page 25.</p> |
| 2. Does test message print correctly when TEST key is depressed (IN SERVICE key off)?  | Go to 4.   | If about half of test message is replaced by font identification symbols ( $\bar{A}\bar{E}$ , etc), verify that Option 19a or c is installed. Otherwise, go to 3.  |
| <p>3. Does type carrier symbol print in every column when printer Test switch is on and cover is closed?</p>  | Go to Integrated Synchronous Controller Analysis — Table I, Page | Go to 80-Column or 132-Column Printer Analysis — Table J or K, Page 29 or 49, respectively.  |

TABLE H (Cont)

## INTEGRATED SYNCHRONOUS ROP TERMINAL ANALYSIS

| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE  |
|--|---|--|
| <p>3. (Cont)<br/>Open cover. Slide Test switch to ON position. Rethread paper through guide window in cover. Close cover.</p> <p>␣␣ ␣␣ ␣␣ ␣␣ ␣␣ or ␣␣<br/>␣␣, ␣␣, ␣␣, ␣␣ or ␣␣</p> <p>symbols should be printed until cover is reopened (80-column tractor feed printer). Slide Test switch to OFF position.</p> <p>␣␣ ␣␣ ␣␣ ␣␣ ␣␣<br/>␣␣, ␣␣, ␣␣, ␣␣ or ␣␣</p> <p>symbols should be printed until cover is reopened (132-column tractor feed printer). Slide Test switch to OFF position.</p> |   |  |
| <p>4. Are messages received on-line?</p>   | Go to 5.  | <p>Check data set and associated cables.</p> <p>Go to Integrated Synchronous Controller Analysis — Table I, Page 25.</p> |
| <p>5. Do received messages contain errors?</p>   | <p>Check data set and associated cables.</p> <p>Go to Integrated Synchronous Controller Analysis — Table I, Page 25.</p> <p>Go to 80-Column or 132-Column Printer Analysis — Table J or K, Page 29 or 49, respectively.</p> |  |

COMPONENT ANALYSIS

A. Integrated Synchronous Controller

TABLE I  
INTEGRATED SYNCHRONOUS CONTROLLER ANALYSIS

| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE   |
|---|---|---|
| 1. Were any opcon lamps flashing (not ON steady or flickering rapidly)? | Refer to Opcon Lamp Analysis below. If controller trouble is indicated, go to 2; if not, take step indicated. | <p>If no lamps are ON, verify that P6 (left side) and P21 (rear) connectors are connected firmly; if so, check voltages to controller using wiring diagram in Section 582-202-400. If good, go to 2.</p> <p>If all four lamps are ON steady, press key. If lamps do not reset, check both 129919 4 amp SL-BL fuses on rear of printer; if good, replace printer.</p> <p>If lamps reset when depressed, go to 4.</p> |

| <u>Opcon Lamps Flashing</u> |                |                   |             |   |
|-----------------------------|----------------|-------------------|-------------|---|
| <u>ALARM</u>                | <u>POL SEL</u> | <u>IN SERVICE</u> | <u>TEST</u> | <u>Required Action</u>  |
| X                           |                |                   | X           | Verify that SSI cable is securely mated to card. If so, refer to 80-Column and 132-Column Printer Analyses — Tables J and K, Pages 29 and 49, respectively. ¶ |
| X                           |                | X                 |             | Refer to 80-Column and 132-Column Printer Analyses — Tables J and K, Pages 29 and 49, respectively. ¶   |
| X                           | X              | X                 |             | Refer to 80-Column and 132-Column Printer Analyses — Tables J and K, Pages 29 and 49, respectively. ¶   |
| X                           |                | X                 | X           | Refer to 80-Column and 132-Column Printer Analyses — Tables J and K, Pages 29 and 49, respectively. ¶   |
| X                           | X              |                   |             | Refer to 80-Column and 132-Column Printer Analyses — Tables J and K, Pages 29 and 49, respectively. ¶   |
| X                           | X              | X                 | X           | Replace circuit card 410733; if flashing lamps continue, refer to Integrated Synchronous Controller Analysis — Table I, Page 25. †                            |

¶ If printer analysis indicates printer is good, refer to Integrated Controller Analysis — Table I, Analysis Question 2, Page 26.  
 † In addition to the indicated lamps flashing the two unmarked lamps will flash.

Opcon Lamp Analysis

TABLE I (Cont)

## INTEGRATED SYNCHRONOUS CONTROLLER ANALYSIS

| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE           | "NO" RESPONSE DIRECTIVE  |
|--|------------------------------------|--|
| 2. Have compatible (usable) options been selected?   | Go to 3.                           | Review Section 582-202-200 and eliminate any incompatible or undesirable option selections. Change options and retest.   |
| 3. Have all controller options (121 through 190) been verified?                                | Go to 4.                           | Check for wrong switch settings for Options 189 and 190.<br><br>Replace 410734 card or replace any open or incorrectly cut diodes on card with 407336 diodes and cut out any diodes that should not be in. If all options are good, go to 4. |
| 4. Replace 410733 and 410735 cards as a unit and retest.<br><br>Is trouble cleared?            | Go to 5.                           | Replace 410734 card.   |
| 5. Replace 410733 card alone (use original 410735 card) and retest.<br><br>Is trouble cleared? | Original 410733 card is defective. | Original 410735 card is probably defective. Replace it alone and retest. Further trouble may indicate cables or connectors are defective.<br><br>Go to Opcon Analysis — Table L, Page 68.  |

## B. Printer (80- and 132-Column)

3.07 Note that the code of the 80-column tractor feed printer used with the integrated synchronous controller is 40P154. The code of the 132-column tractor feed printer used with the integrated synchronous controller is 40P202.

3.08 The following test equipment and tools are required.

*Note:* The following test apparatus is required to enable troubleshooting of the printer. If it is not available, the recommended corrective procedure is replacement of the complete printer (return to authorized repair location) for all troubles which are not clearly evident and easily rectified.

### 80-Column Printer

402617 Gauge  
402779 Line Cord With Switch  
402781 AC Line Cord Adapter (Tractor Feed)  
402782 Interlock Strapping Plug (Tractor Feed)  
402868 Gauge  
402878 Gauge  
408646 Printer Test Assembly  
408650 Test Cable

### 132-Column Printer

402716 Left Gauge  
402717 Right Gauge  
402779 Line Cord With Switch  
402781 AC Line Cord Adapter (Tractor Feed)  
402782 Interlock Strapping Plug (Tractor Feed)  
402868 Gauge  
402878 Gauge  
408646 Printer Test Assembly  
408648 Test Cable

3.09 To use the troubleshooting information, always start with Analysis Question 1 of the analysis to isolate the trouble. If replacement of the indicated defective component does not clear the trouble, replace the next higher order of component, if possible.

3.10 When installing a replacement component, make certain that all options (if present) in this component are implemented for proper set operation.

3.11 Where more than one component is specified for replacement, they should be substituted one at a time in the order specified. The

original component should be replaced if the trouble is not corrected before making the next indicated substitution.

3.12 To locate components, circuit cards, connectors, test switches, indicator lamps and other elements indicated in the troubleshooting information, refer to Section 582-210-702, Disassembly/Reassembly and Parts.

3.13 For cables, connectors, and other wiring indicated for continuity or resistance checks, etc, in troubleshooting, refer to Sections 582-202-400, Wiring Diagrams, and 582-210-702, Disassembly/Reassembly and Parts.

3.14 The following caution procedures must be observed when troubleshooting the printer.

*Caution 1:* Turn off all power or signal sources before removing or replacing any component.

*Caution 2:* To avoid possible internal damage to MOS circuitry whenever the 410071 or 410072 printer circuit card is removed, the 346392 static ground strap must be worn. The strap is not to be worn over clothing but must contact the skin tightly. The ground strap must be connected to ground (either "earth" ground or frame ground) via its associated clip (Fig. 1).

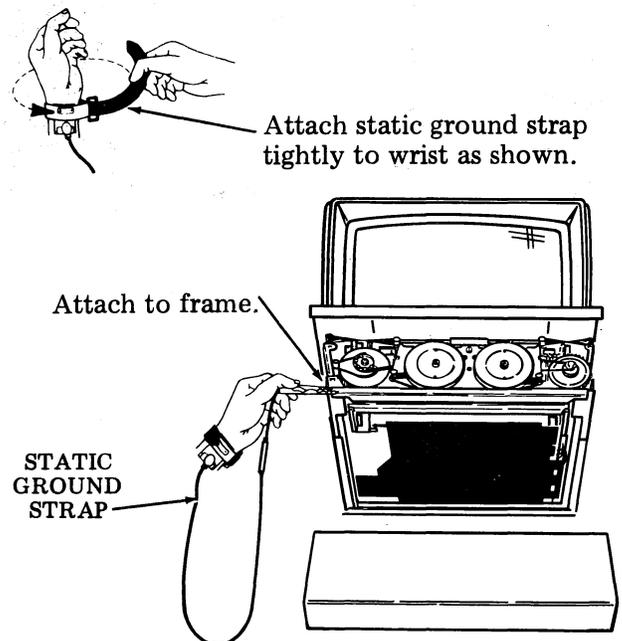


Fig. 1—346392 Static Ground Strap

SECTION 582-202-500

3.15 Before a new 410071 or 410072 is installed, perform the POWER SUPPLY VOLTAGE adjustment. After the 410071 or 410072 circuit card is installed, perform the IMPELLER SHAFT SENSOR and FLAG SENSOR adjustments. Printer adjustments (except for Power Supply) and lubrication are provided in Section 582-210-700. Disassembly and parts information is contained in Section 582-210-702.

3.16 When the type carrier is replaced, it may be necessary to refine the phasing adjustments.

3.17 Refer to Fig. 2 for hookup for running the printer outside the cabinet.

3.18 Once the trouble has been corrected, the terminal should be checked out to be sure that it is performing properly.

- ① Connect 402779 line cord w/switch and 402781 ac line cord adapter to J113 connector on the printer.
- ② Connect 402782 interlock strapping plug to J114 connector on the printer.

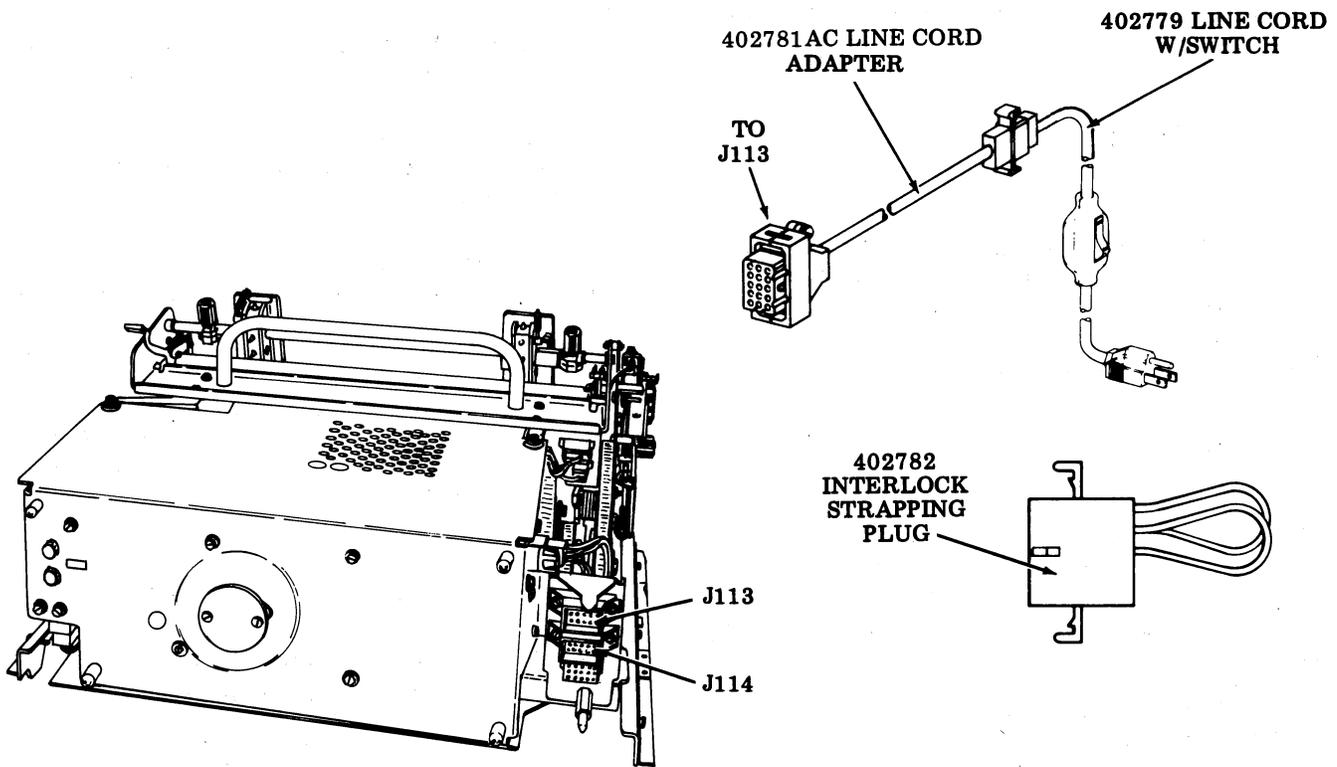


Fig. 2—80- and 132-Column Tractor Feed Printers

TABLE J  
80-COLUMN PRINTER ANALYSIS

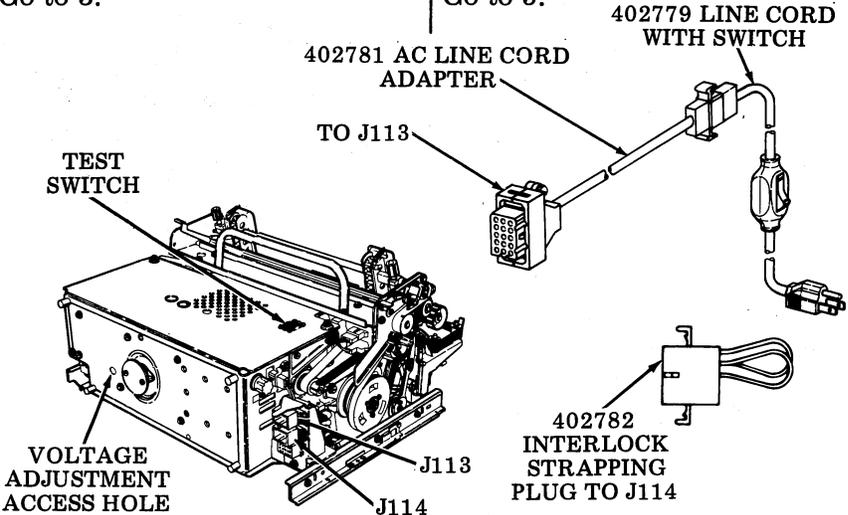
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE  |
|---|---|--|
| <p>1. a. Does motor run?<br/>                     b. Does motor run all the time?<br/>                     c. Does printer line feed properly (from line or cabinet PAPER button)?</p> <p>d. Do ribbon spools rotate and reverse properly?<br/>                     e. Are any characters printed?<br/>                     f. Are characters printed properly?<br/>                     g. Is paper-out indication obtained when paper is out?<br/>                     h. Does form feed advance paper properly?<br/>                     i. Is printed copy smudged?</p> | <p>Go to 1b.<br/>                     Go to 2.<br/>                     Go to 1d.</p> <p>Go to 1e.<br/>                     Go to 1f.<br/>                     Go to 1g.</p> <p>Go to 1h.<br/>                     Go to 1i.<br/>                     Go to 38.</p> | <p>Go to 2.<br/>                     Go to 1c.</p> <p>Verify external connections. If good, remove printer from cabinet.</p> <p>Connect 402781 ac line cord adapter to J113 connector on printer. Plug 402782 plug into J114 connector on printer.</p> <p>Place printer Test switch ON. Operate 402779 line cord switch to ON.</p> <p>Go to 21.<br/>                     Go to 28.</p> <p>Go to 29.</p> <p>Place printer Test switch ON.</p> <p>Go to 30.<br/>                     Go to 51.</p> <p>Go to 47.</p> <p>Place printer in service.</p> |
| <p>2. Remove printer from cabinet.</p> <p>Connect the 402781 ac line cord adapter and 402779 line cord with switch to J113 connector.</p> <p>Plug 402782 interlock plug into J114.</p> <p>Set Test switch to OFF.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does printer motor run?</p>   | <p>Go to 3.</p>   | <p>Go to 5.</p>    |

TABLE J (Cont)

80-COLUMN PRINTER ANALYSIS

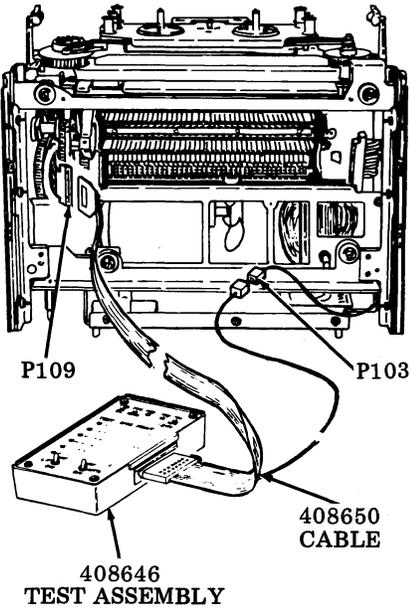
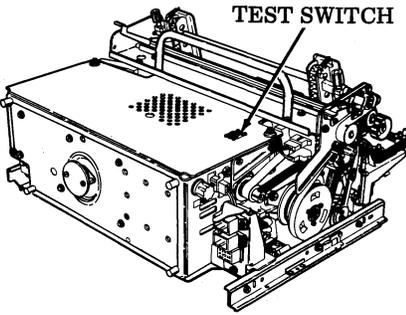
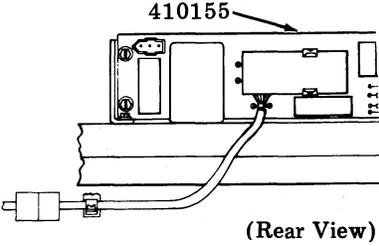
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |
|--|--|---|
| <p>3. Operate 402779 line cord with switch to OFF.</p> <p>Remove 410071 circuit card.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 when connecting plug to P109 connector.</i></p> <p>Operate MTR switch on 408646 test assembly to OFF.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does printer motor run?</p> |  <p>Go to 4.</p>                     | <p>Replace 410071 circuit card.</p> <p>Before installing circuit card, check the <u>POWER SUPPLY VOLTAGE</u> adjustment. With a volt-ohmmeter, check -24 V dc <math>\pm 1\%</math> between TP3 and TP2, TP3 and TP1 on 408646 test assembly. If the voltage is outside the required limits, adjust R-9 resistor on 410151 circuit card. See illustration in step 2.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments; remake if necessary.</p> |
| <p>4. Does the test lamp on 408646 test assembly light?</p>  | <p>Replace 402861 test switch.</p>  | <p>Replace 410155 circuit card assembly.</p>  <p>(Rear View)</p> <p>Replace printer.</p>   |
| <p>5. Operate Test switch on printer to ON.</p> <p>Does the printer motor run?</p>   | <p>Go to 21.</p>   | <p>Go to 6.</p>   |

TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

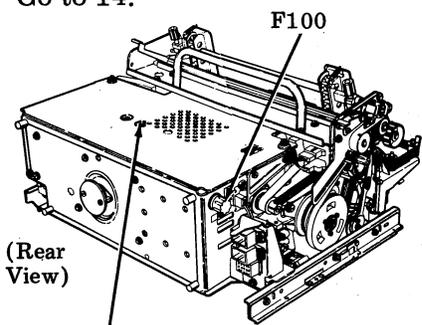
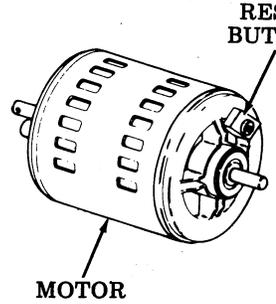
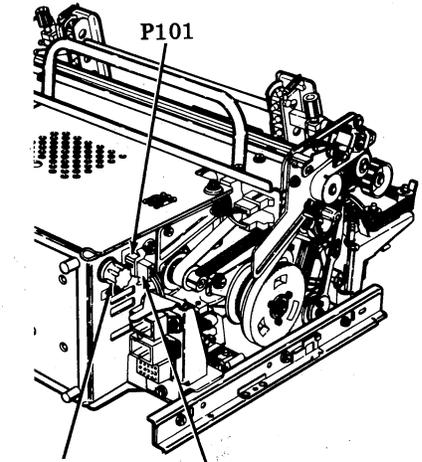
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |
|--|--|---|
| <p>6. Is the motor gear and associated drive mechanisms free to operate (no mechanical bind)?</p>          | <p>Check F100 fuse. If blown, replace with 143306 fuse (1 amp SL-BL MDL-1). If fuse blows again, go to 7. Check thermal overload protector — depress RED reset button on fan end of motor.</p> <p>Go to 14.</p>  <p>(Rear View)</p> <p>ACCESS HOLE TO RESET BUTTON</p> | <p>If mechanical bind is not clearly evident and easily rectified, replace entire printer.</p>  <p>RESET BUTTON</p> <p>MOTOR</p> |
| <p>7. Disconnect P101.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does bench fuse blow?</p> | <p>Problem is in cabinet wiring, locate short.</p> <p>Replace 143306 F100 fuse.</p>  <p>P101</p> <p>F100 FUSE</p> <p>P117</p>  | <p>Operate 402779 line cord with switch OFF.</p> <p>Go to 8.</p>  |

TABLE J (Cont)

80-COLUMN PRINTER ANALYSIS

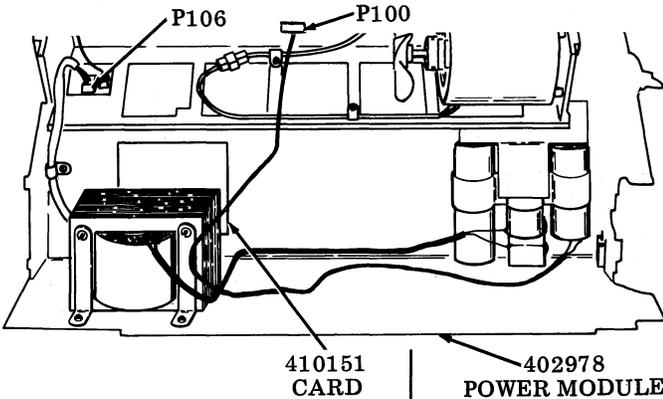
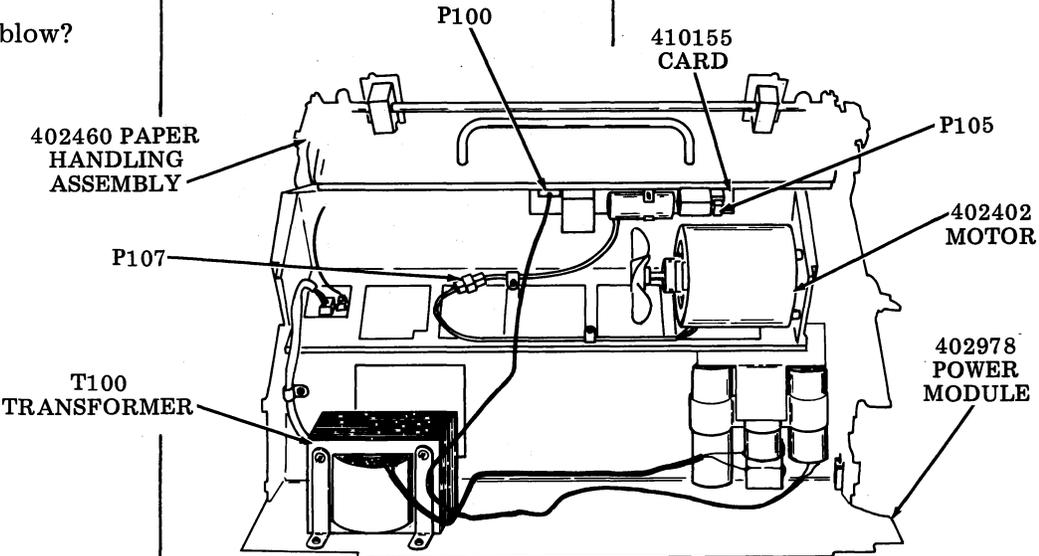
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |
|---|--|---|
| <p>8. Reconnect P101. Disconnect P100 on the motor control assembly.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does F100 fuse blow?</p>   | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 143306 F100 fuse.</p> <p>Go to 13.</p> | <p>Operate 402779 line cord with switch OFF.</p> <p>Go to 9</p>   |
| <p>9. Reconnect P100. Disconnect P105 on the motor control assembly</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does F100 fuse blow?</p>  | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 143307 F100 fuse.</p> <p>Go to 10.</p> | <p>Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments; remake if necessary.</p> |

TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE  |
|--|--|--|
| <p>10. Reconnect P105.</p> <p>Disconnect P107 on the motor control assembly. Operate 402779 line cord with switch to ON.</p> <p>Does F100 fuse blow?</p> | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 410155 circuit card.</p> <p>Replace 143306 F100 fuse.</p> <p>Go to 11.</p>   | <p>Replace 402402 motor.</p>   |
| <p>11. Reconnect P107. Remove 410151 circuit card from J102 receptacle. Operate 402779 line cord with switch to ON.</p> <p>Does F100 fuse blow?</p>      | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 143306 F100 fuse.</p> <p>Go to 12.</p>                                       | <p>Replace 410151 circuit card.</p>  |
| <p>12. Reinsert 410151 circuit card. Remove 410071 circuit card.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does F100 fuse blow?</p>      | <p>Operate 402779 line cord with switch OFF.</p> <p>Reconnect 410071 circuit card.</p> <p>Replace 143306 F100 fuse.</p> <p>Go to 13.</p> | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments; remake if necessary.</p> |

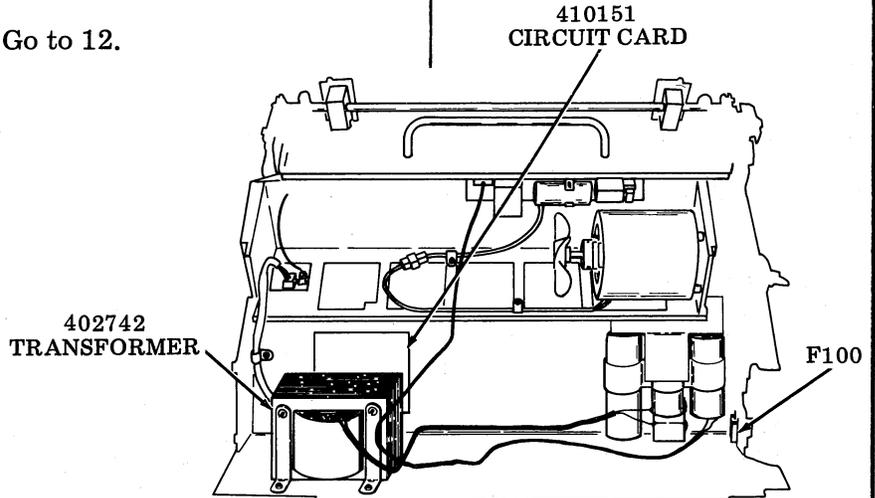


TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

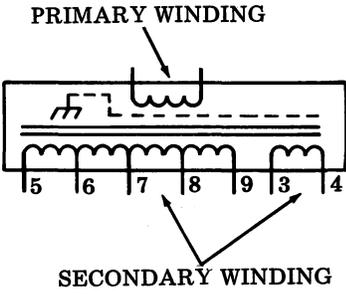
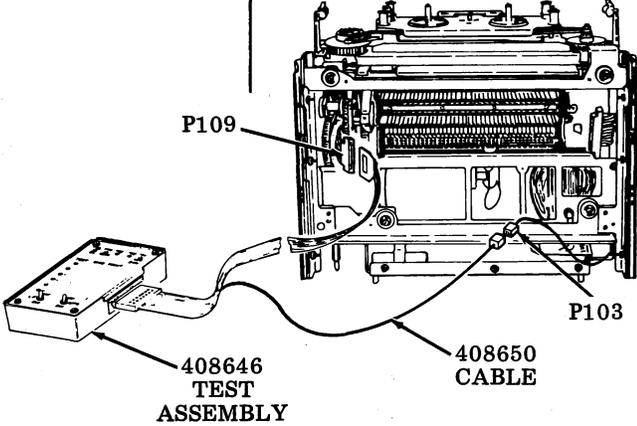
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE  |
|---|--|--|
| <p>13. With an ohmmeter, check for short between primary and secondary windings on T100 transformer. Is transformer shorted?</p>  | <p>Replace 402742 T100 transformer.</p>   | <p>Replace entire printer.</p>   |
| <p>14. Remove 410071 circuit card from printer.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408650 cable when connecting plug to P109 connector.</i></p> <p>Operate 402779 line cord with switch to ON.</p> <p>Operate MTR switch on 408646 test assembly to ON.</p> <p>Does printer motor run?</p> | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 410071 circuit card. After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustment; remake if necessary.</p> | <p>Go to 15.</p>  |

TABLE J (Cont)

80-COLUMN PRINTER ANALYSIS

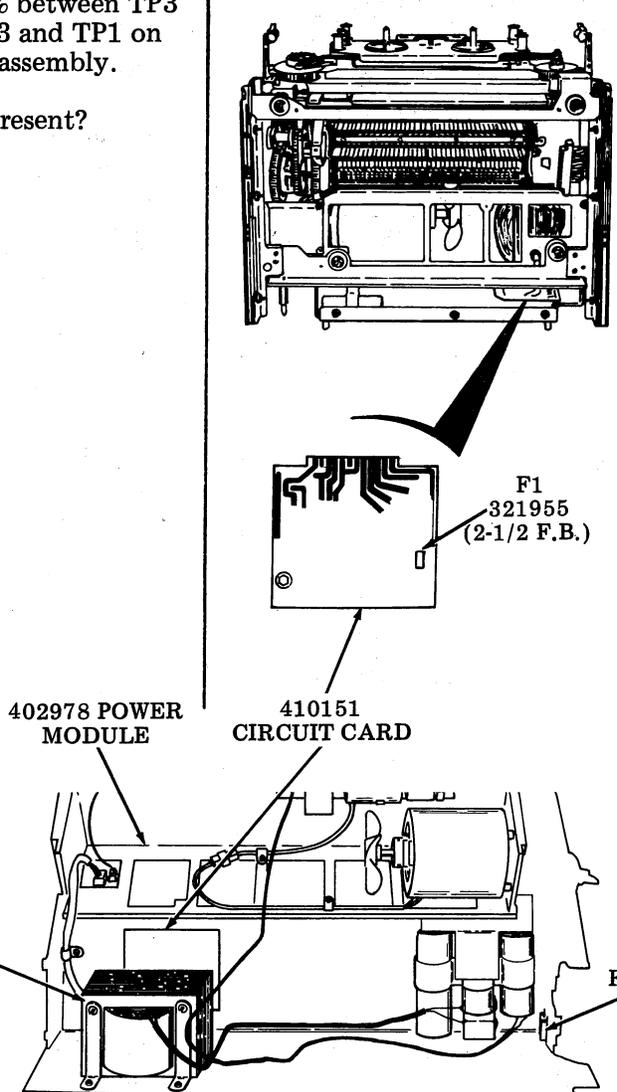
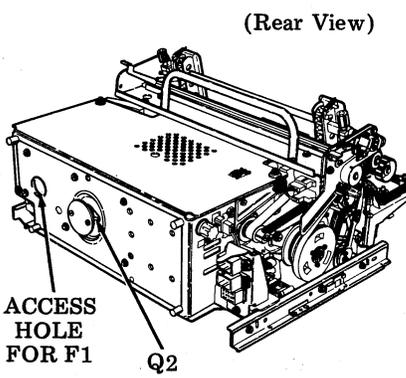
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE  |
|---|--|--|
| <p>15. With a volt-ohmmeter, check -24 V dc +1% between TP3 and TP2, TP3 and TP1 on 408646 test assembly.</p> <p>Is -24 V dc present?</p> | <p>Go to 16.</p>  | <p>Check F1 (long fuse on top right of 410151 circuit card).</p> <p>If fuse is blown, replace with 321955 (2-1/2 amp fast blow) fuse. If fuse blows again, replace 410151 circuit card. Replace 318835 Q2 transistor. Replace 402978 power module.</p>  <p>(Rear View)</p> |
| <p>16. Operate printer Test switch ON.</p> <p>Does the Test lamp on 408646 test assembly light?</p>                                       | <p>Go to 17.</p>   | <p>Replace 402861 test switch.</p>   |

TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

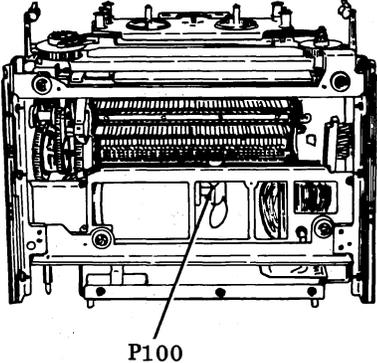
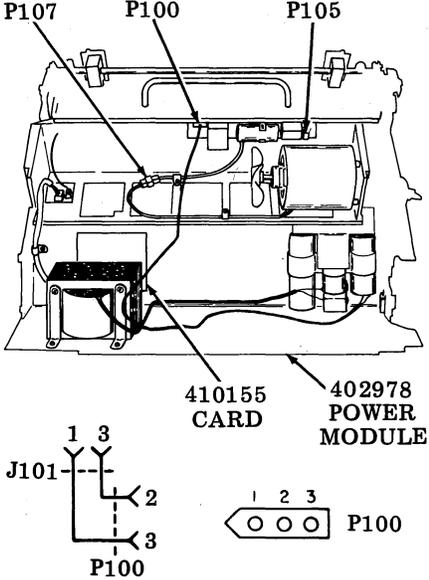
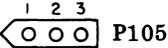
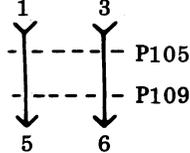
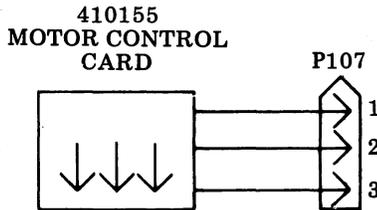
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE  |
|--|---|--|
| <p>17. Operate the 402779 line cord with switch to OFF.</p> <p>Disconnect P100 plug from 410155 circuit card assembly.</p> <p>Operate the 402779 line cord with switch to ON.</p> <p>Measure 117 V ac between terminals 2 and 3 on P100 connector.</p> <p>Is 117 V ac present?</p>           |  <p>Operate 402779 line cord with switch OFF.</p> <p>Go to 18.</p>   |  <p>Check wiring from J101 terminals 1 and 3 to P100 terminals 3 and 2.</p>    |
| <p>18. Reconnect P100. Disconnect P105 plug.</p> <p>Operate 402779 line cord with switch ON. With a volt-ohmmeter, check for -24 V dc between terminals 1 and 3 on P105.</p>  <p>Is -24 V dc present?</p> | <p>Operate 402779 line cord with switch OFF.</p> <p>Go to 19.</p>   | <p>Check wiring from P105 terminals 1 and 3 to P109 terminals 5 and 6.</p>  |
| <p>19. Reconnect P105. Disconnect P107 on the motor control assembly.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>With a volt-ohmmeter, check for 115 V ac between terminals 1 and 2 and between 2 and 3 on P107.</p> <p>Is 115 V ac present?</p>                              | <p>Operate 402779 line cord with switch OFF.</p> <p>Go to 20.</p>  | <p>Replace 410155 circuit card assembly.</p>   |

TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

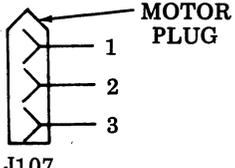
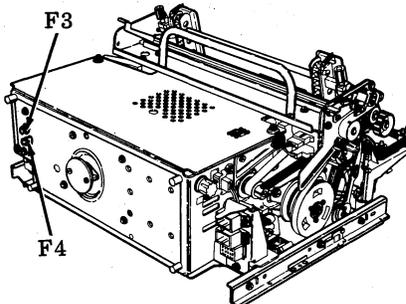
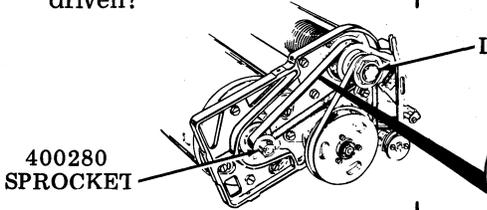
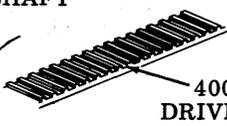
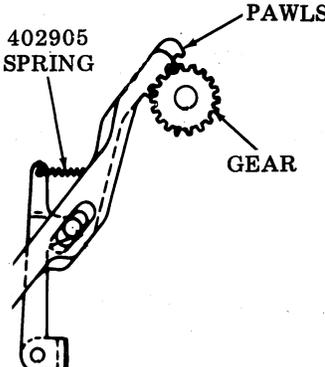
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |
|---|--|---|
| <p>20. With an ohmmeter, measure the following resistances between the indicated terminals on J107 connector:<br/>Terminal 1 to 2 - 40 ohms<br/>Terminal 1 to 3 - 50 ohms<br/>Terminal 2 to 3 - 13 ohms<br/>(All readings <math>\pm 10\%</math>)</p> <p>Are measured resistances correct?</p> |  <p>MOTOR PLUG</p> <p>J107</p> <p>Check F3 and F4 fuses. If blown, replace with 129919 (4.0 Amp SL-BL) fuse.</p> <p>Replace entire printer.</p>  | <p>Replace 402402 motor.</p>  |
| <p>21. Is the impeller shaft being driven?</p>  <p>400280 SPROCKET</p> <p>IMPELLER SHAFT</p>   | <p>Go to 22.</p>  <p>400631 DRIVE BELT</p>  | <p>Check the 400631 impeller shaft drive belt. Replace if worn or broken.</p> <p>Check the 400280 motor shaft sprocket. Replace if worn or broken.</p>  |
| <p>22. Does printer line feed properly with printer Test switch ON?</p> <p>Failure symptoms are:<br/>No line feed<br/>Intermittent line feed<br/>Continuous line feed.</p>  | <p>Go to 26.</p>  <p>402905 SPRING</p> <p>PAWLS</p> <p>GEAR</p>   | <p>Check 400634 or 400632 line feed belts. Replace if worn or broken.</p> <p>Check line feed pawls for engagement with gear.</p> <p>Check line feed bail spring. Replace if broken or worn.</p> |

TABLE J (Cont)

80-COLUMN PRINTER ANALYSIS

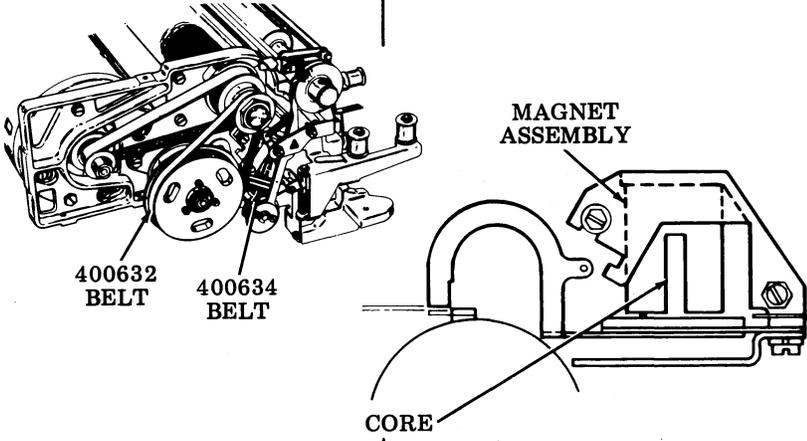
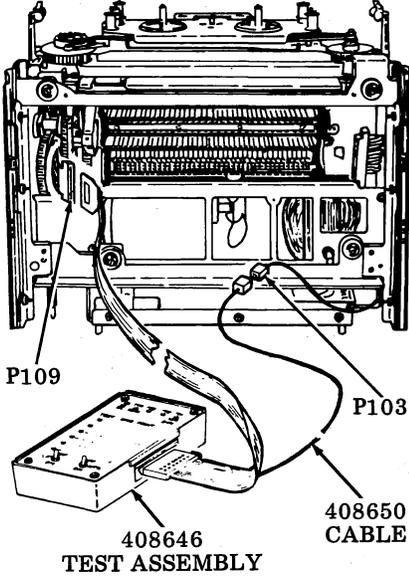
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE   |
|--|---|---|
| <p>22. (Cont)</p>  <p>400632 BELT    400634 BELT</p> <p>MAGNET ASSEMBLY</p> <p>CORE</p>   |   | <p>Check loose mounting of line feed magnet assembly on its core. Replace 402621 line feed assembly if magnet coil is loose.</p> <p>Go to 23.</p> |
| <p>23. Remove 410071 circuit card.</p> <p>Connect 408646 test assembly as shown:</p> <p><i>Caution: Observe caution label on 408650 cable when connecting plug to P109.</i></p> <p>Operate 402779 line cord with switch to ON.</p> <p>Operate MTR switch on 408646 test assembly to ON.</p> <p>Operate LF switch on 408646 test assembly to ON.</p> <p>Does the printer line feed?</p> |  <p>P109</p> <p>P103</p> <p>408646 TEST ASSEMBLY</p> <p>408650 CABLE</p> <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 410071 circuit card.</p> <p>After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustment, remake if necessary.</p> | <p>Go to 24.</p>  |

TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

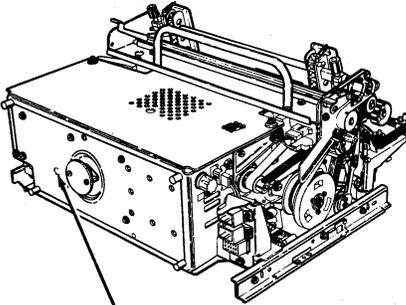
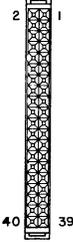
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE  |
|---|---|--|
| <p>24. Check for -24 V dc <math>\pm 1\%</math> between TP2 and TP3 on 408646 test assembly</p> <p>Is -24 V dc <math>\pm 1\%</math> present?</p>   | <p>Go to 25.</p>  | <p>Refine -24 V dc adjustment if voltage reading is outside tolerances.</p>  <p>ACCESS HOLE FOR ADJUSTING R9 ON 410151 CARD (Rear View)</p> <p>Replace 410151 circuit card.</p> |
| <p>25. Operate the 402779 line cord with switch to OFF.</p> <p>Disconnect J109 test cable from printer.</p> <p>Measure for 33 ohms resistance at P109 between terminals 1 and 4.</p> <p>Is measured resistance correct?</p> | <p>Check the following adjustments.</p> <p><u>CLUTCH SHOE RELEASE ARM</u><br/><u>LINE FEED ARMATURE GAP</u><br/><u>LINE FEED BAR ECCENTRIC</u><br/><u>FEED BAR DRIVE BELT TENSION</u><br/><u>CLUTCH DRIVE BELT TENSION</u></p> <p>Replace 402460 paper handling assembly.</p> | <p>Replace 402621 line feed magnet assembly.</p>  <p>P109</p>   |
| <p>26. Place printer LF1 — LF2 switch to position LF2.</p> <p>Does the printer double line space properly?</p>  | <p>Go to 28.</p>  | <p>Go to 27.</p>   |

TABLE J (Cont)

80-COLUMN PRINTER ANALYSIS

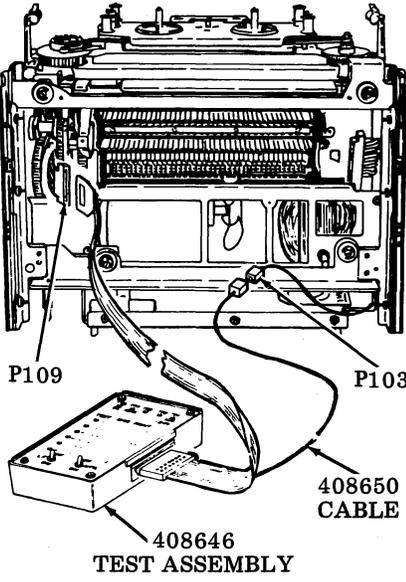
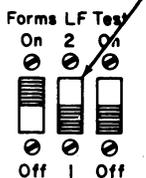
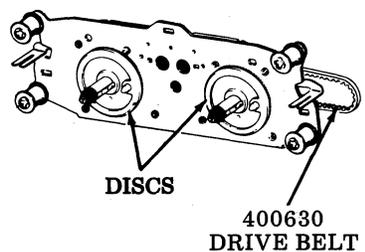
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE  |
|--|--|--|
| <p>27. Remove 410071 circuit card from printer.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408650 cable when connecting plug to P109 connector.</i></p> <p>Operate 402779 line cord with switch ON.</p> <p>Does the line feed lamp on 408646 test assembly light?</p> |  <p>Replace 410071 circuit card.</p> <p>After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustment, remake if necessary.</p> | <p>Replace 402861 switch.</p>                               |
| <p>28. Is the ribbon feed mechanism operating properly?</p> <p>Ribbon spools rotating.<br/>Ribbon reverse working.<br/>No ribbon foldover.</p> <p><i>Note: To check ribbon reversing, manually operate the reversing arms with printer operating (printer Test switch ON).</i></p>                                   | <p>Go to 29.</p>   | <p>Check ribbon drive belt. Replace if worn or broken.</p>  |

TABLE J (Cont)

## 80-COLUMN PRINTER ANALYSIS

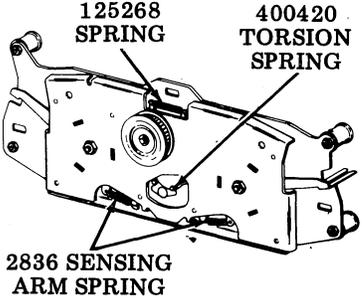
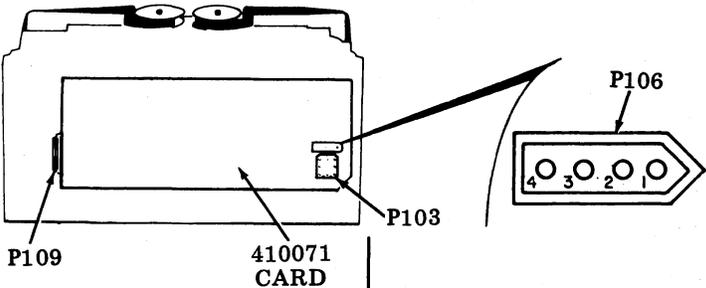
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE | "NO" RESPONSE DIRECTIVE   |
|--|--------------------------|---|
| <p>28. (Cont)</p>  |                          | <p>Remove ribbon mechanism and check the following springs. Replace if broken.</p>  <p>Replace 402420 ribbon mechanism.</p> <p>Check the <u>RIBBON TRACKING</u> adjustment.</p>  |
| <p>29. Are any characters being printed?</p>  | <p>Go to 30.</p>         | <p>Check the following adjustments:</p> <p><u>IMPELLER SHAFT SENSOR GAP</u><br/><u>FLAG SENSOR GAP</u></p> <p>Check impeller sensor for a maximum of 145 ohms. Measure at P106 between terminals 1 and 2.</p> <p>Check flag sensor for a maximum of 145 ohms. Measure at P106 between terminals 2 and 3.</p> <p>Replace 400615 sensor if open or resistance exceeds maximum requirement.</p> <p>Replace 410071 circuit card.</p> <p>After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustment, remake if necessary.</p> |

TABLE J (Cont)

80-COLUMN PRINTER ANALYSIS

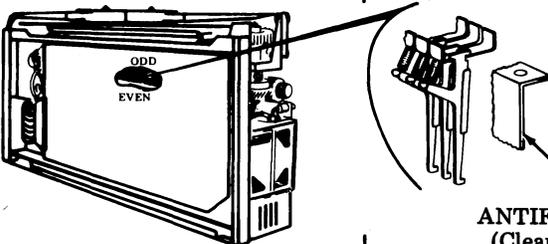
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE   |
|--|---|---|
| <p>30. Is the carrier font symbol the only symbol printed?</p>   | <p>Go to 31.</p>  | <p>If ! (exclamation) or _ (underline) are printed, check the following adjustments:</p> <p><u>FLAG SENSOR GAP</u><br/><u>IMPELLER SHAFT SENSOR GAP</u><br/><u>FLAG SENSOR FINAL</u></p> <p>Replace the 410071 circuit card.</p> <p>After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustment, remake if necessary.</p> |
| <p>31. Are any columns not printing?</p>   | <p>Go to 32.</p>  | <p>Go to 36.</p>  |
| <p>32. Are any of the following groups of columns missing?</p> <p style="padding-left: 40px;">1 - 12<br/>13 - 24<br/>25 - 36<br/>37 - 48<br/>49 - 60<br/>61 - 72<br/>73 - 80</p> | <p>Replace 410071 circuit card.</p> <p>After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustment, remake if necessary.</p>  | <p>Go to 33.</p>  |
| <p>33. Of the columns that are missing, are they all odd-numbered (example: 1, 3, 19, 71) or are they all even-numbered (example: 2, 8, 42, 68)?</p>                             | <p>Check the position of the antifreeze strip.</p> <p>Check for oil on antifreeze strip. If present, spray with 337449 Degreaser (Freon TF).</p>  <p>If antifreeze strip is distorted or missing, replace entire printer.</p> | <p>Go to 34.</p> <p style="text-align: center;"><b>ANTIFREEZE STRIP</b><br/>(Clear Plastic Strip)</p>   |

TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |                      |          |              |          |         |          |         |          |              |          |               |           |
|---|--|---------------------------|----------------------|----------|--------------|----------|---------|----------|---------|----------|--------------|----------|---------------|-----------|
| 34. Are one or more columns missing?  | <p>Check the following adjustments:</p> <p><u>IMPELLER SHAFT SENSOR GAP</u><br/><u>FLAG SENSOR GAP</u><br/><u>IMPELLER SHAFT SENSOR (Final)</u></p> <p>Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments; remake if necessary.</p> <p>Replace entire printer.</p>   | Go to 35.                 |                      |          |              |          |         |          |         |          |              |          |               |           |
| 35. Are any characters not printed?   | <p>Check type carrier for missing pallets.</p> <p>Replace type carrier.</p> <p>Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments; remake if necessary.</p>  | Place printer in service. |                      |          |              |          |         |          |         |          |              |          |               |           |
| 36. Is the font symbol clipped on the left or right?  | <p>Check the <u>IMPELLER SHAFT TO CARRIER PHASING — Final</u> adjustment.</p>  | Go to 37.                 |                      |          |              |          |         |          |         |          |              |          |               |           |
| 37. Are adjacent characters in the type carrier printed in place of the proper character (T instead of S, B instead of A, etc)? | <p>Check the following adjustments:</p> <p><u>FLAG SENSOR GAP</u><br/><u>IMPELLER SHAFT SENSOR GAP</u></p> <p>Check that pallets and flags are in proper position.</p> <table border="1" data-bbox="630 1688 1040 1871"> <thead> <tr> <th><u>Type Carrier</u></th> <th><u>Flag Position</u></th> </tr> </thead> <tbody> <tr> <td>400645AA</td> <td>43, 107, 171</td> </tr> <tr> <td>400629AB</td> <td>12, 108</td> </tr> <tr> <td>400784AN</td> <td>12, 108</td> </tr> <tr> <td>400785AQ</td> <td>43, 107, 171</td> </tr> <tr> <td>408346AZ</td> <td>12,60,108,156</td> </tr> </tbody> </table> <p>Replace entire printer.</p> | <u>Type Carrier</u>       | <u>Flag Position</u> | 400645AA | 43, 107, 171 | 400629AB | 12, 108 | 400784AN | 12, 108 | 400785AQ | 43, 107, 171 | 408346AZ | 12,60,108,156 | Go to 38. |
| <u>Type Carrier</u>   | <u>Flag Position</u>   |                           |                      |          |              |          |         |          |         |          |              |          |               |           |
| 400645AA  | 43, 107, 171   |                           |                      |          |              |          |         |          |         |          |              |          |               |           |
| 400629AB  | 12, 108  |                           |                      |          |              |          |         |          |         |          |              |          |               |           |
| 400784AN  | 12, 108  |                           |                      |          |              |          |         |          |         |          |              |          |               |           |
| 400785AQ  | 43, 107, 171   |                           |                      |          |              |          |         |          |         |          |              |          |               |           |
| 408346AZ  | 12,60,108,156  |                           |                      |          |              |          |         |          |         |          |              |          |               |           |

TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

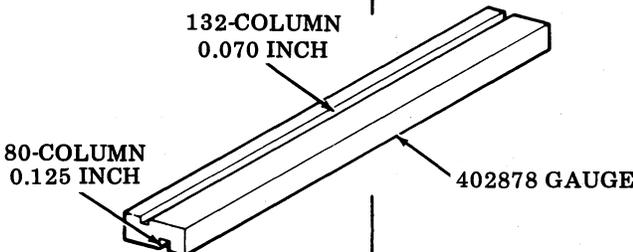
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |
|---|--|---|
| 38. Is copy free of horizontal ink smudges caused by the ribbon rubbing against the paper?  | Go to 39.  | Replace 402798 ribbon shield if deformed.<br><br>Check the following adjustments:<br><br><u>RIBBON GUIDE (Final)</u><br><u>PAPER POSITIONER SHAFT (Final)</u>   |
| 39. Is copy free of double print or ghost images?<br><br> | Go to 40.  | Check the following adjustments:<br><br><u>LEFT CARRIER SPROCKET</u><br><u>RIGHT CARRIER SPROCKET</u><br><br>Check that type pallets are seated properly in carrier. Seat pallets with 402878 gauge. Replace type carrier.<br><br>Replace entire printer. |
| 40. Is the printed copy clear and easily readable?  | Go to 41.  | Replace 402444 ribbon.<br><br>Check the following adjustments:<br><br><u>BACKUP BAR (Final)</u><br><u>LEFT CARRIER SPROCKET</u><br><u>RIGHT CARRIER SPROCKET</u><br><u>RIBBON GUIDE (Final)</u><br><u>PAPER POSITIONER SHAFT</u>                          |
| 41. Is printed copy free from embossing (especially noticeable on characters such as hyphen or underline)?                                  | Go to 42.<br><br>400645AA 80-Column – Monocase (ASCII)<br>400629AB 80-Column – Up-Low (ASCII)<br>400784AN 80-Column – Up-Low (EBCDIC)<br>400785AQ 80-Column – Monocase (EBCDIC)<br>408346AZ 80-Column – 48-Character Set | Check the <u>BACKUP BAR (Final)</u> adjustment and type carrier pallet alignment.<br><br><br><br><br><br><br><br><br><br>Check that type pallets are seated properly in carrier. Seat pallets with 402878 gauge.<br><br>Replace type carrier.             |

TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

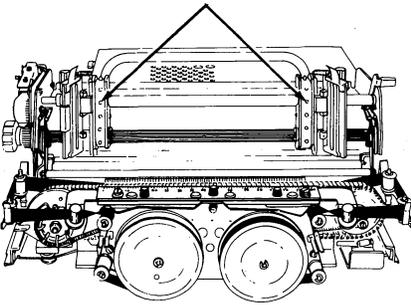
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE  |
|--|---|--|
| 42. Is the print density uniform throughout the line without gradual variations?   | Go to 43.   | Check the following adjustments:<br><u>LEFT CARRIER SPROCKET</u><br><u>RIGHT CARRIER SPROCKET</u><br><u>BACKUP BAR</u>   |
| 43. Is the print density uniform throughout the line without random variations?  | Go to 44.   | Check the following adjustment:<br><u>PAPER POSITIONER SHAFT</u><br><br>Replace entire printer.  |
| 44. Are the bottoms of characters printed clearly (not light) at both ends of the line?  | Go to 45.   | Check the following adjustments:<br><u>LEFT CARRIER SPROCKET</u><br><u>RIGHT CARRIER SPROCKET</u><br><br>Check that ribbon shield is below hammer faces.<br><br>Replace printer. |
| 45. Are all individual characters printed clearly when received?   | Go to 46.   | Check type carrier for missing, broken, distorted, or dirty type pallets.<br><br>Replace type carrier.<br><br>Replace printer.   |
| 46. Are there erratic line feeds or some characters printing too high?<br><br><b>AMBER BELT</b><br> | Check for bind in paper throughout routing path. Check that paper is properly feeding through tractor assemblies.<br><br>Check the following adjustments:<br><u>PAPER POSITIONER SHAFT</u><br><u>TRACTOR PHASING</u><br><br>Replace 400221 idler.<br><br>If amber belt in tractors is worn or broken, replace 402460 paper handling assembly. | Go to 47.  |

TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

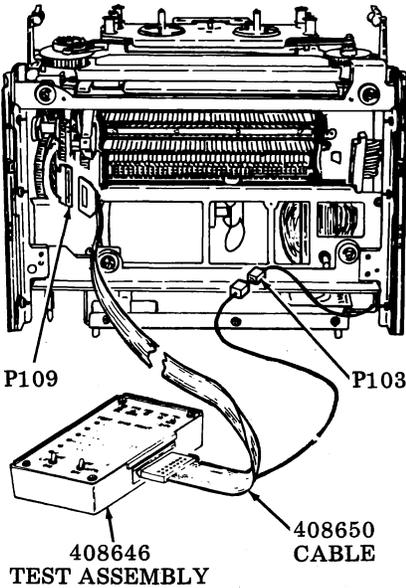
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |
|--|--|---|
| <p>47. When a FF character or local form feed is received, does paper advance one form correctly (Forms switch ON)?</p>  | <p>Go to 51.</p>   | <p>Verify proper belt installation.</p> <p>Check that belt is not worn or cracked. Replace belt.</p> <p>Check that the selector lever on the form-out assembly is properly detented.</p> <p>Check the following adjustments:</p> <p><u>FORM-OUT CONTACT</u><br/><u>LATERAL</u><br/><u>FORM SELECTOR LEVER</u><br/><u>GUIDE</u><br/><u>FORM-OUT GEAR BACKLASH</u><br/><u>FORM-OUT CONTACT TO</u><br/><u>BELT SPACING</u><br/><u>LINE FEED BAR ECCENTRIC</u></p> <p>Go to 48.</p> |
| <p>48. Operate 402779 line cord with switch to OFF.</p> <p>Remove 410071 circuit card.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe Caution label on 408650 cable when connecting plug to P109.</i></p> <p>Operate 402779 line cord with switch to ON.</p> <p>Place Forms switch on printer ON.</p> <p>Does the FORMS MODE lamp on the 408646 test assembly light?</p> |  <p>Go to 49.</p> | <p>Replace 402861 switch.</p>   |

TABLE J (Cont)  
80-COLUMN PRINTER ANALYSIS

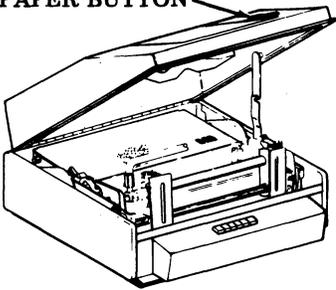
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE  |
|---|---|--|
| <p>49. Operate MTR switch on the 408646 test assembly ON.</p> <p>Operate LF switch on the 408646 test assembly ON.</p> <p>Does the END OF FORM lamp light when the form-out contact touches the cam lobe on the belt?</p> | Go to 50.   | Replace 402570 form-out assembly.  |
| <p>50. When a FF character or local form feed command is received, does paper advance one form?</p>   | Place printer in service.   | <p>Replace 402905 spring.</p> <p>Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments; remake if necessary.</p> <p>Replace printer.</p> <p>Check Form switch and cabling on cabinet.</p> |
| <p>51. Is paper-out indication obtained when a paper-out condition exists?</p>  | <p>PAPER BUTTON</p>  <p>Place printer in service.</p> | <p>Check the <u>PAPER-OUT SWITCH</u> adjustment.</p> <p>Go to 52.</p>  |

TABLE J (Cont)

80-COLUMN PRINTER ANALYSIS

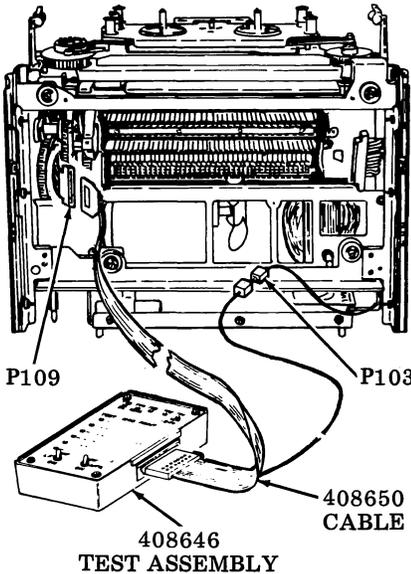
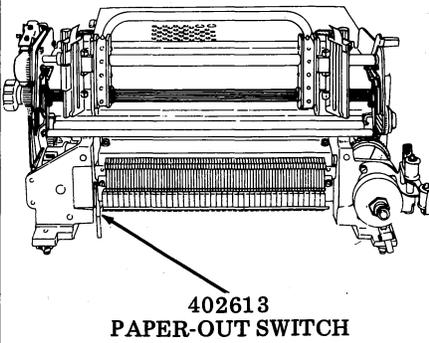
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE  |
|---|---|--|
| <p>52. Operate 402779 line cord with switch OFF.</p> <p>Remove 410071 circuit card from printer.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe Caution label on 408650 cable when connecting plug to P109.</i></p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does the FORMS SUPPLY lamp on the 408646 test assembly light (paper in)?</p> <p>Remove paper. Does the FORMS SUPPLY lamp go out and the ALARM lamp light (paper out)?</p> |  <p>Replace 410071 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments; remake if necessary.</p> | <p>Replace 402613 switch assembly.</p>  <p>402613 PAPER-OUT SWITCH</p> |

TABLE K  
132-COLUMN PRINTER ANALYSIS

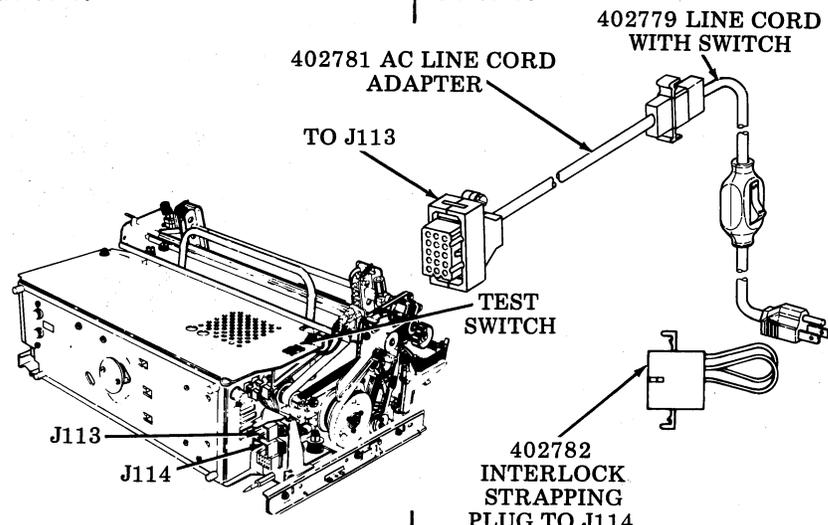
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE   |
|---|---|---|
| <p>1. a. Does motor run?<br/>                     b. Does motor run all the time?<br/>                     c. Does printer line feed properly (from line or cabinet PAPER button, if present)?</p> <p>d. Do ribbon spools rotate and reverse properly?<br/>                     e. Are any characters printed?<br/>                     f. Are characters printed properly?</p> <p>g. Is paper-out indication obtained when paper is out?<br/>                     h. Does form feed advance paper properly?<br/>                     i. Is printed copy smudged?</p> | <p>Go to 1b.<br/>                     Go to 2.</p> <p>Go to 1d.</p> <p>Go to 1e.<br/>                     Go to 1f.<br/>                     Go to 1g.</p> <p>Go to 1h.</p> <p>Go to 1i.<br/>                     Go to 38.</p> | <p>Go to 2.<br/>                     Go to 1c.</p> <p>Verify external connections. If good, remove printer from cabinet.</p> <p>Connect 402781 ac line cord adapter to J113 connector on printer. Plug 402782 plug into J114 connector on printer.</p> <p>Place printer Test switch ON. Operate 402779 line cord switch to ON.</p> <p>Go to 21.<br/>                     Go to 28.</p> <p>Go to 29.</p> <p>Place printer Test switch ON.</p> <p>Go to 30<br/>                     Go to 51.</p> <p>Go to 47.</p> <p>Place printer in service.</p> |
| <p>2. Remove printer from cabinet.</p> <p>Connect the 402781 ac line cord adapter and 402779 line cord with switch to J113 connector.</p> <p>Plug 402782 interlock plug into J114.</p> <p>Set Test switch to OFF.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does printer motor run?</p>   | <p>Go to 3.</p>   | <p>Go to 5.</p>  <p>The diagram illustrates the wiring setup for testing the printer. It shows a side view of the printer with two connectors, J113 and J114, labeled. A 402781 AC LINE CORD ADAPTER is connected to J113. A 402779 LINE CORD WITH SWITCH is connected to the adapter. A 402782 INTERLOCK STRAPPING PLUG TO J114 is connected to J114. A TEST SWITCH is also shown, which is part of the 402779 line cord assembly.</p>                       |

TABLE K (Cont)

132-COLUMN PRINTER ANALYSIS

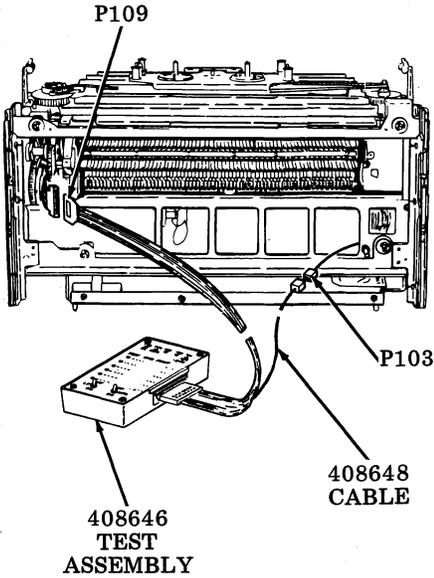
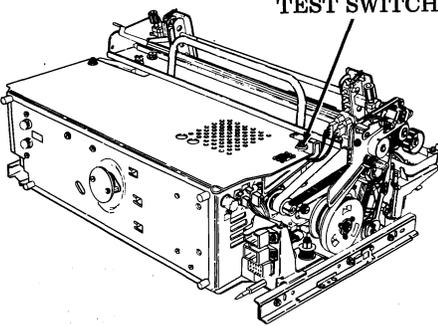
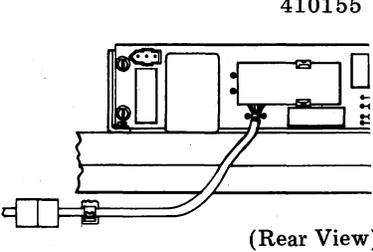
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |
|--|--|---|
| <p>3. Operate 402779 line cord with switch to OFF.</p> <p>Remove 410072 circuit card.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting plug to P109 connector.</i></p> <p>Operate MTR switch on 408646 test assembly to OFF.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does printer motor run?</p> |  <p>P109</p> <p>P103</p> <p>408648 CABLE</p> <p>408646 TEST ASSEMBLY</p> <p>Go to 4.</p> | <p>Replace 410072 circuit card.</p> <p>Before installing circuit card, check the <u>POWER SUPPLY VOLTAGE</u> adjustment. With a volt-ohmmeter, check -24 V dc +10% between TP3 and TP2, TP3 and TP1 on 408646 test assembly. If the voltage is outside the required limits, adjust R9 resistor on 410151 circuit card. See illustration in step 2. After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments; remake if necessary.</p> |
| <p>4. Does the TEST lamp on 408646 test assembly light?</p>  | <p>Replace 402861 test switch.</p>  <p>TEST SWITCH</p>                                  | <p>Replace 410155 circuit card assembly.</p>  <p>410155</p> <p>(Rear View)</p> <p>Replace printer.</p>   |
| <p>5. Operate Test switch on printer to ON.</p> <p>Does the printer motor run?</p>   | <p>Go to 21.</p>   | <p>Go to 6.</p>   |

TABLE K (Cont)  
132-COLUMN PRINTER ANALYSIS

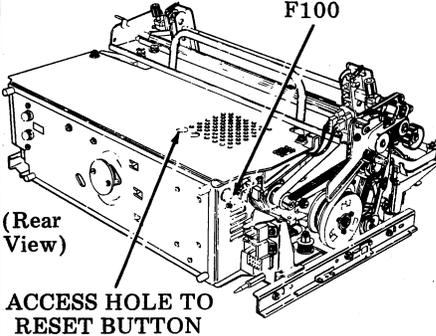
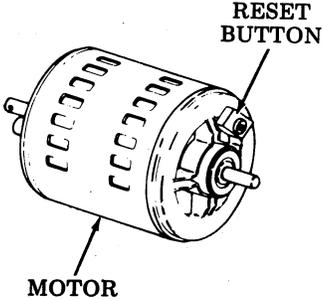
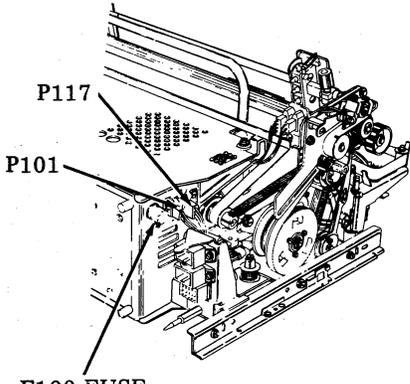
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE  |
|--|--|--|
| <p>6. Is the motor gear and associated drive mechanisms free to operate (no mechanical bind)?</p>          | <p>Check F100 fuse. If blown, replace with 143306 fuse (1 amp SL-BL MDL-1). If fuse blows again, go to 7. Check thermal overload protector — depress RED reset button on fan end of motor.</p> <p>Go to 14.</p>  <p>(Rear View)<br/>ACCESS HOLE TO RESET BUTTON</p> | <p>If mechanical bind is not clearly evident and easily rectified, replace entire printer.</p>  <p>RESET BUTTON<br/>MOTOR</p> |
| <p>7. Disconnect P101.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does bench fuse blow?</p> | <p>Problem is in cabinet wiring, locate short.</p> <p>Replace 143306 F100 fuse.</p>  <p>P117<br/>P101<br/>F100 FUSE</p>  | <p>Operate 402779 line cord with switch OFF.</p> <p>Go to 8.</p>   |

TABLE K (Cont)

132-COLUMN PRINTER ANALYSIS

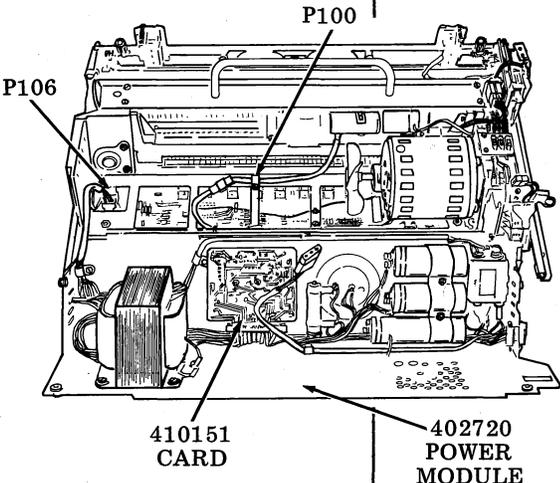
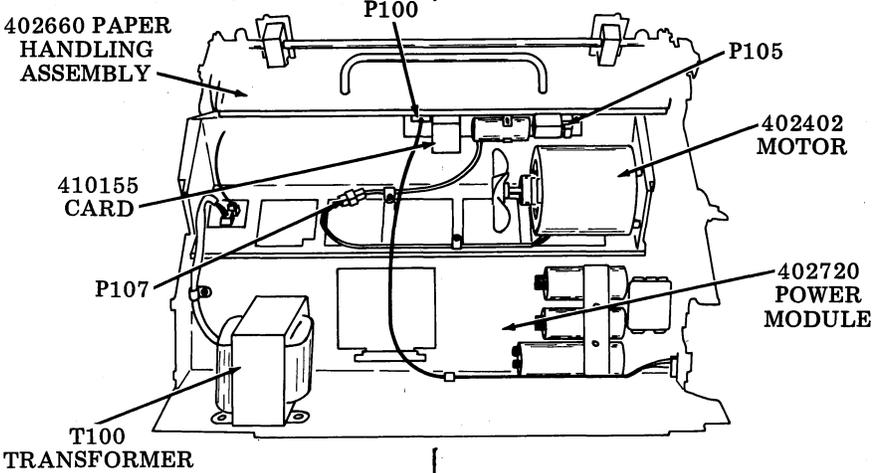
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE   |
|---|---|---|
| <p>8. Reconnect P101. Disconnect P100 on the motor control assembly.</p> <p>Operate 402779 line cord switch to ON.</p> <p>Does F100 fuse blow?</p>  | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 143306 F100 fuse.</p> <p>Go to 13.</p>  | <p>Operate 402779 line cord switch OFF.</p> <p>Go to 9.</p>   |
| <p>9. Reconnect P100. Disconnect P105 on the motor control assembly.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does F100 fuse blow?</p>   | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 143306 F100 fuse.</p> <p>Go to 10.</p>  | <p>Replace 410072 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments; remake if necessary.</p> |

TABLE K (Cont)

## 132-COLUMN PRINTER ANALYSIS

| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE  |
|---|--|--|
| <p>10. Reconnect P105</p> <p>Disconnect P107. Operate 402779 line cord with switch to ON.</p> <p>Does F100 fuse blow?</p>                           | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 410155 circuit card.</p> <p>Replace 143306 F100 fuse.</p> <p>Go to 11.</p>   | <p>Replace 402402 motor.</p>   |
| <p>11. Reconnect P107. Remove 410151 circuit card from J102 receptacle. Operate 402779 line cord with switch to ON.</p> <p>Does F100 fuse blow?</p> | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 143306 F100 fuse.</p> <p>Go to 12.</p>                                       | <p>Replace 410151 circuit card.</p>  |
| <p>12. Reinsert 410151 circuit card. Remove 410072 circuit card.</p> <p>Operate 402779 line cord with switch to ON.</p> <p>Does F100 fuse blow?</p> | <p>Operate 402779 line cord with switch OFF.</p> <p>Reconnect 410072 circuit card.</p> <p>Replace 143306 F100 fuse.</p> <p>Go to 13.</p> | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 410072 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments; remake if necessary.</p> |
| <p>13. With an ohmmeter, check for short between primary and secondary windings on T100 transformer. Is transformer shorted?</p>                    | <p>Replace 402742 T100 transformer.</p>  | <p>Replace entire printer.</p>   |

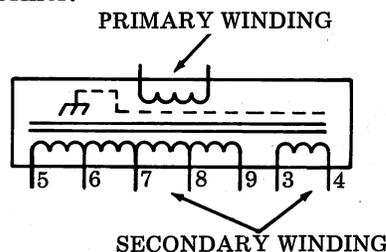
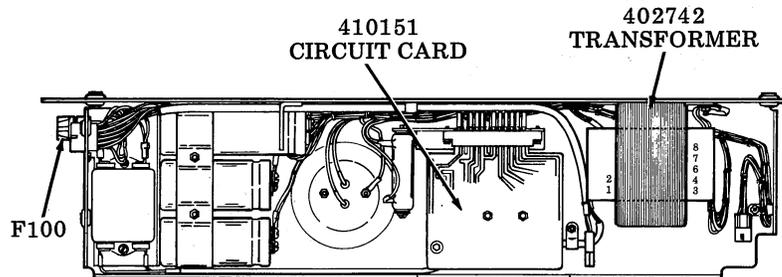


TABLE K (Cont)

132-COLUMN PRINTER ANALYSIS

| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE  |
|---|---|--|
| <p>14. Remove 410072 circuit card from printer.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe Caution label on 408648 cable when connecting plug to P109 connector.</i></p> <p>Operate 402779 line cord with switch to ON.</p> <p>Operate MTR switch on 408646 test assembly to ON.</p> <p>Does printer motor run?</p> | <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 410072 circuit card. After the card is installed, check the IMPELLER SHAFT SENSOR and FLAG SENSOR adjustments, remake if necessary.</p> | <p>Go to 15.</p>   |
| <p>15. With a volt-ohmmeter, check -24 V dc +1% between TP3 and TP2, TP3 and TP1 on 408646 test assembly.</p> <p>Is -24 V dc present?</p>   | <p>Go to 16.</p>  | <p>Check F1 (long fuse on top right of 410151 circuit card).</p> <p>If fuse is blown, replace with 321955 (2-1/2 amp fast blow) fuse. If fuse blows again, replace 410151 circuit card. Replace 318835 Q2 transistor. Replace 402720 power module.</p> |

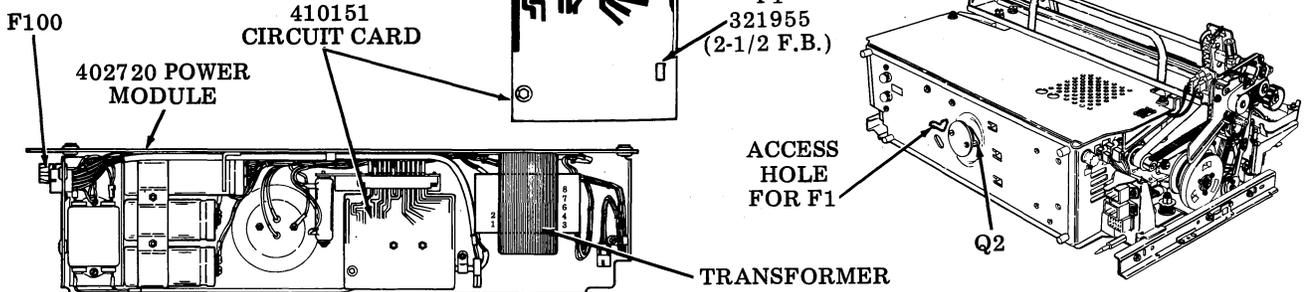
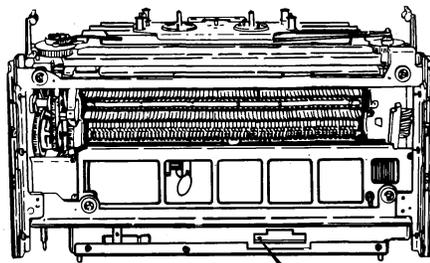
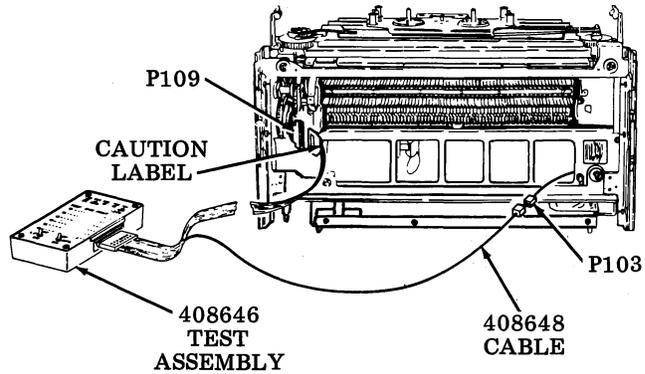


TABLE K (Cont)

132-COLUMN PRINTER ANALYSIS

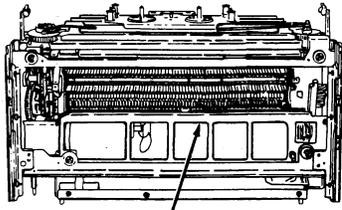
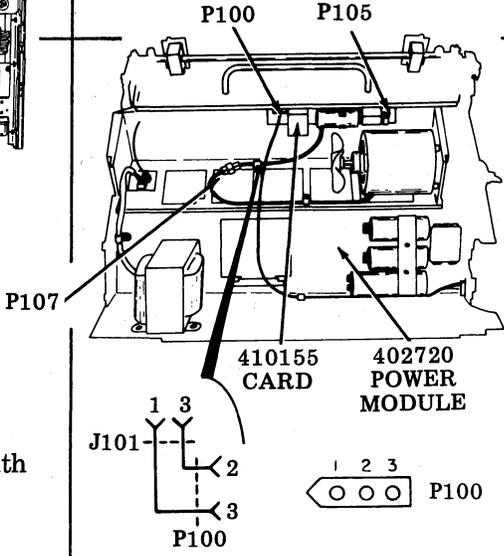
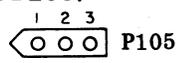
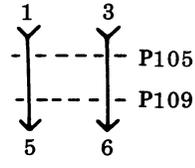
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE  |
|---|---|--|
| <p>16. Operate printer Test switch to ON.</p> <p>Does the TEST lamp on 408646 test assembly light?</p>  | <p>Go to 17.</p>  | <p>Replace 402861 test switch.</p>   |
| <p>17. Operate the 402779 line cord with switch to OFF.</p> <p>Disconnect P100 plug from 410155 circuit card assembly.</p> <p>Operate the 402779 line cord with switch to ON.</p> <p>Measure 117 V ac between terminals 2 and 3 on P100 connector.</p> <p>Is 117 V ac present?</p>              |  <p>P100</p> <p>Operate 402779 line cord with with switch OFF.</p> <p>Go to 18.</p> |  <p>P100 P105</p> <p>P107</p> <p>410155 CARD 402720 POWER MODULE</p> <p>J101</p> <p>P100</p> <p>Check wiring from J101 terminals 1 and 3 to P100 terminals 3 and 2.</p> |
| <p>18. Reconnect P100. Disconnect P105 plug.</p> <p>Operate 402779 line cord with switch to ON. With a volt-ohmmeter, check for -24 V dc between terminals 1 and 3 on P105.</p>  <p>Is -24 V dc present?</p> | <p>Operate 402779 line cord with switch OFF.</p> <p>Go to 19.</p>   | <p>Check wiring from P105 terminals 1 and 3 to P109 terminals 5 and 6.</p>    |
| <p>19. Reconnect P105. Disconnect P107 on the motor control assembly.</p> <p>Operate 402779 line cord with switch to ON.</p>  | <p>Operate 402779 line cord with switch OFF.</p> <p>Go to 20.</p>   | <p>Replace 410155 circuit card assembly.</p>   |

TABLE K (Cont)

132-COLUMN PRINTER ANALYSIS

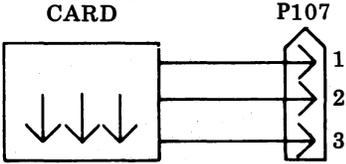
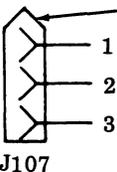
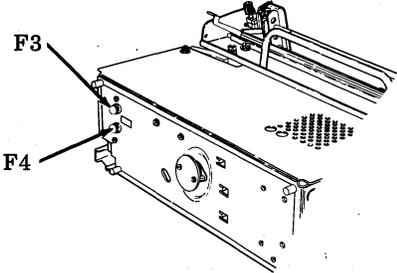
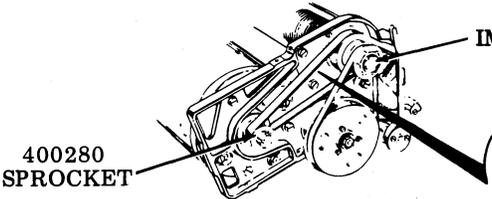
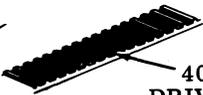
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE  |
|--|--|--|
| <p>19. (Cont)</p> <p>With a volt-ohmmeter, check for 115 V ac between terminals 1 and 2 and between 2 and 3 on P107.</p> <p>Is 115 V ac present?</p>   | <p>410155<br/>MOTOR CONTROL<br/>CARD</p>    |  |
| <p>20. With an ohmmeter, measure the following resistances between the indicated terminals on J107 connector:</p> <p>Terminal 1 to 2 — 40 ohms<br/>Terminal 1 to 3 — 50 ohms<br/>Terminal 2 to 3 — 13 ohms<br/>(All readings <math>\pm 10\%</math>)</p> <p>Are measured resistances correct?</p> | <p>MOTOR PLUG</p>  <p>Check F3 and F4 fuses. If blown, replace with 129919 (4.0 amp SL-BL) fuse.</p> <p>Replace entire printer.</p>  | <p>Replace 402402 motor.</p>   |
| <p>21. Is the impeller shaft being driven?</p>    | <p>Go to 22.</p>    | <p>Check the 400631 impeller shaft drive belt. Replace if worn or broken.</p> <p>Check the 400280 motor shaft sprocket. Replace if worn or broken.</p> |

TABLE K (Cont)

132-COLUMN PRINTER ANALYSIS

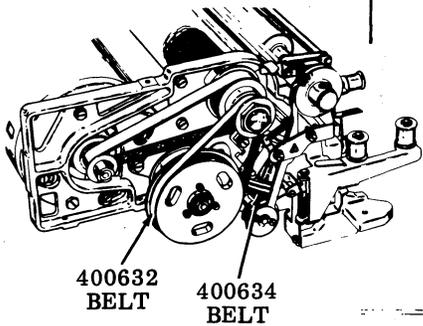
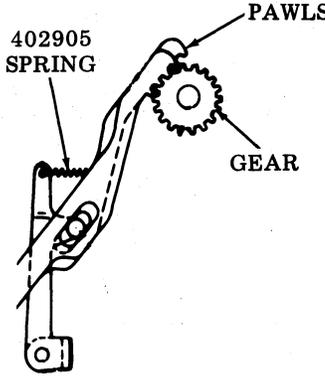
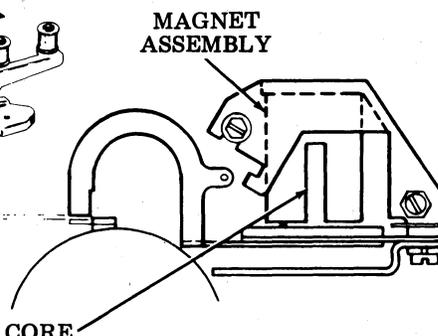
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE   |
|--|---|---|
| <p>22. Does printer line feed properly with Test switch ON?</p> <p>Failure symptoms are:<br/>                     No line feed<br/>                     Intermittent line feed<br/>                     Continuous line feed.</p>  <p>400632 BELT      400634 BELT</p> | <p>Go to 26.</p>  <p>402905 SPRING      PAWLS<br/>                     GEAR</p>  <p>MAGNET ASSEMBLY<br/>                     CORE</p> | <p>Check 400634 or 400632 line feed belts. Replace if worn or broken.</p> <p>Check line feed pawls for engagement with gear.</p> <p>Check line feed bail spring. Replace if broken or worn.</p> <p>Check loose mounting of line feed magnet assembly on its core. Replace 402621 line feed assembly if magnet coil is loose.</p> <p>Go to 23.</p> |

TABLE K (Cont)

132-COLUMN PRINTER ANALYSIS

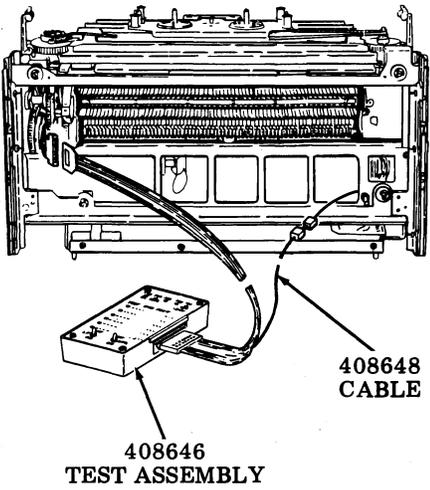
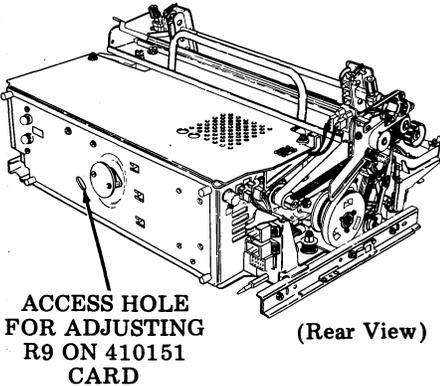
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE  |
|--|--|--|
| <p>23. Remove 410072 circuit card.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting plug to P109.</i></p> <p>Operate 402779 line cord with switch to ON.</p> <p>Operate MTR switch on 408646 test assembly to ON.</p> <p>Operate LF switch on 408646 test assembly to ON.</p> <p>Does the printer line feed?</p> |  <p>Operate 402779 line cord with switch OFF.</p> <p>Replace 410072 circuit card.</p> <p>After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments, remake if necessary.</p> | <p>Go to 24.</p>   |
| <p>24. Check for -24 V dc <math>\pm 1\%</math> between TP2 and TP3 on 408646 test assembly.</p> <p>Is -24 V dc <math>\pm 1\%</math> present?</p>   | <p>Go to 25.</p>    | <p>Refine -24 V dc adjustment, if voltage reading is outside tolerances.</p> <p>Replace 410151 circuit card.</p> |

TABLE K (Cont)  
132-COLUMN PRINTER ANALYSIS

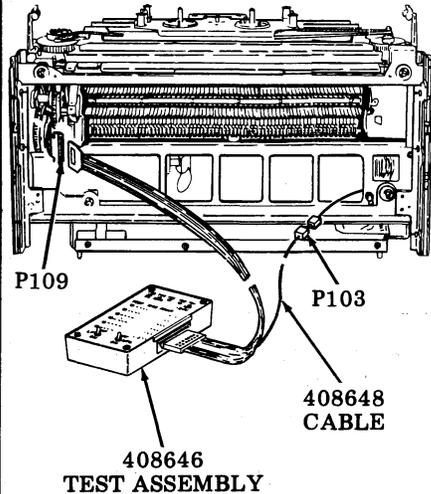
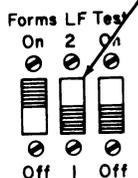
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE   |
|--|---|---|
| <p>25. Operate the 402779 line cord with switch OFF.</p> <p>Disconnect J109 test cable from printer.</p> <p>Measure for 33 ohms resistance at P109 between terminals 1 and 4.</p> <p>Is measured resistance correct?</p>   | <p>Check the following adjustments:</p> <p><u>CLUTCH SHOE RELEASE ARM</u><br/><u>LINE FEED ARMATURE GAP</u><br/><u>LINE FEED BAR ECCENTRIC</u><br/><u>FEED BAR DRIVE BELT TENSION</u><br/><u>CLUTCH DRIVE BELT TENSION</u></p> <p>Replace 402660 paper handling assembly.</p> | <p>Replace 402621 line feed magnet assembly.</p>  <p>P109</p>  |
| <p>26. Place printer LF1 — LF2 switch to position LF2.</p> <p>Does the printer double line space properly?</p>   | <p>Go to 28.</p>  | <p>Go to 27.</p>  |
| <p>27. Remove 410072 circuit card from printer.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting plug to P109 connector.</i></p> <p>Operate 402779 line cord with switch ON.</p> <p>Does the LINE FEED lamp on 408646 test assembly light?</p> | <p>Replace 410072 circuit card.</p> <p>After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments, remake if necessary.</p>   |  <p>P109</p> <p>P103</p> <p>408646 TEST ASSEMBLY</p> <p>408648 CABLE</p> <p>Replace 402861 switch.</p>  |

TABLE K (Cont)

132-COLUMN PRINTER ANALYSIS

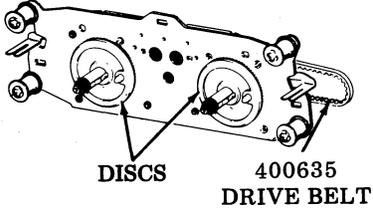
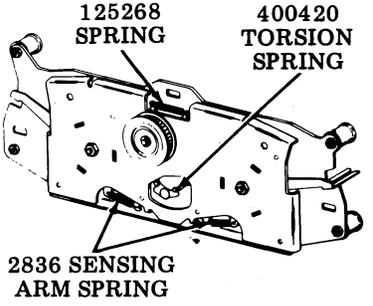
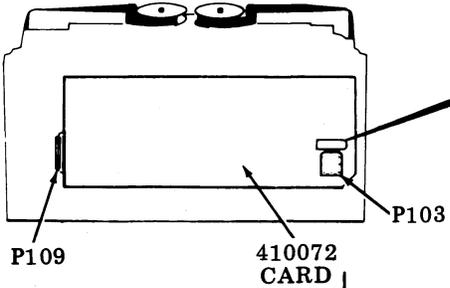
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE | "NO" RESPONSE DIRECTIVE  |
|--|--------------------------|--|
| <p>28. Is the ribbon feed mechanism operating properly?</p> <p>Ribbon spools rotating.<br/>Ribbon reverse working.<br/>No ribbon foldover.</p> <p><i>Note:</i> To check ribbon reversing, manually operate the reversing arms with printer operating (printer Test switch ON).</p> | <p>Go to 29.</p>         | <p>Check ribbon drive belt. Replace if worn or broken.</p>  <p>DISCS 400635 DRIVE BELT</p> <p>Remove ribbon mechanism and check the following springs. Replace if broken.</p>  <p>125268 SPRING 400420 TORSION SPRING<br/>2836 SENSING ARM SPRING</p> <p>Replace 402420 ribbon mechanism.</p> <p>Check the <u>RIBBON TRACKING</u> adjustment.</p> |
| <p>29. Are any characters being printed?</p>  <p>P109 410072 CARD P103</p>  | <p>Go to 30.</p>         | <p>Check the following adjustments:</p> <p><u>IMPELLER SHAFT SENSOR GAP</u><br/><u>FLAG SENSOR GAP</u></p> <p>Check impeller sensor for a maximum of 145 ohms. Measure at P106 between terminals 1 and 2.</p> <p>Check flag sensor for a maximum of 145 ohms. Measure at P106 between terminals 3 and 4.</p> <p>Replace 400615 sensor, if open or resistance exceeds maximum requirement.</p>  |

TABLE K (Cont)

## 132-COLUMN PRINTER ANALYSIS

| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |
|--|--|---|
| 29. (Cont)   |  | Replace 410072 circuit card.<br><br>After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments, remake if necessary.  |
| 30. Is the carrier font symbol the only symbol printed?  | Go to 31.  | If ! (exclamation) or _ (underline) are printed, check the following adjustments:<br><br><u>FLAG SENSOR GAP</u><br><u>IMPELLER SHAFT SENSOR GAP</u><br><u>FLAG SENSOR (Final)</u><br><br>Replace the 410072 circuit card.<br><br>After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments, remake if necessary. |
| 31. Are any columns not printing?  | Go to 32.  | Go to 36.   |
| 32. Are any of the following groups of columns missing?<br><br>1 - 12<br>13 - 24<br>25 - 36<br>37 - 48<br>49 - 60<br>61 - 72<br>73 - 84<br>85 - 96<br>97 - 108<br>109 - 120<br>121 - 132 | Replace 410072 circuit card.<br><br>After the card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments, remake if necessary. | Go to 33.   |

TABLE K (Cont)

132-COLUMN PRINTER ANALYSIS

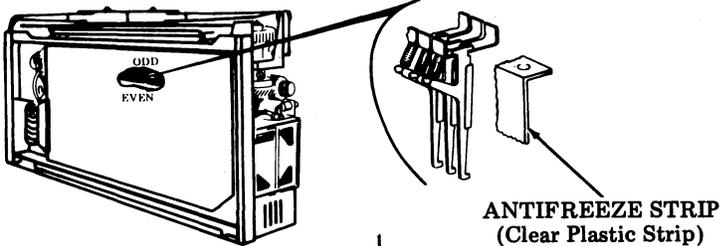
| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE          |
|--|--|----------------------------------|
| <p>33. Of the columns that are missing, are they all odd-numbered (example: 1, 3, 19, 71) or are they all even-numbered (example: 2, 8, 42, 68)?</p> | <p>Check the position of the anti-freeze strip.</p> <p>Check for oil on antifreeze strip. If present, spray with 337449 Degreaser (Freon TF).</p>  <p>If antifreeze strip is distorted or missing, replace entire printer.</p>   | <p>Go to 34.</p>                 |
| <p>34. Are one or more columns missing?</p>  | <p>Check the following adjustments:</p> <p><u>IMPELLER SHAFT SENSOR GAP</u><br/> <u>FLAG SENSOR GAP</u><br/> <u>IMPELLER SHAFT SENSOR (Final)</u></p> <p>Replace 410072 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments, remake if necessary.</p> <p>Replace entire printer.</p> | <p>Go to 35.</p>                 |
| <p>35. Are any characters not printed?</p>   | <p>Check type carrier for missing pallets.</p> <p>Replace type carrier.</p> <p>Replace 410072 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments, remake if necessary.</p>  | <p>Place printer in service.</p> |

TABLE K (Cont)  
132-COLUMN PRINTER ANALYSIS

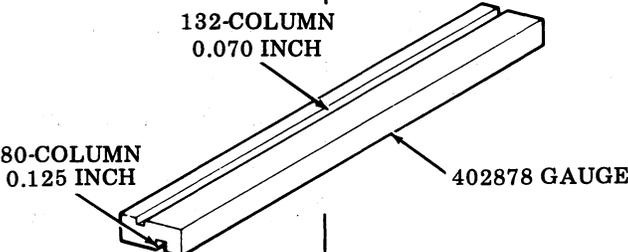
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |                      |          |              |          |                      |          |              |          |                      |          |                            |           |
|---|--|---|----------------------|----------|--------------|----------|----------------------|----------|--------------|----------|----------------------|----------|----------------------------|-----------|
| 36. Is the font symbol clipped on the left or right?  | Check the <u>IMPELLER SHAFT TO CARRIER PHASING</u> — Final adjustment.   | Go to 37.   |                      |          |              |          |                      |          |              |          |                      |          |                            |           |
| 37. Are adjacent characters in the type carrier printed in place of the proper character (T instead of S, B instead of A, etc)? | <p>Check the following adjustments:</p> <p><u>FLAG SENSOR GAP</u><br/><u>IMPELLER SHAFT SENSOR GAP</u></p> <p>Check that pallets and flags are in proper position.</p> <table border="0"> <thead> <tr> <th><u>Type Carrier</u></th> <th><u>Flag Position</u></th> </tr> </thead> <tbody> <tr> <td>400777AG</td> <td>68, 164, 260</td> </tr> <tr> <td>400780AL</td> <td>4, 68, 132, 164, 228</td> </tr> <tr> <td>400783AM</td> <td>68, 164, 260</td> </tr> <tr> <td>400887AS</td> <td>4, 68, 132, 164, 228</td> </tr> <tr> <td>408271AX</td> <td>20, 68, 116, 164, 212, 260</td> </tr> </tbody> </table> <p>Replace entire printer.</p> | <u>Type Carrier</u>   | <u>Flag Position</u> | 400777AG | 68, 164, 260 | 400780AL | 4, 68, 132, 164, 228 | 400783AM | 68, 164, 260 | 400887AS | 4, 68, 132, 164, 228 | 408271AX | 20, 68, 116, 164, 212, 260 | Go to 38. |
| <u>Type Carrier</u>   | <u>Flag Position</u>   |   |                      |          |              |          |                      |          |              |          |                      |          |                            |           |
| 400777AG  | 68, 164, 260   |   |                      |          |              |          |                      |          |              |          |                      |          |                            |           |
| 400780AL  | 4, 68, 132, 164, 228   |   |                      |          |              |          |                      |          |              |          |                      |          |                            |           |
| 400783AM  | 68, 164, 260   |   |                      |          |              |          |                      |          |              |          |                      |          |                            |           |
| 400887AS  | 4, 68, 132, 164, 228   |   |                      |          |              |          |                      |          |              |          |                      |          |                            |           |
| 408271AX  | 20, 68, 116, 164, 212, 260   |   |                      |          |              |          |                      |          |              |          |                      |          |                            |           |
| 38. Is copy free of horizontal ink smudges caused by the ribbon rubbing against the paper?                                      | Go to 39.  | <p>Replace 402686 ribbon shield if deformed.</p> <p>Check the following adjustments:</p> <p><u>RIBBON GUIDE (Final)</u><br/><u>PAPER POSITIONER SHAFT (Final)</u></p>   |                      |          |              |          |                      |          |              |          |                      |          |                            |           |
| 39. Is copy free of double print or ghost images?   | <p>Go to 40.</p>    | <p>Check the following adjustments:</p> <p><u>LEFT CARRIER SPROCKET</u><br/><u>RIGHT CARRIER SPROCKET</u></p> <p>Check that type pallets are seated properly in carrier. Seat pallets with 402878 gauge. Replace type carrier.</p> <p>Replace entire printer.</p> |                      |          |              |          |                      |          |              |          |                      |          |                            |           |

TABLE K (Cont)

## 132-COLUMN PRINTER ANALYSIS

| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE  |
|--|---|--|
| 40. Is the printed copy clear and easily readable?   | Go to 41.   | Replace 402444 ribbon.<br><br>Check the following adjustments:<br><br><u>BACKUP BAR (Final)</u><br><u>LEFT CARRIER SPROCKET</u><br><u>RIGHT CARRIER SPROCKET</u><br><u>RIBBON GUIDE (Final)</u><br><u>PAPER POSITIONER SHAFT</u> |
| 41. Is printed copy free from embossing (especially noticeable on characters such as hyphen or underline)? | Go to 42.<br><br>400777AG Tractor 132-Column — Up-Low (ASCII)<br>400780AL Tractor 132-Column — Monocase (ASCII)<br>400783AM Tractor 132-Column — Up-Low (EBCDIC)<br>400887AS Tractor 132-Column — Monocase (EBCDIC)<br>408271AX Tractor 132-Column — 48-Character Set | Check the <u>BACKUP BAR (Final)</u> adjustment and type carrier pallet alignment.<br><br>Check that type pallets are seated properly in carrier. Seat pallets with 402878 gauge.<br><br>Replace type carrier.                    |
| 42. Is the print density uniform throughout the line without gradual variations?                           | Go to 43.   | Check the following adjustments:<br><br><u>LEFT CARRIER SPROCKET</u><br><u>RIGHT CARRIER SPROCKET</u><br><u>BACKUP BAR</u>   |
| 43. Is the print density uniform throughout the line without random variations?                            | Go to 44.   | Check the following adjustment:<br><br><u>PAPER POSITIONER SHAFT</u><br><br>Replace entire printer.  |
| 44. Are the bottoms of characters printed clearly (not light) at both ends of the line?                    | Go to 45.   | Check the following adjustments:<br><br><u>LEFT CARRIER SPROCKET</u><br><u>RIGHT CARRIER SPROCKET</u><br><br>Replace printer.  |

TABLE K (Cont)  
132-COLUMN PRINTER ANALYSIS

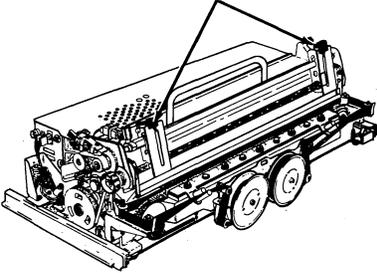
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE   |
|---|--|---|
| <p>45. Are all individual characters printed clearly when received?</p>   | <p>Go to 46.</p>   | <p>Check type carrier for missing, broken, distorted, or dirty type pallets.</p> <p>Replace type carrier.</p> <p>Replace printer.</p>   |
| <p>46. Are there erratic line feeds or some characters printing too high?</p> <p style="text-align: center;"><b>AMBER BELT</b></p>  | <p>Check for bind in paper through-out routing path. Check that paper is properly feeding through tractor assemblies.</p> <p>Check the following adjustments:</p> <p><u>PAPER POSITIONER SHAFT</u><br/><u>TRACTOR PHASING</u></p> <p>Replace 400221 idler.</p> <p>If amber belt in tractors is worn or broken, replace 402660 paper handling assembly.</p> | <p>Go to 47.</p>  |
| <p>47. When a FF character or local form feed is received, does paper advance one form correctly (Forms switch ON)?</p>   | <p>Go to 51.</p>   | <p>Verify proper belt installation.</p> <p>Check that belt is not worn or cracked. Replace belt.</p> <p>Check that the selector lever on the form-out assembly is properly detented.</p> <p>Check the following adjustments:</p> <p><u>FORM-OUT CONTACT</u><br/><u>LATERAL</u><br/><u>FORM SELECTOR LEVER</u><br/><u>GUIDE</u><br/><u>FORM-OUT GEAR BACKLASH</u><br/><u>FORM-OUT CONTACT TO</u><br/><u>BELT SPACING</u><br/><u>LINE FEED BAR ECCENTRIC</u></p> <p>Go to 48.</p> |

TABLE K (Cont)

## 132-COLUMN PRINTER ANALYSIS

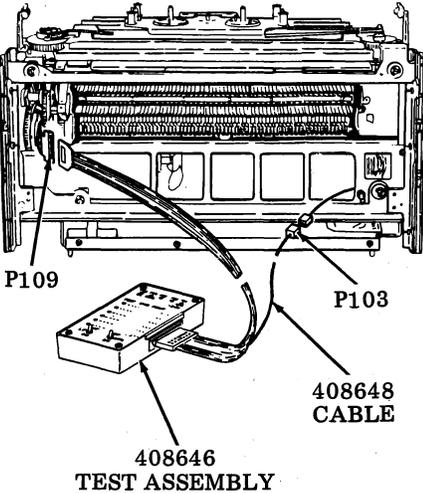
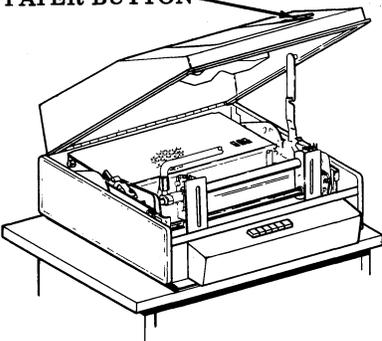
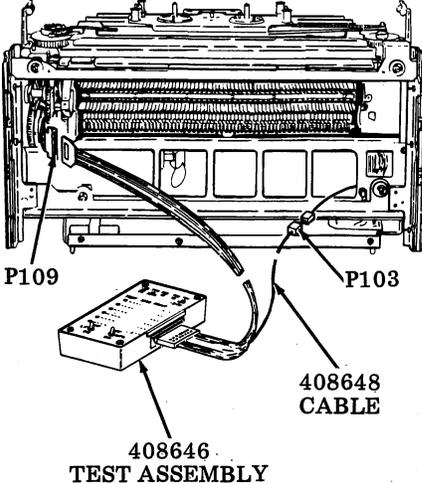
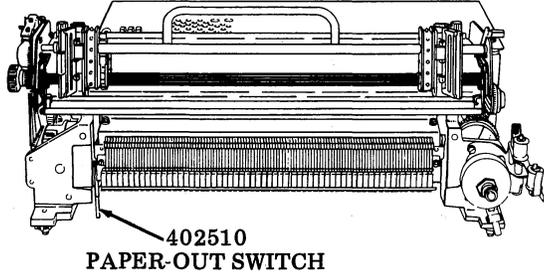
| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE  |
|---|--|--|
| <p>48. Operate 402779 line cord with switch to OFF.</p> <p>Remove 410072 circuit card.</p> <p>Connect the 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting plug to P109.</i></p> <p>Operate 402779 line cord with switch to ON.</p> <p>Place Forms switch on printer to ON.</p> <p>Does the FORMS MODE lamp on the 408646 test assembly light?</p> |  <p>Go to 49.</p> | <p>Replace 402881 switch.</p>  |
| <p>49. Operate MTR switch on the 408646 test assembly to ON.</p> <p>Operate LF switch on the 408646 test assembly to ON.</p> <p>Does the END OF FORM lamp light when the form-out contact touches the cam lobe on the belt?</p>   | <p>Go to 50.</p>   | <p>Replace 402570 form-out assembly.</p>   |
| <p>50. When a FF character or local form feed command is received, does paper advance one form?</p>   | <p>Place printer in service.</p>   | <p>Replace 402905 spring.</p> <p>Replace 410072 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments, remake if necessary.</p> <p>Replace printer.</p> <p>Check Form switch and cabling on cabinet.</p> |

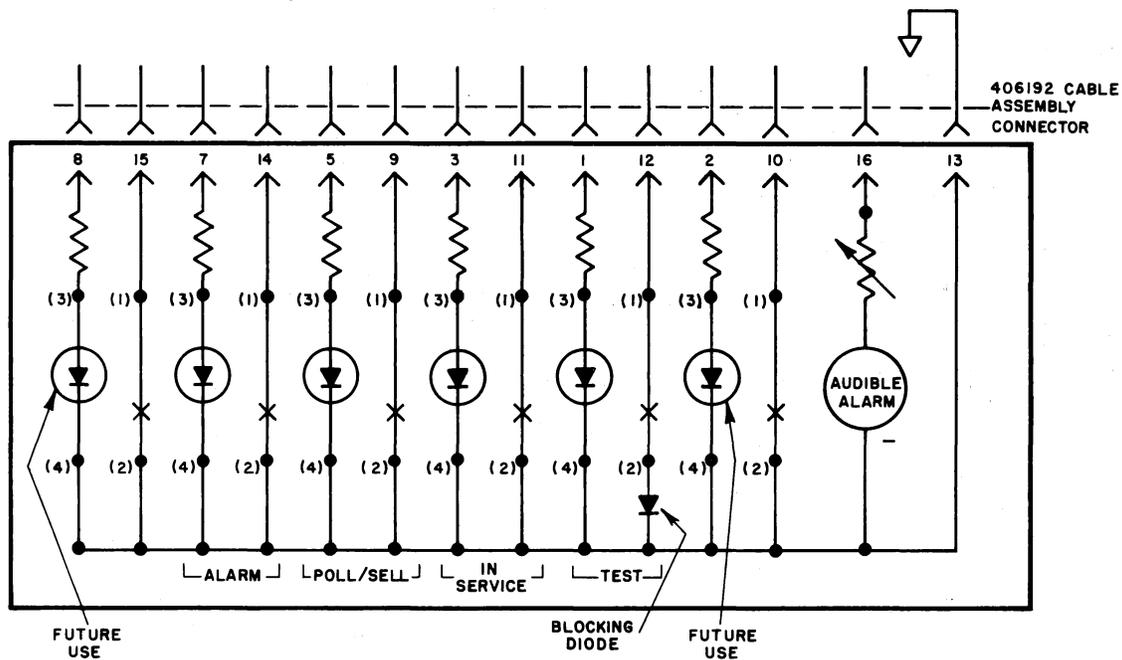
TABLE K (Cont)  
132-COLUMN PRINTER ANALYSIS

| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE   |
|---|---|---|
| <p>51. Is paper-out indication obtained when a paper-out condition exists?</p>  | <p>PAPER BUTTON</p>  <p>Place printer in service.</p>   | <p>Check the <u>PAPER-OUT SWITCH</u> adjustment.</p> <p>Go to 52.</p> |
| <p>52. Operate 402779 line cord with switch OFF.</p> <p>Remove 410072 circuit card.</p> <p>Connect 408646 test assembly as shown.</p> <p><i>Caution: Observe caution label on 408648 cable when connecting P109 plug.</i></p> <p>Operate the 402779 line cord with switch to ON.</p> <p>Does the forms supply lamp on the 408646 test assembly light (paper in)?</p> <p>Remove paper. Does the forms supply lamp go out and the alarm lamp light (paper out)?</p> | <p>Replace 410072 circuit card.</p> <p>After the circuit card is installed, check the <u>IMPELLER SHAFT SENSOR</u> and <u>FLAG SENSOR</u> adjustments, remake if necessary.</p>  <p>Replace 402868 paper-out switch.</p>  |   |

C. Operator Console (Opcon)

TABLE L  
OPCON ANALYSIS

| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE        |
|--|---|--------------------------------|
| 1. Do any lamps light?   | Go to 2.  | Check for open in ground lead. |
| 2. Does IN SERVICE lamp light when power is turned on? (Cabinet lid closed and no paper alarm.)<br><br>Depress IN SERVICE key if motor is running.               | Go to 5.  | Go to 3.                       |
| 3. Is approximately +12 V dc present at pins 1, 2, 5, 7 or 16 with respect to frame ground (pin 13) when ALARM, TEST, IN SERVICE or POL/SEL lamps should be lit? | Check wiring to failing key-switch indicator or audible alarm.<br><br>Replace keyswitch or 410765 circuit card. | Go to 4.                       |



|   |                            |   |
|---|----------------------------|---|
| 4. Is +12 V dc present when associated keyswitch is removed? (See ROP Opcon Schematic.) | Replace shorted keyswitch. | Check for short in wiring across keyswitch. |
|---|----------------------------|---|

TABLE L (Cont)  
OPCON ANALYSIS

| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE  | "NO" RESPONSE DIRECTIVE   |
|---|---------------------------|---|
| 5. Does test message print when TEST key is depressed with IN SERVICE lamp OFF.       | Go to 6.                  | Check wiring to keyswitch terminals.<br><br>Replace open keyswitch.<br><br>Go to Integrated Synchronous Controller Analysis — Table I, Page 25.           |
| 6. Does TEST lamp light?  | Go to 7.                  | Go to 3.  |
| 7. Does the POL/SEL lamp turn on when the terminal is selected?                       | Go to 8.                  | Check wiring to keyswitch.<br><br>Replace opcon keyswitch.<br><br>Go to Integrated Synchronous Controller Analysis — Table I, Page 25.                    |
| 8. When receiving data, does an out of paper condition cause the ALARM lamp to light? | Go to 9.                  | Check wiring to keyswitch.<br><br>Replace open keyswitch.<br><br>Go to Integrated Synchronous Controller Analysis — Table I, Page 25.                     |
| 9. Does the audible alarm sound?  | Go to 10.                 | Go to 3.  |
| 10. Does depressing ALARM key extinguish audible alarm?                               | Place printer in service. | Check wiring to keyswitch terminals.<br><br>Replace open diode on key-switch.<br><br>Go to Integrated Synchronous Controller Analysis — Table I, Page 25. |

## D. Cabinet

**TABLE M**  
**CABINET ANALYSIS**

| ANALYSIS QUESTION   | "YES" RESPONSE DIRECTIVE   | "NO" RESPONSE DIRECTIVE          |
|---|--|----------------------------------|
| 1. Does blower motor run?   | Go to 8.   | Go to 2.                         |
| 2. With ac cable removed from power source and ON/OFF switch in the ON position, is there continuity between terminal 1 of P201 and the LS terminal of the ac plug? | Go to 5.   | Go to 3.                         |
| 3. Does continuity exist between terminal 4 of J200 and the LS terminal of the ac plug?   | Replace 403892 cable assembly.   | Go to 4.                         |
| 4. Does continuity exist across terminals of ac switch?   | Replace 407093 ac cable assembly.  | Replace 407088 switch.           |
| 5. Does continuity exist between terminal 2 of P201 and the GS terminal of the ac plug?   | Replace 403785 blower.   | Go to 6.                         |
| 6. Does continuity exist between terminal 6 of J200 and the GS terminal of the ac plug?   | Replace 403892 cable assembly.   | Go to 7.                         |
| 7. Does continuity exist between terminal on end of white lead of ac cable and GS terminal of ac plug?  | Replace 410626 circuit card assembly.  | Replace 407093 ac cord assembly. |
| 8. Does IN SERVICE lamp light or printer test message print with Interlock switch in maintenance position?  | Go to 10.  | Go to 9.                         |
| 9. Does continuity exist between terminals 6 and 7 of P114?   | Replace printer.<br>Go to Integrated Synchronous ROP Terminal Analysis — Table H, Page 23. | Replace 403835 interlock switch. |

TABLE M (Cont)  
CABINET ANALYSIS

| ANALYSIS QUESTION  | "YES" RESPONSE DIRECTIVE         | "NO" RESPONSE DIRECTIVE                                      |
|--|----------------------------------|--|
| 10. Does IN SERVICE lamp light or printer test message print with cover open and Interlock switch not in maintenance position? | Replace 403835 interlock switch. | Go to 11.  |
| 11. Is cabinet window clear and unbroken?  | Place cabinet in service.        | Replace window:<br>80-Column — 407080<br>132-Column — 407081 |