

35 AUTOMATIC SEND-RECEIVE TELETYPEWRITER SET

SERVICE MAINTENANCE

(TROUBLE SHOOTING)

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1. GENERAL

1.01 The trouble shooting information presented in this section consists of operational and electrical checks designed to lead maintenance personnel to the functional schematic and circuit area that is causing the trouble in the equipment.

1.02 A thorough knowledge of the sequence of operation for each functioning element is of fundamental importance. Refer to the appropriate section to clarify the operation and function of all teletypewriter set parts.

1.03 The functional schematic wiring diagrams referenced will be found in the appropriate section covering the functional diagrams and connecting information for the automatic send-receive set (ASR).

1.04 Where equipment failures are due to mechanical maladjustments, the technician should refer to the adjustment section for the component in question to determine the correct procedure and adjustment.

1.05 Lubrication failures will seldom occur when normal periodic maintenance procedures are followed. See the lubrication section of the component to determine maintenance schedules.

2. TOOLS AND TEST EQUIPMENT

2.01 Standard set of tools (wire gages, spring

scales, spring hooks, wrenches, etc.) as required for component adjustments.

2.02 A volt-ohm-milliamperemeter for checking voltages, current, resistance (continuity) and capacitors.

2.03 An eight level signal distortion test set to perform signal distortion tests on the signal generator and timing contacts.

2.04 A signal analyzer, also required to perform signal distortion tests on the set.

3. TROUBLE SHOOTING

3.01 Since teletypewriter sets are an assemblage of components, the first step in trouble shooting, if the trouble is not obvious, is to sectionalize the trouble to a particular component, then determine what specific mechanism or electrical part is faulty.

3.02 Failures of the equipment can be traced functionally by means of the trouble shooting chart. A step-by-step analysis of the behavior of the equipment in response to the tabulated checks will indicate the area of trouble in which to apply remedial measures outlined below and referenced in the chart. Since, in most cases, each check step is conditioned by the procedure in preceding steps, examine the condition of all controls, and in particular the mode switches, before rechecking any step or otherwise performing any trouble shooting check out of sequence.

(a) Comprehensive electrical analysis of the equipment is not generally required in trouble shooting. Reference to an open condition is to a circuit through which current will not flow, due either to a break, a poor connection or a poor or dirty contact mechanism. Reference to a closed condition is to a normally or intermittently open circuit through which current will flow, either due to a short or to a sticky, dirty or poorly adjusted contact mechanism.

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(b) Running Open is a condition created by an open signal circuit, resulting in operation of typing and printing mechanisms because of the absence of a stop signal to latch the function clutches.

(c) Running Closed is a condition created by a closed signal circuit, resulting in failure of typing and printing mechanisms to respond to a signal, due to the absence of the start and spacing elements in the signal, or to mechanical failure.

(d) Garbling is a condition in which the response of the typing and printing mechanisms does not correspond to the mechanical or signal input.

(e) Blind is a condition in which a unit is turned off or otherwise disconnected to assure non-response to various signal inputs.

Note: If trouble shooting checks indicate abnormal electrical conditions, refer to the functional schematics referenced in the chart. If the trouble appears to be mechanical, isolate the unit, and refer to the associated adjustment section for the unit isolated.

### PROCEDURE

3.03 Make a visual inspection of the equipment to determine if the trouble is caused by loose line or power connections, improperly set switches, erratic motor speed, or improper rangefinder setting.

3.04 Arrange the equipment to operate on a test circuit and perform the procedures normally followed after the installation of an ASR set, to sectionalize the trouble. These procedures are primarily performed after initial installation of new or repaired equipment but may be used to assist in locating troubles when they occur.

3.05 Localizing Electrical Troubles: Most electrical troubles are found at the various contacts in the equipment, which include switch contacts, plug-in connector and pin contacts, wiring field terminals, soldered contacts, (including spliced wires), and chassis ground contacts. Electrical circuits in the teletypewriter set have terminal connections at the points where test must be made. Do not disturb the wiring more than necessary when testing or inspecting. Maintenance personnel must be thoroughly familiar with the schematic and

wiring diagrams and use them while making point-to-point checks of the circuits. Schematic wiring diagrams of external equipment to which the teletypewriter set is connected furnish information helpful for testing and localizing trouble.

3.06 Power Supply Checks: To be sure that proper operating conditions exist, check the input power, AC circuits, and DC circuits in turn before making other tests. These checks will, of necessity, include normal operation of the parts in these circuits and the requirements of all adjustments which would affect the indicated trouble as related to the parts. When check of an adjustment is indicated, care should be exercised not to disturb the adjustment or related adjustments.

### 3.07 Continuity, Resistance, and Capacitor Checks

(a) Continuity: The continuity check is used to locate suspected open circuits. In making continuity checks, be sure that parallel current paths are disconnected. Make the tests by checking the continuity through the circuit suspected to be faulty by connecting the test leads so that the current can go only through the suspected circuit. Be sure no other part of the circuit is shunting the circuit being tested. If necessary, disconnect certain leads. Check all likely circuits in this manner. If, after checking all possible causes, the fault cannot be located, make a continuity test of the entire circuit. If continuity is indicated, test the other half of the circuit. Continue sub-dividing the circuit until the open point is definitely located.

(b) Resistance: The resistance check is used to locate suspected open or shorted coil windings, transformer windings, motor windings, fixed resistors and inductors. In making resistance checks, follow the same general procedures as those described for continuity checks.

(c) Capacitor: The capacitor check is used to locate shorted or leaking elements. To test, discharge the suspected capacitor with an insulated shorting jumper. Then disconnect one lead and connect the capacitor to an ohmmeter. Use the highest reading scale. A good capacitor will be indicated by the ohmmeter pointer first moving up the scale rapidly, then returning more slowly to the infinity mark. A capacitor which is open will give a reading of infinite ohms. A shorted

capacitor will give a reading of constant value between zero and infinity, depending upon the resistance of the short.

**WARNING:** Be extremely careful when handling charged capacitors. A severe electrical shock may be received from the capacitor or leads connected to a power supply in operation.

### 3.08 Electrical Checks

(a) Check for external interruptions to the 115 volt AC power supply by checking the power cord connections on the terminal board at the rear of the call control unit.

(b) Check fuses located on the call control unit, the electrical service unit and in the auxiliary ROTR cabinet. If open, rotate the associated motor by hand and check for excessive mechanical load before replacing the fuse. If a replaced fuse burns out immediately upon installation, check for shorted wiring in the motor, selector magnets, the copy light transformer, or the power transformer in the call control unit.

### 3.09 Localizing Mechanical Troubles

(a) Although mechanical troubles can occur in teletypewriter sets, no difficulty should be experienced in locating the fault if the sequence of operation is checked through its various steps. When a mechanical function

fails to operate, or operates in a faulty manner, the trouble may be in a particular adjustment, or series of adjustments, or it may be in a particular assembly. One method for checking troubles involves checking the individual requirement for all adjustments in the faulty subassembly or mechanism. Use the related data found in the detailed adjustment procedures to determine the sequence to be followed.

(b) A second method involves setting up by hand the selecting mechanism and completing the operation by manually rotating the motor, shaft, gear, or cam that normally drives the assembly. This second method is usually quicker when only one adjustment is faulty and the remainder of the mechanism is in good condition. In such cases only the related adjustments need be checked.

(c) In some instances, faulty operation may be observed only when the mechanism is power driven. The experience of the maintenance personnel and the over-all condition of the equipment will indicate which method is the better approach to a particular trouble. In either mechanical or electrical troubles, additional aid in isolating the difficulty may be secured from records of previous troubles and adjustments.

3.10 Refer to the following trouble shooting charts for a more complete tabulation of possible troubles.

## TROUBLE SHOOTING CHART FOR ASR SETS

| STEP | PROCEDURE AND NORMAL INDICATION  | TROUBLE  | CHECK  | FUNCTIONAL SCHEMATIC REFERENCE    |   |
|------|--|--|--|-----------------------------------|---|
| 1.   | LCL key depressed; LCL lamp lights; cabinet lamp lights; KYBD motor and TD motor starts; T lamp lights on mode switch panel. | Motor does not start.  | Check power line connections.  | FS24                              |   |
|      |  |  | Check fuses.   | FS24 A-3                          |   |
|      |  |  | Check motor thermal cut-off switch.                                      | -                                 |   |
|      |  | Synchronous motor (on sets so equipped) runs at incorrect speed. | Check power line frequency.  | -                                 |   |
|      |  |  | Governed motor (on sets so equipped) runs at incorrect speed.            | Check 117V AC line.               | - |
|      |  |  |  | Check motor and governor brushes. | - |
|      |  | Check governor adjustments.                                      |  | -                                 |   |
|      |  | Governed motor speed uncontrollable.                             | Check governor resistor and capacitor.                                   | -                                 |   |
|      |  |  | Check for sticking governor contacts.                                    | -                                 |   |
|      |  | No cabinet illumination.   | Check copy light receptacle.   | FS24 B-8                          |   |
|      |  |  | Check copy light transformer.  | FS24 B-8                          |   |
|      |  | Some cabinet copy lamps not illuminated.                         | Check bulbs and sockets.   | FS24 C-8                          |   |
|      |  | LCL lamp does not light.   | Check circuit continuity or bulb.  | FS18 D-1                          |   |
|      |  | T lamp does not light.   | Check circuit continuity or bulb.  | FS11 D-2                          |   |
| 2.   | Typing unit runs closed on idle signal; operates on signal impulse from TD (unit in T mode).                                 | Typing unit runs open on idle signal.                            | Check output from data set. Signal line ground to terminal C-R4.         | FS13 D-5                          |   |
|      |  |  | Check output of LP selector magnet driver card. Terminals C-A8 and C-A9. | FS13 D-8                          |   |
|      |  |  | Check for open selector coils.   | FS13 E-8                          |   |

| STEP                        | PROCEDURE AND NORMAL INDICATION  | TROUBLE  | CHECK  | FUNCTIONAL SCHEMATIC REFERENCE |
|-----------------------------|--|--|--|--------------------------------|
|                             |  |  | Check for signal line continuity.  | FS13                           |
|                             |  |  | Check selector adjustments.  | -                              |
|                             |  | Typing unit runs closed during signal impulse from TD. | Check output of signal regenerator circuit.  | FS13 A-2                       |
|                             |  |  | Check output from data set. Signal line ground to terminal C-R4.                               | FS13 D-5                       |
|                             |  |  | Check TD signal generator contacts for shorting or mechanical failure.                         | FS13 C-2                       |
|                             |  |  | Check TD timing contact.   | FS13 B-4                       |
|                             |  |  | Check selector adjustments.  | -                              |
|                             |  |  | Check for open signal line.  | -                              |
| 3.                          | LRPE unit runs closed on idle signal. Operates on signal impulse from KYBD (unit in T mode). | LRPE unit runs open on idle signal.                    | Check output of LRPE selector magnet driver card. Terminals C-D1 and C-K1 (C-J2 on new units). | FS13 C-6                       |
|                             |  |  | Check the KYBD signal generator contacts.  | FS13 C-3                       |
|                             |  |  | Check LRPE auxiliary local circuit connections.  | FS13 D-5                       |
|                             |  |  | Check for open selector coils.   | FS13 D-6                       |
|                             |  |  | Check selector adjustments.  | -                              |
|                             |  | LRPE unit runs closed on signal impulse from KYBD.     | Check KYBD signal generator contacts.  | FS13 C-3                       |
| Check selector adjustments. | -  |  |  |                                |

| STEP | PROCEDURE AND NORMAL INDICATION  | TROUBLE  | CHECK   | FUNCTIONAL SCHEMATIC REFERENCE |
|------|--|--|---|--------------------------------|
| 4.   | Message tape in TD; TD ON key depressed; TD starts transmission which produces typed copy on the typing unit. (unit in T mode) | TD does not turn on when TD ON key is depressed. | Check circuit continuity for TDC relay.   | FS14 A-6                       |
|      |  |  | Check continuity of the TD clutch trip circuit.   | FS14 B-1                       |
|      |  | Selector receiving margin short.                 | Check data set input.   | FS13                           |
|      |  |  | Check TD timing contact adjustment.   | FS13 B-4                       |
|      |  |  | Check data set output. Signal line ground TD terminal C-R4.   | FS13 D-5                       |
|      |  |  | Check the current output of LP selector magnet driver should be 500 ma.   | FS13 B-7                       |
|      |  |  | Check the selector magnets for an open condition.   | FS13 E-8                       |
|      |  |  | Check selector adjustments.   | -                              |
|      |  |  | Check motor speed.  | -                              |
|      |  | Intermittent errors or garbling.                 | Check data set input.   | FS13                           |
|      |  |  | Check range finder (may be at marginal setting).  | -                              |
|      |  |  | Check the current output of the LP selector magnet driver. Should be 500 ma.  | FS13 B-7                       |
|      |  |  | Check selector magnets for shorted turns. When hooked up in parallel, the resistance check should read 3-1/2 ohms +10%. | FS13 E-8                       |
|      |  |  | Check selector adjustments.   | -                              |
|      |  | Check motor speed.                               | -   |                                |

| STEP | PROCEDURE AND NORMAL INDICATION  | TROUBLE   | CHECK   | FUNCTIONAL SCHEMATIC REFERENCE |
|------|--|---|---|--------------------------------|
| 5.   | Transmit from KYBD to LRPE; LRPE operates while printer runs closed. (unit in T mode)                        | LRPE selector receiving margin short.   | Check the LRPE selector magnet driver input.  | FS13 B-5                       |
|      |  |   | Check the LRPE selector magnet driver output.   | FS13 B-5                       |
|      |  |   | Check the selector magnets for shorted turns. When hooked up in parallel, the resistance check should read 3-1/2 ohms +10%. | FS13 D-6                       |
|      |  |   | Check motor speed.  | -                              |
|      |  |   | Check selector adjustments.   | -                              |
|      |  | LRPE intermittent errors or garbling.   | Check range finder (may be at marginal setting).  | -                              |
|      |  |   | Check the current output of the LRPE selector magnet driver. Should be 500 ma.  | FS13 B-5                       |
|      |  |   | Check selector magnets.   | FS13 D-6                       |
|      |  |   | Check motor speed.  | -                              |
|      |  |   | Check selector adjustments.   | -                              |
| 6.   | KT push button depressed, KT lamp goes on, T lamp goes off. LRPE, KYBD, TD and LP on line (unit in KT mode). | KT lamp does not light and T lamp remains lit.  | Check MSK and MSR relays for operation.   | FS12 B-6                       |
|      |  |   | Check MSK 6 and MSR 2 make contacts. Should be closed.  | FS11 C-2 B-2                   |
|      |  | KT lamp does not light but K lamp lights. (verify trouble by depressing KT key again) | Check MSR relay. Should be operated.  | FS12 B-4                       |
|      |  | LP and LRPE run open.   | Check previous steps No. 2 and 3.   | -                              |
|      |  |   | Check circuit continuity between LP and LRPE signal line.   | FS13                           |

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| STEP | PROCEDURE AND NORMAL INDICATION   | TROUBLE  | CHECK   | FUNCTIONAL SCHEMATIC REFERENCE |
|------|---|--|---|--------------------------------|
| 7.   | TD turns on when TD ON key is depressed. (unit in KT mode)  | TD does not turn on.                                       | Check TDC relay circuit continuity.                                   | FS14 A-6                       |
| 8.   | Transmission of X ON function from KYBD should not turn TD on. (unit in KT mode)  | TD turns on.   | Check for short across NCT break contacts No. 2 and 12.               | FS14 E-5                       |
| 9.   | Transmitting any printing character from the TD or KYBD, produces typed copy on the LP and punched tape from reperforator. (unit in KT mode)    | LP and LRPE runs closed.                                   | Check for input to data set.  | FS13                           |
|      |   |  | Check for open signal line.   | -                              |
| 10.  | Transmitting tabbing function characters followed by a fill character from the TD will cause TD to momentarily stop when function is performed. | TD does not stop momentarily, but LP receives function.    | Check TD clutch trip to ground shunt circuit.                         | FS14 A-1                       |
|      |   |  | Check delete sensing contact gap adjustment.                          | -                              |
|      |   | TD does not momentarily stop, but LP receives proper code. | Check mechanical operation of print suppression mechanism.            | -                              |
|      |   |  | Check for stunt box operation.  | FS14                           |
|      |   | Check function bar coding.                                 | -   |                                |
| 11.  | Transmitting X Off or WRU function followed by a fill character from TD will cause TD to turn off.  | TD does not stop, but LP receives function.                | Check for short in TDC circuit.                                       | FS14                           |
|      |   | TD does not stop, but LP receives proper code.             | Check mechanical operation of print suppression mechanism.            | -                              |
|      |   |  | Check for stunt box operation.  | -                              |
|      |   | Check function bar coding.                                 | -   |                                |
| 12.  | If the ASR is equipped with a turn around traffic control card, the LRPE will perforate tape from KYBD transmission after it is turned on.      | The LRPE does not perforate tape after being turned on.    | Check turn around traffic control card disabling circuit TC-H to GND. | FS13 E-3                       |

| STEP | PROCEDURE AND NORMAL INDICATION   | TROUBLE   | CHECK   | FUNCTIONAL SCHEMATIC REFERENCE |
|------|---|---|---|--------------------------------|
| 13.  | If the ASR is equipped with an auxiliary ROTR and the ROTR contains a turn around traffic control card, the ROTR will perforate tape from KYBD transmission after it is turned on.      | The ROTR does not perforate tape after being turned on.               | Check turn around traffic control card disabling circuit. TF L6 to GRD.                   | FS23 E-5                       |
| 14.  | K push button depressed, K lamp goes on; KYBD and LP on line; LRPE on auxiliary local line; TD disabled.  | K lamp does not light.  | Check bulb and circuit connections.   | FS11 C-1                       |
|      |   |   | Check for operation of MSK relay.   | FS11 B-7                       |
|      |   | TD does not disable.  | Check for short across MSK break contacts No. 5.  | FS14 D-6                       |
|      |   | LRPE runs open.   | Check auxiliary local circuit continuity.   | FS13 D-5                       |
| 15.  | Depress CLR. Key Unit will turn off and LCL and K lamps will extinguish.  | Unit does not turn off, but lamps are extinguished.                   | Check motor control relay (MCR).  | FS19 C-7                       |
| 16.  | Depress LCL key and then depress the HERE IS key, immediately thereafter depress the CLR key, the answer back mechanism will finish its operation before the motor begins to slow down. | Motor slows down before answer back mechanism finishes its operation. | Check for open condition in the AB motor hold contacts when the answer back is operating. | FS19 D-5                       |
| 17.  | When the paper supply on the friction feed printer runs low, the buzzer will buzz and the BUZ-RLS lamp will light.  | Buzzer does not buzz.   | Check buzzer connections.   | FS22 C-3                       |
|      |   |   | Check for open in buzzer coils.   | FS22 C-3                       |
|      |   | Buzzer does not buzz and BUZ-RLS lamp does not light.                 | Check for open in buzzer circuit.   | FS22                           |
|      |   |   | Check for open condition across low paper switch.   | FS22 E-5                       |
|      |   | BUZ-RLS lamp does not light.  | Check BUZ-RLS bulb.   | FS22 C-3                       |
|      |   |   | Check BUZ-RLS lamp socket connections.  | FS22 C-3                       |

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| STEP           | PROCEDURE AND NORMAL INDICATION   | TROUBLE   | CHECK  | FUNCTIONAL SCHEMATIC REFERENCE |
|----------------|---|---|--|--------------------------------|
| 18.            | A notched form is fed through the sprocket feed printer. The buzzer will buzz and the BUZ-RLS lamp will light when the notch passes the low paper alarm actuator. | Buzzer does not buzz.                                 | Check buzzer connections.  | FS22 C-3                       |
|                |   |   | Check for open in buzzer coils.                                    | FS22 C-3                       |
|                |   | Buzzer does not buzz and BUZ-RLS lamp does not light. | Check for open in buzzer circuit.                                  | FS22                           |
|                |   |   | Check for open condition across low paper switch.                  | FS22 E-5                       |
|                |   | BUZ-RLS lamp does not light.                          | Check BUZ-RLS bulb.  | FS22                           |
|                |   |   | Check BUZ-RLS lamp socket connections.                             | -                              |
| 19.            | Depressing the BUZ-RLS key will release the LCL key, the buzzing will stop and the BUZ-RLS lamp will remain lit.  | Buzzer does not stop buzzing.                         | Check for closed condition between BUZ-RLS contacts No. 31 and 32. | FS22 D-3                       |
|                |   | BUZ-RLS lamp does not remain lit.                     | Check for open condition between BUZ-RLS contacts No. 31 and 33.   | FS22 D-3                       |
| 20.            | Depress ORIGINATE key, unit will turn on, T lamp will light, ORIGINATE lamp will light, and dial tone is received.  | Unit does not turn on.                                | Check OR relay in data set.  | -                              |
|                |   |   | Check circuit continuity of MCR relay.                             | FS19 C-7                       |
|                |   | ORIGINATE lamp does not light.                        | Check bulb and circuit continuity.                                 | FS7 F-7                        |
|                |   | Dial tone is not received.                            | Check volume control.  | FS9 F-7                        |
|                |   |   | Check for proper telephone line connections.                       | FS21 E-5                       |
|                |   |   | Check amplifier card.  | FS10 F-5                       |
|                |   |   | Check circuit continuity.  | FS10                           |
| Check speaker. | FS10 F-8  |   |  |                                |

| STEP | PROCEDURE<br>AND<br>NORMAL INDICATION  | TROUBLE  | CHECK   | FUNCTIONAL<br>SCHEMATIC<br>REFERENCE |
|------|--|--|---|--------------------------------------|
| 21.  | Dial number of automatic test line.  | No break in dial tone or wrong number dialed consistently. | Check appropriate specification for dial mechanism being used.                      | -                                    |
|      |  |  | Check associated ASR circuitry for continuity.                                      | FS8<br>FS10                          |
| 22.  | Call connection made; depress TEST key; receive message from test center and simultaneously send message back. Depress CLR key and disconnect set. | Local message garbled or not received.                     | Check for data set output.  | -                                    |
|      |  | Printer runs closed.                                       | Check for open signal line from distant station.                                    | -                                    |
|      |  | Test center does not receive message.                      | Check circuit continuity in area of test key.                                       | -                                    |
| 23.  | Dial distant set; after connection is established, depress the BREAK key, the BRK RLS lamp will light and TD will be disabled.                     | BRK RLS lamp does not light.                               | Check RB relay and appropriate S relay contacts in data set.                        | FS3 E-1                              |
|      |  |  | Check bulb.   | FS3 E-3                              |
|      |  |  | Check circuit continuity.   | FS3 E-3                              |
|      |  | TD is not disabled.  | Check to see if TDC relay is de-energized.  | FS14 A-6                             |
|      |  |  | Check TDC No. 2 contacts for a CLOSED condition, should be open.                    | FS14 E-1                             |
| 24.  | Depress the BRK RLS key, the BRK RLS lamp will extinguish and the TD will operate when the TD ON key is depressed.                                 | BRK RLS lamp does not extinguish and TD remains disabled.  | Check to see that RB relay in data set has de-energized.                            | FS1 E-1                              |
| 25.  | Switch unit into K mode by depressing the K push button; depress CTRL and WRU keys simultaneously. The local answer back will not respond.         | Local answer back trips.                                   | Check non-contention relay (NCT). Should operate when transmitting from TD or KYBD. | FS14 A-3                             |
|      |  |  | Check for closed condition in the non-contention relay (NCT) contacts No. 12.       | FS14 D-4                             |

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| STEP | PROCEDURE AND NORMAL INDICATION   | TROUBLE  | CHECK   | FUNCTIONAL SCHEMATIC REFERENCE |
|------|---|--|---|--------------------------------|
| 26.  | Depress the HERE IS key; answer back mechanism will trip and message will be monitored on the typing unit. If HERE IS key is held depressed, answer back will not repeat. | Answer back mechanism does not trip.                               | Check HERE IS contacts No. 6.   | FS14 C-4                       |
|      |   | Answer back mechanism repeats as long as HERE IS key is depressed. | Check ABR relay, should remain energized until HERE IS key is released. | FS14 B-4                       |
| 27.  | Depress CTRL and BELL key simultaneously.   | Bell does not ring.  | Check bell stunt box contacts.  | FS24 D-7                       |
|      |   |  | Check bell circuit continuity.  | FS24 C-7                       |
|      |   |  | Check stunt box function bar coding.                                    | -                              |
| 28.  | Unit still in K mode, with tape in the TD, the depression of the TD ON should not operate the TD.   | TD operates upon depression of the TD ON key.                      | Check for CLOSED condition across MSK 5 relay contacts.                 | FS14 D-6                       |
| 29.  | The end of line indicator lamp should light at about the 70th character.  | End of line indicator lamp does not light.                         | Check EOL bulb.   | FS24 D-8                       |
|      |   |  | Check for open in end of line switch.                                   | FS24 E-8                       |
|      |   | End of line indicator lamp lights, but not at about 70 characters. | Check mechanical adjustments of end of line indicator.                  | -                              |
| 30.  | Depression of the local BSP key will cause the reperforator to backspace the tape one character.  | Reperforator does not backspace the tape one character.            | Check for an OPEN condition in the local backspace switch.              | FS24 C-5                       |
|      |   |  | Check circuit continuity connecting the backspace key and magnet.       | FS24 C-5                       |
|      |   |  | Check for open in backspace magnet coil.                                | FS24 C-5                       |
| 31.  | Depression of the CTRL and EOT keys simultaneously shall disconnect the set.  | Set does not disconnect.   | Check EOT stunt box contacts for OPEN condition.                        | FS15 D-6                       |
|      |   |  | Check EOT circuit continuity.   | FS15 D-7                       |
|      |   |  | Check S relay in data set for operation.                                | FS15 D-8                       |

| STEP | PROCEDURE AND NORMAL INDICATION   | TROUBLE  | CHECK  | FUNCTIONAL SCHEMATIC REFERENCE |
|------|---|--|--|--------------------------------|
| 32.  | Connect to a 60 wpm, 5 level D-TWX station if available. Depress K pushbutton and switch unit to the K mode. Depressing the repeat and any printing character simultaneously will eventually result in lighting the restraint lamp and blinding the KYBD. | Restraint lamp does not light, printer continually monitors keyboard transmission. | Check REST relay. Relay should be operated.  | -                              |
|      |   |  | Check RS contacts.   | FS4 F-2                        |
| 33.  | Depress CLR key - unit will turn off and LCL and K lamps will extinguish.   | See step 15.   | See step 15.   | FS19 C-7                       |
| 34.  | Set receives call from another station; answer light goes on and set automatically answers.   | Set does not automatically answer. (answer lamp does not light.)                   | Check AN relay in data set (should be operated).   | FS22 B-5                       |
|      |   |  | Check M relay in data set (should be operated).  | FS14 F-5                       |
|      |   |  | Check CON relay contacts in data set (should be operated).                                     | FS14 F-8                       |
|      |   |  | Check automatic answer circuit for proper continuity.  | FS14 B-5                       |
|      |   |  | Check the low paper contacts on the friction feed printer and the low tape switch on the ROTR. | FS22 C-7<br>D-5                |
| 35.  | When in a low paper condition, the automatic answer circuit will be disabled to calls from another station. The set can answer manually by depressing the ANS key while the BUZ-RLS key is depressed.   | The automatic answer circuit will not be disabled.                                 | Check for a closed condition in the low paper switch.  | FS22 D-5                       |
|      |   | The set cannot answer manually.  | Check for an open condition in the answer key.   | FS5 D-7                        |
| 36.  | When a set is wired with the make-busy option, steps No. 35 and 44 will result in a busy signal rather than a no answer condition.  | Busy signal is not received.   | Check for open condition in make-busy circuitry (option A).                                    | FS21 E-4                       |

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| STEP | PROCEDURE AND NORMAL INDICATION   | TROUBLE   | CHECK  | FUNCTIONAL SCHEMATIC REFERENCE |
|------|---|---|--|--------------------------------|
| 37.  | Distant station sends WRU code combination. Local answer back trips and transmits identification information.   | Answer back mechanism does not trip.                                      | Check for a CLOSED condition in the NCT relay contacts No. 8             | FS14 C-5                       |
|      |   |   | Check for continuity through the answer back clutch trip magnet circuit. | FS14 B-5                       |
| 38.  | Switch unit into KT mode by depressing the KT push button. Receive X ON code from distant station. Transmitter should turn on.  | Transmitter does not turn on.   | Check the following contacts for open conditions:                        | FS14                           |
|      |   |   | 1. Tape out contacts.  | FS14 D-6                       |
|      |   |   | 2. MSR 1 make contacts.  | FS14 E-5                       |
|      |   |   | 3. MSK 5 make contacts.  | FS14 D-5                       |
|      |   |   | 4. TDC 4 break contacts.   | FS14 E-5                       |
|      |   |   | 5. NCT 2 break contacts.   | FS14 E-5                       |
|      |   |   | 6. NCT 12 break contacts.  | FS14 D-4                       |
|      |   |   | Check X ON stunt box contacts for open condition.                        | FS14 D-5                       |
|      |   |   | Check X ON stunt box function bar coding.                                | FS14 D-5                       |
| 39.  | Local station sends WRU code combination. Local answer back does not trip.  | Local answer back trips.  | Check NCT 8 contacts for open condition.                                 | FS14 C-5                       |
| 40.  | Sprocket feed printer, when connected to another station, depression of the CTRL and FORM key simultaneously will cause form feed. After the form feed is finished, depression of the CLR key will not cause a form feed operation on the disconnect. | Depression of the CLR key causes a form feed operation on the disconnect. | Check for closed condition in the form out off normal contacts.          | FS16 E-2                       |

| STEP | PROCEDURE AND NORMAL INDICATION   | TROUBLE  | CHECK   | FUNCTIONAL SCHEMATIC REFERENCE |
|------|---|--|---|--------------------------------|
| 41.  | Sprocket feed printer, when reconnected to another station and the LF key is operated several times, depression of the CTRL and EOT simultaneously will feed the form out to the end of the form. | Form does not feed out.                                | Check for open condition in the form out off normal contacts.                       | FS16 E-2                       |
| 42.  | When the last form is fed out of the sprocket feed printer, the set will automatically disconnect.  | Set does not automatically disconnect.                 | Check paper out switch for open circuit condition.                                  | FS15 B-5                       |
| 43.  | Depression of the CLEAR key after the message is received, will turn the unit off.  | Unit does not turn off.                                | Check S relay in data set, S relay should operate upon depression of the CLEAR key. | FS1 B-6                        |
| 44.  | Operate out-of-service switch to the locking position (counter-clockwise). The out-of-service lamp will light and the ringer and automatic answer circuit will be disabled.                       | Out-of-service lamp does not light.                    | Check bulb.   | FS20 B-3                       |
|      |   |  | Check out-of-service switch contacts 7 and 8.                                       | FS20 B-2                       |
|      |   | Set automatically answers incoming call.               | Check out-of-service switch contacts 9 and 10.                                      | FS22 E-7                       |
|      |   | Ringer rings on incoming call.                         | Check out-of-service switch contacts No. 5 and 6.                                   | FS21 D-3                       |
| 45.  | Operate out-of-service switch to restore position (clockwise). Dial tone will be heard over speaker.  | Dial tone is not heard.                                | Check out-of-service switch contacts 3 and 4.                                       | FS21 D-6                       |
| 46.  | Unit on line and mode switch in the KT mode. Unit equipped with a turn around traffic control card. The LRPE (or LPR) will perforate tape only during incoming traffic.                           | LRPE (or LPR) perforates tape during outgoing traffic. | Check output of turn around traffic control card in ASR.                            | FS13 D-3                       |
|      |   |  | Check circuit continuity of TATC.   | FS13                           |
| 47.  | Unit equipped with an auxiliary ROTR. ROTR cabinet does not contain a TATC card. The ROTR, after being turned on, will perforate tape during both incoming and out going traffic.                 | ROTR does not perforate tape.                          | Check RCR relay for operation.  | FS23 C-2                       |
|      |   |  | Check RCR No. 10 contact for open condition.  | FS23 B-3                       |

## SECTION 574-202-300

| STEP | PROCEDURE AND NORMAL INDICATION   | TROUBLE  | CHECK   | FUNCTIONAL SCHEMATIC REFERENCE |
|------|---|--|---|--------------------------------|
| 48.  | ASR equipped with an auxiliary ROTR. ROTR cabinet contains a turn around traffic control card. The ROTR will perforate tape only during incoming traffic.                         | ROTR perforates tape during out going traffic. | Check output of turn around traffic control card in ROTR cabinet. | FS23 C-6                       |
|      |   |  | Check circuit continuity of TATC.                                 | FS23                           |
| 49.  | ASR equipped with an auxiliary ROTR. Depressing the CTRL and TAPE keys simultaneously when the ASR set is connected to another station will result in the ROTR remaining blinded. | ROTR unblinds.                                 | Check for operation of the RCR relay.                             | FS23 C-2                       |
|      |   |  | Check for closed condition in the NCT 10 contacts.                | FS23 E-2                       |
| 50.  | ASR equipped with an auxiliary ROTR. Operation of the CTRL and TAPE keys from the distant station shall unblind the ROTR to subsequent traffic.                                   | ROTR remains unblinded.                        | Check for open condition in the NCT 10 contacts.                  | FS23 E-2                       |
|      |   |  | Check circuit continuity.   | FS23                           |
| 51.  | ASR equipped with an auxiliary ROTR. With the ROTR unblinded, depression of the CTRL and TAPE keys simultaneously shall blind the ROTR and feed out tape.                         | ROTR remains unblinded.                        | Check RCR relay. The relay should be de-energized.                | FS23 C-2                       |
|      |   |  | Check TAPE (R10F) stunt box contacts for closed contacts.         | FS23 E-3                       |
|      |   | ROTR does not feed out tape.                   | Check to see if TFR relay contacts No. 1 have an open condition.  | FS23 B-3                       |
|      |   |  | Check circuit continuity.   | FS23                           |
|      |   |  | Check tape feed magnet.   | FS23 B-2                       |
|      |   |  | Check mechanical linkages.  | -                              |
| 52.  | ASR equipped with an auxiliary ROTR. Depression of the ROTR ON key shall unblind the ROTR.  | ROTR remains blinded.                          | Check continuity and operation of ROTR ON key.                    | FS23 E-2                       |

| STEP | PROCEDURE AND NORMAL INDICATION   | TROUBLE   | CHECK  | FUNCTIONAL SCHEMATIC REFERENCE |
|------|---|---|--|--------------------------------|
| 53.  | ASR equipped with an auxiliary ROTR. Depression of the break key when the ROTR is unblinded will cause the ROTR to be blinded and tape fed out.                                     | ROTR remains unblinded and tape is not fed out. | Check for operation of the RB relay in the data set.                           | FS23 F-2                       |
| 54.  | ASR equipped with an auxiliary ROTR. Depress the ROTR ON key and then depress the CLR key. The ROTR shall feed out tape.  | Tape is not fed out.                            | Check CON relay in data set.   | FS23 F-2                       |
| 55.  | ASR equipped with an auxiliary ROTR and the ALL TRAFFIC SWITCH in the operated position. The ROTR shall normally be unblinded. On break or disconnect, the ROTR will feed out tape. | The ROTR is not normally unblinded.             | Check wiring and circuit continuity in conjunction with the All TRAFFIC SWITCH | FS23 D-2                       |
| 56.  | ASR unit equipped for tape-to-tape send operation. TD will send on line, but will not be monitored by printer. Keyboard can transmit to reperforator in AUX local.                  | Page printer monitors line.                     | Check MSP relay No. 8 contacts.  | FS13 D-6                       |
|      |   |   | Check MSP relay, it should be operated.  | FS12 C-5                       |
|      |   |   | Check continuity of TTS push button associated circuitry.                      | FS12 C-7                       |
| 57.  | ASR unit switched to tape-to-tape receive mode, LRPE on line. Page printer blinded and TD is disabled.  | Page printer monitors line.                     | Check continuity of TTR push button associated circuitry.                      | FS12 C-7                       |
|      |   | TD not disabled.                                | Check for open condition in MSR 5 and MSP 10 relay contacts.                   | FS14 E-6                       |