# 37 AUTOMATIC SEND-RECEIVE (ASR) TELETYPEWRITER SET

# NO. 1 ESS-ADF (ADNET) AND 85/86 SELECTIVE CALLING SERVICE

# TROUBLESHOOTING

## 1. GENERAL

1.01    This section provides troubleshooting information for the 37 Automatic Send-Receive (ASR) Teletypewriter Set which is used in No. 1 ESS-ADF (ADNET) and 85/86 Selective Calling Service.

1.02    The ASR Teletypewriter (Figure 1) is capable of operating in originate-terminate, originate only, or split ASR originate-terminate station applications. To become a functional station, the ASR must interface with the communications channel. A Data Auxiliary Set (DAS) 820-type station controller equipped with a 108A, 108E, 109A, or 109E Data Set must be used in conjunction with the proper DAS 804R-type Attendant Set. The station application and station arrangement determine the type of station controller, attendant set, and specific cable assemblies required.

1.03    The ASR teletypewriter logic interfaces the typing unit, reperforator, and tape reader to the station controller, and provides motor control and controller interface signals indicative of the ASR status. The station controller with its associated attendant set performs the necessary line and supervisory control functions for the station. The station controller also provides regeneration of incoming signals.

1.04    In an 86B2 station using the 37 ASR as an originate-terminate terminal, a separate RO or ROTR is used as a primary receiver, and is connected by a cable to the same controller that is used by the ASR. If the 86B2 station uses the split ASR, a separate primary receiver is not required; the typing unit on the ASR is used as the receiver.
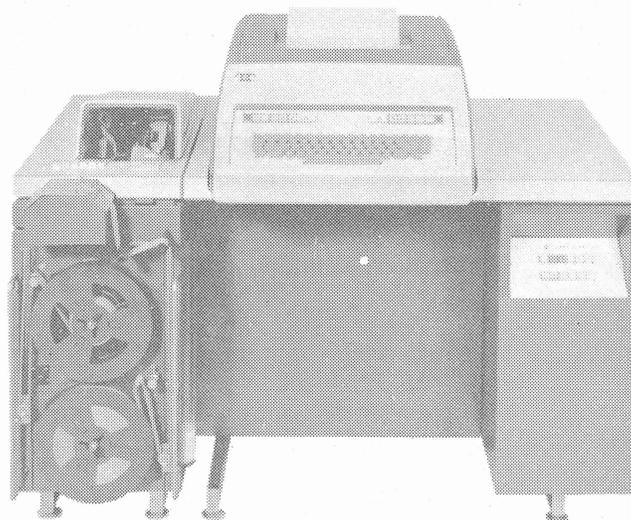


Figure 1 - 37 ASR Teletypewriter (With DAS804R-Type Attendant Set)

1.05    The ASR station arrangements may optionally require the use of an auxiliary receiver (separate RO or ROTR). The auxiliary receiver control and data signals are derived from the Electrical Service Unit (ESU) of the ASR teletypewriter set. To facilitate interconnection, an auxiliary cable (TP327881 or TP327882) is used. Refer to W-Plan E7FS1 for wiring information.

1.06    An interface cable (part of ASR) and associated 50-pin microribbon connector (P303) is provided for interfacing the ASR teletypewriter to its associated 820-type station controller. Refer to BSTSEA, Volume 1, for complete materials lists for 85A2, 86A2, and 86B2 station control units, cabinets, associated attendant sets, cable assemblies, and proper interfacing scheme.

1.07    The information in this section includes test procedures to check Model 37 set operation after installation, routine maintenance, or emergency maintenance. Each step of a test gives an action, the required verification, and a trouble analysis reference for use in case the set does not operate correctly. The trouble analysis reference enables the craftsman to analyze specific troubles, and either gives a direct correction or references a specific adjustment found in an appropriate adjustment section.

1.08    The trouble call analysis procedure that is normally followed during a trouble call is shown in Figure 2. The test room has sectionalized the trouble and the tests indicate the trouble to be at the station. The report is given to a station maintenance man who follows the procedures in Figure 2.

1.09    The information in this section contains test procedures which check teletypewriter set operation while disconnected from the station controller, attendant set, and auxiliary receiver.

1.10    Perform each operating test step by step. If the set does not operate properly and a corrective action is not given in Trouble Analysis, consider the following:

    (a) Use locally specified procedures (assistance, call supervisor, etc).

    (b) Replace suspected defective component.

    (c) Repair suspected component using associated BSPs and wiring diagrams.

    (d) Temporarily restore any partial service if possible.

    Note:   Test Procedures (Part 4) is divided into subparts as shown in Table A. Use the subpart division and analysis appropriate to the trouble area being checked.

1.11    An ASR set requires routine maintenance which consists of periodic lubrication of the teletypewriter set mechanical components. After 300 to 500 hours of operation, the unit should be relubricated to make sure all operating points receive lubrication. At this time all clutch gaps should be rechecked to insure that the gaps have not opened up after all parts have seated themselves. Refer to typing unit adjustment Section 574-320-703 and reperforator adjustment Section 574-329-703 for requirements. Thereafter, the teletypewriter set should be lubricated every 1500 hours of operation or 6 months, whichever occurs first. These figures are for normal operating conditions. More frequent servicing may be required for other than normal operating conditions. See the component lubrication sections for complete lubricating information.

    Note 1:   Gold-plated contacts should be cleaned at time of lubrication. The interval may be reduced, depending upon the signal circuit configuration, usage, and environment.

    Note 2:   Use twill jean cloth (KS2423) to clean gold-plated contacts. Do not use burnishers, files, etc, which will remove gold plating. Other materials and tools necessary to maintain this equipment can be found in Section 570-005-800.

1.12    To gain access to the typing unit or reperforator for lubrication or adjustment, the covers must be raised or removed. For information on this operation and other component removal and replacement information, see Section 574-302-702. Disassembly and reassembly procedures for component mechanisms are given in the appropriate disassembly and reassembly sections.

1.13    Some of the conditions which may be encountered in the troubleshooting procedures are explained below.

1.14    An open condition refers to a circuit through which current will not flow because of a broken or poor connection, defective contact mechanism, or defective semiconductor

device. When a normally open circuit has current flowing through it, a shorted or closed condition exists which may be caused by a sticking or improperly adjusted contact mechanism, or a shorted semiconductor device.

1.15    Running open is an abnormal condition created by a continuously spacing selector which causes continuous operation of the typing mechanism. Since there is no stop bit, the selector clutch does not latch.
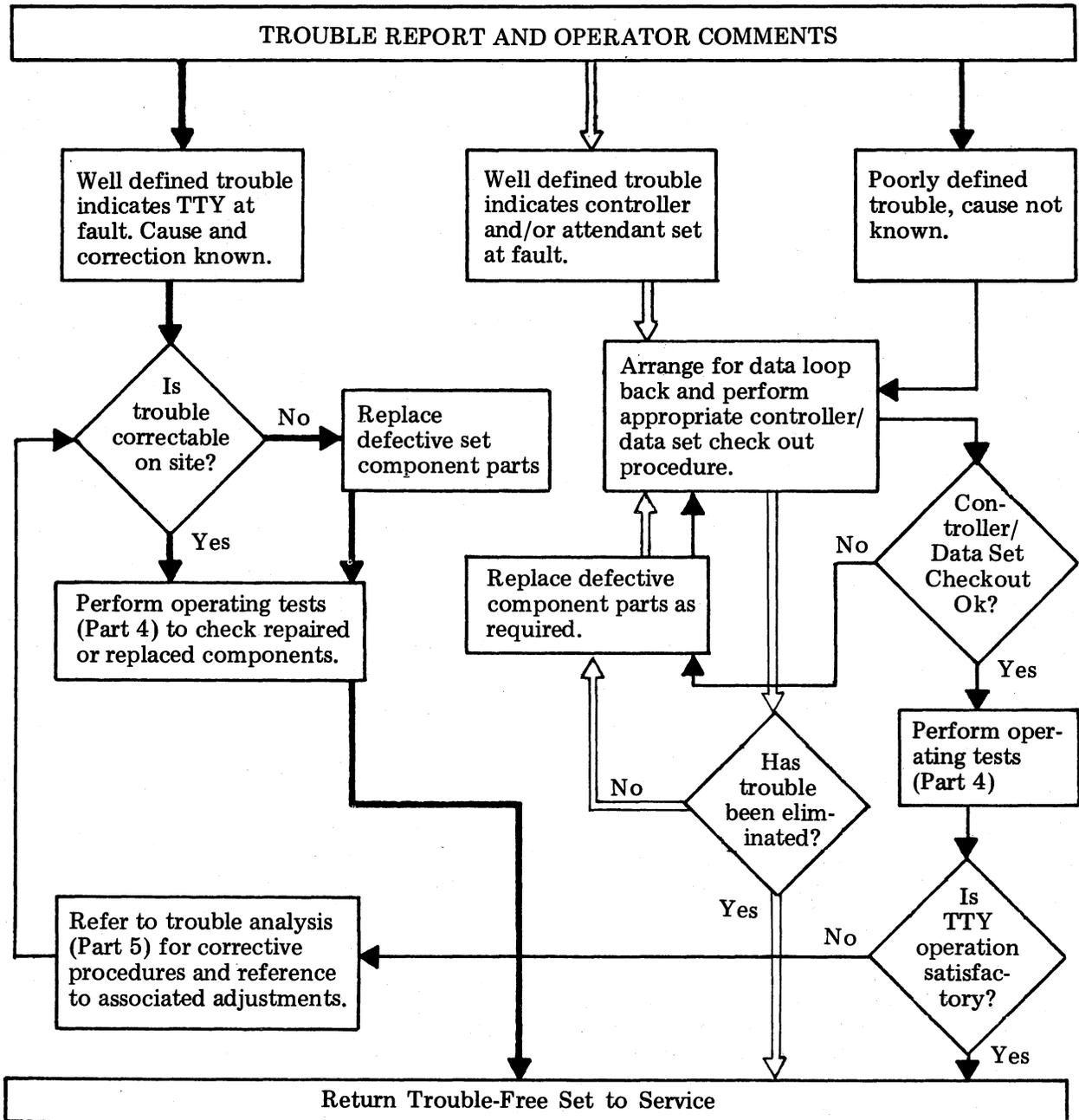


Figure 2 - Trouble Call Analysis Flow Chart

TABLE A

TEST PROCEDURE OUTLINE

| SUB-PART | TEST | CIRCUIT |
|----------|------|---------|
| 4.06 | Power On Circuits Normalization | — |
| 4.07 | Keyboard to Printer (Off-Line Mode) | Local Circuit |
| 4.08 | Keyboard to Printer/Punch (Off-Line Mode) | Local Circuit |
| 4.09 | Reader to Printer (Off-Line Mode) | Local Circuit |
| 4.10 | Reader to Printer/Punch (Off-Line Mode) | Local Circuit |
| 4.11 | Keyboard to Punch (On-Line Mode)<br>Reader to Printer (On-Line Mode) | Line Circuit<br>Line Circuit |
| 4.12 | Keyboard to Punch (Unattended Mode)<br>Reader to Printer (Unattended Mode)<br>Reader to Printer/RT Punch Auxiliary Receiver<br>(Unattended Mode)<br>Reader to Printer/RT Receive on Punch<br>(Unattended Mode) | —<br>Line Circuit<br>Line Circuit<br>(See Note 2)<br>Line Circuit<br>(See Note 3) |
| 4.13 | RO and ROTR Auxiliary Receiver Controls<br>(On-Line and Unattended Modes) | Line Circuit<br>(See Note 1) |
| 4.14 | Two-Color Ribbon (Option) | — |

Note 1:   This test should be performed only if the ASR teletypewriter is equipped with a TP332666 circuit card set (see Table F) and if the station arrangement will contain an auxiliary RO or ROTR teletypewriter.

Note 2:   This test should be performed only if the ASR teletypewriter is equipped with a TP332666 circuit card set (see Table F) programmed for the RT Punch Auxiliary Receiver option per W-Plan E7FS1 or 8930WD.

Note 3:   This test should be performed only if the ASR teletypewriter is equipped with a TP332666 circuit card set (see Table F) programmed for the RT Receive on Punch option per W-Plan E7FS1 or 8930WD.

1.16     Running closed is an abnormal condition characterized by the selector armature held continuously marking, failing to respond to a signal. The cause may be missing start and spacing bits in the signal, or mechanical failure.

1.17     Mark hold is a normal typing unit or reperforator condition during an idle line or no signal input condition. The selector armature is attracted, all clutches are latched, and the typing and function mechanisms are at rest.

1.18     Garbling is an abnormal condition in which the response of the typing and function mechanisms does not correspond with the signal input.

1.19     The test equipment used to properly troubleshoot the ASR set is listed in Part 3, Test Equipment. Arrangements should be made to obtain pieces of test equipment that might not be available at the repair site.

2. REFERENCES

| ITEM | SECTION NUMBER |
|---|---|
| **85A2 Stations:** | |
| Description and Operation | 581-131-101 |
| Installation | 581-131-201 |
| Maintenance | 581-131-301 |
| Test Procedures | 581-131-501 |
| **86A2 Stations:** | |
| Description and Operation | 581-136-101 |
| Installation | 581-136-201 |
| Maintenance | 581-136-301 |
| Test Procedures | 581-136-501 |
| **86B2 Stations:** | |
| Description and Operation | 581-136-103 |
| Installation | 581-136-203 |
| Maintenance | 581-136-303 |
| Test Procedures | 581-136-503 |
| **Adjustments:** | |
| Motor | 570-220-700 |
| Typing Unit | 574-320-703 |
| Keyboard | 574-321-703 |
| Table | 574-323-703 |
| Typing Unit Cover | 574-326-703 |
| Reperforator-Transmitter Cabinet | 574-327-700 |
| Nontyping Reperforator (YRPE800 Series) | 574-329-700 |
| Nontyping Reperforator (YRPE808 and 809) | 574-329-703 |
| Typing Reperforator | 574-330-700 |
| Typing Unit Base | 574-331-100 |
| Reader | 592-801-700 |
| **Disassembly and Reassembly:** | |
| Removal and Replacement of Components (ASR Set) | 574-302-702 |
| Typing Unit | 574-320-705 |
| Keyboard | 574-321-705 |
| Nontyping Reperforator (YRPE800 Series) | 574-329-702 |
| Nontyping Reperforator (YRPE808 and 809) | 574-329-705 |
| Typing Reperforator | 574-330-702 |
| Reader | 592-801-702 |
| **Lubrication:** | |
| Motor | 570-220-701 |
| Typing Unit | 574-320-704 |
| Keyboard | 574-321-704 |
| Typing Unit Cover | 574-326-704 |
| Reperforator-Transmitter Cabinet | 574-327-701 |
| Nontyping Reperforator (YRPE800 Series) | 574-329-701 |

| ITEM | SECTION NUMBER |
|---|---|
| **Lubrication:** | |
| Nontyping Reperforator (YRPE808 and 809) | 574-329-704 |
| Typing Reperforator | 574-330-701 |
| Typing Unit Base | 574-331-100 |
| Reader | 592-801-701 |
| **Wiring Diagrams and Wiring Plans:** | |
| Model 37 ASR (YESU806) | WDP0207 |
| Model 37 ASR (YESU826) | WDP0311 |
| Model 37 ASR Circuit Card Set for 85/86 Service | WDP0209 |
| Model 37 RT Module Circuit Card Set for 85/86 Service | WDP0211 |
| Model 37 RT Module (YESU803) | WDP0210 |
| Model 37 RT Module (YESU823) | WDP0307 |
| Control Panel Wiring and Labels | 8365WD |
| Option Analysis Chart | 8930WD |
| ASR Set Wiring Plan | W-E7FS1 |

Note: WDP refers to a Wiring Diagram Package. A WDP contains a group of WDs and SDs that are applicable to the circuit card set or teletypewriter set.

| | |
|---|---|
| **Assembly Drawings:** | |
| 37 ASR Set | A-E7FS1 |
| **Material Lists:** | |
| 37 ASR Set | M-E7FS1 |
| **Bell System Repair Specification (BSRS):** | |
| General Requirements | 456.051 |
| Typing Unit | 456.164 |
| Keyboard and Base | 456.165 |
| Reperforator | 456.166 |
| Electrical Service Assembly | 456.167 |
| Cabinets and Tables | 456.168 |
| Stations | 456.942 |

3. TROUBLESHOOTING

3.01 The station test procedures sections listed in 2. REFERENCES should be followed prior to and following installation on the customer premises. The test procedures in this section should also be used during routine or emergency maintenance. After the required maintenance has been completed, the station arrangement should be completely tested before returning the station to service.

3.02    Using the Trouble Call Analysis Flow Chart (Figure 2) as a guide, determine whether the problem lies in the teletypewriter set or the controller and attendant set. If the problem is in the teletypewriter set, disconnect the set from the controller and attendant set to perform the test procedures.

3.03    Several factors affect the response of the set at the P303 interface connector and/or the auxiliary receiver interface. Before starting with the test procedures, consider the following:

(a)    Typing Unit — A basic typing unit and four USOC coded variations are available. Each variation provides unique operational features, and in some cases affects circuit card strap options. Refer to W-E7FS1 for strap option information.

(b)    Control Panel — The control panel wiring varies as a function of the station arrangement. Three wiring arrangements are available. Refer to W-E7FS1 or 8365WD for proper control panel wiring.

(c)    Circuit Cards — If Mode Control I (TP322322 Circuit Card Assembly) is used, no auxiliary receiver (RO or ROTR) interface control signals are provided.

SAFETY PROCEDURES

3.04    Before plugging the ASR power cord into the ac receptacle, verify the outlet is properly wired. With the VOM on appropriate ac volts range, check for any voltage between power ground and the outlet mounting screw. Sequentially decrease ac volts range to minimum while constantly monitoring the meter. If zero (0) volts is measured on all ac ranges, place VOM on low ohms range, and measure continuity between power ground and the outlet receptacle mounting screw. Switch back to an ac volts range, and with the power ground pin hole on the right (as viewed from front of ac receptacle) verify 0 v ac between power ground and the bottom (wide) pin hole in the outlet receptacle. Verify 115 v ac ±10 percent between power ground and the top (narrow) pin hole in outlet receptacle.

Note: When performing the above tests, avoid contact with the metallic portions of the meter leads and avoid shorting the leads together when measuring the hot side of the ac line.

All of these voltage tests can be performed using an ac line checker such as the Woodhead 1750 or Dearborn 5012B or equivalent.

3.05    DO NOT UNDER ANY CIRCUMSTANCES REMOVE OR INSERT CIRCUIT CARDS WITH POWER APPLIED TO THE TERMINAL. Failure to remove ac power from the terminal while changing circuit cards can destroy the logic card assemblies.

3.06    DO NOT UNDER ANY CIRCUMSTANCES DISCONNECT THE PRINTER AND/OR REPERFORATOR BASE CONNECTORS WITH AC POWER APPLIED. These connectors contain 115 v ac and could present a shock hazard or fuse blowing problem if touched or shorted to the base or cabinet/table assembly.

3.07    The reperforator-transmitter (RT) interface connector contains dc power bus wiring from the main electrical service unit (YESU806 or YESU826). To eliminate the possibility of unnecessary fuse blowing, always remove ac power before connecting or disconnecting the RT interface connector.

3.08    ALWAYS REMOVE THE AC POWER CORD FROM THE WALL OUTLET RECEPTACLE WHEN PERFORMING CONTINUITY OR RESISTANCE MEASUREMENTS. For meter protection always discharge the filter capacitors in the power supply prior to any continuity or resistance measurements.

3.09    DO NOT UNDER ANY CIRCUMSTANCES INSERT OR REMOVE FUSES WITH AC POWER APPLIED TO THE TERMINAL. There is a possible shock hazard from metal parts on the fuse holder.

3.10    WHEN OPENING THE RT CABINET TOP, CHECK TO SEE THAT THE CABINET TOP BLOCKING LINK DROPS INTO ITS DETENT TO PREVENT ACCIDENTAL CLOSING. For information on this operation and other component removal and replacement information, refer to Section 574-302-702 (Removal and Replacement of Components).

3.11    DO NOT UNDER ANY CIRCUMSTANCES SERVICE, LUBRICATE, OR ADJUST ANY ELECTROMECHANICAL DEVICES, MOTORS, OR GEARS WHILE THESE DEVICES ARE IN OPERATION. As an added precaution, remove rings and watches, and secure or remove any loose or dangling clothing articles which could become entangled in

mechanical assemblies or rotating devices. Because of the hazard presented by long hair where there is danger of hair entanglement in machinery having exposed rotating or moving parts, a hat, cap, or hair net should be worn.

INTERFACE PIN ASSIGNMENTS

3.12    The 37 ASR interface pin assignments (P303 connector) are listed in Table B. The following nomenclature will be assigned to the interface and auxiliary receiver control signals.

High = +5.0 v dc to +5.5 v dc = OFF = Logic Level "SPACE"
Low = 0 v to +0.5 v dc = ON = Logic Level "MARK"
EIA MARK = -3.0 v dc to -25.0 v dc
EIA SPACE = +3.0 v dc to +25.0 v dc

3.13    The voltage levels present at the P303 connector interface leads are a function of the ASR set logic, with the exception of Pin 24, Motor Control lead, and Pin 43, Receive Data lead. On the P303 interface connector, Pin 24 and Pin 43 voltage levels are a function of the station controller, and on the auxiliary receiver cable, they are a function of the primary receiver logic. When the P303 connector is disconnected from the station controller or primary receiver, Pin 24 voltage will be high and Pin 43 voltage level will be at ground.

3.14    The interface pin voltage level readings and the test procedures are intended to be made with the ASR set disconnected from the station controller and auxiliary receiver, ac power cord plugged in, and power turned on.

TABLE B

ASR SET INTERFACE

| P303 PIN NO. | FUNCTION | COMMENTS |
|---|---|---|
| 1,2,3 | Circuit Ground | Common return for all signal circuits. |
| 12 | Selected To Receive | Used in HDX ASR applications. High when Selected To Receive, otherwise Low. |
| 14 | Character Detected | Normally Low. High to Low transition occurring between the second bit and end of the eighth bit, inclusive. |
| 16 | Send Data | Normally Low during MARK data bit or when idle. High during SPACE data bit. |
| 24 | Motor Control | Run = Low; Stop = High |
| 27 | Tab, Form-Feed in Process | For typing units without tabbing or form-feed features, this lead remains permanently high. For typing units equipped with tabbing or form-feed, this lead switches low for the duration of the tab or form-feed in process. |
| 29 | EOT Punched | Normally High. A Low going pulse of approximately 700 to 800 microseconds occurs when EOT is keyboarded to the tape reperforator in the On-Line mode. |
| 30 | Reader On, Taut Tape, Tape Available. | High if reader tape is not available, taut tape condition exists, or Reader On control on RT operated to Off. Otherwise Low (during normal tape reader transmission). |

TABLE B

ASR SET INTERFACE (Continued)

| P303 PIN NO. | FUNCTION | COMMENTS |
|---|---|---|
| 33 | Paper Alarm | Normally High; Low during Low Paper or Form-Out condition. |
| 33,42 | Unattended mode | Low when in Unattended mode, otherwise High. |
| 34 | Off-Line mode | Low when in Off-Line mode, otherwise High. |
| 36 | Taut Tape (Reader) | Low when reader tape is taut, otherwise High. |
| 37 | Tape Available (Reader) | Low when tape is not available, otherwise High. |
| 40 | Reader On | Low when Reader On control is operated to Off (key/lamp Off). |
| 43 | Receive Data | This lead carries data to the terminal. MARK = Low; SPACE = High. |
| 44 | Form-Feed (Stunt Box) | Always Low for ASRs not equipped with form feeding typing units. Normally Low (typing units equipped with form-feed feature). High to Low transition of approximately 20 milliseconds in duration upon stunt box detection of Form-Feed. |
| 49 | Tape Reader Control | Reader Run = Low<br>Reader Stop = High<br>The reader will respond to this DAS signal in the On-Line and Unattended modes only. |
| 50 | Frame Ground | Electrically connected to the ESU frame, table, and console assemblies. It is electrically isolated from signal ground in the teletypewriter. |

3.15 The 85A2 and 86A2 originate/terminate and 86B2 originate/terminate split ASR station arrangements may optionally require the use of an auxiliary receiver (separate RO or ROTR teletypewriter terminal). The auxiliary receiver control and data signals are derived from the electrical service unit (ESU) of the ASR teletypewriter. To facilitate interconnection, an auxiliary cable (TP327881 or TP327882) is used. Refer to W-Plan E7FS1 for wiring information. Table C contains the pin assignments and description of the auxiliary receiver signals.

CIRCUIT CARD ARRANGEMENTS

3.16 The logic in the electrical service units is divided into logical, functional subunits, each of which is arranged on a circuit card or cards. The logical subunits are either device logic or set logic. Device logic adapts transmitting and receiving devices to a standard peripheral interface. Set logic coordinates the operation of the devices into the Data Auxiliary Set. The functions and locations of the circuit cards used in the KSR/ASR and RT modules are listed in Table D and Table E, respectively.

TABLE C

AUXILIARY RECEIVER INTERFACE

| AUXILIARY CONNECTOR PIN | FUNCTION | COMMENTS |
|---|---|---|
| 1,2,3 | Circuit Ground | Common return for all signal circuits. |
| 24 | Aux Motor Control | Run = Low Stop = High |
| 25 | Feedout Request | Normally High; switches Low upon stunt box detection of DC4 or ETX. Reset High by Aux interface signal Feedout In Process, from ROTR. See Note. |
| 27 | Feedout In Process (Feedout Indication) | Normally High; switches Low for duration of ROTR feedout cycle. See Note. |
| 43 | Auxiliary Receive Data | MARK = 0 v; SPACE = +5 v |

Note: Auxiliary connector Pins 25 and 27 perform no useful station function when the auxiliary receiver is an RO teletypewriter and do not require termination for proper RO operation. Pins 25 and 27 are functional only when the auxiliary receiver is a 37 ROTR Teletypewriter.

TABLE D

KSR/ASR LOGIC SUBUNITS (YESU806 OR YESU826)

| DESCRIPTION | FUNCTION | LOCATION |
|---|---|---|
| Local Distributor | Serializes parallel data inputs from tape reader and keyboard in the Off-Line mode (Local circuit). | XZ101 |
| Line Distributor | Serializes parallel data inputs from the tape reader in the On-Line and Unattended modes. | XZ102 |
| Send Control | Directs transmission of signals from the keyboard and reader in the local and on-line circuits. | XZ103 |
| Receive Control | Directs reception line data to the typing unit and reperforator, if selected. | XZ105 |
| Mode Control | Establishes the relationship of the sending and receiving devices with respect to the local and on-line circuits. | XZ106 |
| Keyboard Interface | Electronic interface to a mechanical keyboard assembly. Parallel 8 level ASCII output. | XZ301 |
| Character Counter | Decodes the output of the Keyboard Interface card and generates count-up (step forward), count-down (step reverse), or reset signals to the up-down counter. | XZ302 (Piggyback on XZ301) |

TABLE D

KSR/ASR LOGIC SUBUNITS (YESU806 OR YESU826) (Continued)

| DESCRIPTION | FUNCTION | LOCATION |
|---|---|---|
| Counter Control | Counts the number of forward spacing characters generated by the keyboard and lights the EOL (End of Line) lamp when the programmed line length is reached. | XZ303 |
| Receiving Device | Typing unit motor and selector control. | XZ304 |
| Two-Color Ribbon (Option) | Red/black ribbon control in response to control characters ESC 3 and ESC 4, respectively. | XZ404 |

TABLE E

RT LOGIC SUBUNITS (YESU803 OR YESU823)

| DESCRIPTION | FUNCTION | LOCATION |
|---|---|---|
| Reader Driver | Tape reader interface to the set control logic. | XZ108 |
| Receiving Device | RT motor and reperforator selector control. | XZ107 |

3.17    The YESU806 and YESU826 electrical service units were designed to operate in private line full duplex and half-duplex Data Selective Calling station services. The specific circuit card sets used are determined by the station arrangement and are listed in Table F. The circuit card set used in the RT module YESU803 or YESU823 is shown in Table G.

3.18    Many of the circuit cards contain strap options. Strap options increase circuit card and terminal versatility. These strap options must be properly selected based on the station arrangement, station application, USOC coded variations, and optional items. Refer to the W-Plan E7FS1 or 8930WD for proper strap option selection.

COMPONENT OPTIONS AND VARIATIONS

A.   Electrical Service Units

3.19    The 37 ASR set contains two electrical service units, one in the bottom compartment of the main table and one in the RT module cabinet. The lower portion of the main table contains either a YESU806 or the new style equivalent YESU826. The RT module cabinet contains either a YESU803 or the new style equivalent YESU823. These electrical service units, when used with the proper circuit card sets, provide the following:

(a)   A receiving device interface for the reception of data.

(b)   A sending device interface for transmission of data.

(c)   Appropriate set logic for the control and coordination of sending and receiving devices.

(d)   A Data Auxiliary Set interface which permits reception, transmission, and control of the associated terminal equipment on-line.

(e)   A Reperforator-Transmitter (RT) module interface.

(f)   Alarms and Controls logic for the performance of the above functions.

TABLE F

KSR/ASR CIRCUIT CARD SETS (YESU806 OR YESU826)

| CARD SET | CONTENTS | QUANTITY | USE |
|---|---|---|---|
| TP332665 | TP322059 Distributors | 2 | Full duplex (FDX) and half-duplex (HDX), applications not requiring an aux receiving device. |
| | TP322321 Send Control | 1 | |
| | TP322320 Receive Control | 1 | |
| | TP322044 Keyboard Interface | 1 | |
| | TP322045 Character Counter | 1 | |
| | TP322315 Counter Control | 1 | |
| | TP303149 Receiving Device | 1 | |
| TP322322 | TP322322 Mode Control I | 1 | |
| TP332665 | See above | | HDX applications where aux receiver and associated features are desired. FDX applications as a maintenance aid. |
| TP332666 | TP322324 Mode Control II | 1 | |
| | TP322325 Oscillator | 1 | |

TABLE G

RT MODULE CIRCUIT CARD SET (YESU803 OR YESU823)

| CARD SET | CONTENTS | QUANTITY | USE |
|---|---|---|---|
| TP332565 | TP322323 Reader Driver | 1 | All 85A2, 86A2, and 86B2 system ASR station arrangements. |
| | TP303149 Receiving Device | 1 | |

3.20    All ASR terminals contain a common circuit card set and a variable Mode Control circuit card (Table F). The options available as a function of the Mode Control circuit card are shown in Table H.

B.    Typing Units

3.21    The typing units available for 85/86 service are shown in Table I. A typing unit may be identified by the code plate mounted on the left side of the typing unit front plate. The stunt box arrangements available are listed in Table J. Perform only the operating tests which apply to the typing unit used in the ASR set being tested.

3.22    Two-color printing is a USOC coded optional typing unit and set logic feature. Perform the two-color printing test pro-

cedure only if the ASR teletypewriter is equipped with this option. The presence of this option is indicated by the use of circuit card assembly TP322070 in card position XZ404 (YESU806 or YESU826) in conjunction with the two-color ribbon magnet (right side of typing unit).

3.23    Print suppression is a USOC coded optional feature, associated with the TP332666 circuit card set. Check for the TP322324 Mode Control II circuit card and associated piggyback card TP322325 in card connector position XZ106. Check for the presence of the print suppression magnets behind the stunt box.

C.    Reperforators

3.24    The reperforator normally associated with the basic ASR teletypewriter is a nontyping reperforator. The RT module may

TABLE H

OPTIONS AVAILABLE WITH MODE CONTROL

| Circuit Card In Position XZ106 | Auxiliary Receiver | Print Suppression | Printer Code | Stuntbox Arrangement | Reperforator | Two-Color Printing | Tape Reader |
|---|---|---|---|---|---|---|---|
| Mode Control I TP322322 | See Note (1) | See Note (1) | 37P003/XXX/AV 37P003/XXX/AW 37P004/XXX/AX 37P003/XXX/AZ 37P004/XXX/BA | YAZ YBA YBA YBB YBB | YRPE800 or YPR804 | See Note (4) | CX806 |
| Mode Control II TP322324 TP322325 | See Note (2) | See Note (3) | Same as above | Same as above | YRPE800 or YPR804 | See Note (4) | CX806 |

Note 1: No provision for option.

Note 2: Provision for option. Option may consist of RT Punch Auxiliary Receiver feature, RT Receive on Punch feature, or separate RO or ROTR Auxiliary Receiver.

Note 3: Provision for option.

Note 4: Available customer-preferred option not affected by Mode Control Logic.

optionally contain a typing reperforator. Perform only the tests which apply to the reperforator that is used. Table K lists the features of the reperforators used in the RT module.

TEST EQUIPMENT

3.25    To facilitate ASR testing, a WECO W50A Cord should be used, providing access to all interface signals on the P303 connector. For these purposes only, one connector on the WECO W50A Cord is connected to the P303 connector, and the other connector is not used.

3.26    Typing unit and reperforator problems occasionally require the use of a test sentence generator and/or distortion measuring equipment. A 911A Test Set or equivalent is recommended for this purpose. If the typing unit

or reperforator is not repairable on customer premises or a 911A Test Set or equivalent is not available, replace the typing unit or reperforator.

3.27    The majority of the ASR teletypewriter interface or logic signals can be checked on a static or dc basis using a 20k ohm per volt voltmeter. Interface signals with dynamic timing requirements should be checked with an oscilloscope.

3.28    The test equipment recommended for troubleshooting the ASR set is listed below:

(a)    VOM (20k ohm/volt minimum)

(b)    Oscilloscope (if available)

(c)    Data Source (150 wpm, 10 unit code), EIA Interface

TABLE I

MODEL 37 TYPING UNIT FEATURES

| Typing Unit Code | Sprocket Feed (SP) or Friction Feed (FR) | Platen Width (Inches) | Stunt Box Arrangement (Included in Typing Unit Code) | Vertical Tab (Maintenance Man Set) | Form Length (Inches) | TABULATION | | | | ALARMS | | Carriage Return on Form Feed (See Note) | Carriage Return on Vertical Tab (See Note) |
| | | | | | | Vertical Tab With On-Line Set and Clear | Nonrepeat Form Out | Horizontal Tab (Maintenance Man Set) | Horizontal Tab With On-Line Set and Clear | Low Paper | Paper Out | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37P003/XXX/AV | FR | 8-1/2 | YAZ | | | | | | | X | | | |
| 37P003/XXX/AW | FR | 8-1/2 | YBA | | 11 | X | X | | X | X | | X | X |
| 37P004/XXX/AX | SP | 9-1/2 | YBA | | 11 | X | X | | X | | X | X | X |
| 37P003/XXX/AZ | FR | 8-1/2 | YBB | X | 11 | | X | X | | X | | X | X |
| 37P004/XXX/BA | SP | 9-1/2 | YBB | X | 11 | | X | X | | | X | X | X |

Note: May be disabled by removing Part No. TP157274.

TABLE J

MODEL 37 STUNT BOX FEATURES

| CODE | Mechanical Functions | | | | | | | | |
| | Vertical Tabulation | | Horizontal Tabulation | | Back Space | Delete | Form Feed | Carriage Return | Line Feed (New Line) |
| | On-Line Set and Clear | Maintenance Man Set and Clear | On-Line Set and Clear | Maintenance Man Set and Clear | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| YAZ | | | | | X | X | | X | X |
| YBA | X | | X | | X | X | X | X | X |
| YBB | | X | | X | X | X | X | X | X |

TABLE K

RT MODULE REPERFORATOR FEATURES

| TELETYPE CODE | Feed-Out Lever | Feed-Out Magnet | Backspace | Last Character Visibility | Print Suppression | APPLICATION |
|---|---|---|---|---|---|---|
| YRPE800 | X | | X | | | RT |
| YPR804 | X | | X | X | | RT |

(d) Patch cords and WECO W50A Cord

(e) Clip leads

## 4. TEST PROCEDURES

4.01 The Test Procedures contain a step-by-step test procedure and specify the action required for a specific verification or response. A trouble analysis column is provided in case the equipment does not function properly. The trouble analysis enables the craftsman to analyze a specific trouble and gives a specific adjustment found in the appropriate adjustment section.

4.02 The complete station arrangement should be tested prior to and after installation on customer premises using the station test procedure BSPs. Test Procedures in this BSP should be used for routine or emergency maintenance. After maintenance has been completed, the station arrangement should be completely tested before returning it to service.

4.03 Operating tests for features not used may be omitted from the test procedures. Check the wiring plan, BSTSEA arrangements, and customer order for the features and options used on your set.

4.04 Test Procedures is divided into subparts as shown in Table A. The test arrangements of transmitters and receivers shown in Table A does not in all cases represent the actual arrangement of transmitters and receivers in an operational station application and station arrangement. The test arrangements shown completely test the ASR independent of its station equipment. Appropriate data loopbacks are made at the Data Auxiliary Set interface to functionally check all logic and component parts of the ASR teletypewriter.

4.05 The following steps should be performed to prepare the ASR for testing:

(a) Plug RT module ac power cord into utility outlet in power supply or utility strip of main electrical service unit.

(b) Connect RT interface connector P310 to J310.

(c) Verify all connectors are properly mated and secured.

(d) With ac power switch or circuit breaker in the off position, plug the main set power cord into the wall outlet receptacle.

(e) If ASR is equipped with the YESU806, plug the ESU power cord into the utility strip.

(f) Place Maintenance Man switch in the off position.

(g) Connect Data Auxiliary Set interface connector (P303) to the WECO W50A Cord.

(h) Connect Auxiliary Receiver interface connector (if so equipped) to another WECO W50A Cord.

(i) Provide adequate tape and paper supply.

4.06 POWER ON CIRCUITS NORMALIZATION

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|------|--------|--------------|-------------------------------------|
| 1 | Place S101 power switch (YESU826) or CB101 circuit breaker (YESU806) in the NORMAL position. | RT TAPE ALARM, lamp off. | 1 |
| | | PAPER ALARM lamp off. | 2 |
| | | RT motors off. | 3 |
| | | Printer motor off. | 3 |
| | | EOL lamp off.(Carriage at left-hand margin.) margin.) | 4 |
| | | OFF-LINE lamp off. | 5 |
| | | ON-LINE lamp off. | 6 |
| | | UNATTENDED lamp on. | 7, 17 |
| | | Unattended interface signal (Pins 33 and 42 of WECO W50A Cord) at 0 volts with respect to Pin 1. | 8 |
| | | Off-line interface signal (Pin 34 of WECO W50A Cord) at +5 volts with respect to Pin 1. | 9, 17 |
| | | PUNCH ON lamp off. | 10 |
| | | Verify punch blind (Pin B14 of XZ106) is at 0 volts with respect to Pin B2. | 11 |
| | | RCV ON PUNCH lamp off, if so equipped. | 12 |
| | | AUX RCVR lamp off, if so equipped. | 13 |
| | | If set is equipped with AUX RCVR key; verify AUX RCVR blind (Pin B21 of XZ106) is at 0 volts with respect to Pin B2. | 14 |
| | | READER ON lamp (RT) off. | 15 |
| | | Reader on interface signal (Pin 40 of WECO W50A Cord) at 0 volts with respect to Pin 1. | 16 |

4.07      KEYBOARD TO PRINTER (OFF-LINE MODE)

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 2 | Place Maintenance Man Switch in the NORMAL position.<br><br>Connect a patch cord between Pins 24 and 34 of WECO W50A Cord (loopback off-line to motor control).<br><br>Operate the OFF-LINE push-button on control panel. | Printer, Punch, and Reader motors on. | 18, 19, 20 |
| | | Copylamps on. | 21 |
| | | OFF-LINE mode lamp on. | 22 |
| | | UNATTENDED mode lamp off. | 23 |
| | | ON-LINE lamp off. | 24 |
| | | Unattended interface signal (Pins 33 and 42 of WECO W50A Cord) at +5 volts with respect to Pin 1. | 25 |
| | | Printer selector energized (Mark hold). | 26, 123 |
| | | Punch selector energized (Mark hold). | 27, 59, 175, 183 or 194 |
| 3 | <u>KEYBOARD CAPS OPTION</u><br><br>This option provides UPPER CASE Alpha and numbers output to the printer and/or punch from lower case alpha and numbers inputs from the keyboard.<br><br>Perform this test only if the terminal under test has this option.<br><br>Presence of option may be detected by checking for a TP327842 strap between pins 24 and 2 of Card Connector XZ301. Verify circuit card XZ301 is Issue 10 or later.<br><br><u>Note</u>:  If CAPS feature is implemented subsequent reference to | | |

4.07   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 3 (cont) | lower case should be changed to UPPER CASE when alphas are keyboarded.<br><br>Keyboard alphas "a through z." | <br><br><br>Verify UPPER CASE alphas "A through Z" printed. | <br><br><br>28, 29, 30, 50, 51, 123-129, 160, 161 |
| | Keyboard numbers "0 through 9." | Verify numbers "0 through 9" printed. | 28, 29, 30, 50, 51, 123-129, 160, 161 |
| | Note:  This option does not affect paper affecting keyboard functions and generation of control functions. These are checked in future steps. | | |
| 4 | KEYBOARD/PRINTER<br><br>Operate each keytop which produces a printable character several times. | <br><br>Keyboard reset mechanism trips once for each character selected — no double tripping. | <br><br>204, 208 |
| | | No keytop binds. | 205 |
| | | Each key returns to normal "home" position. | 206 |
| | | Correct characters printed in selected case. | 29, 30, 207 |
| | | Punch selector energized (Mark hold). | 27, 59, 175, 183 or 194 |
| 5 | Depress each of the following repeat keys to repeat position for about 55 characters. | PRINTER ACTION | |
| | SPACE BAR | Spaces | 128 |
| | NULL | Printer cycles, but does not functionally space. | 129 |
| | NEW LINE | Line-Feed or Line-Feed and Carriage Return | 131, 136, 140, 141, 171 |
| | | Note:  Presence of TP157274 clip in slot 4 of stunt box inhibits Carriage Return on New Line. | |

4.07   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 5 (cont) | x (LOWER CASE) | Prints x | 29, 30 |
| | — (DASH) | Prints — | 29, 30 |
| | __ (UNDERSCORE) | Prints __ | 29, 30 |
| | BACKSPACE | BACKSPACES | 130 |
| | : (COLON) | Prints : | 29, 30 |
| | . (PERIOD) | Prints . | 29, 30 |
| 6 | With keyboard in Shift Lock, operate each key which produces a printed character several times. | Correct characters printed in UPPER CASE. | 29, 30 |
| 7 | Operate the following keys in the keyboard Shift Lock mode. | PRINTER ACTION | |
| | TAB | Horizontal Tab, if printer has YBA or YBB stunt box only. | 142 |
| | | Otherwise no printer response. | |
| | RETURN | Carriage returns to left-hand margin. | 136 |
| | Depress repeat X (about 10 characters). | Prints "X" ten (10) times. | |
| | BACKSPACE | Backspaces | 130 |
| | NULL | Cycles; no printing, no spacing. | |
| | DELETE | Cycles; no printing, no spacing. | |
| | NEW LINE | Line-Feed or Line-Feed and Carriage Return | 131, 136, 140, 141, 171 |
| | | Note:  Presence of TP157274 Clip in slot 4 of stunt box inhibits Carriage Return on New Line. | |
| 8 | HT CONTROL  This step applies only to printers with on-line HT SET and HT CLEAR (YBA Stunt Box). | | |

4.07 Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 8 (cont) | Depress "ESCAPE 2" character sequence. | Printer clears any horizontal tabs previously set. Carriage travels to right margin stop. | 131, 144, 145, 164, 171 |
| | Depress RETURN key. | Carriage returns to left hand margin. | 136 |
| | Set horizontal tab stops at three (3) typebox positions. Depress "ESCAPE 1" character sequence for HT set. | HT stops set at selected positions. | 131, 146, 164, 165, 171 |
| 9 | This step applies only to printers with on-line HT set and HT clear, and TELCO adj HT stops (YBA or YBB stunt box).<br><br>Note: Set TELCO adj tab stops at three (3) known typebox positions. | | |
| | Depress TAB key three (3) times. | Typebox stops at each pre-selected position each time TAB key is depressed. Tabbing speed is three times normal rate. | 131, 142, 164, 171 |
| | | Verify low going pulse (+5 v/0 v/+5 v) for the duration of the tab in process on Pin 27 of the WECO W50A Cord with respect to Pin 1. | 31 |
| 10 | This step applies only to printers that have on-line HT clear and HT set (YBA stunt box). | PRINTER ACTION | |
| | Depress RETURN key. | Carriage returns to left-hand margin stop. | 136 |
| | Depress "ESCAPE 2" character sequence. | Printer clears all H-TABS set previously and stops at right-hand margin. | 131, 144, 145, 164, 171 |
| | Depress RETURN keytop. | Carriage returns to left-hand margin. | |
| | Depress TAB keytop. | Carriage travels to the right-hand margin indicating all H-TAB stops have been cleared. | 131, 142, 164, 171 |

4.07   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 11 | VT CONTROL<br><br>This step applies only to printers with on-line VT set and VT clear (YBA stunt box).<br><br>Depress CONTROL and L keytops simultaneously. | Printer feeds out form.<br><br>Verify high going pulse (0 v/+5 v/0 v) on Pin 44 of WECO W50A Cord with respect to Pin 1 for duration of form feed in process. | 32, 131, 164, 171 |
|  | Depress NEW LINE keytop. | Line feed or carriage return and line feed. | 166 |
|  | Depress "ESCAPE 6" character sequence keytops. | Printer feeds out form and clears any VT previously set. | 131, 164, 167, 168, 171 |
|  | After positioning form with RETURN keytop, depress ESCAPE and 5 keytops. Repeat as required. | VT stops set at various positions on form. | 131, 147, 148, 164, 171 |
|  | Depress NEW LINE keytop. | Line feed or carriage return and line feed. | |
|  | Depress CONTROL and L keytops simultaneously. | Printer feeds out form. | 32, 131, 164, 171 |
| 12 | This step applies only to printers with on-line VT set and VT clear and TELCO adj VT stops (YBA and YBB stunt box).<br><br>Depress spacebar to move typebox away from left-hand margin.<br><br>Depress CONTROL and K keytops simultaneously. | PRINTER ACTION<br><br>Printer line feeds to preselected VT stops at three times normal speed each time CONTROL and K keytops are depressed.<br><br>Note:  If "Carriage Return on VT" feature has not been disabled, typebox returns to left-hand margin on first VT command. | 131, 143, 164, 171 |

4.07 Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 12 (cont) | | Verify low going pulse (+5 v/0 v/+5 v) for the duration of tab in process on Pin 27 of WECO W50A Cord with respect to Pin 1. | 31 |
| | Depress CONTROL and L keytops simultaneously. | Verify high going pulse (0 v/+5 v/0 v) on Pin 44 of WECO W50A Cord with respect to Pin 1 for duration of form feed in process. | 32, 131, 164, 171 |
| 13 | This step applies only to printers with on-line VT set and VT clear (YBA stunt box). | PRINTER ACTION | |
| | Depress NEW LINE keytop. | Line feed or carriage return and line feed. | 131, 136, 140, 141, 171 |
| | Depress CONTROL and L keytops simultaneously. | Printer feeds out form. | |
| | Depress "ESCAPE 6" character sequence keytops. | Printer feeds out form and clears all VT previously set. | 131, 164, 167, 168, 171 |
| | Depress CONTROL and K keytops simultaneously. | Printer feeds out form. All VT stops cleared. | |
| 14 | Depress CONTROL keytop and depress all keytops without control designation. | Keytops without control designation are mechanically blocked from operation when CONTROL key is depressed. | |
| 15 | Depress CONTROL keytop and depress CAN, SUB, SYN, DC1, and DC3 keytops. | Printer cycles but does not print or space. | 137 |
| 16 | BELL<br><br>Depress CONTROL and G keytops simultaneously. | Bell rings each time bell code is generated. | 33 |
| 17 | EOL CONTROL<br><br>Depress RETURN keytop. | Carriage returns to left-hand margin. EOL lamp goes off, if on. | 34, 136 |

4.07 Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 17 (cont) | With the number of characters per line known, depress repeat X. | Printer prints X. EOL lamp on at desired number of characters per line. Example — Left-hand margin set at 9, counter programmed for 66 characters, EOL lamp on at character position 75. | 35, 36 |
| | Depress RETURN keytop. | Carriage returns to left-hand margin and EOL lamp goes off. | 34, 136 |
| | Keyboard "X" 30 times, keyboard backspace 10 times, and keyboard "X" to programmed EOL. | Copy contains "X" in each character position, EOL lamp on at desired line length. Note: This test checks the countdown logic on the Counter Control card (Z303). | 37 |
| 18 | Depress RETURN keytop. Manually move carriage and typebox to right-hand margin. | Carriage returns to left-hand margin. EOL lamp on. | |
| | Operate MANUAL RETURN pushbutton on control panel. | Carriage returns to left-hand margin and EOL goes off. | 38 |
| 19 | ESCAPE SEQUENCE Depress ESCAPE keytop and spacebar to repeat position simultaneously. | Printer cycles due to SPACE but does not type or space. | |
| | Depress lower case h keytop. | Printer cycles but does not type or space. | 137 |
| | Depress lower case g keytop. | Printer cycles, prints lower case g, and spaces. | |
| 20 | CHARACTER DETECTED Depress repeat X. | Verify high going pulses (0 v/5 v/0 v) of at least 5 milliseconds duration on Character Detected Pin 14 of WECO W50A Cord with respect to Pin 1. The entire high going pulse occurring between the second and eighth bits inclusive. | 39, 41 |

4.07 Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 20 (cont) | Keyboard idle. | Pin 14 of WECO W50A Cord at 0 volts. | 40 |
| 21 | Perform this step only if strap B, character detected inhibit on Paper Alarm on Z105 (Receive Control), is connected. | | |
| | Remove printer paper supply and depress "X" keytop several times. | Pin 14 of WECO W50A Cord remains at 0 volts. | 42 |
| | | PAPER ALARM lamp on. | 43 |
| | | Paper Alarm interface signal on Pin 31 of WECO W50A Cord at 0 v with respect to Pin 1. | 44 |
| | Replace printer paper supply and depress repeat "X". | Verify high going pulses (0 v/+5 v/0 v) of at least 5 milliseconds duration on Character Detected Pin 14 of WECO W50A Cord with respect to Pin 1. The entire high going pulse should occur between the second and eighth bits, inclusive. | 46 |
| | | PAPER ALARM lamp off. | 45 |
| | | Paper Alarm interface signal on Pin 31 of WECO W50A Cord at +5 v with respect to Pin 1. | 47 |
| 22 | Remove printer paper supply. | PAPER ALARM lamp on. | 43 |
| | | Paper Alarm interface signal on Pin 31 of WECO W50A Cord at 0 volts with respect to Pin 1. | 44 |
| | Replace printer paper supply. | PAPER ALARM lamp off. | 45 |
| | | Paper Alarm interface signal on Pin 31 of WECO W50A Cord at +5 volts with respect to Pin 1. | 47 |

4.08    KEYBOARD TO PRINTER/PUNCH (OFF-LINE MODE)

| 23 | Operate PUNCH ON pushbutton. | PUNCH ON lamp on. | 48 |
|---|---|---|---|

4.08 Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 24 | Prepare tape from keyboard containing adequate Delete tape leader; "The Quick Brown Fox — Back 12345678910 Times, Return, New Line, Delete; (repeat several times); and adequate Delete tape tail." Remove and save punched tape. | Printer copies message correctly.<br><br>Even left-hand margin.<br><br>Punch copies message correctly.<br><br>If punch is a typing reperforator, verify proper typing on tape.<br><br>Verify clear, legible typed characters.<br><br>· Verify punch Print Suppression on function characters or lower case characters, if so programmed. | 26, 50, 51, 53, 132, 133, 134, 138, 139, 149-153, 156, 157, 160-163<br>135<br><br>27, 50-52, 55; YPR-172, 173, 182, 183, 184; YRPE-190, 191, 193-197<br>176, 177, 178, 179, 180<br><br>176, 177, 178, 179<br><br>181, 182, 188 or 189 |
| 25 | Perform this test if RT contains a typing reperforator.<br><br>Depress CONTROL keytop and operate Q, W, Y, A, S, and G keytops. | Verify dc, ETB, EM, SOH, DC3, and bell codes punched in tape. Bell rings.<br><br>Verify punch print suppression on control function codes, if so programmed. | 181, 182, 188 or 189 |
| 26 | Perform this test if punch is a typing reperforator.<br><br>Depress and hold the VIEW LAST CHARACTER pushbutton on RT Control.<br><br>Release VIEW LAST CHARACTER pushbutton on RT. | Typewheel and ribbon retracted. (View Last Character magnet energized.)<br><br>Typewheel and ribbon return to normal position (magnet de-energized). | 49, 185 |
| 27 | Keyboard Delete 10 times followed by "X" (5 times). | Printer prints "X."<br><br>Punch punches 10 Deletes and 5 "Xs" in tape.<br><br>Note: If punch is a typing reperforator, "X" is printed 5 times on tape. Operate VIEW LAST CHARACTER pushbutton on RT cabinet to verify. | 50, 51, 53<br><br>27, 50-52, 55; YPR-172, 173, 182, 183, 184; YRPE-190, 191, 193-197<br>49, 185 |

4.08    Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 28 | Operate PUNCH BACKSPACE pushbutton 5 times. | Reperforator backspaces 5 times. | YPR — 186<br>YRPE — 198 |
| 29 | Keyboard Delete 20 times and remove punched tape. | Reperforator punches 20 Deletes.<br><br>Tape contains all Deletes (no "X" code).<br><br>Verify 10 characters per inch. | <br><br><br><br>YPR — 174<br>YRPE — 192 |
| 30 | EOT PUNCHED<br><br>Repeatedly generate EOT (CONTROL and D) from the keyboard. ·<br><br><br><br><br><br>Leave keyboard idle. | <br><br>Verify a low going pulse (5 v/0 v/5 v) of approximately 700 to 800 microseconds on Pin 29 (EOT punched) of WECO W50A Cord with respect to Pin 1 each time EOT is keyboarded.<br><br>Verify Pin 29 (EOT punched) of WECO W50A Cord at +5 v with respect to Pin 1. | <br><br>54<br><br><br><br><br><br><br>56 |
| 31 | Operate PUNCH ON pushbutton. | PUNCH ON lamp off. | 57 |
| 32 | Repeatedly generate EOT (CONTROL and D) from the keyboard. | Pin 29 (EOT punched) of WECO W50A Cord remains at +5 v with respect to Pin 1. | 58 |
| 33 | Keyboard repeat "X" 10 times. | Printer copies 10 "X"'s.<br><br>Punch selector energized (Mark hold). No tape copy produced. | <br><br>27, 59, 175, 183 or 194 |

4.09    RDR TO PTR (OFF-LINE MODE)

| 34 | Position paper to top of form and operate MANUAL RETURN pushbutton on control panel.<br><br>Place previously prepared tape in reader. Operate READER ON pushbutton. | Carriage at left-hand margin and positioned at top of form.<br><br>READER ON lamp on.<br><br>Reader transmits message to printer and stops on reader tape out condition. | <br><br><br><br>60<br><br>61, 62, 64, 199-203 |

4.09   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 34 (cont) | | Printer copies message correctly. | 63 |
| | | Left-hand margin is even. | 135 |
| | | No typebox bounce. | |
| | | Even horizontal character spacing. | 134, 138 |
| | | Even vertical character alignment. | 133 |
| | | Even printing density. | 160, 161 |
| | | No partial red/black characters if equipped with two-color ribbon. | 153 |
| | | Reader stops on tape-out condition. | 64 |
| | | TAPE ALARM lamp on. | 65 |
| 35 | Operate READER ON pushbutton. | READER ON lamp off. | |
| | | TAPE ALARM lamp off. | 66 |
| | Reposition tape in reader and repeatedly operate the READER STEP pushbutton on the RT cabinet. | Reader steps through test message at a rate of one character each time the READER STEP pushbutton is operated. Printer copies characters. | 67 |
| 36 | Remove tape from reader and operate READER ON pushbutton. | Verify Reader On interface signal (Pin 40 of WECO W50A Cord) at +5 v with respect to Pin 1. | 68 |
| | | Note:   Reader not sending due to tape-out condition. | |
| | | TAPE ALARM lamp on. | 65 |
| | With tape gate closed push down the tape out contact actuator (small button near code reading sensing fingers) to flush with top of reader. | Reader transmits Delete characters to printer. | |
| | | TAPE ALARM lamp off. | |

4.09   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 36 (cont) | | Verify Reader On, Taut Tape, Tape Available interface signal on Pin 30 of W50A Cord at 0 volts with respect to Pin 1. | 69 |
| | Operate taut tape arm on reader. | Reader stops transmitting Deletes. | 70 |
| | | Verify Pin 30 of W50A Cord at +5 volts with respect to Pin 1. | 71 |
| | | Verify Taut Tape interface signal on Pin 36 of WECO W50A Cord at 0 volts with respect to Pin 1. | 72 |
| | Release taut tape arm on reader. | Reader resumes transmission of Deletes to printer. | |
| | | Verify Taut Tape interface signal on Pin 36 of WECO W50A Cord at +5 volts with respect to Pin 1. | 73 |
| | | Verify Pin 30 of WECO W50A Cord at 0 volts with respect to Pin 1. | 69 |
| | Operate taut tape arm on RT cabinet door. | Reader stops transmitting Deletes. | 74 |
| | | Verify Taut Tape interface signal on Pin 36 of WECO W50A Cord at 0 volts with respect to Pin 1. | 72 |
| | | Verify Pin 30 of WECO W50A Cord at +5 volts with respect to Pin 1. | 71 |
| | Release taut tape arm on RT cabinet door. | Reader resumes transmission of Deletes to printer. | |
| | | Verify Taut Tape interface signal on Pin 36 of WECO W50A Cord at +5 volts with respect to Pin 1. | 73 |
| | | Verify Pin 30 of WECO W50A Cord at 0 v with respect to Pin 1. | 69 |

4.09 Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|------|--------|--------------|--------------------------------------|
| **36** (cont) | Operate READER ON push-button. | Reader stops transmission.<br><br>READER ON lamp off.<br><br>Verify Pin 30 of WECO W50A Cord at +5 v with respect to Pin 1. | 75<br><br><br>71 |
| 37 | Place previously prepared test message tape in reader and operate READER ON pushbutton. While reader sends, depress at random various keytops on keyboard. | READER ON lamp on.<br><br>Verify Tape Available interface signal on Pin 37 of WECO W50A Cord at +5 volts with respect to Pin 1.<br><br>Printer receives error free message "The Quick Brown Fox 12345678910 Testing."<br><br>Keyboard reset mechanism cycles but transmission from keyboard inhibited.<br><br>Reader stops on tape out.<br><br>TAPE ALARM lamp on.<br><br>Verify Tape Available interface signal on Pin 37 of WECO W50A Cord at 0 volts with respect to Pin 1. | 76<br><br><br><br><br><br>77<br><br><br>64<br><br>65<br><br>78 |
| | Operate READER ON push-button. | READER ON lamp off. | |
| 38 | Reposition tape to beginning of test message and operate READER ON pushbutton.<br><br>While reader is sending, randomly operate the taut tape lever on the RT cabinet. | READER ON lamp on.<br><br>Reader sends test message to printer.<br><br>Reader stops on taut tape and restarts on removal of taut tape condition.<br><br>Printer copies entire test message.<br><br>Verify no printer copy errors.<br><br>Reader stops on tape-out condition. | 60<br><br><br><br><br><br><br><br>79<br><br>64 |

4.09 Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|------|--------|--------------|--------------------------------------|
| 38 (cont) | Operate READER ON push-button. | READER ON lamp off. | |
| 39 | Remove reperforator tape supply.<br><br>Replace reperforator tape supply. | RT TAPE ALARM lamp on.<br><br>RT TAPE ALARM lamp off. | 80 |

4.10     RDR TO PTR/PCH (OFF-LINE MODE)

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|------|--------|--------------|--------------------------------------|
| 40 | Operate the PUNCH ON push-button.<br><br>Place previously prepared tape in reader.<br><br>Operate READER ON push-button. | PUNCH ON lamp on.<br><br><br><br>READER ON lamp on.<br><br>Reader transmits test message to printer and punch.<br><br>Printer copies message correctly.<br><br>Reperforator produces punched tape copy or optionally punched and printed tape copy.<br><br>Reader stops when out of tape.<br><br>TAPE ALARM lamp on. | 48<br><br><br><br>60<br><br><br><br><br><br>63<br><br><br><br><br><br><br><br>64<br><br><br>65 |
| | Operate READER ON push-button. | READER ON lamp off.<br><br>TAPE ALARM lamp off. | 66 |
| | Remove tape just transmitted and place tape just produced (do not tear off from reperforator) in reader. Operate READER ON pushbutton. Leave reperforator to reader loop in operation until verification is provided. | Printer verifies a good tape copy of message. | |
| | Operate READER ON push-button and remove tape from reader. | Reader stops transmission.<br><br>READER ON lamp off. | |

4.10   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 41 | READER STOP CONTROL<br><br>Perform this step only if printer has YBA stunt box. Prepare a Horizontal Tab test tape which contains<br>(1) Delete leader.<br>(2) HT Clear.<br>(3) HT Set followed by "X."<br>(Repeat 3 or 4 times.)<br>(4) Horizontal Tab.<br>(5) Delete tape trailer.<br><br>Note:   Add Return, New Line, or New Line characters as required.<br><br>Place tape in reader and operate READER ON pushbutton. Leave reperforator to reader loop in operation until proper reader control is verified.<br><br><br><br><br><br><br><br>Operate READER ON push-button and remove tape from reader.<br><br>Operate PUNCH ON pushbutton. | <br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>Reader transmits HT test message to printer and reperforator.<br><br>Reader pauses when HT Clear and HT are trans-mitted.<br><br>Note:   This test checks the transmitter stop control feature and associated internal logic.<br><br>Reader stops transmission.<br><br>READER ON lamp off.<br><br>PUNCH ON lamp off. | <br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>81 |
| 42 | Perform this step only if the printer has YBB stunt box. Pre-pare at HT test tape (HT stops previously set to desired tab stop positions). Test tape should con-tain:<br>(1) Delete leader.<br>(2) HT followed by "X."<br>(Repeat as required.)<br>(3) Delete tape trailer.<br><br>Note:   Add Return New Line or New Line as required. | | |

4.10   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 42 (cont) | Place tape in reader and operate READER ON pushbutton. Leave reperforator to reader loop in operation until proper reader control is verified. | Reader transmits HT test message to printer and reperforator.<br><br>Reader pauses when HT is transmitted.<br><br>Note:   This test checks the transmitter stop control feature and associated internal logic. | 81 |
| | Operate READER ON push-button and remove tape from reader. | Reader stops transmission, READER ON lamp off. | |
| | Operate PUNCH ON pushbutton. | PUNCH ON lamp off. | |

4.11      (ON-LINE MODE)

| | | | |
|---|---|---|---|
| 43 | KBD TO PCH | | |
| | Operate ON-LINE pushbutton on the control panel. | Printer, reperforator, and reader motors off. | 82 |
| | | Copylamps off. | |
| | | ON-LINE lamp on. | 83 |
| | | OFF-LINE lamp off. | 84 |
| | | UNATTENDED lamp off. | 85 |
| | | PUNCH ON lamp on. | |
| | Remove patch cord from Pin 34 of WECO W50A Cord (Other end remains connected to Pin 24) and reconnect to Pin 1 of W50A Cord. | Printer, reperforator, and reader motors on.<br><br>Copylamps on. | |
| | | Verify Unattended interface signal (Pins 33 and 42 of WECO W50A Cord) at +5 volts with respect to Pin 1. | 86 |
| | | Verify Off-Line interface signal (Pin 34 of WECO W50A Cord) at +5 volts with respect to Pin 1. | |
| | Keyboard several characters. | Reperforator produces tape copy. | |

4.11   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|------|--------|--------------|--------------------------------------|
| 44 | RDR to PTR<br><br>Connect a patch cord between Pins 16 and 43 of WECO W50A Cord (loop back of Send Data to Receive Data).<br><br>Connect a patch cord between Pin 49 of W50A Cord and Pin 1.<br><br>Place previously prepared "Quick Brown Fox" test message in reader and operate READER ON pushbutton.<br><br><br><br><br><br>Operate READER ON push-button. | <br><br><br><br><br><br><br><br><br><br>Reader transmits test message to printer.<br><br>Reader stops on tape-out condition.<br><br>TAPE ALARM (RT) lamp on.<br><br>READER ON lamp off.<br><br>TAPE ALARM lamp off.<br><br>Note:  This test checks the line distributor and associated receive logic. | <br><br><br><br><br><br><br><br><br><br>87, 88<br><br><br>64<br><br><br>65<br><br><br>66 |
| 45 | KBD TO PCH; RDR TO PTR<br><br>Reposition tape in reader to beginning of message and operate READER ON pushbutton. While reader is sending to the printer, keyboard a short message to the reperforator.<br><br><br><br><br><br><br><br><br><br><br><br><br>Operate READER ON push-button and remove tape from reader. | <br><br>Printer receives message from reader correctly.<br><br>Reperforator receives keyboard message correctly.<br><br>Note:  This test checks send control logic; and the ability to send simultaneously in the local circuit (keyboard to punch) and on-line circuit (reader to printer).<br><br>READER ON lamp off. | <br><br>89<br><br><br>89 |

4.12       (UNATTENDED MODE)

| 46 | Operate the UNATTENDED pushbutton on control panel. | UNATTENDED mode lamp on.<br><br>ON-LINE mode lamp off. | 90<br><br><br>91 |

4.12   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| **46** (cont) | | PUNCH ON lamp off. <br><br> OFF-LINE mode lamp off. <br><br> Verify Unattended interface signal (Pins 33 and 42 of W50A Cord) at 0 volts with respect to Pin 1. <br><br> Verify Off-Line interface signal (Pin 34 of W50A Cord) at +5 volts with respect to Pin 1. | 92 |
| 47 | <u>RT PCH AUX RCVR</u> <br><br> Perform this test if the control panel has the AUX RCVR push-button and the 322324 Mode Control II Card Assembly strapped for the RT Punch Aux Receiver feature. <br><br> Randomly depress keytops on keyboard. <br><br><br><br><br><br> Place previously prepared "Quick Brown Fox" test message in reader and operate READER ON pushbutton. <br><br><br><br><br><br><br><br><br> Operate READER ON push-button. <br><br><br> Operate AUX RCVR push-button. <br><br> Reposition test tape in reader and operate READER ON push-button. | Keyboard reset mechanism cycles but transmission from keyboard in the local circuit is inhibited. <br><br> Printer selector remains energized (Mark hold). <br><br> READER ON lamp on. <br><br> Reader transmits test message correctly to printer. <br><br> Reader stops on tape out condition. <br><br> TAPE ALARM lamp on. <br><br> READER ON lamp off. <br><br> TAPE ALARM lamp off. <br><br> AUX RCVR lamp on. <br><br> READER ON lamp on. | 93, 94 <br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br> 95 |

4.12   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|------|--------|--------------|--------------------------------------|
| 47 (cont) | | Printer and RT reperforator copy message transmitted from reader correctly. | 96 |
| | | Reader stops on tape-out condition. | |
| | | TAPE ALARM lamp on. | |
| | Operate READER ON pushbutton and remove tape from reader. | READER ON lamp off. | |
| | | TAPE ALARM lamp off. | |
| | Operate AUX RCVR pushbutton. | AUX RCVR lamp off. | |
| 48 | RCV ON PCH | | |
| | Perform this test if the control panel has the RCV ON PCH pushbutton and the 322324 Mode Control II card assembly strapped for the RT RCV On Punch feature. | | |
| | Operate the RCV ON PCH pushbutton. | RCV ON PCH lamp on. | 97 |
| | Insert "Quick Brown Fox" test tape in reader and operate READER ON pushbutton. | READER ON lamp on. | |
| | | Reader transmits test message to printer and reperforator. | 98 |
| | About midpoint of message, operate READER ON pushbutton. | Reader stops transmission. | |
| | Operate RCV ON PCH pushbutton. | RCV ON PCH lamp off. | |
| | Operate READER ON pushbutton. | READER ON lamp on. | |
| | | Reader transmits remainder of test message to printer. | |
| | | Printer copies all of test message; no characters lost or garbled. | |
| | | Reperforator selector energized (Mark hold). | 99 |

4.12   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 48 (cont) | | Reader stops on tape-out condition. | |
| | | TAPE ALARM lamp on. | |
| | Operate READER ON pushbutton and remove tape from reader. | READER ON lamp off. | |
| | | TAPE ALARM lamp off. | |
| | Operate RCV ON PCH pushbutton. | RCV ON PCH lamp on. | |
| | Operate ON-LINE pushbutton. | UNATTENDED mode lamp off. | |
| | | ON-LINE mode lamp on. | |
| | | RCV ON PCH lamp off. | 100 |
| | | PUNCH ON lamp on. | |
| | Operate RCV ON PCH pushbutton. | RCV ON PCH lamp remains off. | 101 |
| | Operate UNATTENDED pushbutton. | PUNCH ON lamp off. | 102 |

4.13   RO & ROTR AUXILIARY RECEIVER CONTROLS
(ON-LINE AND UNATTENDED MODES)

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 49 | <u>MANUAL AUX RCVR CONTROL</u> | | |
| | Perform this test if the station arrangement will contain an Auxiliary Receiving RO or ROTR. | | |
| | Connect Aux Receiver interface cable per W-E7FS1, 1010SD-B6, or 1021SD-B6. | | |
| | Connect the AUX W50A Cord to Auxiliary RCVR interface cable and proceed as follows. | | |
| | With the UNATTENDED mode lamp on, operate the AUX RCVR pushbutton. | AUX RCVR lamp on. | |
| | | Verify AUX RCVR Motor Control interface signal on Pin 24 of AUX RCVR W50A Cord at 0 volts with respect to Pin 1. | 103 |

4.13   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|------|--------|--------------|--------------------------------------|
| 49 (cont) | Momentarily connect a patch cord from Pin 12 of DAS interface W50A Cord to Pin 1. | Verify AUX RCVR Motor Control interface signal on Pin 24 of AUX W50A Cord momentarily switches to +5 volts with respect to Pin 1.<br><br>Pin 24 must switch back to 0 volts after patch cord is removed. | 104 |
| | Place "Quick Brown Fox" test message in reader and operate READER ON pushbutton. | READER ON lamp on.<br><br>Printer copies reader message.<br><br>Verify MARK/SPACE transitions on AUX RCVR Data interface signal (Pin 43 of AUX RCVR W50A Cord) with respect to Pin 1. | 105 |
| | While reader transmits test message above, operate AUX RCVR pushbutton. | Printer copies remainder of test message.<br><br>AUX RCVR lamp off.<br><br>If AUX RCVR is an ROTR and strap H on TP322324 Card Assembly is connected, verify Feedout Request AUX interface signal (Pin 25 of AUX W50A Cord) at 0 volts with respect to Pin 1.<br><br>Verify AUX RCVR Data interface signal (Pin 43 of AUX W50A Cord) at 0 volts with respect to Pin 1. (Mark hold.)<br><br>Reader stops on tape-out condition.<br><br>TAPE ALARM lamp on. | 106<br><br><br><br><br>107 |
| | Operate READER ON pushbutton and reposition tape to beginning of message. | READER ON lamp off.<br><br>TAPE ALARM lamp off. | |

4.13   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|------|--------|--------------|--------------------------------------|
| 49 (cont) | If AUX RCVR is an ROTR, momentarily connect patch cord from Pin 27 of AUX RCVR W50A Cord to Pin 1. Remove patch cord. | Verify Feedout Request AUX interface signal (Pin 25 of AUX RCVR W50A Cord) at +5 volts with respect to Pin 1. | 108 |
| | Operate On-Line mode push-button. | UNATTENDED mode lamp off. | |
| | | On-Line mode lamp on. | |
| | | PUNCH ON lamp on. | |
| | Operate AUX RCVR push-button. | AUX RCVR lamp on. | |
| | | Verify AUX RCVR Motor Control interface signal on Pin 24 of AUX W50A Cord at 0 volts with respect to Pin 1. | |
| | Momentarily connect a patch cord from Pin 12 of DAS interface W50A Cord to Pin 1. | Verify Auxiliary Receiver Motor Control interface signal on Pin 24 of Auxiliary W50A Cord momentarily switches to +5 volts with respect to Pin 1. | 104 |
| | Place "Quick Brown Fox" test message in reader and operate READER ON pushbutton. | READER ON lamp on. | |
| | | Printer copies reader message. | |
| | | Verify Mark/Space transitions on Auxiliary Receiver data interface signal (Pin 43 of Auxiliary Receiver W50A Cord) with respect to Pin 1. | 105 |
| | While reader transmits test message above, operate AUX RCVR pushbutton. | Printer copies remainder of test message. | |
| | | AUX RCVR lamp off. | |
| | | If Auxiliary Receiver is an ROTR and strap H on TP322324 Circuit Card is connected, verify Feed-Out Request Auxiliary interface signal (Pin 25 of Auxiliary W50A Cord) at 0 volts with respect to Pin 1. | 106 |

4.13  Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|------|--------|--------------|--------------------------------------|
| 49 (cont) | | Verify Auxiliary Receiver Data interface signal (Pin 43 of Auxiliary W50A Cord) at 0 volts with respect to Pin 1 (Mark hold). | 107 |
| | | Reader stops on tape out condition. | |
| | | TAPE ALARM lamp on. | |
| | Operate READER ON push-button and remove tape from reader. | READER ON lamp off. | |
| | | TAPE ALARM lamp off. | |
| 50 | AUTOMATIC AUX CONTROL<br><br>Place terminal in Off-Line mode with PUNCH ON lamp on. Prepare a test tape containing the following:<br>(1) Delete leader.<br>(2) Test message no. 1.<br>(3) DC2, Delete, Delete.<br>(4) Test message no. 2.<br>(5) DC4 or ETX, Delete, Delete.<br>(6) Test message no. 3.<br>(7) Delete tape trailer.<br><br>Note:  DC4 or ETX control codes blind the AUX RO or ROTR.<br><br>Place terminal in the Unattended mode; place test tape in reader; and operate READER ON push-button.<br><br>Stunt box detects DC2. | | |
| | | READER ON lamp on.<br><br>Printer copies complete test message no. 1. | |
| | | If printer is equipped with Print Suppression Modification Kit, verify print, space, and function suppress on printer following DC2.<br><br>If printer is not equipped with Print Suppression Modification Kit, printer will copy message no. 2. | 109, 170 |

4.13   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 50 (cont) | | Verify MARK/SPACE transitions on AUX RCVR Data interface signal (Pin 43 of AUX RCVR W50A Cord) with respect to Pin 1 following stunt box recognition of DC2. | 110 |
| | | Note:  This test checks AUX RCVR Data control by control characters DC2 and DC4 or ETX. | |
| | Stunt box detects DC4 or ETX. | Print Suppression removed on DC4 or ETX and printer copies message no. 3. | 112 |
| | | Upon printer detection of DC4, or ETX, verify AUX RCVR Data interface signal (Pin 43 of AUX RCVR W50A Cord) at 0 volts (Mark hold) with respect to Pin 1. | 111 |
| | | If AUX RCVR is an ROTR, verify Feed-Out Request (Pin 25 of AUX RCVR W50A Cord) switches to 0 volts with respect to Pin 1 upon detection of DC4 of ETX. | 113 |
| | | Reader transmission stops on tape-out condition. | |
| | | TAPE ALARM lamp on. | |
| | Operate READER ON push-button. | READER ON lamp off. | |
| | | TAPE ALARM lamp off. | |
| | If AUX RCVR is an ROTR, momentarily connect patch cord between Pin 27 of AUX RCVR W50A Cord (Feed Out In Process) and Pin 1. | Verify Pin 25 of AUX RCVR W50A Cord (Feed-Out Request) at +5 volts with respect to Pin 1. | 108 |
| 51 | Connect a patch cord between Pin 12 (Selected To Receiver, and Pin 1 of DAS W50A Cord). | | |

4.13  Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 51 (cont) | Reposition DC2/DC4 test tape in reader and operate READER ON pushbutton. | READER ON lamp on.<br><br>Reader transmits message no. 1 to printer. | |
| | Stunt box detects DC2. | If printer is equipped with Print Suppression modification kit, verify printer copies message no. 2.<br><br>Printers not equipped with Print Suppression also copy message no. 2. | 114 |
| | | Verify Pin 43 of AUX RCVR W50A Cord at 0 volts (Mark hold) with respect to Pin 1 following stunt box detection of DC2. | 115 |
| | Stunt box detects DC4 or ETX. | If AUX RCVR is an ROTR, verify Feed-Out Request (Pin 25 of AUX RCVR W50A Cord) at +5 volts with respect to Pin 1.<br><br>Printers with or without Print Suppression copy messages no. 1, no. 2, and no. 3.<br><br>Reader stops on tape-out condition.<br><br>TAPE ALARM lamp on. | 116 |
| | Operate READER ON pushbutton and remove tape from reader. | READER ON lamp off.<br><br>TAPE ALARM lamp off. | |
| | Remove patch cord between Pin 12 and Pin 1 of DAS W50A Cord. | | |

4.14  TWO-COLOR RIBBON (OPTIONAL)

| | | | |
|---|---|---|---|
| 52 | Perform this test only if the terminal under test is equipped with the optional two-color ribbon feature. | | |

4.14   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| **52** (cont) | Place terminal in the Off-Line mode and keyboard a short test message to the printer. | Test message printed in Black. | |
| | Depress "ESCAPE 3" character sequence keytops. | Ribbon magnet (right side of printer) energized. | 117, 154 |
| | Repeat same test message to printer. | Test message printed in Red. | |
| | | Verify entire character printed in Red. | 153 |
| | Depress "ESCAPE 4" character sequence keytops. | Ribbon magnet de-energized. | 118, 155 |
| | Repeat same test message. | Test message printed in Black. | |
| | Depress "ESCAPE 3" character sequence keytops. | Ribbon magnet energized. | 117, 155 |
| | Remove patch cord from Pin 24 (Motor Control) of DAS W50A Cord (other end remains connected to Pin 1). | Printer, reperforator and reader motors off. | |
| | | Copylamps off. | |
| | | Ribbon magnet de-energizes (Normalization to black ribbon on motor control cycle). | 119 |
| | Reconnect patch cord to Pin 24 of DAS W50A Cord. | Printer, reperforator, and reader motors on. | |
| | | Copylamps on. | |
| | Keyboard several characters. | Printer prints characters in Black. | |
| 53 | Remove all patch cords from DAS W50A Cord. | All set motors off. | |
| | | Copylamps off. | |
| | Place maintenance man switch in the on position. | All set motors on. | 120 |
| | | Copylamps on. | |
| 54 | Perform this check only if the terminal under test has a printer with a YAZ stunt box. | Verify TAB, Form Feed In Process interface signal on Pin 27 of DAS W50A Cord at +5 volts. | 121 |

4.14   Continued

| STEP | ACTION | VERIFICATION | TROUBLE ANALYSIS REFERENCES (Part 5) |
|---|---|---|---|
| 54 (cont) | | Note:   This lead is held at +5 volts through a 680 ohm isolation resistor when printer is equipped with a YAZ stunt box. | |
| 55 | Remove ac power from the terminal by placing CB101 (YESU 806) or S101 (YESU 826) in the off position.<br><br>Perform this check only if the terminal under test has a printer with a YAZ stunt box. | All set motors off.<br><br>Copylamps off.<br><br>Verify continuity between Pin 44 (Form Feed) of DAS W50A Cord and Pin 1. | |
| 56 | This test must be performed on all terminals. | Verify continuity between the wall outlet receptacle mounting screw and the following points:<br><br>YESU Frame<br><br>Utility Strip (YESU 806 only) Frame<br><br>Unpainted Part of Table Assembly<br><br>Unpainted Part of Printer Console<br><br>Printer Base<br><br>Printer Frame<br><br>Unpainted Part of RT Cabinet<br><br>Unpainted Part of RT Door<br><br>Reperforator Base<br><br>Reperforator Frame<br><br>Reader Frame | 122 |

## 5. TROUBLE ANALYSIS

5.01 Because of the complexity of the ASR terminal under test, the Trouble Analysis section divides the analysis into the main parts shown in Table L. A complete point-to-point wiring checkout for every possible problem cause would result in an extremely large troubleshooting document. If the problem does not involve a circuit card assembly or mechanical component, the craftsman must have the appropriate W-plan to check out the wiring. In addition, it is recommended that the craftsman have copies of the appropriate BSP adjustment sections on hand when testing an ASR terminal.

5.02 The circuit card number includes its location in the electrical service unit frame. For example, Z314 is located in vertical row 3 and horizontal position 14. When troubleshooting a logic level interface, an "off" state is indicated by approximately +5 v dc and an "on" state is indicated by 0 v to +0.5 v dc. Any signal level midway between indicates a defective circuit card.

CAUTION: BEFORE PERFORMING CONTINUITY OR RESISTANCE MEASUREMENTS, ALWAYS REMOVE MAIN POWER CORD FROM WALL OUTLET RECEPTACLE.

TABLE L

### 37 ASR TROUBLE ANALYSIS

| SUB-PART | DESCRIPTION |
|----------|-------------|
| 5.03 | Set Logic Trouble Analysis |
| 5.04 | Typing Unit Trouble Analysis |
| 5.05 | Typing Reperforator Trouble Analysis |
| 5.06 | Nontyping Reperforator Trouble Analysis |
| 5.07 | Tape Reader Trouble Analysis |
| 5.08 | Keyboard Trouble Analysis |

### 5.03 SET LOGIC TROUBLE ANALYSIS

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|-----|---------|----------------------|
| 1 | RT TAPE ALARM lamp on with adequate tape supply. | Verify adequate reperforator tape supply.<br><br>Verify READER ON lamp off.<br><br>Verify the following voltage levels on RT Card Connector XZ108 with respect to Pin B2. (No tape in reader.)<br><br>Pin B24    +5 v dc<br>Pin B25    +5 v dc<br>Pin B23    0 v<br>Pin B27    0 v<br>Pin B21    +5 v dc<br>Pin B22    0 v<br><br>If these voltage levels are verified and Pin B29 of XZ108 (RT) is at +5 v dc; replace the TP322323 Reader Driver card, Z108.<br><br>While performing voltage level checks, Pin B24 of XZ108 was at 0 v and the READER ON lamp is off, Pin B24 is shorted to ground on the card or in the punch base connector cabling, or through a misadjusted or defective Low Tape switch on the reperforator. |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 1 (cont) | | Check out wiring to XZ108 Pin B24 per W-Plan. Check out Low Tape switch and switch assembly adjustments.<br><br>Replace the TP322323 Reader Driver card, Z108 in RT module.<br><br>While performing voltage level checks, if Pins B22 and/or B27 are at +5 v, (No Taut Tape condition existing), check wiring to these pins per W-Plan. Check associated contact assemblies on the reader and RT door for proper adjustment. Replace if required.<br><br>If problem still exists, replace the TP322323 Reader Driver card, Z108. |
| 2 | PAPER ALARM lamp on with adequate paper supply. | With adequate paper supply, check voltage levels on Card Connector XZ105 (in YESU806 or YESU826) with respect to XZ105 Pin 2.<br><br>Pin 22        +5 v dc<br>Pin 20            0 v<br><br>If Pin 22 is at 0 v and Pin 20 is at +5 v, the low paper or paper-out contact is operated. Check for proper adjustment or defective switch assembly.<br><br>If Pin 20 and 22 of XZ105 is at +5 v, check for broken wire between Pin 20 and low paper or paper-out contact on printer, or broken ground wire from switch assembly.<br><br>If voltage levels are verified, replace the TP322320 Receive Control card, Z105. |
| 3 | RT motors and/or printer motors on with maintenance man switch in the off position. | If all set motors are on and copylight lamps are on, check XZ106 Pin B31 for +5 v dc with respect to Pin B2.<br><br>If Pin B21 is at 0 v, verify maintenance man switch is in off position. If switch is in off position, check for defective maintenance man switch or defective wiring.<br><br>If Pin B31 is at +5 v dc, check XZ106 Pin B33 for 0 v. Remove Z106 Mode Control. If motors remain on, check for defective wiring or short to circuit ground. If motors remain off with mode control removed, replace the TP322322 Mode Control I card, the TP322324 or Mode Control II card, Z106.<br><br>If RT motors are on and printer motor is off, replace the TP303149 Receiving Device card, Z107 in the RT module. |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 3 (cont) | | If printer motor is on and RT motors are off, replace the TP303149 Receiving Device card, Z303. |
| 4 | EOL lamp on (carriage at left-hand margin). | Verify printer EOL contact on printer base is open. Adjust if required.<br><br>Replace the TP322315 Counter Control card, Z303. |
| 5 | OFF-LINE mode lamp on when power is applied to terminal. | Verify Off-Line normally open contact (Bl-Y) wire terminated to TB111-E9.<br><br>Replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 6 | ON-LINE mode lamp on when power is applied to terminal. | Verify On-Line normally open contact (Y-BR) wire terminated on TB111-E8.<br><br>Replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 7 | UNATTENDED mode lamp off when power is applied to terminal. | Check associated 24 volt lamp in key/switch assembly. If OK, proceed as follows.<br><br>Check for 0 volts on Pins 33 and 42 of WECO W50A Cord with respect to Pin 2. If at +5 v dc, replace TP322322 Mode Control I or TP322324 Mode Control II card, Z106.<br><br>Check control panel wiring to associated lamp. Repair if required.<br><br>Check control panel +12.5 v dc lamp common. Repair if required.<br><br>If control panel wiring is OK, replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 8 | Unattended interface signal (Pin 33 and 42 of WECO W50A Cord) at +5 volts when power is applied to terminal. | Replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 9 | Off-Line interface signal (Pin 34 of WECO W50A Cord) at 0 v with respect to Pin 2 when power is applied to terminal. | Replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 10 | PUNCH ON lamp on when power is applied to terminal. | Replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |

5.03    Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 11 | Punch Blind (Pin B14 of XZ106) at +5 volts when power is applied to terminal. | Replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 12 | RCV ON PCH lamp on when power is applied to terminal. | Replace the TP322324 Mode Control II card, Z106. |
| 13 | AUX RCVR lamp on when power is applied to terminal. | Replace the TP322324 Mode Control II card, Z106. |
| 14 | AUX RCVR Blind (Pin B21 of XZ106) is at +5 v dc when power is applied to terminal. | Replace the TP322324 Mode Control II card, Z106. |
| 15 | READER ON lamp on when power is applied to terminal. | Replace the TP322323 Reader Driver card, Z108 in the RT module. |
| 16 | READER ON interface signal (Pin 40 of WECO W50A Cord) at +5 v dc when power is applied (READER ON lamp off). | Replace the TP322323 Reader Driver card, Z108 in the RT module. |
| 17 | Proper dc voltages absent. (CB101 or S101 in the on position.) | The following procedure applies to YESU826 only.<br><br>Check ac power cord is plugged into wall outlet receptacle.<br><br>Check to see which dc voltages are absent. Refer to W-Plan or 1021SD-B7. If all dc voltages are absent, consider the following:<br><br>Check F103 (15 amp, SL-BL) ac fuse.<br><br>Check F104 (2-1/4 amp SL-BL) ac fuse.<br><br>Open door on front of YESU and check the following dc fuses.<br><br>F1 — 4 amp — +12.5 v dc<br>F2 — 3 amp — +5 v dc<br>F3 — 3 amp — -12.5 v dc<br><br>Check for presence of approximately 20 v ac between pins (1) and (4) of CR101 Power Bridge Rectifier (see 1020SD-B1) in power supply. If voltage is present, check wiring from CR101 to filter capacitors and 322329 Regulator card. Repair as required.<br><br>If wiring and fuses are OK and 20 v ac is present at CR101, replace defective CR101. |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 17 (cont) | | Lack of 20 v ac at CR101 Pins (1) and (4) indicates defective primary circuit wiring and/or a defective T101 power transformer. Proceed as follows. |
| | | Check primary circuit wiring per W-Plan or 1020SD-B1. Check T101 primary for approximately 1.20 ohms. Replace T101 if required. |
| | | If F3 (-12.5 v dc) fuse repeatedly blows, remove all circuit cards (including cards in RT), check resistance between -12.5 v dc voltage bus and circuit ground and frame ground. |
| | | Measure resistance greater than 4 ohms. Replace F3 fuse and reapply power (cards out). If F3 does not blow, check each card for a short circuit card between -12.5 v dc and circuit ground. If resistance measurement is low, disconnect all connectors and recheck. Refer to W-Plan a 1021SD, 1025SD, and 1011SD, trace out wiring and repair. |
| | | If F1 (+12.5 v dc fuse repeatedly blows, remove all circuit cards (including cards in RT), check resistance between +12.5 v dc bus and circuit ground and frame ground. Measure resistance greater than 3 ohms. Replace F1 and reapply power (cards out). If F1 does not blow, check each card for a short circuit between +12.5 v dc and circuit ground. If resistance measurement is low, disconnect all connectors and recheck. Refer to W-Plan or 1021SD, 1025SD and 1011SD, trace out wiring, and repair. |
| | | If F2 (+5 v dc) fuse repeatedly blows, remove all circuit cards (including cards in RT) check resistance between +5 v dc voltage bus and circuit ground and frame ground. Measure resistance greater than 1.6 ohms. Replace F2 and reapply power (cards out). If F2 does not blow check each card for a short circuit between +5 v dc and circuit ground. If F2 blows with cards out proceed as follows. Remove power cord from wall receptacle Discharge Filter Capacitors C101 and C102 through a resistance, disconnect emitter of Q102 power pass transistor from TP322329 Regulator card in power supply. (See 1020SD), disconnect base of Q102 from emitter of Q101 Current Boost Transistor, disconnect base of Q101 from TP322329 Regulator card, and remove F2 fuse. Check NPN transistors, Q101 and Q102, on low ohms range as follows. Check for diode characteristic between the base/emitter and collector/base junctions of Q101 and Q102. |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 17<br>(cont) | | Note:   Each PN junction must be checked for conduction in one direction only and blocking (high resistance) in the other direction by reversing ohmmeter leads. Also check for blocking (high resistance) between collector/emitter junctions of Q101 and Q102. Replace transistors as required. If Q101 and Q102 are OK, proceed as follows.<br><br>Replace the TP322329 +5 v dc Regulator card in power supply.<br><br>Note 1:   When troubleshooting power supply, DO NOT APPLY POWER WITH P203 POWER SUPPLY CONNECTOR DISCONNECTED FROM J203. This will cause F2 to blow.<br><br>Note 2:   If power supply must be disconnected from YESU main frame and power applied, connect P203 Pin 10 (Remote Sense) to P203 Pin 13 (VCC).<br><br>The following procedure applies to YESU 806 only.<br><br>Check ac power cord is plugged into wall outlet receptacle.<br><br>Check to see which dc voltages are absent. Refer to W-Plan or 1010SD-B7. If all dc voltages are absent consider the following:<br><br>Check CB101 circuit breaker in utility strip. Refer to W-Plan or 8361WD.<br><br>Check dc fuses below:<br><br>F1 — 3 amp — +5 v dc<br>F2 — 5 amp — +12.5 v dc<br>F3 — 3 amp — -12.5 v dc<br><br>Check for presence of approximately 20 v ac between "ac" terminals of Power Bridge Rectifier CR1 in power supply. (See W—Plan or 8358WD.) If voltage is present, check CR1 wiring to filter capacitors and EC150 Regulator. Check filter capacitors. Repair as required.<br><br>If wiring, dc fuses and filter capacitors are OK, and 20 v ac is present at CR1, replace defective CR1.<br><br>Lack of 20 v ac at CR1, indicates defective primary circuit wiring and/or a defective T1 power transformer. Proceed as follows: |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|-----|---------|----------------------|
| 17 (cont) | | Check all primary circuit wiring per W-Plan or 8358WD. Check T101 primary for 1.2 ohms. |
| | | Note:   T1, a constant voltage transformer, has a high voltage resonant winding (660 v ac). If this winding is checked for 5.5 ohms resistance, verify resonant capacitor is discharged before attempting any measurements. |
| | | Replace T1 and matching resonating capacitor as required. |
| | | If F2 (+12.5 v dc) fuse repeatedly blows, remove all circuit cards (including cards in RT), check resistance between +12.5 v dc bus and circuit ground and frame ground. Measure resistance greater than 2.4 ohms, replace F2 and reapply power (cards out). |
| | | If F3 does not blow, check each card for a short between +12.5 v dc and circuit ground. If resistance measured is low, disconnect all connectors, and recheck. Trace out wiring and repair per W-Plan or 1010SD, 1025SD or 1011SD. |
| | | If F3 (-12.5 v dc) fuse and F1 (+5 v dc) fuse repeatedly blow, consider the following causes: |
| | | Check for short circuit between -12.5 v dc voltage bus and circuit ground and frame ground (all cards out). Disconnect all connectors to isolate source of short. Check all cards for short between -12.5 v dc and circuit ground if required. Refer to W-Plan or 1010SD, 1025SD, or 1011SD. |
| | | Note:   -12.5 v dc is used as a reference for the EC150 Power Supply Regulator card. Whenever F3 blows, F1 will blow due to regulator crowbar action. |
| | | If F1 (+5 v dc) fuse repeatedly blows, consider the following: |
| | | Check for a short circuit between the +5 v dc voltage bus and circuit ground and frame ground (all cards out). Check all cards for short circuit between +5 v dc and ground, if required. Check all associated wiring per W-Plan or 1010SD, 1025SD, or 1011SD. Repair as required. |
| | | Check power transistors in power supply as follows: |
| | | Discharge filter capacitors, C2 and C3, disconnect emitter of Q1 power pass transistor from EC150 card, |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 17 (cont) | | disconnect base of Q1 from emitter of Q3, disconnect base of Q3 for EC150 card, and remove F1. Check NPN transistors (see 8358WD or W-Plan), Q1 and Q3 on low ohms range as follows. Check for diode characteristics between the base/emitter and collector/base junctions of Q1 and Q3.

Note:   Each PN junction must be checked for conduction in one direction only and blocking (high resistance) in the other direction by reversing ohmmeter leads. Also check for blocking (high resistance between collector/base junctions of Q1 and Q3, are OK, proceed as follows.

Replace the EC150 Power Supply Regulator card. |
| 18 | Printer, punch and reader motors off in Off-Line mode. Copylamps off. | Verify all dc voltages are present. See Trouble No. 17.

Verify 0 v on Pin B31 of XZ106 with respect to Pin B2. If Pin B31 is not at 0 v, replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106.

Check wiring from DAS interface connector P303 to Pin B31 of XZ106. Refer to W-Plan or 1010SD or 1021SD.

If Pin B31 of XZ106 is at 0 v and wiring from DAS is OK, proceed as follows.

Check for 0 v on Pin B33 of XZ106 with respect to Pin B2. If not at 0 v, replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106.

PRINTER MOTOR

If Pin 33 is at 0 v, check for approximately 0 v on XZ304 Pin 8 with respect to Pin 2. Check XZ304 Pin 9 for approximately -12 v dc. If Pin 9 is at +12.5 v dc with Pin B at 0 v, replace Receiving Device card, Z304.

If XZ304 Pin 9 is at -12 v dc with Pin 8 at 0 v, check wiring from Pin 9 to motor control relay. Refer to W-Plan or 1010SD or 1021SD. Repair as required.

Check motor control relay.

Note:   This relay is contained in the utility strip for YESU806 and in the power supply for YESU826. Replace as required. |

5.03  Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|-----|---------|---------------------|
| 19 | Printer motor on, RT motors off in Off-Line mode. | Verify RT in interface cable P310 is properly mated to J310.<br><br>Check for presence of proper voltages in RT. Refer to W-Plan or 1025SD and 1011SD.<br><br>Check for 0 v on XZ107 Pin 4 with respect to Pin 2 (RT module). If not at 0 v, check interface cable wiring per W-Plan or 1025SD, 1011SD, 1010SD, and 1021SD. Repair as required.<br><br>If XZ107 Pin 4 is at 0 v, check for -12.5 v dc on XZ107 Pin 9 with respect to Pin 2 (RT module). If XZ107 Pin 9 is at +12.5 v dc, replace TP303149 Receiving Device card, Z107 in RT module.<br><br>Check wiring from XZ107 Pin 9 to motor control relay. Repair as required.<br><br>Check motor control relay. Replace as required. |
| 20 | RT motors on, printer motor off in the Off-Line mode. | Replace TP303149 Receiving Device card, Z304.<br><br>Check wiring from XZ304 Pin 9 to the motor control relay. Repair as required.<br><br>Check motor control relay. Replace as required. |
| 21 | Copylamps off, set motors on. | Check for defective copylamps.<br><br>Check copylamp transformer primary and secondary wiring. Repair as required.<br><br>Replace copylamp transformer if required. |
| 22 | Off-Line mode lamp off. | Check associated lamp in control panel key/switch assembly.<br><br>Check control panel wiring.<br><br>Replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 23 | Unattended mode lamp on. | Check control panel wiring.<br><br>Replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 24 | On-Line mode lamp on. | See Corrective Procedure 23. |

5.03 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|-----|---------|----------------------|
| 25 | Unattended interface signal Pins 33 and 42 of DAS test jig at 0 v. | Check DAS interface cable wiring for short to ground.<br><br>Replace TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 26 | Printer runs open (armature remains unattracted). Off-Line mode. | Verify printer connector P306 plugged into J306.<br><br>Verify all dc voltages present.<br><br>Remove Local Distributor, Z101. If printer selector is Mark hold, replace the TP322059 Local Distributor. If printer selector runs open, reinstall Local Distributor. Remove the TP322320 Receive Control, Z105. If printer selector runs open, reinstall the Receive Control, and replace the TP303149 Receiving Device card, Z304. If printer selector runs open proceed as follows.<br><br>With all cards in set, verify +5 v on the following circuit card pins.<br><br><table><tr><td>Card Connector</td><td>Pin</td></tr><tr><td>XZ101</td><td>12</td></tr><tr><td>XZ105</td><td>26</td></tr><tr><td>XZ105</td><td>31</td></tr></table><br>If any of the above pins are at 0 v, check for shorted pins and/or wiring errors.<br><br>Disconnect P306 and J306. Check for approximately 3.5 ohms between J306 Pin 1 and J306 Pin 3. Replace coils if required. |
| 27 | Punch runs open (armature remains unattracted). | Verify punch connector P315 is plugged into J315.<br><br>Check for proper dc voltages present in RT module. Refer to W-Plan or 1011SD or 1025SD for wiring information.<br><br>If punch selector runs open when the PUNCH ON lamp is off, remove Receive Control, Z105. If punch selector continues to run open, reinstall Z105 and replace the TP303149 Receiving Device card, Z107 in RT module. If punch selector runs open, proceed as follows.<br><br>Verify +5 v on XZ107 Pin 5 with respect to Pin 2. If not at +5 volts, check RT interface wiring for shorted or defective wiring. Refer to W-Plan or 1010SD, 1011SD, 1021SD, and 1025SD. |

5.03    Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 27 (cont) | | Disconnect P315 and J315. Check for approximately 3.5 ohms between J315 Pin 17 and J315 Pin 16. Repair or replace coils if required. |
| 28 | Typing unit prints lower case alphas. Keyboard Caps option implemented. | Verify the TP322044 Keyboard Interface card, Z301 is Issue 10 or later.<br><br>Verify presence of strap between XZ301 Pin 24 and XZ301 Pin 2.<br><br>Replace the TP322044 Keyboard Interface card, Z301 (Issue 10 or later).<br><br>Replace the TP322059 Local Distributor, Z101. |
| 29 | Typing unit prints characters in improper case. Keyboard Caps option not implemented. | Replace the TP322044 Keyboard Interface card, Z301.<br><br>Replace the TP322059 Local Distributor, Z101.<br><br>See Keyboard Trouble Analysis Section 5.08, Trouble No. 207 and 208.<br><br>See Printer Trouble Analysis Section 5.04, Trouble No. 151, 156, and 157. |
| 30 | Typing unit prints wrong characters. | See Corrective Procedure 29. |
| 31 | No Tab In Process interface signal on Pin 27 of WECO W50A Cord. Tab function performed. | Verify printer has YBA or YBB stunt box.<br><br>Check wiring to Tab Normally Open and Tab Normally Closed stunt box contacts per W-Plan or 1010SD or 1021SD.<br><br>Check wiring from XZ105 Pin 11 to Pin 27 of WECO W50A Cord.<br><br>Verify continuity from circuit ground to Pin 1 of WECO W50A Cord.<br><br>Replace TP322320 Receive Control card, Z105. |
| 32 | No Form Feed interface signal on Pin 44 of WECO W50A Cord. Form feed function performed. | Verify printer has a YBA or YBB stunt box.<br><br>Verify strap A on Receive Control, Z105; removed.<br><br>Check wiring to form feed normally open and form feed normally closed stunt box control per W-Plan, or 1010SD or 1021SD.<br><br>Check wiring from XZ105 Pin 5 to Pin 44 of WECO W50A Cord.<br><br>Replace the TP322320 Receive Control card, Z105. |

5.03  Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 33 | Signal bell does not ring. | Check code in selector and codebars.<br><br>Check wiring to bell normally open stunt box contact per W-Plan or 1010SD or 1021SD. See Figures 3 or 4 or 5.<br><br>Check wiring from Z105 Pin 17 to bell assembly.<br><br>Check for bell winding resistance of 110 ohms ±10%. Replace signal bell if required.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 34 | EOL lamp on after RETURN key-top operated. | Check printer EOL contact, contact assembly adjustment, and wiring on typing unit base assembly. Replace or repair as required.<br><br>Replace the TP322045 Character Counter card, Z302 (piggyback on Z301).<br><br>Replace the TP322315 Counter Control, Z303. |
| 35 | EOL lamp remains off at desired number of characters per line. | Check EOL lamp in associated key/switch assembly.<br><br>Check the TP322315 Counter Control card for proper programmed character count.<br><br>Check control panel wiring to EOL lamp. Repair as required.<br><br>Replace the TP322045 Character Counter card, Z302.<br><br>Replace TP322315 Counter Control card, Z303. |
| 36 | EOL lamp on near left-hand margin. | Check TP322315 Counter Control card for proper programmed character count.<br><br>Replace TP322045 Character Counter card, Z302.<br><br>Replace TP322315 Counter Control card, Z303.<br><br>Check PTR EOL contact on printer base. |
| 37 | EOL lamp on ten (10) characters too soon. | Replace the TP322045 Character Counter card, Z302 (piggyback on Z301).<br><br>Replace the TP322315 Counter Control card, Z303. |
| 38 | EOL lamp remains on after carriage returned to left-hand margin by manual return. | See Corrective Procedure 34. |

5.03    Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 39 | No Character Detected interface signal on Pin 14 of WECO W50A Cord. | If strap option B on Z105 is connected, verify no paper alarm exists.<br><br>Verify contact closure to circuit ground on XZ105 Pin 18 during reception of data. If an oscilloscope is not available to verify adequate contact closure time, check contact for proper adjustment per Section 574-320-703.<br><br>If no contact closures are observed, check contact adjustment per Section 574-320-703.<br><br>Check wiring from XZ105 Pin 18 to the character detected normally open contact on the printer per W-Plan or, 1010SD or 1021SD.<br><br>Verify circuit ground is connected to the stationary contact.<br><br>Check wiring from XZ105 Pin 19 to Pin 14 of the WECO W50A Cord.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 40 | Character Detected interface signal at +5 v dc with printer selector Mark hold. | Verify approximately +12.5 v dc between XZ105 Pin 18 and Pin 2.<br><br>If XZ105 Pin 18 is at 0 v, check contact adjustment per Section 574-320-703.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 41 | Improper timing on Character Detected interface signal. | Readjust contact assembly per Section 574-320-703.<br><br>Note:   Proper timing must be obtained while receiving data at 150 wpm (10 Unit Code).<br><br>Check for defective or broken return spring on contact assembly.<br><br>Replace Receive Control card, Z105. |
| 42 | Character detected not inhibited by paper alarm (Z105 strap B connected). | Verify strap B connected.<br><br>Verify PAPER ALARM lamp on.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 43 | Paper alarm remains off when paper supply is removed. | Check for defective lamp in associated key/switch assembly. |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 43 (cont) | | Check wiring from XZ105 Pin 22 (paper alarm normally open) and XZ105 Pin 20 (paper alarm normally closed) to printer paper alarm contacts. Refer to W-Plan or 1010SD or 1021SD.<br><br>Check control panel wiring per W-Plan or 8365WD.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 44 | No Paper Alarm interface signal on Pin 31 of WECO W50A Cord. | Check wiring from XZ105 Pin 22 (paper alarm normally open) and XZ105 Pin 20 (paper alarm normally closed) to printer paper alarm contacts. Refer to W-Plan, 1010SD or 1021SD.<br><br>Check wiring from XZ105 Pin 21 to W50A Cord per W-Plan or 1010SD or 1021SD. Repair as required.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 45 | PAPER ALARM lamp remains on after paper supply is replaced. | Check wiring from XZ105 Pin 20 (paper alarm normally closed) to paper alarm contacts on printer.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 46 | No Character Detected interface signal after paper supply is replaced. PAPER ALARM lamp on. | See Corrective Procedure 45. |
| 47 | Paper Alarm interface signal remains at 0 v after paper supply is replaced. PAPER ALARM lamp on. | See Corrective Procedure 45. |
| 48 | PUNCH ON lamp remains off after operation of punch on key/switch assembly. | Verify Off-Line mode lamp on.<br><br>Check associated 24 volt lamp in punch on key/switch assembly.<br><br>Check control panel wiring to punch on key/switch assembly per W-Plan or 8365WD.<br><br>If equipped with RCV ON PCH feature, check control panel wiring to RCV ON PCH key/switch assembly per W-Plan or 8365WD.<br><br>Verify proper straps are selected per terminal requirements. Refer to W-Plan or 8930WD for circuit card strapping information. The above refers to terminals equipped with the TP322324 Mode Control II card assembly. |

5.03    Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 48 (cont) | | Replace the TP322322 Mode Control I card or the TP322324 Mode Control II card. |
| 49 | No view last character. | Verify all dc voltages are present. See Trouble No. 17. |
| | | Check wiring to punch connector, P315 per W-Plan or, 1010SD or 1021SD. |
| | | Check punch wiring and VLC solenoid for 72 ohms ±10% per W-Plan or 4735WD. |
| | | See Section 5.05, Trouble No. 185. |
| | | Check RT Control Panel wiring per W-Plan or 8365WD. |
| 50 | Unable to transmit from keyboard to printer and/or punch in the Off-Line mode. | Check for presence of 4.8 Hz clock signal on XZ106 Pin B26. (Use oscilloscope.) If not present, replace the TP322322 Mode Control I card, Z106 or the TP322325 Oscillator card (piggyback on Mode Control II card, Z106). |
| | | See Keyboard Trouble Analysis Section 5.08, Trouble No. 205. |
| | | Verify keyboard aux contact closure and +5 v/ -0.7 v/+5 v transition on XZ301 Pin 25. |
| | | Check wiring from keyboard aux contact to XZ301 Pin 25, if required. |
| | | Check amplitude of keyboard auxiliary contact signal. If signal is +5 v/-12 v/+5 v, replace the TP322044 Keyboard Interface card, Z301 and the TP322321 Send Control card, Z103. |
| | | Check for +5 v/0 v/+5 v signal on Pin 21 or XZ301. If signal is not present, replace the TP322321 Send Control card, Z103. |
| | | If signal on Pin 21 of XZ301 is present, check for +5 v/0 v/+5 v signal on Pin 18 of XZ103. If signal is not present, replace the TP322321 Send Control card, Z103. |
| | | If signal on Pin 18 of XZ103 is present, replace the TP322059 Local Distributor, Z101. |
| 51 | Dropping bits when transmitting from keyboard to printer and/or punch in the Off-Line mode. (Printer and punch copies have same errors.) | See Keyboard Trouble Analysis Section 5.08, Trouble No. 207. |
| | | If same bits are consistently incorrect, replace the TP322044 Keyboard Interface card, Z301 and/or the TP322059 Local Distributor card, Z101. |

5.03 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 52 | KBD to PTR/PCH (Off-Line mode) KBD to PTR data OK, KBD to PCH data errored. | See 5.05, Trouble No. 172, 173, and 182<br><br>or<br><br>See 5.06 Trouble No. 190, 191, 195, and 197.<br><br>Replace the TP303149 Receiving Device card, Z107 in the RT module. |
| 53 | KBD to PTR/PCH (Off-Line mode) KBD to PTR data errored, KBD to PCH data OK. | Replace the TP303149 Receiving Device card, Z304 in YESU806 or YESU826.<br><br>See Printer Trouble Analysis Section 5.04, Trouble No. 124 to 218, 149 to 153, 156, and 157. |
| 54 | No EOT Punched Interface signal on Pin 29 of WECO W50A Cord. Transmission from keyboard to printer and/or punch OK. | Check wiring from XZ103 Pin 30 to P303 interface connector and WECO W50A Cord.<br><br>Replace the TP322321 Send Control card, Z103. |
| 55 | PUNCH ON lamp on but punch does not copy test message (selector energized) from keyboard. Printer data OK. | Verify +5 v on XZ106 Pin B14. If at 0 v proceed as follows.<br>Replace the TP322322 Mode Control card, Z106 or the TP322324 Mode Control II card, Z106.<br>Check YESU wiring for short per W-Plan, or 1010SD or 1021SD.<br>Verify +5 v/0 v/+5 v transitions on Pin 27 of XZ105. If Pin 27 is a steady +5 v, replace the TP322320 Receive Control card, Z105.<br>Replace the TP303149 Receiving Device card, Z107 in the RT module. |
| 56 | With keyboard idle, EOT Punched Interface signal Pin 29 of WECO W50A Cord rests at 0 v. Keyboard transmission to printer and/or punch OK. | Replace the TP322321 Send Control card, Z103.<br><br>Check wiring from XZ103 Pin 30 to P303 interface connector and WECO W50A Cord. |
| 57 | PUNCH ON lamp cannot be manually turned off (Off-Line mode). | Check wiring from XZ106 Pin B17 (punch on normally closed) and XZ106 Pin 16 (punch on normally open) to control panel per W-Plan or 8365WD.<br><br>Replace the TP322322 Mode Control I card, Z106 or the TP322324 Mode Control II card, Z106. |
| 58 | With PUNCH ON lamp off, EOT keyboarded results in EOT Punched Interface signal on Pin 29 of WECO W50A Cord. | Replace the TP322322 Mode Control I card, Z106 or the TP322324 Mode Control II card, Z106.<br><br>Replace the TP322321 Send Control card, Z103. |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 59 | With PUNCH ON lamp off (lamp previously on), punch copies keyboarded data (Off-Line mode). | Verify XZ106 Pin B14 at 0 v. If not at 0 v, replace the TP322322 Mode Control I card, Z106 or the TP322324 Mode Control II card, Z106.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 60 | READER ON lamp remains off when associated RT key/switch is operated (tape in reader). | Verify all dc voltages are present. See Trouble No. 17.<br><br>Check RT interface voltage bus wiring per W-Plan or 1010SD, 1011SD, 1021SD, or 1025SD.<br><br>Check associated lamp in reader on key/switch assembly.<br><br>Check wiring from XZ108 Pin A6 (reader on normally closed) and XZ108 Pin A7 (reader on normally open) in RT module per W-Plan or 8365WD.<br><br>Check wiring from XZ108 Pin A33 (RT) to associated lamp per W-Plan or 1011SD or 1025SD.<br><br>Replace the TP322323 Reader Driver card, Z108 in RT module. |
| 61 | Reader will not feed (tape in reader), READER ON lamp on. | Verify no taut tape condition exists.<br><br>Check for presence of proper dc voltages. Check voltage bus wiring per W-Plan or 1011SD or 1025SD if required.<br><br>Verify XZ108 Pin B20 at 0 v.<br><br>Verify the following voltages on XZ108 connector in RT module.<br><br><table><tr><td>Pin</td><td>Voltage</td></tr><tr><td>B23</td><td>+5 v</td></tr><tr><td>B25</td><td>0 v</td></tr></table><br>If the voltages on the above pins are reversed, the tape-out contacts in reader are not operating properly. Refer to 5.07, Trouble No. 201 for CX adjustment information.<br><br>If Pin B23 and B25 are both at +5 v, check for broken wire from reader to Pin B25. Refer to W-Plan or 1011SD or 1025SD.<br><br><table><tr><td>Pin B21</td><td>+5 v</td></tr><tr><td>Pin B22</td><td>0 v</td></tr><tr><td>Pin B27</td><td>0 v</td></tr></table> |

5.03 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 61 (cont) | | Voltage levels other than those specified for Pins B21, B22, and B27 indicate operated or defective taut tape contacts on reader and/or RT door or defective wiring. See W-Plan or 1011SD, 1025SD, and 5072WD.<br><br>Refer to 5.07, Trouble No. 201 for CX adjustments.<br><br>Check for presence of Cp1 and Cp2 clock pulse signals from reader flywheel pickup coils on XZ108 Pins A23 and A22, respectively. (Scope must be used.)<br><br>Note: Signal amplitude must be a minimum of +1.5 volts peak (minimum of 3 volts peak-to-peak). Refer to 5.07, Trouble No. 201 CX for adjustment.<br><br>If Cp1 and Cp2 are not present, check CX wiring for shorted out pickup coils per W-Plan or 5072WD, 1011SD and 1025SD.<br><br>If XZ108 Pin B20 is at 0 v and all previous Corrective Procedures have been verified, check CX reader magnet to see if it is energized, check wiring from XZ108 Pin B30 (reader magnet) to CX reader. Refer to W-Plan or 1011SD, 1025SD, and 5072WD for wiring information. If magnet is energized and reader will not feed, see 5.07, Trouble No. 203 for required adjustment.<br><br>If reader magnet wiring is OK and reader magnet is not energized, replace the TP322323 Reader Driver Interface card, Z108 in RT.<br><br>If all previous Corrective Procedures are verified, replace the TP322321 Send Control card, Z103.<br><br>Replace the Local Distributor, Z101 in YESU826 or YESU806. |
| 62 | Reader steps once and stops. | Momentarily connect a clip strap between XZ108 Pin B32 and B2. If reader steps, replace the TP323321 Send Control, Z103. Retransmit message. If same problem exists, replace the Local Distributor, Z101. |
| 63 | Message from RDR to PTR errored, KBD to PTR OK (Off-Line mode). | See 5.07, Trouble No. 199 and 200 for CX adjustment.<br><br>Replace the TP322321 Send Control card, Z103.<br><br>Replace the TP322323 Reader Driver card, Z108 in the RT. |

5.03  Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 64 | Reader transmission continues during tape-out condition. (TAPE ALARM lamp on.) | Verify the following voltages on XZ108 in RT.<br><br>Pin  Voltage<br>B23   0 v<br>B25   +5 v<br><br>If above voltages are verified, replace the TP322323 Reader Driver card, Z108 in RT.<br><br>Check wiring from Pins B23 and B25 to CX Reader, if above voltages are not verified. Refer to W-Plan or 1011SD, 1025SD and 5072WD. |
| 65 | TAPE ALARM lamp remains off during reader tape-out condition. (READER ON lamp on.) | Check for defective lamp in associated key/switch assembly.<br><br>If OK, check wiring for XZ108 Pin B33 to RT control panel per W-Plan or 8365WD.<br><br>Replace the TP322323 Reader Driver card, Z108 in the RT. |
| 66 | TAPE ALARM lamp remains on when READER ON lamp is extinguished. | Verify adequate punch tape supply.<br><br>Replace the TP322323 Reader Driver card, Z108 in the RT. |
| 67 | Reader does not step when reader step key/switch is operated. Normal reader operation OK. | Verify +5 v/0 v/+5 v signal on XZ108 Pin B31 with respect to Pin B2.<br><br>Check wiring from XZ108 Pin B31 (one step normally open) to RT control panel per W-Plan or 8365WD.<br><br>Replace the TP322323 Reader Driver card, Z108 in the RT. |
| 68 | Reader On Interface signal on Pin 40 of WECO W50A Cord at 0 v. (READER ON lamp on.) | Check wiring from XZ108 Pin B28 in RT to P303 interface cable and WECO W50A Cord. Refer to W-Plan or 1011SD, 1025SD, 1010SD, and 1021SD.<br><br>Replace the TP322323 Reader Driver card, Z108 in RT. |
| 69 | Reader On, Taut Tape, Tape Available Interface signal on Pin 30 of WECO W50A Cord at 5 v. | Check wiring from XZ108 Pin A29 in RT to P303 interface cable and WECO W50A Cord. Refer to W-Plan or 1011SD, 1025SD, 1010SD and 1021SD.<br><br>Replace the TP322323 Reader Driver card, Z108 in RT. |
| 70 | Reader does not stop transmission when reader taut tape condition exists. | Verify XZ108 Pin B20 at +5 v in RT. If Pin B20 is at 0 v, proceed as follows. |

5.03 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| **70** (cont) | | Verify +5 v on XZ108 Pin B27 and 0 v on B21 in RT. If above voltages are verified, replace the TP322323 Reader Driver card, Z108 in the RT. If above voltages are not verified, check wiring from above pins to reader taut tape contacts. Refer to W-Plan or 1011SD, 1025SD, and 5072WD. |
| 71 | Reader On, Taut Tape, Tape Available Interface signal on Pin 30 of WECO W50A Cord at 0 v during taut tape condition. | See Corrective Procedure 69. |
| 72 | Taut Tape Interface signal on Pin 36 of WECO W50A Cord at +5 v during a reader taut tape condition. | Replace the TP322323 Reader Driver card, Z108 in RT. |
| 73 | Taut Tape Interface signal on Pin 36 of WECO W50A Cord at 0 v during normal reader operation. | Check wiring from XZ108 Pin A24 in RT to P303 interface cable and WECO W50A Cord. Refer to W-Plan or 1011SD, 1025SD, 1010SD and 1021SD.<br><br>Replace the TP322323 Reader Driver card, Z108 in RT. |
| 74 | Reader does not stop transmission when RT door taut tape condition exists. | Verify XZ108 Pin B20 at +5 v in RT. If Pin B20 is at 0 v, proceed as follows.<br><br>Verify +5 v on XZ108 Pin B22 and 0 v on Pin B21. If above voltages are verified, replace the TP322323 Reader Driver card, Z108 in the RT. If above voltages are not verified, check wiring from above pins to RT door taut tape contacts. Refer to W-Plan or 1011SD and 1025SD. |
| 75 | Operating the reader on key/switch (lamp off) does not stop reader transmission. Previous reader operation OK. | Verify XZ108 Pin B20 at +5 v in RT. If not at +5 v, replace the TP322323 Reader Driver card, Z108 in the RT. |
| 76 | Tape Available interface signal on Pin B37 of WECO W50A Cord at 0 v with tape in reader and tape gate closed. | Verify +5 v on XZ108 Pin B23 and 0 v on Z108 Pin B25 in RT module.<br><br>If above pins have voltage levels reversed, see 5.07, Trouble No. 201 for proper tape-out contact adjustment.<br><br>Check wiring from XZ108 Pin B19 (in RT) to P303 interface cable and W50A Cord. Refer to W-Plan or 1010SD, 1011SD, 1021SD and 1025SD.<br><br>Replace the TP322323 Reader Driver card, Z108 in the RT. |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 76 (cont) | | Check wiring from Pins B23 and B25 of XZ108 to reader tape-out contacts. Refer to W-Plan or 1011SD, 1025SD and 5072WD. |
| 77 | During continuous reader transmission, keyboarded characters garble printer copy (Off-Line mode). | Replace the TP322321 Send Control card, Z103. |
| 78 | Tape Available Interface signal on Pin B37 of WECO W50A Cord at +5 v during a reader tape-out condition. | Verify 0 v on XZ108 Pin B23 and +5 v on XZ108 Pin B25 in RT module.<br><br>If above pins have voltage levels reversed, see 5.07, Trouble No. 201 for proper tape-out contact adjustment.<br><br>Replace the TP322323 Reader Driver card, Z108 in the RT.<br><br>Check wiring from Pins B23 and B25 of XZ108 to reader tape-out contacts. Refer to W-Plan or 1011SD, 1025SD, and 5072WD. |
| 79 | Random operation of taut tape lever on RT door causes errored or lost characters. | See 5.07, Trouble No. 199 for CX pickup magnet adjustment.<br><br>Replace the TP322321 Send Control card, Z103.<br><br>Replace the TP322059 Local Distributor, Z101 if trouble occurs in the Off-Line mode or replace the TP322059 Line Distributor, Z102 if the problem occurs in the On-Line or Unattended modes. |
| 80 | RT TAPE ALARM lamp remains off when reperforator tape supply is removed. | If proper TAPE ALARM lamp operation was noted during previous tests, check wiring from XZ108 Pin B24 (in RT) to the low tape contact on the punch base.<br><br>Check contact assembly adjustment.<br><br>Replace contact if required. |
| 81 | Reader fails to pause after transmitting HT Clear, and/or HT (function performed). | Verify a momentary +5 v/0 v/+5 v transition on Tab, Form Feed in Process interface lead, Pin 27 of WECO W50A Cord. Above verification indicates stunt box detection of HT Clear and/or HT. Replace the TP322321 Send Control card, Z103.<br><br>Monitor Pin 8 (tab normally open) of XZ105 for a +5 v/0 v/5 v transition during printer reception of HT Clear and/or HT. Monitor Pin 9 (tab normally closed) of XZ105 for a 0 v/+5 v/0 v transition during printer reception of HT Clear and/or HT. If no transitions are |

5.03 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 81 (cont) | | observed, check wiring to associated stunt box contacts. Refer to W-Plan or 1010SD or 1021SD. If wiring is OK, check associated function bars for proper coding and operation. Correct as required. If transitions are observed, proceed as follows.<br><br>Replace the TP322320 Receive Control card, Z105.<br><br>Replace the TP322321 Send Control card, Z103, if required. |
| 82 | Operation of on-line key/switch fails to turn off set motors. ON-LINE mode lamp on. | Replace the TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 83 | ON-LINE lamp fails to turn on when on-line key/switch is operated. | Check associated 24 volt lamp on control.<br><br>Check wiring to ON-LINE control panel lamp per W-Plan or 8365WD. Repair as required.<br><br>Replace the TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 84 | Operation of ON-LINE pushbutton fails to extinguish OFF-LINE lamp. ON-LINE and OFF-LINE lamps on. | Replace the TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 85 | PUNCH ON lamp remains off when switching from Off-Line to On-Line mode. Manual control of PUNCH ON lamp OK in Off-Line mode. | Replace the TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 86 | Unattended Interface signal (Pins 33 and 42 of WECO W50A Cord) at 0 v in the On-Line mode. | Replace the TP322322 Mode Control I card or TP322324 Mode Control II card, Z106.<br><br>Check wiring from XZ106 Pin B15 to P303 interface and W50A Cord. Refer to W-Plan or 1010SD or 1021SD. |
| 87 | No transmission from reader to printer in the On-Line mode. Off-Line mode OK. | Replace the TP322321 Send Control card, Z103.<br><br>Replace the TP322059 Line Distributor, Z102. |
| 88 | Transmission from reader to printer in the On-Line mode results in errored copy. Reader to printer in the Off-Line mode OK. | Replace the TP322059 Line Distributor, Z102.<br><br>Replace the TP322320 Receive Control, Z105. |
| 89 | Printer and/or punch copy garbled when simultaneously transmitting in the On-Line and Local circuits. | Replace the TP322321 Send Control card, Z103. |

5.03  Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 90 | UNATTENDED mode lamp remains off after operating the Unattended mode key/switch assembly. | Check associated 24 volt lamp on control panel.<br><br>Check Unattended interface signal (Pin 33 and 42 of WECO W50A Cord) for 0 v. If not at 0 v, check wiring to Unattended mode switch per W-Plan or 8365WD.<br><br>Check control panel lamp wiring from XZ106 Pin B7 to control panel per W-Plan or 8365WD.<br><br>Replace the TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 91 | Operation of UNATTENDED pushbutton fails to extinguish the ON-LINE lamp. UNATTENDED and ON-LINE lamps on. | Replace the TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 92 | Operation of UNATTENDED pushbutton fails to turn off PUNCH ON lamp. | Replace the TP322322 Mode Control I card or TP322324 Mode Control II card, Z106. |
| 93 | Printer copies keyboarded message in the Unattended mode. | Replace the TP322324 Mode Control II card, Z106. Retest.<br><br>Replace the TP322321 Send Control card, Z103. Retest.<br><br>Replace the TP322320 Receive Control card, Z105. Retest. |
| 94 | Punch copies keyboarded message in the Unattended mode. | Perform Corrective Procedure 93. |
| 95 | AUX RCVR lamp remains off when AUX RCVR pushbutton is operated. | Recheck strap option wiring on the TP322324 Mode Control II card, Z106.<br><br>Check associated 24 volt lamp on control panel.<br><br>Recheck wiring to AUX RCVR control panel pushbutton per W-Plan or 8365WD.<br><br>Check associated lamp wiring from XZ106 Pin B18 to control panel for continuity.<br><br>Replace the TP322324 Mode Control II card, Z106. |
| 96 | Punch fails to copy reader message (AUX RCVR lamp on). Printer copies message OK. Unattended mode. | Recheck strap option wiring on the TP322324 Mode Control II card assembly.<br><br>Verify +5 v on XZ106 Pin B14 (punch blind). If not at +5 v, replace the TP322324 Mode Control II card, Z106. |

5.03    Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 96 (cont) | | Replace the TP322320 Receive Control card, Z105. |
| 97 | RCV ON PCH lamp remains off when RCV ON PCH pushbutton is operated. | Check associated 24 volt lamp on control panel.<br><br>Check strap option wiring for RCV ON PCH feature per W-Plan or 8365WD.<br><br>Check RCV ON PCH switch wiring per W-Plan or 8365WD.<br><br>Check RCV ON PCH lamp wiring from XZ106 Pin A17 to control panel per W-Plan or 8365WD.<br><br>Replace the TP322324 Mode Control II card, Z106. |
| 98 | Printer copies message from reader. Punch does not copy. RCV ON PCH lamp on. | Verify Z106 Pin B14 (punch blind) at +5 v. If B14 is at 0 v, replace the TP322324 Mode Control II card, Z106.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 99 | Punch copies reader message with RCV ON PCH lamp off. | Replace the TP322320 Receive Control card, Z105. |
| 100 | RCV ON PCH lamp fails to normalize to off when changing from Unattended to On-Line mode. | Replace the TP322324 Mode Control II card, Z106. |
| 101 | RCV ON PCH feature enabled (lamp on) in the On-Line mode. | Verify strap D on TP322324 Mode Control II card closed.<br><br>Replace the TP322324 Mode Control II card, Z106. |
| 102 | PUNCH ON lamp fails to turn off when going from the On-Line to Unattended mode. | Replace the TP322324 Mode Control II card, Z106. |
| 103 | AUX RCVR Motor Control Interface signal Pin 24 of AUX RCVR W50A Cord at +5 v during motor on command. | Replace the TP322324 Mode Control II card, Z106. |
| 104 | AUX RCVR Motor Control Interface signal on Pin 24 of AUX RCVR W50A Cord remains at 0 v during motor off command. | Replace the TP322324 Mode Control II card, Z106. |
| 105 | No MARK/SPACE transitions on Pin 43 of AUX RCVR W50A Cord. AUX RCVR lamp on. | Verify +5 v on XZ105 Pin 23. If Pin 23 is at +5 v, replace the TP322320 Receive Control card, Z105. If Pin 23 is at 0 v, replace the TP322324 Mode Control II card, Z106. |

5.03 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 106 | Feed-Out Request not initiated by blinding AUX RCVR. | Verify strap H on the TP322324 Mode Control II card, Z105 is closed.<br><br>Replace the TP322324 Mode Control II card, Z106. |
| 107 | AUX RCVR lamp off fails to hold AUX RCVR Data Interface signal at 0 v. MARK/SPACE transitions seen. | Verify 0 v on XZ105 Pin 23. If Pin 23 is at 0 v, replace the TP322320 Receive Control card, Z105. If Pin 23 is at +5 v, replace the TP322324 Mode Control II card, Z106. |
| 108 | Tape Feed Out in Process Interface signal at 0 v fails to reset Feed-Out Request interface signal +5 v. | Replace the TP322324 Mode Control II card, Z105. |
| 109 | Printer fails to print suppress upon detection of DC2. | Check for presence of print suppression magnets beneath paper tray.<br><br>Verify magnets are energized. If magnets are not energized, retransmit DC2 from tape using the Reader Step feature. Check codebars and stunt box for detection of DC2.<br><br>Check stunt box for proper operation. Refer to appropriate figure indicating location of DC2 stunt box contact.<br><br>Verify 5 v/0 v/5 v transition on XZ106 Pin B25 during DC2 detection. If no transition is verified, check wiring to stunt box per W-Plan or 1010SD or 1021SD.<br><br>Replace the TP322324 Mode Control II card, Z106.<br><br>If magnets are energized, see 5.04, Trouble No. 170 for proper Print Suppression adjustment. |
| 110 | DC2 fails to enable AUX RCVR W50A Cord. No +5 v/0 v transitions verified. | Verify proper stunt box operation and detection of DC2.<br><br>Verify 5 v/0 v/5 v transition on XZ106 Pin B25 during DC2 detection. If no transition is verified, check wiring to stunt box per W-Plan, 1010SD or 1021SD.<br><br>Replace TP322324 Mode Control II card, Z106.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 111 | DC4 or ETX fails to blind AUX RCVR Data (Pin 43 of AUX RCVR W50A Cord). +5 v/0 v transitions verified following DC4 or ETX. | Retransmit DC4 or ETX for reader using Reader Step feature. Check codebars and stunt box for detection of DC4 or ETX. |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|-----|---------|---------------------|
| 111 (cont) | | Verify a +5 v/0 v/+5 v transition on XZ106 Pin B28 (DC4) or XZ106 Pin B29 (ETX). If no transition is verified, check wiring to stunt box per W-Plan or 1010SD or 1021SD.<br><br>Replace the TP322324 Mode Control II card, Z106. |
| 112 | DC4 or ETX fails to remove print suppression. | See Corrective Procedure 111.<br><br>Check for broken or weak magnet armature return spring on print suppression magnet assembly. |
| 113 | DC4 or ETX fails to initiate a Feed-Out Request. | See Corrective Procedure 111. |
| 114 | Print suppression not inhibited (selected to receive Pin 12 of WECO W50A Cord at 0 v) following detection of DC2. | Verify 0 v on XZ106 Pin B23. If at 0 v, replace the TP322324 Mode Control II card, Z106.<br><br>If Pin B23 is not at 0 v, check wiring from Pin B23 to P303 DAS interface cable per W-Plan or 1010SD or 1021SD. |
| 115 | AUX RCVR Data not held Mark hold (selected to receive Pin 12 of WECO W50A Cord at 0 v) following detection of DC2. | Replace the TP322324 Mode Control II card, Z106. |
| 116 | Feed-Out Request not inhibited (selected to receive Pin 12 of WECO W50A Cord at 0 v) following detection of DC2. | Replace the TP322324 Mode Control II card, Z106. |
| 117 | ESC and 3 keytops fail to energize ribbon magnet. | Verify momentary 5 v/0 v/5 v transition on XZ404 Pin 24 upon detection of "ESC 3" character sequence. If no transition is verified, check wiring from Pin 24 to stunt box per W-Plan or 1010SD or 1021SD.<br><br>Recheck Two-Color Ribbon Modification Kit installation instructions and adjustments per appropriate BSP.<br><br>If a transition on XZ404 Pin 24 is verified, check wiring from XZ404 Pin 33 to ribbon magnet per W-Plan or 1010SD or 1021SD.<br><br>Replace the TP322070 Two-Color Ribbon card, Z404. |
| 118 | ESC and 4 keytops fail to de-energize the ribbon magnet. | Verify momentary 5 v/0 v/5 v transition on XZ404 Pin 25 upon detection of "ESC 4" character sequence. If no transition is verified, check wiring from Pin 25 to stunt box per W-Plan or 1010SD or 1021SD. |

5.03   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 118 (cont) | | Recheck Two-Color Ribbon Modification Kit installation instructions and adjustments per appropriate BSP.<br><br>If a transition on XZ404 is verified, replace the TP322070 Two-Color Ribbon card, Z404. |
| 119 | Motor Control cycle fails to de-energize two-color ribbon magnet. | Replace the TP322070 Two-Color Ribbon card, Z404. |
| 120 | Maintenance Man switch fails to turn on set motors and copylamps in the on position. | Check switch wiring per W-Plan or 8928WD and 1010SD or 9302WD and 1021SD.<br><br>Replace switch if required. |
| 121 | Printer with YAZ stunt box only. Tab Form Feed in Process Interface signal on Pin 27 of WECO W50A Cord at 0 volts. | Verify 0 v on XZ105 Pin 9. If Pin 9 is not at 0 v, check wiring to stunt box connector and/or stunt box.<br><br>Note:  Pin 9 must be permanently grounded.<br><br>Replace the TP322320 Receive Control card, Z105. |
| 122 | No power ground continuity between outlet receptacle mounting screw to component parts of ASR. | Verify outlet receptacle is grounded.<br><br>Secure printer, reperforator, and reader with mounting bolts or screws.<br><br>Verify all grounding straps are connected. |

5.04   TYPING UNIT TROUBLE ANALYSIS

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 123 | Printer runs open (armature attracted). | Check range finder setting.<br><br>Check selector magnet bracket adjustment.<br><br>Check selector clutch adjustments. Refer to Section 574-320-703. |
| 124 | Garbling at selector. | Check for dirt or oil on selector magnet armature.<br><br>Check range finder setting (should not be near end of scale).<br><br>Check Range Finder Knob Phasing adjustment.<br><br>Check Selector Magnet Bracket adjustment.<br><br>Check for missing springs in selector.<br><br>Check for loose selector magnet wires and/or printer connector. |

5.04 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 124 (cont) | | Check Intermediate Arm Latch Bail adjustment. Replace Z105 and/or Z304. |
| 125 | Garbling at codebars. Codebar shiftbars position incorretcly. | Check selected levers in selector. Check Transfer Lever Eccentric adjustment. Check Intermediate Arm Backstop Bracket adjustment. Check Front or Rear Codebar Shift Lever adjustment. |
| 126 | Selected codebars not positioned. | Check codebar shiftbar and codebar engagement. Check TP156301 retaining plate. |
| 127 | Codebars bouncing back after being selected. | Check Codebar Detent adjustment. Check Retraction Mechanism adjustment. |
| 128 | No spacing. | Check Trip Shaft Cam Follower adjustment. Check Spacing Clutch Trip Lever adjustment. Check for a function operation in the stunt box. Check for the presence and operation of print and space suppression modification kit (magnet mounted on the rear of stunt box). |
| 129 | Continuous spacing. | Check Spacing Clutch Trip Lever adjustment. If the unit is equipped with horizontal tab, check that the function lever in slot no. 17 of the stunt box is inserted in slot of slide located directly under slot no. 17. |
| 130 | No backspace. | Check code in selector; codebars and stunt box. Check the position of the suppression slide to the suppression bail. Check Trouble No. 131. |
| 131 | No functions. | Check code in selector and codebars. Check stunt box arrangement (Figures 3 or 4 or 5) to determine slot, and then check slot for operation of selected function. Check Trip Shaft Cam Follower adjustment. Check Function Clutch Trip Arm adjustment. |

5.04   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 131 (cont) | | Check Stripper Blade adjustment.<br><br>Check Function Reset Bail Blade adjustment.<br><br>Check for the presence and operation of the print, space, and function suppress modification kit (magnets mounted on the rear of the stunt box).<br><br>See Trouble Nos. 124 to 127. |
| 132 | Ribbon not reversing. | Check Connecting Rod Final adjustment.<br><br>Check Ribbon Feed Brackets (Left and Right) adjustments.<br><br>Check Feed Pawl Drive Clamp (Right and Left) adjustments.<br><br>Check the Check Pawl (Right and Left) adjustments. |
| 133 | Vertical — Character misalignment. | Check Vertical Clutch Bite adjustment.<br><br>Check Vertical Aggregate — Dampener Synchronization adjustment.<br><br>Check Print Hammer Latch adjustment. |
| 134 | Improper spacing between characters. | Perform character spacing test (Table Q).<br><br>Check for missing spacing pawl spring.<br><br>Check Spacing Gear Phasing adjustment.<br><br>Check Spacing Clutch Trip Lever adjustment.<br><br>Check Typebox Rail Alignment adjustment.<br><br>Check Coordinating Cable adjustment.<br><br>See Trouble No. 138. |
| 135 | Left-hand margin not aligned.<br><br>Right-hand margin not aligned. | Check Left-Hand Margin adjustment.<br><br>Check for disabling clip on slot no. 5 (CR) in stunt box.<br><br>Check position of carriage return lever to the carriage return latch. |
| 136 | No carriage return. | Check code in selector and codebars.<br><br>Check for disabling clip on slot no. 5 (CR) in stunt box. |

5.04   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 136 (cont) | | Check position of carriage return lever to the carriage return latch. |
| 137 | No Escape No. 10 operation. | Check Blocking Bar adjustment.<br><br>Check for the presence of the no. 10 blocking bar spring. |
| 138 | Horizontal — Character misalignment (incorrect spacing between characters). | Perform typebox alignment test (Table N).<br><br>Perform typebox horizontal motion test (Table P).<br><br>Check Oscillating Arm Detent Disc Phasing adjustment.<br><br>Check Horizontal Aggregate — Dampener Synchronization adjustment.<br><br>Check Coordinating Cable adjustment.<br><br>Check Print Hammer Position adjustment.<br><br>Check Print Hammer Latch adjustment.<br><br>Check Spacing Gear Phasing adjustment.<br><br>See Trouble No. 134. |
| 139 | Improper printing. | Check code in selector and codebars.<br><br>Use typebox arrangement (Figure 6) to determine code and location of character being printed versus character selected.<br><br>See Troubles: 124, 125, 156, 157, 150 and 151. |
| 140 | No Line Feed. | Check selection in selector, codebars, and stunt box.<br><br>See Figures 3 or 4 or 5.<br><br>Check Line Feed Clutch Trip Lever Adjusting Screw adjustment.<br><br>Check Line Feed Clutch Trip Lever Eccentric Post adjustment. |
| 141 | Improper Line Feed. | Check Line Feed Clutch Phasing adjustment. |
| 142 | No Horizontal Tab. | Check selection in selector and codebars.<br><br>See stunt box arrangement (Figures 4 or 5) for slot location and check stunt box for operation.<br><br>Check Trip Bail adjustment. |

5.04    Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 143 | No Vertical Tab. | Check code in selector and codebars.<br><br>See stunt box arrangement (Figures 4 or 5) for slot location and check stunt box for operation.<br><br>Check Slide Retainer adjustment.<br><br>Check Blocking Levers adjustment.<br><br>Check Line Feed Clutch Trip Lever Adjusting Screw adjustment. |
| 144 | No Horizontal Tab Clear. | Check code in selector and codebars.<br><br>See stunt box arrangement (Figure 4) for slot location and check stunt box for operation.<br><br>Check Tab Clear Arm adjustment.<br><br>Check Latch Arm adjustment.<br><br>Check Latch Release adjustment. |
| 145 | Horizontal Tab Clear selected, but receiving Tab Set operation. | Check Horizontal Tab Set and Clear cables for being reversed at the function levers. See stunt box arrangement (Figure 4) for location. |
| 146 | No Horizontal Tab Set. | Check selection in selector and codebars.<br><br>See stunt box arrangement (Figure 4) for slot location and check stunt box for operation.<br><br>Check for missing tab stop on tab ring.<br><br>Check Eccentric Post adjustment.<br><br>Check Tab Set Arm Cable adjustment. |
| 147 | Vertical Tab Set selected, but receiving Tab Clear operation. | Check Vertical Tab Set and Clear cables for being reversed at the function levers. See stunt box arrangement (Figure 4) for slot location. |
| 148 | No Vertical Tab Set. | Check code in selector and codebars.<br><br>See stunt box arrangement (Figure 4) for slot location and check stunt box operation.<br><br>Check Mounting Plate adjustment.<br><br>Check Tab Set Arm Cable adjustment. |

5.04   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|------|---------|----------------------|
| 149 | No printing. | Check code in selector and codebars.<br><br>Check Trip Shaft Cam Follower adjustment.<br><br>Check Print Clutch Trip Arm adjustment.<br><br>Check Square Shaft Drive Arm adjustment.<br><br>Check Print Hammer Latch adjustment.<br><br>Check for a function selection in the stunt box and see Trouble No. 164.<br><br>Check for the presence and operation of the Print Suppression Modification Kit (magnets mounted on the rear of stunt box).<br><br>See Trouble No. 169. |
| 150 | Printing one horizontal character off. | Check typebox arrangement (Figure 6) to determine code and location of character being printed versus character selected.<br><br>Perform horizontal position clutch test (Table M).<br><br>Check Print Hammer Latch adjustment.<br><br>Check Print Hammer Position adjustment. |
| 151 | Printing one vertical character off. | Check typebox arrangement (Figure 6) to determine code and location of character being printed versus character selected.<br><br>Check Vertical Print Hammer Alignment adjustment.<br><br>Check Print Hammer Latch adjustment. |
| 152 | Improper typebox retraction. | Check Retraction Reset Shaft adjustment.<br><br>Check Retraction Slide adjustment.<br><br>Check Blocking Pawl adjustment.<br><br>Check Ratchet Stop adjustment.<br><br>Check Stop Plate adjustment. |
| 153 | Printed character incomplete. | Check Ribbon Guide to Platen adjustment.<br><br>Check Ribbon Feed Bracket (Right and Left) adjustments.<br><br>Check Ribbon Retract Position adjustment. |

5.04    Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 153 (cont) | | Check Ribbon Print Position adjustment. Check Oscillator Downstop adjustment. |
| 154 | Will not shift-out black ribbon. | Check selection in selector, codebars, and stunt box. Check Ribbon Print Position-Red adjustment. Check Magnet Assembly to Blocking Slide adjustment. Check for the presence and operation of the TP332374 Escape No. 10 Modification Kit. See stunt box arrangement (Figure 4) for slot location. Check the operation of the Escape No. 10 fork-shift mechanism in the stunt box and the No. 10 Blocking Bar adjustment. See Trouble No. 117. |
| 155 | Will not shift-out red ribbon. | Check selection in selector, codebars, and stunt box. Check Ribbon Print Position — Black adjustment. Check the operation of the Escape No. 10 fork-shift mechanism in the stunt box and No. 10 Blocking Bar adjustment. See Trouble No. 118. |
| 156 | Horizontal — Typebox positioning incorrectly. | Check typebox arrangement (Figure 6) to determine code and location of character being printed versus character selected. Check code in selector and codebars. Check alignment of the codebar forks on codebars 1, 2, 3, 4 with their clutch trip levers. Perform horizontal positioning clutch test (Table M) to isolate clutch(es) not tripping. |
| 157 | Vertical — Typebox positioning incorrectly. | Check typebox arrangement (Figure 6) to determine code and location of character being printed versus character selected. Check code in selector and codebars. Perform vertical positioning clutch test (Table O) to isolate clutch(es) not tripping. Check Vertical Clutch Bite adjustment. |

5.04   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 157 (cont) | | Check alignment of the bellcranks to codebars 5, 6 and 7.<br><br>Check Vertical Print Hammer Alignment adjustment. |
| 158 | Improper spacing at left-hand margin. | Check Left-Hand Margin adjustment. |
| 159 | Spacing on functions. | Check the position of the suppression slide to the suppression bail. |
| 160 | Character density uneven (top or bottom). | Check Typebox Alignement adjustment.<br><br>Check Vertical Print Hammer Alignment adjustment.<br><br>Check Ribbon Retract Position adjustment.<br><br>Check Ribbon Print Position adjustment.<br><br>See Trouble No. 161. |
| 161 | Character density uneven (when using a replacement typebox). | Install the original typebox and check or make the Typebox Alignment adjustment as needed. Remove the typebox.<br><br>For replacement typebox(es) providing: Light density on the top of a printed character; adjust typebox plate tab (located on the bottom of the typebox) by slightly bending tab towards the rear of the typing unit.<br><br>For light density on the bottom of a printed character; adjust typebox plate tab (located on the bottom of typebox) by slightly bending tab towards the front of the typing unit.<br><br>Install the replacement typebox and type a few characters. It may be necessary to refine bending adjustment of the tab.<br><br>CAUTION:   OVERBENDING OF THE TAB CAN RESULT IN BREAKAGE. |
| 162 | Breaking off type pallets. | Check Retraction Reset Slide adjustment.<br><br>Check Stop Plate adjustment.<br><br>Check Print Hammer Position adjustment.<br><br>Check Vertical Print Hammer Alignment adjustment.<br><br>Check Print Hammer Latch adjustment. |

5.04   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 162 (cont) | | Check Vertical Aggregate-Dampener Synchronization adjustment. |
| | | Check Aggregate-Dampener Synchronization adjustment. |
| 163 | Print Indicator. | |
| | Improper vertical alignment. | Check Vertical Position of Indicator Bracket adjustment. |
| | Improper horizontal alignment. | Check Horizontal Position of Indicator Bracket adjustment. |
| 164 | Improper function. | Check code in selector and codebars (Figure 6). |
| | | Check stunt box arrangement (Figure 3 or 4 or 5) to determine slot, and then check slot for operation of selected function. |
| | | Check function bars for coding and/or broken tines. |
| | | If Escape No. 10 Modification Kit is used, check No. 10 Blocking Bar adjustment. |
| | | See Trouble Nos. 124 to 127. |
| 165 | Horizontal Tab Set selected, but receiving Tab Clear operation. | Check Horizontal Tab Set and Clear cables for being reversed at the function levers. See stunt box arrangement (Figure 4) for location. |
| 166 | Continuous Line Feed. | Check Line Feed Clutch Trip Lever Adjusting Screw adjustment. |
| | | Check Line Feed Clutch Trip Lever Eccentric Post adjustment. |
| | | If the unit is equipped with Vertical Tab, check that the function lever in slot no. 41 of the stunt box is inserted in slot of slide located directly under slot no. 41. |
| 167 | No Vertical Tab Clear. | Check selection in selector and codebars. |
| | | See stunt box arrangement (Figure 4) for slot location and check stunt box for operation. |
| | | Check Tab Clear Arm Cable adjustment. |
| | | Check Latch adjustment. |
| | | Check Latch Release adjustment. |

5.04 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 168 | Vertical Tab Clear selected, but receiving Tab Set operation. | Check Vertical Tab Set and Clear cables for being reversed at the function levers. See stunt box arrangement (Figure 4) for slot location. |
| 169 | Print Suppression operating, but not selected. | Check for the presence of a spring on print suppress magnets engaging fork.<br><br>Check the operation of the contact over slot no. 18 in the stunt box.<br><br>See Trouble No. 164. |
| 170 | No Print Suppression. | Check the code in the selector and codebars.<br><br>Check the operation of the contact over slot no. 18 in the stunt box.<br><br>Check Shift Fork Mechanism (slot no. 7) adjustment.<br><br>Check Shift Fork Mechanism (slot no. 22) adjustment.<br><br>Check Function Lever to Latch adjustment (slot no. 22).<br><br>See Trouble No. 109, 131 and 171. |
| 171 | No functions. | Check code in selector and codebars.<br><br>Check selection in stunt box, use appropriate stunt box arrangement.<br><br>Check Function Clutch Trip Lever adjustment.<br><br>Check Function Reset Bail Blade adjustment.<br><br>Check Stripper Blade Drive Cam adjustment.<br><br>Check Function Clutch Shoe Lever adjustment.<br><br>Check Function Clutch BIDREC Gap requirement.<br><br>See Trouble Nos. 124 to 127. |

5.05 TYPING REPERFORATOR TROUBLE ANALYSIS

| | | |
|---|---|---|
| | Note: Paragraph numbers listed after an adjustment title in Corrective Procedures column refer to Section 574-330-700, Typing Reperforator adjustments. | |
| 172 | Faulty tape punching. | Check the following adjustments: |

5.05 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 172 (cont) | | Cam Follower Roller (2.08) |
| | | Cam Follower Roller adjustment (2.09) |
| | | Punch Slide Downstop Position (2.11) |
| | | Punch Slide Spring (2.11) |
| | | Check punch pins for binds; clean punch block. |
| | | Punch Pin Penetration (2.10) |
| | | Latch Lever Clearance (2.13) |
| | | Punch Slide Latch Spring (2.13) |
| | | Reset Bail Trip Lever (2.12). The reset bail should trip before function clutch is tripped. |
| | | See Trouble Nos. 27, 50, 51, 52 and 55. |
| 173 | Reperforator fails to feed tape out of punch block. | Check the following adjustments: |
| | | Cam Follower (2.08) |
| | | Cam Follower Roller Alignment (2.09) |
| | | Punch Pin Penetration (2.10) |
| | | Bias Spring (Punch Block) (2.17) |
| | | Detent Lever and Feed Pawl (2.14) |
| | | Feed Pawl and Detent Lever Springs (2.18) |
| 174 | Failure to meet ten (10) characters per inch. | Check Tape Guide Assembly Spring and Bias Spring (Punch Block) (2.17). |
| | | Check Ten Characters Per Inch adjustment (2.16). |
| | | Check Lateral and Front to Rear Feed Wheel Position Detent (2.15). |
| 175 | Selector clutch fails to release or latch. | Check Selector Clutch Shoe Lever adjustment and Clutch "BIDREC" Gap (2.01). |
| | | Check Selector Clutch Drum Endplay (2.03). |
| | | Check Selector Clutch Stop Arm adjustment (2.40). |
| | | Check Selector Armature Downstop adjustment (2.38). |

5.05   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|-----|---------|---------------------|
| 175 (cont) | | Check Selector Magnet Bracket adjustment (2.42).<br><br>Check Clutch Shoe Lever Spring and Clutch Shoe Spring Tensions (2.02).<br><br>See Trouble No. 27. |
| 176 | Failure to print. | Check ribbon for ink, wear and proper installation.<br><br>Check that print suppression magnet is released; replace Mode Control II circuit card, Z106.<br><br>Check Print Suppression Mechanism adjustments (3.02).<br><br>Check Print Suppression Contacts (3.03).<br><br>Check Printing Latch adjustment (2.30).<br><br>Check Print Hammer adjustment (2.33). |
| 177 | Printing misalignment (vertical position). | Check the following adjustments; if incorrect, readjust:<br><br>Axial Corrector (2.26)<br><br>Oscillating Bail Pivot (2.24)<br><br>Axial Output Rack Guide Roller (2.25). |
| 178 | Printing misalignment (horizontal position). | Check the following adjustments; if incorrect, readjust:<br><br>Typewheel Positioning (2.32)<br><br>Rotary Corrector Mesh (2.29)<br><br>Typewheel Rack Clearance (2.28)<br><br>Printing Latch — Final (2.30), (if readjusting, keep clearance to a minimum).<br><br>Print Hammer (2.33). |
| 179 | Incorrect or partial printing of characters with correct perforation of tape. | Check the following adjustments; if incorrect, readjust:<br><br>Pushbar Opening Blade Alignment (2.20)<br><br>Pushbar Locking Blade (2.19)<br><br>Transfer Lever Bracket (2.21)<br><br>Guideplate (2.20)<br><br>Pushbar Guide Bracket (2.25) |

5.05 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|-----|---------|----------------------|
| 179 (cont) | | Axial Corrector (2.26) <br><br> Locking Blade Spring Tension (2.23) <br><br> Bellcrank Springs — No. 6 and 7 (2.22). |
| 180 | Failure to meet selector margin requirements. | Check Selector Armature adjustment (2.37). <br><br> Check Range Finder Knob Phasing adjustment (2.40). <br><br> Check Armature Spring adjustment (2.41); if incorrect, readjust and/or replace selector armature spring. <br><br> Check Selector Magnet Bracket adjustment (2.42). |
| 181 | Print Suppression Magnet operates but no Print Suppression. | Check Armature Extension Height adjustment (3.02). <br><br> Check Armature Extension Horizontal adjustment (3.02). <br><br> Check Print Suppression and Auxiliary Timing Contacts adjustments (3.03) and (3.04), respectively. <br><br> Check Print Suppression Contact Positioning adjustment (3.04). |
| 182 | Erratic function clutch operation. | Check the following function mechanism adjustments: <br><br> Clutch Shoe Lever (2.01) <br><br> Clutch Trip Lever (2.04) <br><br> Function Clutch Reset and Latchlevers (2.05) <br><br> Trip Cam Follower Lever (2.06). |
| 183 | Punch Selector runs open (magnet energized). | Check Selector Clutch Stop Arm adjustment (2.40). <br><br> Check Selector Magnet Bracket adjustment (2.42). |
| 184 | Erratic Selector Armature operation. | Clean armature and pole face, if necessary. <br><br> Check Selector Armature Downstop adjustment (2.38). <br><br> Check Selector Magnet Bracket adjustment (2.42). <br><br> Check Range Finder Knob Phasing adjustment (2.40). <br><br> Check Selector Armature Spring adjustment (2.41); if incorrect, readjust and/or replace selector armature spring. |

5.05 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|-----|---------|----------------------|
| 185 | No View Last Character. | Check Ribbon Carrier Spring adjustment (2.34). <br><br> Check Last Character Visibility Solenoid Link Positioning adjustment (3.11). <br><br> Check Inhibit Contact Gap and Pressure (3.12). <br><br> See Trouble No. 49. |
| 186 | No Power Backspace. | Check Feed Pawl Clearance adjustment (3.13). <br><br> Check Feed Pawl Spring adjustment (3.14). <br><br> Check Feed Pawl Eccentric adjustment (3.15). <br><br> Check Backspace Magnet Assembly Positioning adjustment (3.17). <br><br> Check wiring to Backspace Magnet (P315 punch connector) per W-Plan or 1011SD or 1025SD. <br><br> Check for proper dc voltages present. See Trouble No. 17. <br><br> Check Backspace Magnet for 284 ohms ±10% per W-Plan or 4735WD. <br><br> Check RT control panel wiring per W-Plan or 8365WD. |
| 187 | No Print Suppression of lower case characters. | See Trouble No. 181. <br><br> Check for strap between points (1) and (4) of YPR function contacts. Strap between points (3) and (6) removed. <br><br> Check for -12.5 v dc on point (2) of YPR function contacts. Check for +12.5 v dc on point (1) of Print Suppression Solenoid. Refer to W-Plan or 4735WD. <br><br> Check Print Suppression Solenoid for 110 ohms ±10%. See W-Plan or 4735WD. |
| 188 | No Print Suppression of function characters. | See Trouble No. 181. <br><br> Check for strap between points (3) and (6) of YPR function contacts. Strap between points (1) and (4) removed. <br><br> Check for -12.5 v dc on point (2) of YPR function contacts. Check for +12.5 v dc on point (1) of Print Suppression Solenoid. Refer to W-Plan or 4735WD. |

5.05  Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|-----|---------|----------------------|
| 188 (cont) | | Check Print Suppression Solenoid for 110 ohms ±10%. See W-Plan or 4735WD. |

5.06    NONTYPING REPERFORATOR TROUBLE ANALYSIS

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|-----|---------|----------------------|
| 189 | Reperforator fails to feed tape out of punch block. | Check the following adjustments: <br><br> Cam Follower Roller and Cam Follower Roller Alignment adjustments <br><br> Punch Pin Penetration <br><br> Punch Mechanism adjustment <br><br> Bias Spring (Punch Block) <br><br> Feed Pawl and Detent Lever Spring adjustment. |
| 190 | Faulty tape punching. | Check the following adjustments: <br><br> Cam Follower Roller and Cam Follower Roller Alignment adjustments <br><br> Punch Slide Downstop Position <br><br> Punch Slide Spring. |
| 191 | Failure to meet ten (10) characters per inch. | Check the following adjustments: <br><br> Punch Slide Spring and Bias Spring adjustments <br><br> Ten (10) Characters Per Inch adjustment <br><br> Lateral and Front to Rear Feed Wheel Position Detent adjustment. |
| 192 | Selector Clutch fails to release or latch. | Check the following adjustments: <br><br> Clutch Shoe Lever and Function Clutch Endplay adjustments <br><br> Selector Clutch Drum and Function Clutch Trip Lever adjustments <br><br> Rangefinder Knob Phasing and Selector Clutch Stop Arm adjustments <br><br> Selector Armature Downstop adjustment <br><br> Selector Clutch Shoe Lever Spring adjustment <br><br> Selector Magnet Bracket adjustment. |

5.06 Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 193 | Punch Selector runs open (magnet energized). | Check the following adjustments:<br><br>Rangefinder Knob Phasing and Selector Clutch Stop Arm adjustments<br><br>Selector Magnet Bracket adjustment. |
| 194 | Erratic Selector Armature operation. | Check the following adjustments:<br><br>Selector Armature Downstop adjustment<br><br>Selector Magnet Bracket adjustment.<br><br>Note: If adjustments are correct, clean armature and pole face.<br><br>Rangefinder Knob Phasing adjustment<br><br>Selector Armature Spring adjustment. Replace spring if required. |
| 195 | Failure to meet selector margin requirements. | Check the following adjustments:<br><br>Rangefinder Knob Phasing and Selector Clutch Stop Arm adjustments<br><br>Selector Armature Spring and Marking Locklever Spring adjustments<br><br>Selector Magnet Bracket adjustment. |
| 196 | Erratic function clutch operation. | Check the following function mechanism adjustments:<br><br>Clutch Shoe Lever adjustment<br><br>Clutch Trip Lever adjustment<br><br>Function Clutch Release Lever Spring and Reset Arm adjustments<br><br>Trip Cam Follower Lever. |
| 197 | No Power Backspace. | Check the following adjustments:<br><br>Feed Pawl Clearance adjustment<br><br>Feed Pawl Spring adjustment<br><br>Feed Pawl Eccentric adjustment<br><br>Backspace Magnet Assembly Positioning adjustment. |

5.06   Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| **197** (cont) | | Check wiring to Backspace Magnet (P315 punch connector) per W-Plan or 1011SD or 1025SD. |
| | | Check for proper dc voltages present. See Trouble No. 17. |
| | | Check Backspace Magnet for 284 ohms ±10% per W-Plan or 4735WD. |
| | | Check RT control panel wiring per W-Plan or 8365WD. |

5.07     TAPE READER TROUBLE ANALYSIS

| | |
|---|---|
| Note:    Paragraph numbers listed after an adjustment title in Corrective Procedure column refer to Section 592-801-700, CX Reader adjustments. | |

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 198 | Reader makes errors. | Check Tape Lid adjustment (2.01). |
| | | Check Tape Guide and Tape Guideplate adjustments (2.02) and (2.03). |
| | | Check Sensing Bail adjustment (2.09). |
| | | Check Feed Wheel Detent adjustment (2.10). |
| | | Check Feed Pawl adjustment (2.11). |
| | | Check Sensing Cam Follower adjustment (2.13). |
| | | Check Magnet adjustment (2.14). |
| | | Check Code Reading Contact adjustment (2.16). |
| | | Check Pick-Up Coil adjustment (2.23). |
| | | See Trouble Nos. 174 and 192 (Reperforator 10/Inch) adjustment. |
| 199 | Reader "Hobbles" and/or makes errors. | See Corrective Procedure 198. |
| 200 | Reader will not feed tape. | Check Start-Stop Contact adjustment (2.07). |
| | | Check Tape-Out Contact adjustment (2.05). |
| | | Check Magnet Assembly adjustment (2.14). |
| | | Check Pick-Up Coil adjustment (2.23). |
| 201 | Improper tape feeding. | Check Tape Lid adjustment (2.01). |
| | | Check Tape Guide and Tape Guideplate adjustments (2.02) and (2.03). |

5.07    Continued

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 201 (cont) | | Check Sensing Bail adjustment (2.09).<br><br>Check Feed Wheel Detent adjustment (2.10).<br><br>Check Feed Pawl adjustment (2.11). |
| 202 | Magnet energized but reader will not feed. | Check Sensing Cam Follower adjustment (2.31).<br><br>Check Magnet adjustment (2.14).<br><br>Check Feed Pawl adjustment (2.11). |

5.08    KEYBOARD TROUBLE ANALYSIS

| NO. | TROUBLE | CORRECTIVE PROCEDURE |
|---|---|---|
| 203 | Keyboard reset mechanism trips more than once for each character selected. | Check Universal Tie Link Spring and Contact Block Spring Tensions (2.01).<br><br>Check Trip Arm Spring Tension and Trip Arm adjustment (2.02).<br><br>Check Latchlever Spring, Nonrepeat Lever Spring, and Repeat Downstop Bar Spring Tensions requirements (2.05). |
| 204 | No Keyboard Aux Contact closure. | Check Auxiliary Contact adjustment (3.12) per Section 574-331-100. |
| 205 | Various keytops bind and/or are inoperative. | Check for binding codebars (2.06).<br><br>Keytop guide on incorrectly. |
| 206 | Keytops do not return to "Home" position. | Check Shift and Control Tie Link and Space Tie Link Spring requirements (2.03).<br><br>Check Keylever Leaf Spring requirements (2.04). |
| 207 | Improper code setup by keyboard contacts. | Check Contact Wire Spring requirements (2.04).<br><br>Verify contacts are in proper contact guides. |
| 208 | Repeated AUX contact closures due to improper operation of reset mechanism clutch. | The following requirements are in Section 574-331-100.<br><br>Check Clutch Shoe Spring requirements (3.09).<br><br>Check Trip Lever Spring and Reset Bail Spring requirements (3.10).<br><br>Check Clutch Stop Arm adjustment (3.11). |

| SLOT NO. | FUNCTION | FUNCTION BAR | FUNCTION PAWL | FUNCTION LEVER | SPRING PLATE OR LATCH PLATE | CONTACT ASSEM. OR CABLE BRACKET | LATCH RELEASE BAIL OR STUD | FUNCTION BAR BLOCKING PAWL | SPECIAL |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | |
| 2 | DC-4 | 319793 | 152653 | 152642 | 152660 | 326104 | | | |
| 3 | | | | | | | | | |
| 4 | NEW LINE (LF & VT) | 306220 | 152653 | 152298 | 154613 | | | | CLIP — 157274 (NOT SHOWN) |
| 5 | CARRIAGE RET (CR & FF) | 319804 | 152653 | 152298 | 154613 | | | | |
| 6 | ESCAPE, TERMINATE | 319796 | 152653 | 319481 | 152660 | | | | PRE-STRIPPER 334286 |
| 7 | ESCAPE NO.9 | 306214 | 152653 | 162059 | 152089 | | | | FORK-SHIFT MECHANISM |
| 8 | ESCAPE HOLD | 319802 | 152653 | 152642 | 152660 | | | | |
| 9 | BACK SPACE | 306206 | 152653 | 152642 | 152660 | 326103 | | | |
| 10 | DC-2 | 319791 | 152653 | 152642 | 152660 | | | | |
| 11 | ETX | 319797 | 152653 | 152642 | 152660 | | | | |
| 12 | BELL | 306205 | 152653 | 152642 | 152660 | | | | |
| 13 | FUNCTION SUPPRESS | 319794 | 152653 | 152641 | 152660 | | | | |
| 14 | DELETE | 306221 | 152653 | 152641 | 152660 | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |
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| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | LINE FEED | 306202 | 152653 | 326172 | 152660 | | | | |
| 41 | | | | | | | | | |
| 42 | | | | | | | | | |

Figure 3 - "YAZ" Stunt Box Arrangement

| SLOT NO. | FUNCTION | FUNCTION BAR | FUNCTION PAWL | FUNCTION LEVER | SPRING PLATE OR LATCH PLATE | CONTACT ASSEM. OR CABLE BRACKET | LATCH RELEASE BAIL OR STUD | FUNCTION BAR BLOCKING BAIL | SPECIAL |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | |
| 2 | DC-4 | 319793 | 152653 | 152642 | 152660 | 326105 | | | |
| 3 | ETX | 319797 | 152653 | 152642 | 152660 | | | | |
| 4 | NEW LINE (LF & VT) | 306220 | 152653 | 152298 | 154613 | | | | CLIP – 157274 (NOT SHOWN) |
| 5 | CARRIAGE RET (CR & FF) | 319804 | 152653 | 152298 | 154613 | | | | |
| 6 | ESCAPE, TERMINATE | 319796 | 152653 | 319481 | 152660 | | | | PRE-STRIPPER 334286 |
| 7 | ESCAPE NO. 9 | 306214 | 152653 | 162059 | 152089 | | | | FORK-SHIFT MECHANISM (B) |
| 8 | ESCAPE HOLD | 319802 | 152653 | 152642 | 152660 | | | | |
| 9 | BACK SPACE | 306206 | 152653 | 152642 | 152660 | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | FUNCTION SUPPRESS | 319794 | 152653 | 152641 | 152660 | 326152 | | | |
| 14 | DELETE | 306221 | 152653 | 152641 | 152660 | | | | |
| 15 | HT SET | 319810 | 152653 | 326158 | 152660 | | | | |
| 16 | HT CLEAR | 319811 | 334282 | 326158 | 152660 | | | | |
| 17 | HORIZONTAL TAB. | 306203 | 153598 | 338458 | 152660 | 326102 | | | PRE-STRIPPER 334286 |
| 18 | DC-2 | 319791 | 152653 | 152642 | 152660 | | | | |
| 19 | BELL | 306205 | 152653 | 152642 | 152660 | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |
| 25 | ESCAPE NO 10 | 306214 | 152653 | 162059 | 154613 | | | | FORK-SHIFT MECHANISM (A) |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
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| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | LINE FEED | 306202 | 152653 | 326172 | 152660 | 326152 | | | |
| 39 | VERTICAL TAB SET | 319812 | 152653 | 326158 | 152660 | 326107 | | | |
| 40 | VERTICAL TAB CLEAR | 319813 | 334282 | 326158 | 152660 | | | | |
| 41 | VERTICAL TAB. | 306212 | 153598 | 326172 | 152660 | | | | |
| 42 | FORM FEED | 306213 | 152653 | 326172 | 152660 | | | | |

Note:   Control Bracket TP326152. TP319813 Function Bar has 11 tines.

Figure 4 - "YBA" Stunt Box Arrangement

| SLOT NO. | FUNCTION | FUNCTION BAR | FUNCTION PAWL | FUNCTION LEVER | SPRING PLATE OR LATCH PLATE | CONTACT ASSEM. OR CABLE BRACKET | LATCH RELEASE BAIL OR STUD | FUNCTION BAR BLOCKING BAIL | SPECIAL |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | |
| 2 | DC-4 | 319793 | 152653 | 152642 | 152660 | 326105 | | | |
| 3 | ETX | 319797 | 152653 | 152642 | 152660 | | | | |
| 4 | NEW LINE (LF & VT) | 306220 | 152653 | 152298 | 154613 | | | | CLIP — 157274 (NOT SHOWN) |
| 5 | CARRIAGE RET (CR & FF) | 319804 | 152653 | 152298 | 154613 | | | | |
| 6 | ESCAPE, TERMINATE | 319796 | 152653 | 319481 | 152660 | | | | PRE-STRIPPER 334286 |
| 7 | ESCAPE NO. 9 | 306214 | 152653 | 162059 | 152089 | | | | FORK-SHIFT MECHANISM |
| 8 | ESCAPE HOLD | 319802 | 152653 | 152642 | 152660 | | | | |
| 9 | BACK SPACE | 306206 | 152653 | 152642 | 152660 | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | FUNCTION SUPPRESS | 319794 | 152653 | 152641 | 152660 | | | | |
| 14 | DELETE | 306221 | 152653 | 152641 | 152660 | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |
| 17 | HORIZONTAL TAB. | 306203 | 153598 | 338458 | 152660 | 326102 | | | PRE-STRIPPER 334286 |
| 18 | DC-2 | 319791 | 152653 | 152642 | 152660 | | | | |
| 19 | BELL | 306205 | 152653 | 152642 | 152660 | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
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| 33 | | | | | | | | | |
| 34 | | | | | | | | | |
| 35 | | | | | | | | | |
| 36 | | | | | | | | | |
| 37 | | | | | | | | | |
| 38 | LINE FEED | 306202 | 152653 | 326172 | 152660 | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | 326107 | | | |
| 41 | VERTICAL TAB. | 306212 | 152653 | 326172 | 152660 | | | | |
| 42 | FORM FEED | 306213 | 152653 | 326172 | 152660 | | | | |

Figure 5 - "YBB" Stunt Box Arrangement

Figure 6 - 6-Row Typebox Arrangement

Note 1:   Carriage Return (CR) and Line Feed (LF) Codes:  CR 1_ 3 4 _ _ _ 8 Marking and LF_ 2 _4 _ _ _ _Marking.

Note 2:   The 8th BIT MARKING for even parity.

Note 3:   Typebox arrangement ASCII 68 (American National Standard Code for Information Interchange) as viewed from print hammer.

The following analysis is to verify proper clutch operation in the horizontal and vertical positioning mechanisms, typebox alignments, and spacing. Disable the retraction mechanism and alternately select each of the paired characters shown — produce a "rolling" action (example: to check no. 1 clutch, select Rubout ~ Rubout ~ — etc). Observe indicated clutch(es) operation, typebox alignment(s), and character spacing in the following tables.

TABLE M

| HORIZONTAL POSITIONING CLUTCHES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depress Keytop | Shift Delete | Shift ∧ | Shift ∧ | Shift ╲ | Shift ╲ | Unshift X | Unshift X | Unshift P |
| Character Selected | Rubout | ~ | ~ | ┊ | ┊ | x | x | p |
| Positioning Clutch(es) Tripped | 1, 2, 3, 4 | 1 | 1 | 2 | 2 | 3 | 3 | 4 |

| Unshift Delete | Unshift Q | Unshift Delete | Unshift S | Unshift Delete | Unshift W |
|---|---|---|---|---|---|
| Rubout | q | Rubout | s | Rubout | w |
| 1, 2, 3, 4 | 2, 3, 4 | 1, 2, 3, 4 | 3, 4 | 1, 2, 3, 4 | 4 |

Note:  If the above clutches do not trip, check the following troubles: 124, 125, 126, and 156.

TABLE N

| TYPEBOX ALIGNMENT — HORIZONTAL MOTION | | |
|---|---|---|
| Depress Keytop | Shift A | Shift N |
| Character Selected | A | N |

Note:  If the above alignment is off, check the following troubles: 134, 138, and 150.

TABLE O

| VERTICAL POSITIONING CLUTCHES | | | | | | |
|---|---|---|---|---|---|---|
| Depress Keytop | Unshift Delete | Unshift 0 | Unshift 0 | Shift ? | Shift Delete | Shift 0 |
| Character Selected | Rubout | o | o | / | Rubout | 0 |
| Positioning Clutch(es) | 5, 6, 7 | 5 | 5 | 7 | 5, 6, 7 | 5, 6 |

Note:   If the above clutches do not trip, check the following
troubles:  124, 125, 126, and 157.

TABLE P

| TYPEBOX ALIGNMENT — HORIZONTAL MOTION-VERTICAL CORRECTION | | |
|---|---|---|
| Depress Keytop | Shift E | Unshift U |
| Character Selected | E | U |

Note 1:   Disable the retraction mechanism and alternately select each of the paired characters
shown for one completed line length.

Note 2:   Check the right and left halves of the page separately. The characters must be evenly
spaced as gauged by eye.

Note 3:   If the characters are offset as follows:  E uE uE uE, the u is misplaced to the right:  See
Typebox Rail Final adjustment.

Note 4:   If the characters are offset as follows:  Eu Eu Eu Eu, the u is misplaced to the left:  See
Typebox Rail Final adjustment.

TABLE Q

| CHARACTER SPACING (For One Complete Line Length) | | |
|---|---|---|
| Depress Keytop | Unshift X | |
| Character Selected | X | XXXXXXX |

Note:   The characters should be evenly spaced as gauged by eye. If not evenly spaced, see Trouble No. 134.

Use the following message for Final Test:

ThE qUiCk BrOwN fOx JuMpEd OvEr ThE lAzY dOg'S bAcK 123456789 tImEs.