

35 EDGE PUNCHED CARD TYPING REPERFORATOR SET

(1A KEYBOARD PUNCH)

CHECKOUT AND TROUBLESHOOTING

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1. GENERAL

1.01 This section provides checkout and troubleshooting information for the 35 Edge Punched Card Typing Reperforator Send-Receive Set (1A KEYBOARD PUNCH). It is reissued to add engineering changes, include information on current design units, remove redundant material, and to change the title from Troubleshooting to Checkout and Troubleshooting. Arrows in the margin indicate changes and additions.

1.02 The information in this section consists of checks designed to lead to the mechanism or circuit area causing trouble. The method is to first identify the faulty component of the set (reperforator, keyboard, etc), then to determine which mechanism or electrical part in that component is malfunctioning.

1.03 Where equipment failures are caused by mechanical maladjustments, all related adjustments should be checked. Refer to the following sections for set and component adjustments:

<u>Section No.</u>	<u>Contents</u>
574-121-700	Keyboard Adjustments
574-206-700	Set Adjustments and Lubrication

2.01 Perform the operational checks outlined in Table A. Although this procedure is usually followed after installation of new or repaired equipment, it is also useful in localizing troubles at other times. Refer to Section 574-206-700 for set adjustments that are to be checked whenever any of the component units are removed and replaced.

2.02 The accepted method of using TP156011 gauge to check the code hole, feed hole relationship is as follows.

(1) With the unit operating under power, perforate a sample card consisting of six series of nine NULL combinations followed by one RUBOUT combination.

(2) Place the card over the gauge so that the second and third sets of the perforated RUBOUT are located over the gauge feed pins.

(3) With the feed holes in the card located on the gauge pins, the small holes in the gauge should be centrally located, horizontally, within the code hole of the card.

(4) The card should be checked in three places, approximately one inch from either end and at the center of the card.

TABLE A - CHECKOUT PROCEDURE

STEP	OPERATION	RESPONSE
1.	Connect signal line and power cords.	
2.	<u>Early Design Units:</u> Place power switch in ON position; Place mode switch in LOCAL position. <u>Current Design Units:</u> Place switch in LOCAL position.	Motor should operate.
		Punch unit selector should lock up in MARK hold.
3.	Thread first card of fanfolded stack into punch position in punch unit, using feed wheel knob to position card. Insert card with reference hole to the left.	
4.	Sequentially depress each key on the keyboard, except the HERE IS key which does not activate the punch or printing mechanisms.	All codes should be punched.
		Printed characters should be in line with punched code holes.
		All graphics (nonfunctions) should be printed.
		Printing should be suppressed on all control characters (6 and 7 bits spacing) and RUBOUT (6 and 7 bits marking).
5.	Depress and hold manual PRINT switch during keyboard operation.	All printing characters in areas where printing is normally suppressed should be printed.
6.	Momentarily depress the manual EJECT switch.	Card in punch unit should be rapidly ejected and bursted. Following card should stop in home position.
7.	Depress and hold the manual B.SP switch while rotating the left feed wheel to the right, using the feed wheel knob.	Card in punch unit should backspace freely.
8.	Depress the CTRL key and the W* key.	Card in punch unit should be rapidly ejected and bursted. Following card should stop in home position.

*Function blade coded for control "W" (option).

Note: The feed holes in the card should not be burred.

2.03 The feed wheel alignment is checked in the same manner as the code hole, feed hole relationship (2.02), except that the small holes in the gauge should be located vertically within the code hole of the card.

3. TERMS

3.01 Terms used in the troubleshooting procedures are explained below.

3.02 An open condition refers to a circuit through which current will not flow.

3.03 A closed condition refers to a circuit through which current flows.

3.04 Running open (always SPACING) is a condition created by an open signal circuit which causes continuous operation of the perforating mechanism. With an open signal circuit there are no marking bits and the typing re-perforator unit function clutch and selector clutch does not latch.

3.05 Running closed (always MARKING) is a condition created by a closed signal circuit or malfunction of internal circuitry resulting in failure of the printing and perforating mechanisms to respond to a signal. Refer to Table C, Step 2.

3.06 Garbling is a condition in which the response of the printing and perforating mechanisms does not correspond with the signal input.

4. VISUAL INSPECTION

4.01 Make a visual inspection of the equipment to determine if the trouble may be caused by loose connections, broken or missing parts, binding mechanisms, or improper range finder setting on the punch unit selector.

WARNING: FOR EQUIPMENT THAT HAS BEEN IN OPERATION, CHECK FOR ACCUMULATIONS OF PAPER LINT OR CHAD WHICH CAN AFFECT THE MECHANICAL AND ELECTRICAL OPERATION OF THE EQUIPMENT. IF LINT OR CHAD IS PRESENT, THE UNITS SHOULD BE CLEANED AND LUBRICATED BEFORE PROCEEDING WITH THE TROUBLESHOOTING CHECKS.

5. ELECTRICAL CHECKS

5.01 Electrical Troubles: Most electrical troubles occur at the various connections and contacts in the equipment. These include switch contacts, plug-in connector and pin contacts, terminal board connections, soldered connections, and chassis ground connections. Use the appropriate schematic and actual wiring diagrams for point-to-point circuit checks.

5.02 Power Supply Checks: Check the input power and ac circuits before making other tests. Check for interruptions in the ac power input by checking the power cord connections on the terminal board. Check the dc output of the packaged bridge rectifier. Refer to wiring diagram 6997WD. Also refer to Table C for information on troubleshooting the selector magnet driver.

WARNING: BE EXCEPTIONALLY CAREFUL WHEN HANDLING CHARGED CAPACITORS. A SEVERE ELECTRICAL SHOCK MAY BE RECEIVED FROM THE CAPACITOR OR LEADS CONNECTED TO A POWER SUPPLY IN OPERATION. REMOVE (AC, DC, SIGNAL LINE) POWER BEFORE PERFORMING THE CONTINUITY, RESISTANCE, AND CAPACITOR CHECKS LISTED BELOW.

5.03 Continuity Checks: The continuity check is used to locate suspected open circuits. When making continuity checks, be sure parallel current paths are disconnected and that no other part is shunting the circuit being tested. If necessary, disconnect certain leads to isolate the circuit.

5.04 Resistance Checks: The resistance check is used to locate suspected open or shorted coil windings, motor windings, fixed resistors and inductors. Make these checks following the same general procedures used in continuity checks (5.03).

5.05 Capacitor Checks: The capacitor check is used to locate open, shorted, or partially shorted (leaky) capacitors. To make the test, first discharge the suspected capacitor with an insulated shorting jumper. Then disconnect one lead and connect the capacitor to an ohmmeter. Use the highest resistance range. A good capacitor is indicated when the ohmmeter pointer moves rapidly across the scale and then returns slowly toward the infinity mark. An open capacitor will indicate a constant reading of infinite ohms. A shorted capacitor will give

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a reading of constant value between zero and infinity, depending on the resistance of the short.

6. TROUBLESHOOTING CHARTS

6.01 Equipment failures can be traced functionally with the aid of the troubleshooting charts, Tables B and C. A step-by-step analysis of the behavior of the equipment in response to the listed checks will indicate the trouble area. In some cases the step is conditioned by the procedures in the preceding steps, therefore, note the conditions of all controls before rechecking steps or performing checks out of sequence. Comprehensive electrical analysis is not usually required in troubleshooting this equipment.

Note: Refer to the appropriate schematic and actual wiring diagrams when making electrical checks.

6.02 By noting the symptoms of the trouble, determine which section of the set is at fault. The difficulties can possibly be attributed to three main areas; keyboard, base, or punch unit.

6.03 Keyboard and distributor or selector magnet driver (part of base unit) troubles result in the generation of incorrect codes, repeated characters, or inability to send intelligence.

6.04 Punch unit troubles may result in improper punching or printing, or malfunctions in feeding cards. Difficulties could also be encountered with the ejection and bursting of cards.

6.05 If trouble encountered is traced to the selector magnet driver, proceed as follows.

- (1) Remove the SMD circuit card.
- (2) Check for proper voltages at card connector. (See Section 574-244-100).
- (3) If voltages are correct, install new circuit card.
- (4) If voltages are not as specified replace the selector magnet driver assembly.

The defective SMD circuit card and assembly may be sent to a repair center for troubleshooting.

6.06 The repair center should have equipment capable of simulating normal operating conditions and for checking the electrical components of the selector magnet driver. The replacement of any electrical component on the SMD will require that the collector current in Q2 be rechecked and readjusted if necessary. Table C may be used as a guide for troubleshooting the selector magnet driver.

TABLE B - SET TROUBLESHOOTING

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	CHECK		
1.	Set power switch ON. External signal line adjusted for 20 ma. Motor on. Punch unit selector magnet energized. Typing on keyboard.	a. Incorrect characters generated by keyboard or distributor.	Keyboard codebar contacts are not damaged or bent, are clean and free of foreign material, and are properly seated in their nylon levers. Distributor <u>BRUSH HOLDER</u> and <u>BRUSH HOLDER SPRING</u> adjustments. Distributor segments clean and not shorted. Distributor brushes for wear or damage. Signal line current.		
		b. Repeated characters.	Improper mounting of keyboard. Keyboard reset lever for binds and adjustments. Distributor clutch adjustments and spring tensions.		
		c. Difficulty in normal keyboard trip operation.	Keyboard reset adjustments.		
		2.	Feed holes in cards are prepunched.	Feed holes damaged.	New card feed hole spacing for 10 holes per inch. <u>FRONT CARD GUIDE, LEFT CARD GUIDE, GUIDEPLATE, FRONT LID, and FEED WHEEL PHASING</u> adjustments. Clearance between right top plate. Card pressure plate for distortion.
					3.
		4.	Depress manual EJECT pushbutton. Card should be ejected and burst at its serrations.	a. Card not burst at serrations.	<u>BURST SWITCH OPERATING, and SWITCH LEVERS</u> adjustments. Card pressure plate for distortion.

TABLE B - SET TROUBLESHOOTING (continued)

STEP	PROCEDURE AND NORMAL INDICATION	TROUBLE	CHECK
		b. Cards not completely separated by burst blade.	Burst blade adjustments.
		c. Tearing of eject code holes.	Delay capacitor across relay A (1 MF).
		d. After ejection, next card stops at position other than with burst switch lever in reference hole in the card.	All switch levers for proper adjustments and free of binds. Card pressure plate for distortion.
		e. Burster clutch magnet trips more than once on each burst cycle.	<u>BURST LIMIT SWITCH</u> and <u>BURST CLUTCH TRIP MECHANISM</u> adjustments.
		f. Eject solenoid fails to energize when eject code is received by punch unit.	Proper coding of function blade. <u>FUNCTION BLADE SPRING</u> requirement and <u>NORMALLY OPEN CONTACT GAP</u> and <u>PUSHBAR LOCATION</u> adjustments and related function box adjustments.
		g. "Nibbling" occurs between rapid feed cam and its follower rollers during normal feeding of cards.	<u>INNER RAPID FEED CAM FOLLOWER</u> , <u>OUTER RAPID FEED CAM FOLLOWER</u> , and <u>CAM FOLLOWER LATCH</u> adjustments.
5.	Typing on keyboard or receiving from external transmitter. Punch unit perforates and all graphics are printed.	a. Printing occurring during use of control characters.	<u>ARMATURE STOP</u> , <u>PRINT SUPPRESSION CONTACTS</u> , and <u>PRINT SUPPRESSION</u> adjustments.
		b. Print suppression does not occur during the six characters preceding the extreme end of a card.	<u>PRINT SUPPRESS SWITCH OPERATING</u> adjustment and print suppress operating lever, at top plate, for binds.
		c. Smudging of card by ribbon.	Ribbon guide and card pressure plate for distortion.
6.	Depress B.SP. push-button switch. Card should move one character (either direction).	Card does not move in either direction.	Check continuity of switch. On current design units, check 2 amp fuse on rectifier assembly (TP332970).

TABLE C - SELECTOR MAGNET DRIVER (SMD) TROUBLESHOOTING

STEP	TROUBLE	CHECK
1.	Switching levels out of tolerance.	*R1 out of tolerance.
		Open zener diode (ZD1).
		Shorted zener diode.
		Zener out of tolerance.
		Q1 low gain.
2.	Circuit always MARKING.	Q1 open.
		Q2 shorted collector-to-emitter.
		Q2 collector grounded.
		CR5 shorted.
3.	Circuit always SPACING.	No dc voltage.
		Q1 shorted collector-to-emitter.
		R3, R4, R5, R7, or R8 open.
		Open circuit to Q1 base.
		Q2 open base, collector, or emitter.
		Wire broken.
4.	Transient suppressor network ineffective.	CR3 open or shorted.
		C1 open or shorted.
		R9 open or shorted.
5.	*R1, R3, or Q1 destroyed.	Input circuit subjected to excessive current. (Normally R3 fails first.)
6.	CR5 shorted.	Input circuit subjected to excessive current.
7.	Output current not regulating.	Defective zener diode (ZD1).
		CR4 or Q2 defective.

*R10 for the TP181821 card.