

HIGH SPEED TAPE READER

(DX TYPE)

TROUBLESHOOTING

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1. GENERAL

1.01 This section provides field service and troubleshooting for high speed tape readers (DX Type). It is reissued to add information and rearrange the text. Marginal arrows indicate changes or additions.

1.02 Repairs should be made at a properly equipped maintenance center by qualified personnel. Testing and replacement of components should be performed by persons familiar with transistor circuits.

Note: After performing maintenance or troubleshooting duties, make certain all screws and electrical connections are secure.

2. FIELD SERVICING

2.01 Excessive amounts of tape lint and dust accumulating in the grooves on the tape lid and top plate can be removed daily by lightly brushing with a R-2119 brush on the affected parts.

2.02 The contact sensing wires are sensitive elements that can become maladjusted or inoperable from inexperienced or unnecessary handling. Operating or maintenance personnel should avoid touching sensing wires either with fingers or probes.

2.03 Armature and pole mating surfaces should be serviced at every maintenance period to insure proper operation. This is best accomplished by turning the reader unit on its right side and placing a piece of paper (not perforator tape, preferably smooth KS-7187 bond paper) between each armature (left and right) and pole piece surface. Apply pressure to the paper by controlling the pallet with the other hand. When pressure on the paper has been applied, withdraw the paper from between armature and pole surface. Repeat operation on each magnet until paper is clean when withdrawn.

2.04 Should trouble arise with any of the contact assemblies (code, verify, tangled-tape/tape-out, end-of-block, and block counter) used in the reader unit, recheck all related adjustments and refine if necessary. The contact assemblies are factory adjusted items and are not intended to be disassembled for servicing. If readjusting fails to correct the trouble, replace contact assembly.

Note: The appearance of rust at any point indicates maintenance and/or lubrication is required. Do not operate the unit until the required maintenance is performed.

3. TROUBLESHOOTING

3.01 If the tape reader fails to operate, the trouble should be analyzed to recognize the source of the problem. Make certain the tape reader is causing trouble, rather than associated equipment.

3.02 Pinpoint the exact area or cause of trouble rather than giving a general description. For example, it would be more informative to say, "The unit is dropping the eighth code level" instead of "The unit is failing to transmit properly."

3.03 Readjustments should not be made to correct trouble that is not fully understood. This can result in inserting more trouble into a malfunctioning mechanism.

SECTION 592-804-300

3.04 As an aid to troubleshooting, the following chart serves as a guide in the analysis and correction of difficulties. The associated sections containing schematic and actual wiring diagrams are required for reference. The chart is intended for field repair and, as such, will recommend the quickest path to solving the problem. For example, if a circuit card failed, the immediate solution would be to replace the circuit card instead of tracing down the defective component and trying to replace it. The chart is divided into the following general descriptions of problems:

Note 1: Troubleshooting procedure should be followed in sequence as shown in the Chart.

- (1) Motor failure
- (2) Tape feed hole burring
- (3) Output signal errors

- (4) Stepper trouble
 - (a) No signal
 - (b) Incorrect signal
 - (c) Correct signal
- (5) Retractor trouble
- (6) Tangled-tape/tape-out signal errors
- (7) EDC block counter output signal errors

Note 2: When splicing tape, do not overlap spliced ends of tape, use butted end method of splicing. Splice on tape should be up when passing through reading head. Splicer and splice part numbers are referenced in adjustment Section 592-804-700.

STEP	TROUBLE INDICATION	PROBABLE CAUSE	CORRECTIVE ACTION
1.	Motor fails to start.	<p>Check fuses F1 and F2 (0.6 amp each). Replace if defective.</p> <p>Check motor connector and mating connector for proper engagement.</p> <p>Check motor winding circuits which are strapped through relays K1, 2, and 3 externally to the reader (8070WD schematic).</p> <p>Check for faulty motor circuit wiring, loose connections, and tangled-tape/tape-out contacts out of adjustment.</p>	<p>Check external ac power through interface connections to reader.</p> <p>Replace damaged contact pins or replace connectors if defective.</p> <p>Motor will not run if strapping circuits are not hooked up properly.</p> <p>If trouble cannot be corrected, replace motor unit.</p>
2.	Excessive burring of tape feed hole.	<p>Check tape lid to top plate and feed wheel to reading head adjustments in Section 592-804-700. Readjust mechanisms if necessary.</p>	<p>If preceding adjustments are correct, check for excessive drag on tape caused by an external condition.</p>

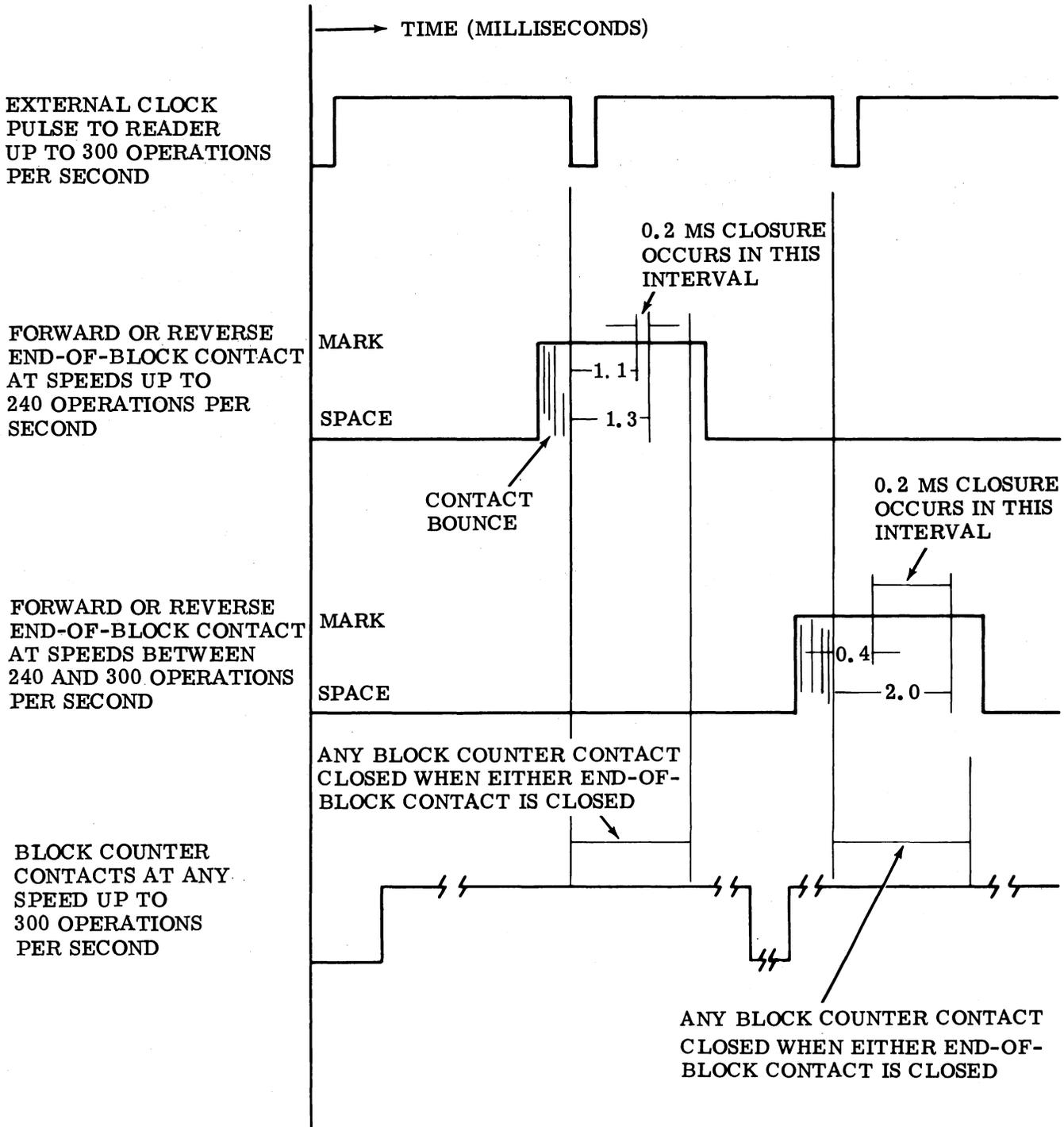
STEP	TROUBLE INDICATION	PROBABLE CAUSE	CORRECTIVE ACTION
3.	Errors on code or verify output signal.	<p>Check output from code and verify contacts as described in Section 592-804-700.</p> <p>If preceding adjustments are correct, check for loose connections or interference with contact wires.</p>	<p>If contact output is wrong, check contact assembly, contact assembly to feed wheel, tape lid latch, and tape guide in adjustment section. Readjust if necessary.</p> <p>If output from contacts is correct, check external logic and wiring for loose connections.</p> <p>If trouble persists, replace defective contact assembly.</p>
4.	<p>Failure to step or erratic stepping.</p> <p>(a) Signal is not present.</p>	<p>Check input pulse at terminal no. 14 on TP318810 circuit card for proper voltage, pulse width, and rise time.</p> <p>Check 18 v supply at terminal no. 9 on TP318810 circuit card.</p>	<p>Check for signal at terminal no. 6 on TB1 of TP318800 electronic magnet driver or terminal no. 2 on left magnet coil (brown wire). Compare signal with that shown in timing diagram figure.</p> <p>Check external pulse generator for correct signal.</p> <p>Check fuses F3 and F4 (1.5 and 0.6 amps respectively). Replace fuses if necessary.</p> <p>If correct voltage is present, check collectors of transistors mounted on TP318822 chassis.</p> <p>If voltage is not correct, check for loose, defective, or incorrect wiring. Check rectifiers CR1 through CR4, filter capacitor C1, and transformer T1. Replace defective components if necessary.</p>

STEP	TROUBLE INDICATION	PROBABLE CAUSE	CORRECTIVE ACTION
4. (cont)	<p>Failure to step or erratic stepping.</p> <p>(a) Signal is not present. (continued)</p> <p>(b) Signal is present but incorrect.</p>	<p>If signal is not present, check base of both transistors mounted on TP318822 chassis.</p> <p>If signal is present, check both magnet coils for proper dc resistance (1.9 ohms $\pm 10\%$). Check for loose or incorrect wiring. Replace components if necessary.</p> <p>Check collectors of TP318822, transistors Q1 and Q2 for similarity and a minimum of 325 v, approximately 150 microsecond pulse after turn off.</p> <p>Similar but not adequate voltage.</p> <p>If voltage is not correct, check base of chassis mounted 2N3055 transistor Q3 for 2.5 ms pulses.</p>	<p>Replace transistors if necessary.</p> <p>If transistors are good, check inductor L1 for loose connections or damaged wire. Replace inductor if necessary.</p> <p>Check signal at terminal no. 6 on TB1 of TP318800 electronic magnet driver or terminal no. 2 on left magnet coil (brown wire). Compare signal with that shown in timing diagram figure.</p> <p>Check 18 v supply at terminal no. 9 on circuit card connections.</p> <p>If voltage is not correct value, check for loose connections, damaged, or incorrect wiring. Check chassis mounted rectifiers CR1 through CR4, filter capacitor C1, and transformer T1. Replace defective components as needed.</p> <p>If voltage is correct, check re-charge circuit at terminal no. 13 of TP318810 circuit card for +6 v to +18v square wave and 2.5 ms pulse width. Check for loose connections.</p> <p>If after checking for loose connections, wrong voltage value is present, replace 2N3055 transistor Q3.</p> <p>If after checking for loose connections, voltage is not present, replace TP318810 circuit card.</p>

STEP	TROUBLE INDICATION	PROBABLE CAUSE	CORRECTIVE ACTION
4. (cont)	<p>Failure to step or erratic stepping.</p> <p>(b) Signal is present but incorrect. (continued)</p> <p>(c) If signal is present and correct.</p>	<p>Dissimilar but adequate voltage.</p> <p>Dissimilar transistor, one not carrying adequate voltage.</p> <p>If voltage is not present.</p> <p>If correct signal is received at terminal no. 6 on TB1 of TP318800 electronic magnet driver or terminal no. 2 on left magnet coil (brown wire), compare with that shown in timing diagram figure.</p> <p>Check torque applied from motor to escapement shaft.</p>	<p>Check magnet coils for proper dc resistance and shorts.</p> <p>If resistance reading is not correct, check for loose connections, damaged, or incorrect wiring. Replace coil if defective.</p> <p>If resistance reading is correct, check escapement adjustment in adjustment Section 592-804-700. Readjust if necessary.</p> <p>If trouble persists, clean armature and pole faces. Check for loose connections.</p> <p>Check base of TP318822 transistor for approximately one volt base drive signal.</p> <p>If inadequate voltage is present, replace defective TP318822 transistor after checking for loose connections.</p> <p>Check input clock pulse for voltage, pulse width, and fall time. Check external pulse generator.</p> <p>If correct voltage is present, replace TP318810 circuit card after checking for loose connections.</p> <p>Check drive spring, motor belt, and hysteresis clutch torque. See adjustment Section 592-804-700. Readjust if necessary.</p> <p>If preceding adjustments are correct, check binds in pallet and escapement shafts. Eliminate all binds in these areas.</p>

STEP	TROUBLE INDICATION	PROBABLE CAUSE	CORRECTIVE ACTION
4. (cont)	<p>Failure to step or erratic stepping.</p> <p>(c) If signal is present and correct. (continued)</p>	<p>Check escapement adjustment in Section 592-804-700. Readjust if necessary.</p>	<p>If escapement adjustments are correct, clean armature and pole surfaces. If trouble persists, check pallet and escapement wheel for wear. Replace items that are worn.</p>
5.	<p>Retractor difficulty — failure to operate.</p>	<p>Solenoid hums.</p> <p>Solenoid drops out after being energized for an extended time.</p> <p>If the previous operation is not at fault, check that the motor reverse does not occur until the interlock switch is operated.</p> <p>If adjustment is correct, check operation of retractor interlock switch with an ohmmeter.</p> <p>If wiring and circuitry check, look for binds in retractor mechanism.</p>	<p>Check retractor solenoid and retractor interlock switch adjustments in Section 592-804-700. Readjust if necessary.</p> <p>The solenoid is designed for intermittent duty and is equipped with a thermal cutout device which opens the coil if left on for extended periods. When the coil cools, the solenoid will be operative again. The external circuit should be checked to prevent the coil from remaining on for extended periods.</p> <p>If necessary, readjust to provide proper control.</p> <p>Check for loose connections or faulty wiring.</p> <p>Eliminate located binds.</p> <p>Replace solenoid if necessary.</p>
6.	<p>Errors on tangled-tape/tape-out signal.</p>	<p>If contact output is wrong, check contact adjustments in Section 592-804-700. Readjust if necessary</p>	<p>If adjustments and contacts are correct, check for loose connections, shorted wires, and external logic. Clean contacts with a piece of paper. Replace contact assembly if necessary.</p>

STEP	TROUBLE INDICATION	PROBABLE CAUSE	CORRECTIVE ACTION
7.	Errors on EDC block counter output.	<p>Check end-of-block and block counter contact output as described in adjustment Section 592-804-700. If contact output is correct, check external logic.</p> <p>If preceding adjustments are correct, check for binds in the block counter mechanisms.</p>	<p>For end-of-block contact failure, check the following adjustments in Section 592-804-700:</p> <ul style="list-style-type: none"> End-of-block contact bracket Escapement pinion Upper shaft gear backlash End-of-block contact cam <p>Readjust if necessary.</p> <p>For block counter contact failure check the following adjustments:</p> <ul style="list-style-type: none"> Block counter contact bracket Block counter contact cam <p>Readjust if necessary.</p> <p>Eliminate binds in escapement and block counter mechanisms.</p> <p>If binds are not found, check for loose connections, damaged, or shorted wires. Replace faulty contact assembly if necessary.</p>



EDC Block Counter Contact Strobing