HIGH SPEED TAPE READERS (DX TYPE)

PDI AND PTI INTERFACE

TROUBLESHOOTING

CONTENTS PAGE

1. GENERAL

1.01 This section provides field service and troubleshooting on high speed tape readers for PDI and PTI interfaces. Notes and instructions appear in the following paragraphs. Troubleshooting charts provide detailed information to locate trouble.

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. Any adjustments referenced in the troubleshooting charts can be found in Section 592-804-710.

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 tape lid grooves 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 KS7187 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 Repeat operation on each magnet until paper is clean when withdrawn.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 and tangled-tape/tape-out) 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.

Prepared for American Telephone and Telegraph Company by Teletype Corporation

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.

3.04 As an aid to troubleshooting, the following charts serve as a guide in the analysis and correction of difficulties. The charts are 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 following charts are divided into general descriptions of problems.

Note: Troubleshooting procedures should follow in sequence as shown in the charts.

Chart 1 — Motor Failure
Motor fails to start.

Chart 2 — Stepper Troubles
- No. 1 — Failure to step, or erratic stepping.
- No. 2 — Signal present and correct.
- No. 3 — Signal present but incorrect.
- No. 4 — Signal dissimilar but adequate voltage.
- No. 5 — Signal dissimilar, inadequate voltage.
- No. 6 — Signal not present.

Chart 3 — Tape Feed Hole Burring
Excessive burring of tape feed holes.

Chart 4 — Output Signal Errors
Errors on code output signals.

Note: When splicing tape, do not overlap spliced ends of tape; use butted end method of splicing. Tape splice should be up when passing through reading head. Splicer and splice part numbers are referenced in adjustment Section 592-804-710.

CHART 1

MOTOR FAILURE

TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
Motor fails to start.	a. Disconnect power cable and check fuses (5) on power supply. Replace blown fuses with correct current rating as listed on fuse holder. b. If fuses are not blown, lay reader on its right side (motor down) and remove bottom plate. c. Connect power cable. Check for 5 volts dc on terminal 15 of MC448 or MC449. If voltage is incorrect, and inputs to the reader are in their proper state, replace MC448 or MC449. d. If inputs are correct, disconnect power cable and remove MC448 or MC449. Reconnect power cable and check voltage on MC447 as follows: Terminal 1 — 18 volts dc Terminal 3 — 5 volts dc e. If voltages are incorrect, check power supply. f. If voltages are correct, check voltages on MC447 as follows: P1-3 to P1-4 110 volts ac P1-3 to J3-3 110 volts ac J3-1 to P1-3 110 volts ac Upon failure of any one item, replace MC447 (after checking to insure that all connections are good). g. If MC447 is correct and motor still fails to start, replace motor.

CHART 2

STEPPER TROUBLES

NO.	TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
1.	Failure to step, or erratic stepping.	a. Check signal at rear terminal of left magnet coil (black wire). Compare pick up time for left and right magnet. Pick up time should be of equal duration within 0.4 milliseconds. b. If signal is present and correct, proceed to no. 2. c. If signal is present but incorrect, readjust Escapement Wheel and Pallet Alignment, and proceed to no. 3. d. If no signal is present, proceed to no. 4.

CHART 2

STEPPER TROUBLES (Continued)

NO.	TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
2.	Signal present and correct. Note: First check no. 1.	a. Check torque applied from motor to escapement shaft. Check drive spring, motor belt, and magnetic clutch torque. Check Magnet Clutch Torque adjustment. If incorrect, readjust. b. If torque is correct, look for binds in pallet and escapement shafts. Eliminate all binds in these areas. c. If no binds are present, check escapement adjustment in no. 1.c., and readjust if necessary. Clean armature and pole surfaces. d. If adjustments are correct and trouble persists, check pallet and escapement wheel for wear. Replace worn parts.
3.	Signal present but incorrect. Note: First check no. 2.	a. Check collectors of TP318822 transistors Q7 and Q8 for similarity and a minimum pulse of 325 volts and approximately 150 microseconds wide after turn off. b. If transistors are dissimilar and voltage is adequate, proceed to no. 4. c. If transistors are dissimilar and signal is not of adequate voltage, proceed to no. 5. d. If transistors are similar but not of adequate voltage, check 18 volts supply at terminal 1 on MC447. e. If voltage is incorrect, check power supply and replace if necessary. f. If voltage is correct, check collector at Q9 for +5 volts to +18 volts square wave and 2.7 millisecond pulse width. g. If voltage is incorrect, replace MC447. h. If voltage is still incorrect, replace stepper coils and/or TP318818 recharge coil. i. If still incorrect, and a +5 volts to 0 volt signal is present at terminal 14 of MC447, replace MC447.
4.	Signal dissimilar but of adequate voltage. Note: First check no. 3.	a. Check magnet coils for proper dc resistance and shorts to ground. If incorrect, check for loose or incorrect wiring. Replace associated magnet coil if necessary. b. If resistance is correct, check Escapement Wheel and Pallet Alignment adjustment. Readjust if necessary. c. If adjustment is correct and trouble persists, clean armature and pole face surfaces. Check for loose connections.

CHART 2

STEPPER TROUBLES (Continued)

NO.	TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
5.	Signal dissimilar, inadequate voltage. Note: First check no. 4.	a. Check base of TP318822 transistors for approximately 1 volt drive signal. If signal is present and transistor does not work, replace associated TP318822 transistor after checking for loose wire. b. If signal is not present, check input signal at terminal 14. c. If signal is incorrect, check external connections and MC448 or MC449. d. If signal is correct, replace MC447 after checking for loose connections.
6.	Signal not present. Note: First check no. 2.	a. Check signal input at terminal 14 on MC447. If incorrect, check MC448 or MC449. b. If incorrect, check 18 volts supply at terminal 1 on MC447. c. If incorrect, check power supply. d. If correct, check collectors of TP318822 transistors. e. If signal is present, check both magnet coils for proper dc resistance. f. If incorrect, check for loose or incorrect wiring. Replace coils if necessary. g. If signal is not present, check base of both TP318822 transistors. If no signal is present, replace MC447. h. If signal is present, check both TP318822 transistors. If faulty, replace transistors. i. If not faulty, check TP318818 coil for loose connection. If faulty, replace inductor.

CHART 3

TAPE FEED HOLE BURRING

TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
Excessive burring of tape feed holes.	a. Check Tape Lid, Tape Sensing and Transport Mechanism Alignment adjustments, if incorrect, readjust. b. If adjustments are correct, check for excessive drag on tape from external source.

CHART 4

OUTPUT SIGNAL ERRORS

TROUBLE INDICATION	ANALYSIS AND RECOMMENDED ACTION
Errors on code output signals.	a. Check output from code contacts (refer to appropriate wiring diagram). Note: View contact output on oscilloscope using test tape in reader which has a repetitive pattern requiring marking and spacing outputs for each level. b. If requirements cannot be met, recheck contact adjustments, Contact Sensing Wire Tip Height and Tape Sensing Wires and Feed Wheel Alignment. c. If errors still occur, recheck the following adjustments: Tape Lid Latch, Tape Guides, Tape Sensing Wires and Feed Wheel Alignment. If incorrect, readjust. d. If adjustments are correct, check external logic. Look for loose connections. Repair or replace, if necessary. e. Check for interference with sensing wires or contacts. Attach a spring hook under the sensing wire that is failing, and carefully move the hook back and forth to clear any obstacle from the path of the wire, do not bend sensing wire unnecessarily. If trouble persists, replace contact assembly.