"DATASPEED"* TAPE-TO-TAPE SYSTEM

TAPE RECEIVER 5B

TROUBLESHOOTING

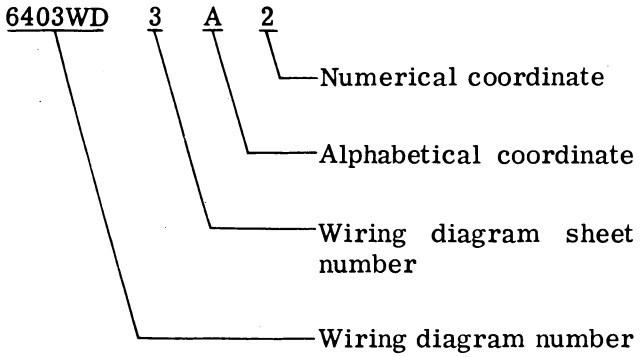
CONTENTS PAGE

1. GENERAL

1.01 This section provides the troubleshooting procedures for the "DATASPEED" Tape Receiver 5B. It is being reissued to expand and update the text and troubleshooting procedures. Because of the extensive changes and amount of new material being added, marginal arrows used to indicate changes have been omitted.

1.02 General description and operation information, installation procedures, and adjustment and lubrication are found in Sections 592-808-100, 592-808-200, and 592-808-700 respectively.

1.03 All circuit descriptions in this section are made with reference to specific schematic wiring diagrams. These wiring diagrams can be found in Section 592-808-400. The circuit elements on these diagrams relate to the text and may be located as follows:



2. EQUIPMENT REQUIRED

2.01 Aside from the standard hand tools, most troubleshooting is done with a volt-ohm-milliammeter. Punch driver card adjustments (Section 592-808-700) will require the use of an oscilloscope. These cards seldom, if ever, need to be adjusted.

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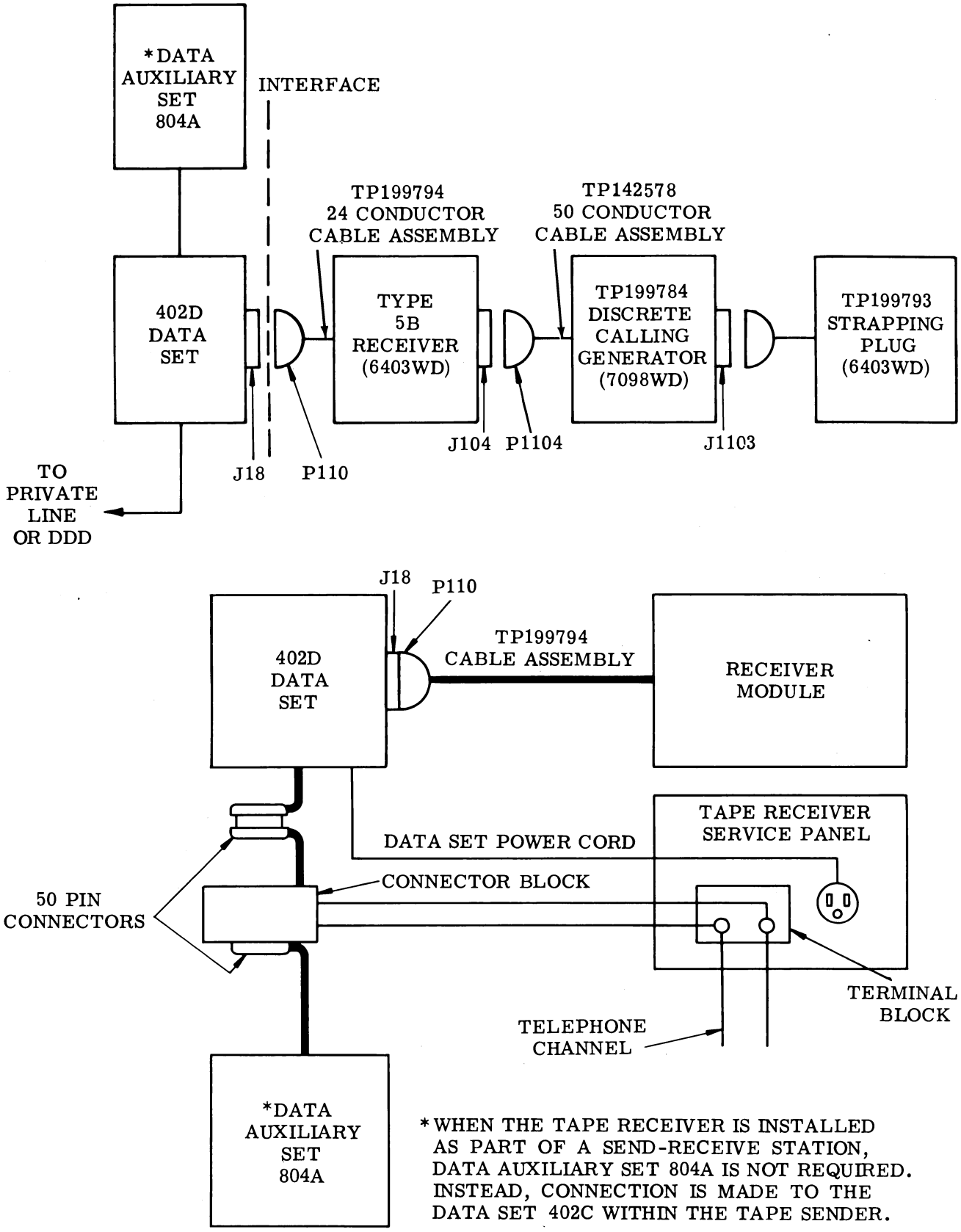

Figure 1 - Interconnecting Diagram for Receive-Only Terminal with Discrete Calling Feature

3. TROUBLESHOOTING

CAUTION: DISCONNECT ALL POWER BEFORE REMOVING ANY ASSEMBLIES OR COVERS FROM THE PUNCH OR ANY OTHER APPARATUS UNIT.

GENERAL

3.01 Check for and attempt to clear possible cause of trouble. To avoid recurrence, it may be necessary to replace modules, punch unit, power supply or motors as required to restore normal operation as soon as possible. After service is restored, the defective component can be repaired, adjusted, and tested in a more suitable environment.

3.02 If the type and cause of a trouble are unknown, refer to Troubleshooting Chart 1 and the following paragraphs to isolate the problem area. For extra feature apparatus unit service arrangements and wiring option tables, see Section 592-808-200.

Note: On all station visits, use a tape gauge to check for accurate hole spacing and alignment. Also check operation of the low tape and flashing power lamp. Inspect the chad chute for excessive chad near the punch block.

TAPE PUNCH

3.03 This section deals primarily with Tape Receiver 5B electronic components. For information on the tape punch, refer to Section 592-803-100.

CABINET CIRCUITS

3.04 Aside from interconnections, cabinet circuits include a line filter (on electrical service panel), a power switch, and a tape winder. The control panel switches and indicators are associated with the receiver module. Although the tape feed motor runs continuously, a mercury switch on the tape-tension arm turns on the winder motor when slack tape allows the arm to drop to a predetermined level. Improper tape winding indicates a maladjustment. (See Section 592-808-700.) Complete failure to wind or feed indicates a defective switch, winder motor, or feed motor.

TAPE RECEIVER 5B CIRCUITS

A. General

3.05 Circuits associated with the receiver and its module are divided into five groups:

Control circuits
Timing pulse circuit
Alarm circuits
Punch driver circuits
Power supply circuits

Note: Refer to Chart 1 for troubleshooting, and to Chart 2 for symbol and wiring diagram references.

(a) Unusual troubles that may not have been anticipated in this section can be cleared by reference to Section 592-808-100, where circuit details are discussed. An interconnecting block diagram (Figure 1), a control circuit diagram (Figure 2), and an interface diagram (Figure 3) are included in this section for the convenience of the serviceman. Also included are trouble sources, and general information that may otherwise be difficult to obtain (Charts 1 and 2).

(b) The test center test of the receiver consists of sending test patterns from the data set test set while the data set is in the DATA mode. These patterns should be punched as alternating all-punch and blank characters.

(c) Data reception or use of test center signals is the most satisfactory test of overall receiver operation. The BLANKS F.O. (feed-out) and ALL F.O. (feed-out) provide testing for the punch and driver circuits. With no received carrier, the control circuits can be checked by placing the data set in the DATA mode, waiting a few seconds, and manually operating and releasing the CN relay. The RC relay should operate when the CN relay operates and remain operated even after the CN relay is released. This should cause the SIGNAL lamp to light, and the auxiliary signal circuit to close.

B. Data Set Interface

3.06 A brief description of each interface pin connected to data set 402D is given in Table A. This includes pin numbers, lead designations, and function of lead designations.

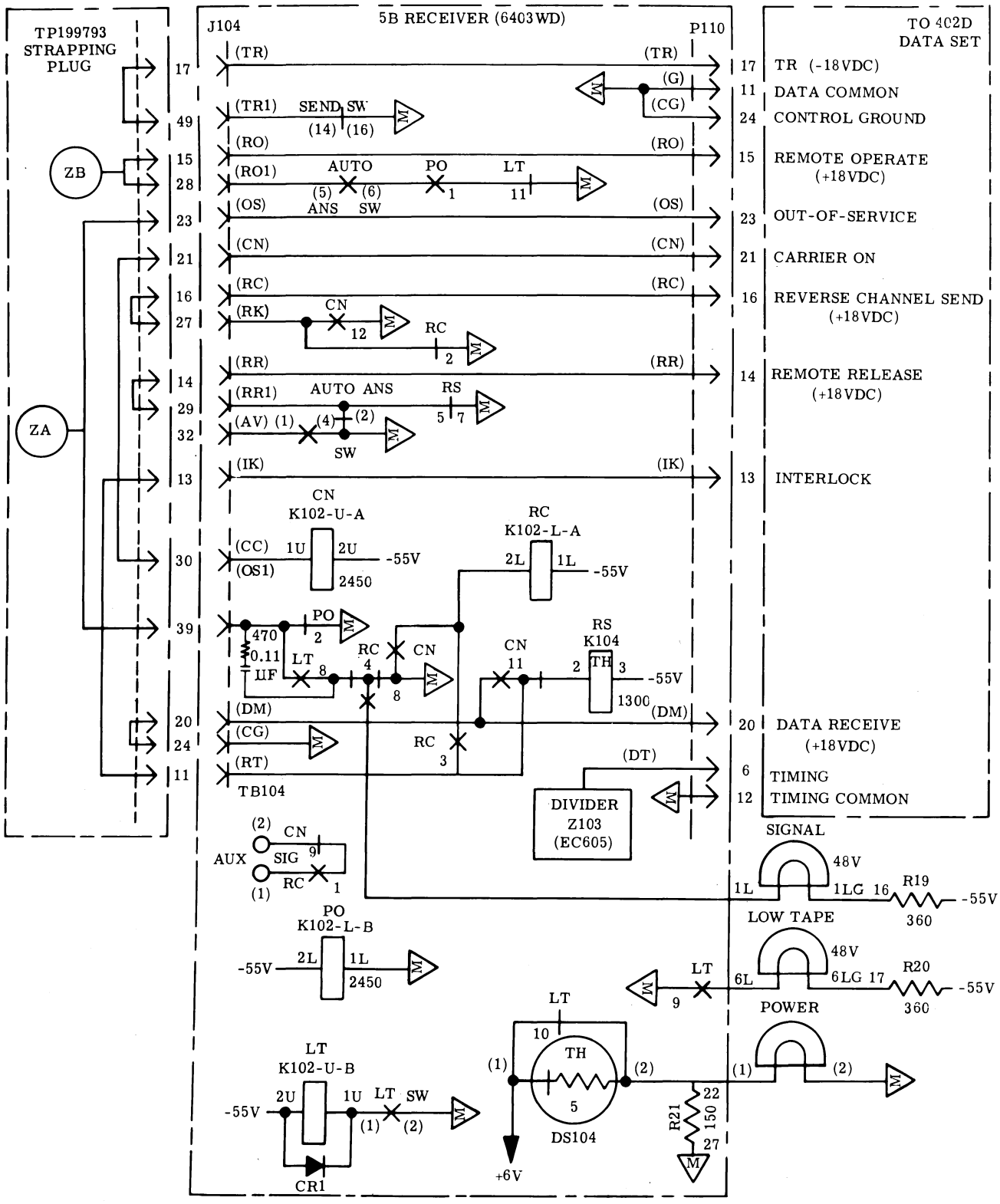

Figure 2 - Tape Receiver 5B, Receive-Only Terminal Control Circuits

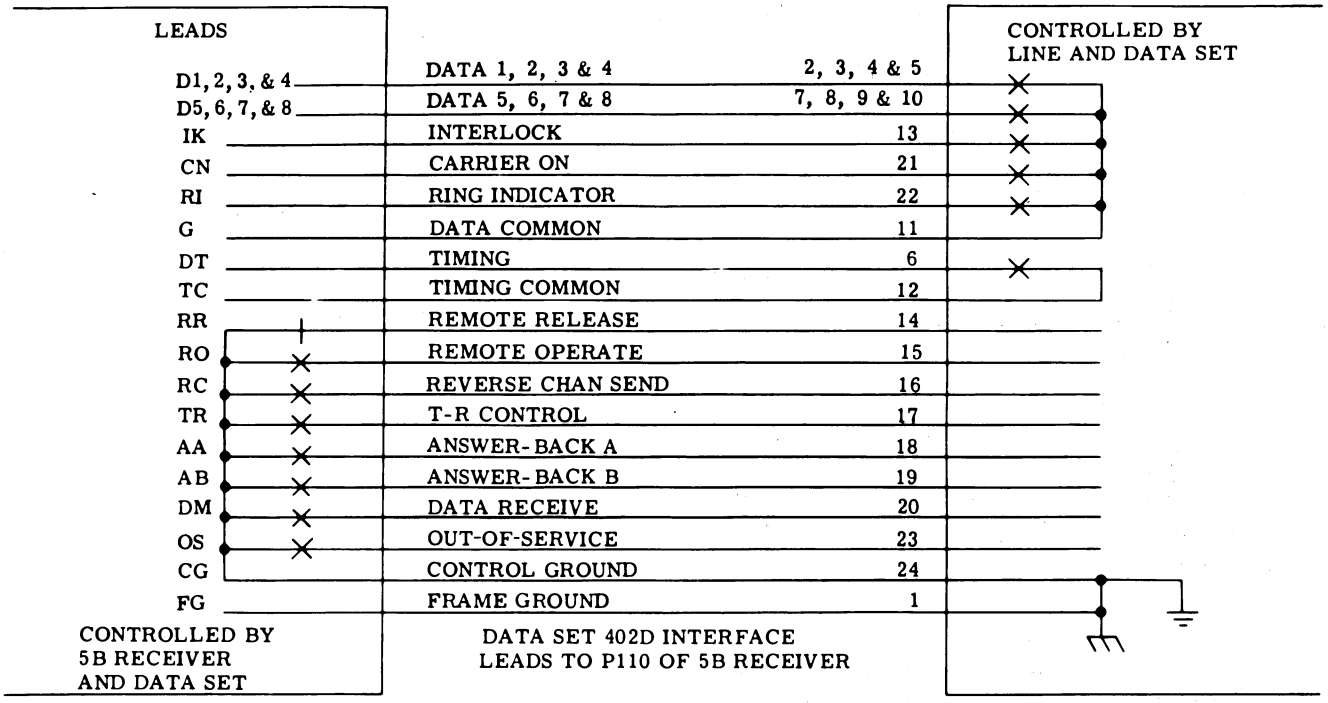

Figure 3 - Typical Interface - Contact Control Arrangements at Data Set

C. Control Circuits (Figure 2)

3.07 The control circuits associated with data set 402D interface-contact control arrangements must function as follows when used as part of a receive-only terminal.

Interlock Circuit

3.08 Interlock, IK lead to data set pin 13.

(a) The data set grounds this lead immediately after it transmits a 2025 Hz beep signal and goes to DATA mode (indicated by lighted DATA lamp). Unless the carrier is being received from a 402C type data set (to operate carrier-on relay CN), the IK lead will operate thermal relay RS and drop the call in 30 seconds (if AUTO ANS. is on) by removing ground from pin 14 of data set 402D. During the 30-second delay of relay RS, the IK lead holds reverse channel relay RC operated if it had been previously operated by relay CN.

(b) In an unattended send-receive terminal, the IK circuit becomes part of the control circuits in the unattended send-receive apparatus unit and the recognizer apparatus unit. Its use is explained in Sections 592-808-102 and 592-807-101 respectively.

(c) If the IK lead to ground is open, the receiver will not automatically terminate the call in 30 seconds when received carrier stops. Nor will it hold the reverse channel send signal on the line for 30 seconds after the received carrier stops. When data set 402D is not in the DATA mode, the 387 Hz reverse channel transmitter is disabled.

Data Receive Mode Circuit

3.09 Data Mode, DM lead to data set pin 20.

(a) This lead must be permanently grounded by the receiver to receive data through strapping plug TP199793. It also serves as a permanent ground for the data set Control Ground, CG lead pin 24.

(b) If an extra feature apparatus unit is used, the lead to pin 20 must be opened for the receiver to transmit identification signals (over answer-back AA lead) or answer-back signals.

(c) If the DM ground lead to pin 20 of the data set is open, the receiver will not receive data.

TABLE A

INTERFACE OF 402D RECEIVING DATA SET

Pin No.	Lead	Function
1	Frame Ground	Common to signal and ac power service ground.
2	Data 1	Indicates whether corresponding channel is mark (closed) or space (open).
3	Data 2	
4	Data 3	
5	Data 4	
6	Timing	Closes to timing common for 5 ms for each character.
7	Data 5	Indicates whether corresponding channel is mark (closed) or space (open).
8	Data 6	
9	Data 7	
10	Data 8	
11	Data Common	Common lead for closing data leads.
12	Timing Common	Common lead for closing timing lead.
13	Interlock	Signals 5B Receiver when data set is in data mode.
14	Remote Release	Opened from control ground, 5B Receiver when AUTO ANS key is operated, to terminate call.
15	Remote Operate	Closed to control ground by 5B Receiver for unattended answer feature.
16	Reverse Channel Send	Closed to control ground by 5B Receiver to cause reverse channel to transmit (option).
17	TR Control	Controls transmit or receive condition at transmit-receive terminals using unattended send-receive apparatus unit feature.
18	Answer-Back A	Operated to transmit corresponding answer-back for discrete calling and/or unattended send-receive feature service.
19	Answer-Back B	
20	Data Receive	Grounded by 5B Receiver to receive data, opened to transmit answer-back.
21	Carrier On	Closes to data common to indicate a signal is being received from a remote 402-type transmitter.
22	Ring Indicator	Indicates presence of ringing current to 5B Receiver on incoming call.
23	Out-of-Service	Enables line to be made busy when equipment is out of service.
24	Control Ground	Common with frame ground.
25		Not used.

Transmit-Receive Circuit

3.10 TR Control, TR lead to data set pin 17.

(a) This lead must be grounded by the receiver to keep the 402D data set and receiver on line. It is opened only by the receiver SEND switch or by an unattended send-receive apparatus unit to place data set 402C and sender on line at a send-receive terminal. With the SEND switch unoperated, it is permanently grounded through strapping plug TP199793 to receiver module ground.

(b) Under certain conditions, the TR lead may be grounded outside the receiver at a receive-only terminal. At this type of station, manual control and telephone service are supplied by auxiliary data set 804A and data set 402D. At a send-receive terminal, manual control and telephone service is supplied by data set 402C associated with the sender.

(c) If the TR lead is not grounded, the receiving data set will not be on-line to receive data.

Remote Release Circuit

3.11 Remote Release, RR lead to data set pin 14.

(a) This lead must be grounded through strapping plug TP199793 to receiver module ground to keep the on line data set in the DATA receive mode. It is grounded through the AUTO ANS. switch when this switch is unoperated and/or it is grounded through the 30-second delay thermal relay RS when this relay is unoperated.

(b) In an unattended send-receive terminal this RR lead becomes part of the automatic disconnect circuits in the unattended send-receive apparatus unit and in the recognizer apparatus unit. Sections 592-808-102 and 592-807-101, respectively, cover these two extra feature apparatus units, and explain the use of the RR lead.

(c) When the RR ground to the data set is opened, the data set terminates the call. When the remote sender stops transmission of carrier, the receiver CN lead opens a ground path to and releases the CN relay which then energizes the RS relay. The RS relay operates 30 seconds later to open the RR ground lead. If the RR ground lead is opened too soon, the message will be interrupted.

Remote Operate Circuit

3.12 Remote Operate, RO lead to data set pin 15.

(a) This lead must be grounded in the receiver for unattended answering service by the receiving data set. The RO lead is grounded through the ZB wiring option of strapping plug TP199793, the operated AUTO ANS switch, contact 1 of operated power-on relay PO, and contact 11 of unoperated low-tape relay LT to module ground in the receiver. Automatic answering is thereby prevented if low tape and/or power off conditions exist, even though AUTO ANS is operated.

(b) In an unattended send-receive terminal the receiver RR lead is connected to the sender RR lead and has an alternate path to ground in the recognizer if the sender has tape and is arranged for unattended answering (AUTO ANS. operated). The unattended send-receive apparatus unit (Section 592-808-102) and the recognizer apparatus unit (Section 592-807-101) explain the use of RO lead for this type of service.

(c) Data set 402D will not answer incoming calls automatically unless its RO lead to pin 15 is grounded.

Reverse Channel Send Circuit

3.13 Reverse Channel Send, RC lead to data set pin 16.

(a) This lead must be grounded by the receiver for data set 402D to transmit a 387 Hz reverse channel signal over the line. It is grounded through strapping plug TP199793, contact 2 of unoperated relay RC, or contact 12 of operated relay CN to module ground in the receiver. When relay CN operates, it also operates relay RC, leaving RC ground lead dependent on contact 12 of relay CN.

(b) In a send-receive terminal the reverse channel send circuit functions in the same manner and is independent, except for wiring, of any circuits in the extra feature apparatus units or sender.

(c) The data set will not transmit reverse channel signal while this RC lead ground path is open. A remote sender that is wired for reverse channel operation will immediately stop transmission and light a SIGNAL lamp when the reverse channel signal stops.

Carrier on Circuit

3.14 Carrier On, CN lead to data set pin 21.

(a) This lead must be grounded by the data set to keep the set on the line when the AUTO ANS is operated, and to transmit reverse channel (circuit assurance and break feature) signal and to setup the aux sig and signal lamp circuits for end of message indication. The CN lead is grounded by the data set 30 ms after it receives an all-space signal from a remote sending terminal. The data set then continues to hold ground on the CN lead until received mark and space carrier signal ceases on either channel 7, or channel 4, or channel 2, indicating end of remote send terminal transmission. This CN ground is applied through the TP199793 strapping plug, carrier on (CN) relay coil to -55 v in the receiver and operates the CN relay. Operated CN relay contacts in the circuit function as follows.

(1) Contact 11 opens the data set interlock ground path to 30-second RS relay, preventing the RS relay from operating and opening the receiver ground path through TP199793 strapping plug to data set remote release, thereby terminating (hanging up) the call while the remote sender is transmitting carrier.

(2) Contact 12 applies receiver ground through TP199793 strapping plug to data set reverse channel send pin 16 to transmit reverse channel if a 402D data set is used and wired for this feature.

(3) Contact 8 applies ground to coil of, and operates, reverse-channel (RC) relay which then hold itself operated through its own contact 3 and TP199793 strapping plug to data set interlock ground pin 13. When the CN relay is released, this operated RC relay lights the SIGNAL lamp through its contact 4, closes the aux sig circuit through its contact 1 and opens the alternate ground to data set reverse channel send pin 16 through its contact 2 and the TP199793 strapping plug.

(4) Contact 9 of operated CN relay opens the aux sig circuit.

(b) In a send-receive terminal that is equipped for unattended operation, the CN ground is also applied to the pulse generator-relay drive circuit in the unattended send-receive apparatus unit. This stops cycling of the terminal from send to receive condition and holds the receiving data set on the line in the receive mode. This type of operation is explained in the Section 592-808-102 covering the TP199788 unattended send-receive unit feature.

(c) The data set will not stay on the line more than 30 seconds if the CN lead ground path is open with the AUTO ANS. key operated. If the CN lead is opened when the RC relay is operated, reverse channel signal transmission will immediately cease, the aux sig circuit will close and the SIGNAL lamp will light and remain lighted until the ground path from data set interlock pin 13 is opened.

Out-of-Service Circuit

3.15 Out-of-Service, OS lead to data set pin 23.

(a) The ZA wiring option must be present in the TP199793 strapping plug and this lead must be grounded during an out-of-service condition due to low tape or power failure, to cause the 402D data set to appear busy to the remote calling terminal. The ZA wiring should normally be removed except for service such as incoming-only lines of rotary hunting groups where the out-of-service option is required. One path to ground for this lead is supplied by contact 2 of unoperated power-on (PO) relay. Another path to ground is supplied by contact 8 of operated low-tape (LT) relay through contact 4 of unoperated reverse-channel (RC) relay and contact 8 of unoperated carrier-on (CN) relay.

(b) In an unattended send-receive terminal this OS lead also becomes part of the out-of-service and answer-back A circuits as illustrated by the control and schematic diagrams in the section covering the TP199788 unattended send-receive apparatus unit.

(c) The line will not appear busy to remote calling station if the OS lead to the receiving data set is not grounded.

D. Manual Controls

3.16 For proper operation, the manual controls must be positioned according to the section covering operation of the terminal equipment. This includes any extra feature units used. The manual controls may also be operated as an aid in checking their related circuits and to isolate possible troubles in the receiver. Refer to Figure 2 and Chart 1 in this section, and to wiring diagrams 6403WD and 6404WD shipped with the receiver.

E. Timing Pulse Circuit (Figure 4)

3.17 The amplifier-inverter circuit contains bias resistors and clamping diodes to convert the eight-wire contact closure signals from data set 402D to voltage level signals. These signals are 0 volt (mark) when the contacts are closed or -6 volts (space) when they are open. The timing signal from the data set is also converted to a voltage level and then inverted for use as a sample signal to the punch driver. This signal is gated at the data set with a carrier-on condition. The inverter includes a feedback capacitor to prevent data set contact bounce from causing double punching. The timing signal from the data set is normally 5 milliseconds so that the punch command is given about 5 milliseconds after a new character appears on the data leads.

F. Alarm Circuits

3.18 The SIGNAL lamp lights when carrier-off occurs at the end of data reception. An auxiliary signal circuit is closed when this lamp lights. The power switch light assembly flashes whenever a low tape condition exists. When this condition is detected, adjustable low tape contacts operate relay LT. Operation of relay LT lights the low tape SIGNAL lamp and removes a short circuit across flasher DS104, which causes the POWER on lamp to flash repeatedly.

G. Punch Driver Circuits (Figure 5)

3.19 In the reset condition, each magnet driver and its associated magnet is energized. When a character sample is received at P110, pin 6, it is inverted by Z103W (EC605) and then applied to integrator pulse shaper Z113B to remove any line noise. The output of the integrator pulse shaper (Figure 6) samples all magnet drivers (Figure 7). Each magnet driver that is primed to mark (0 volt on pin 15) opens the current path to its associated magnet. This causes its corresponding reed to release and punch tape.

Note: The feed level magnet driver is permanently primed and therefore energizes for each character sample received. This causes the tape to feed once per character.

The gated oscillator, Z113A (Figure 7), receives a 0-volt signal from feed magnet driver Z112, pin 24 whenever it is de-energized. This 0-volt signal causes the gated oscillator to time out after 1.9 milliseconds and produce a positive pulse to be applied to pin 30 of all magnet drivers. Those magnet drivers that were set will now reset and close the current path to their respective magnets.

H. Power Supply Circuit

3.20 Power supply TP148850 consists of full-wave silicon diode rectifiers and provides a continuous -55v, -5v, -12v, -6v, and +6v from a 105 to 130 vac, 58.5 - 61.5 Hz source. These voltages are all labeled, and their wiring color coded to show source, route, and destination. The following information is provided to aid troubleshooting procedures.

(a) Circuit symbol numbers are stamped on the chassis or mounting bracket adjacent to the designated apparatus.

(b) Wiring diagrams 6405WD and 6406WD show the schematic and actual wiring of the rectifier.

(c) Fuses (similar to 3AG) are commercially available, or may be ordered from Section 592-808-800.

(d) Signal ground (common) is isolated from frame ground.

(e) Maximum permissible ripple is 5 percent for the -5v supply and 2 percent for all other supplies.

(f) The power supply is capable of continuous operation under full load (250 watts), and at ambient temperature ranges of 0 to 55°C.

(g) There should be no variation of the -6v, -55v, or -5v outputs by more than 2 percent. Variation of the load on any supply voltage from no load to full load should

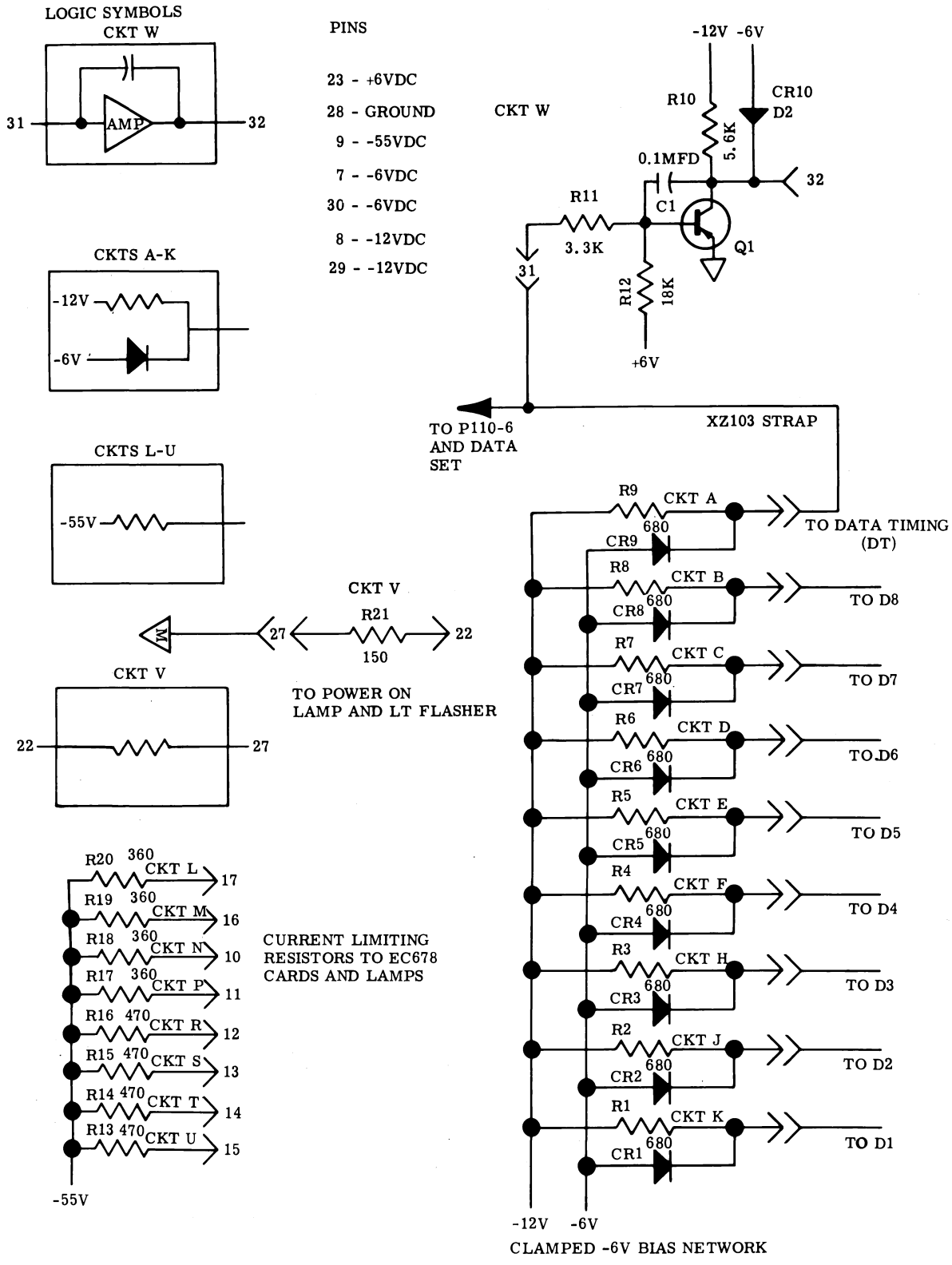

Figure 4 - Timing Pulse Amplifier-Inverter, Bias Network, and Current Limiting Resistors Circuit Card (EC605)

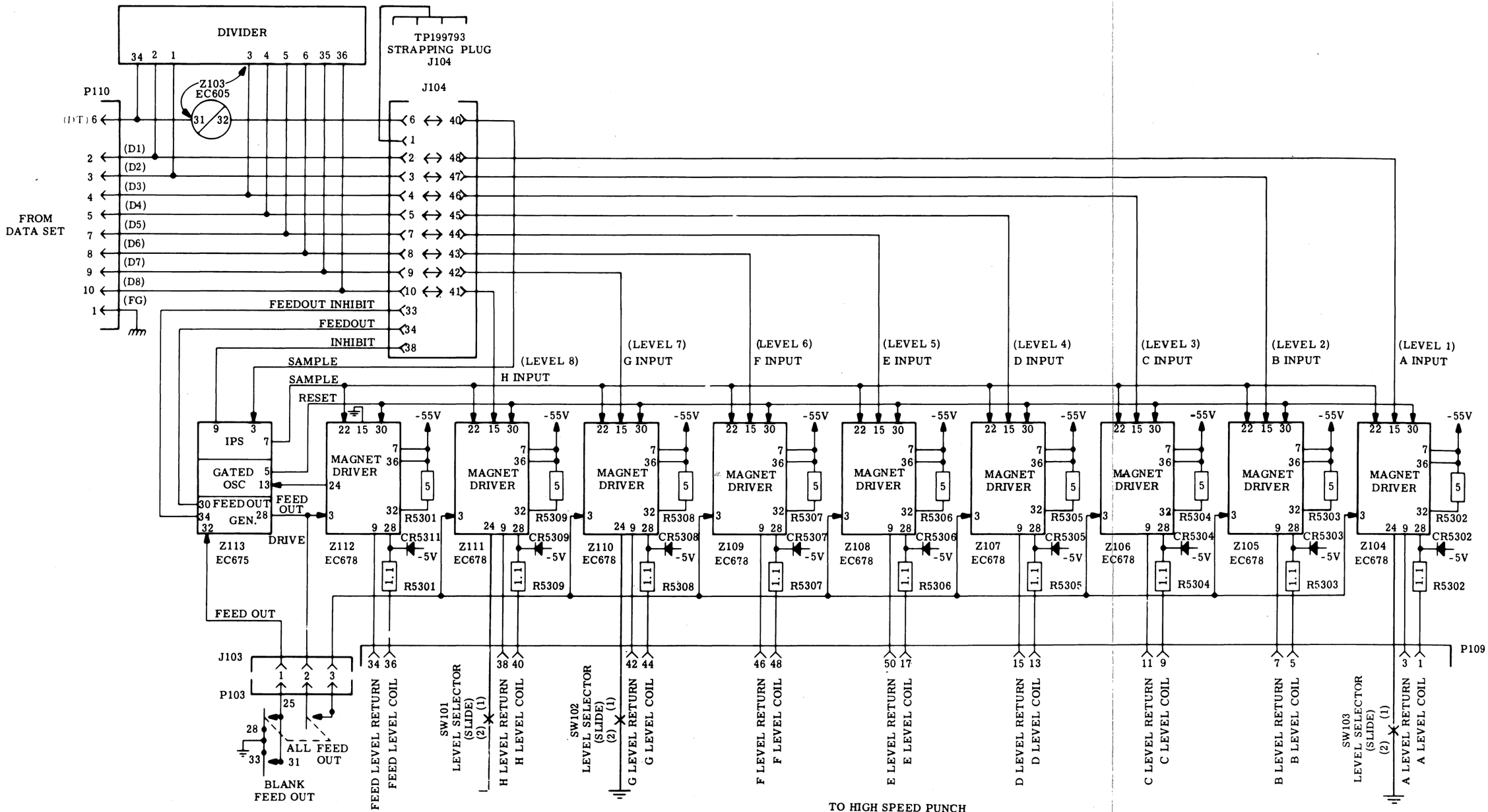

Figure 5 - Punch Driver Circuits

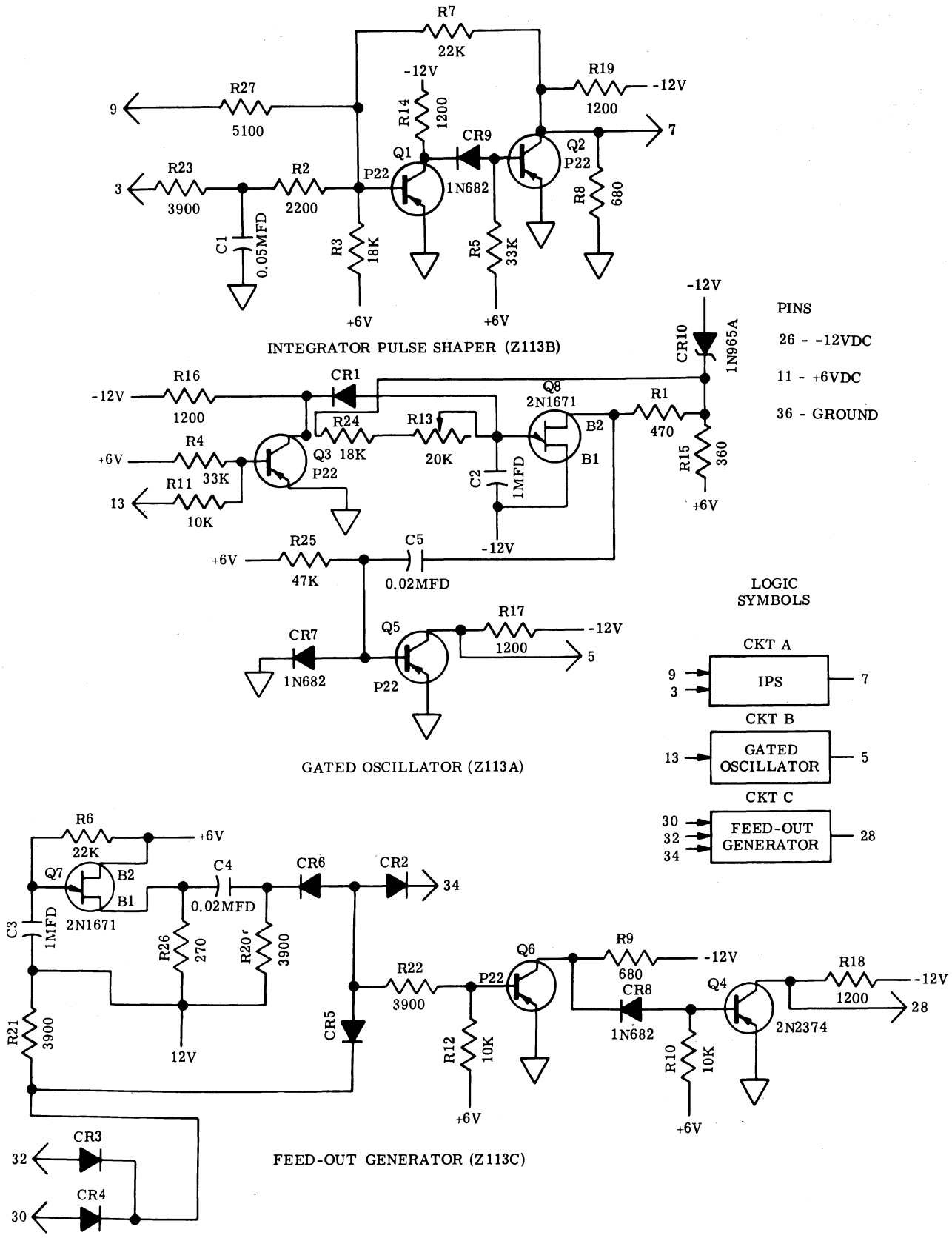

Figure 6 - Integrator Pulse Shaper, Gated Oscillator, and Feed-Out Generator Circuit Card (EC675)

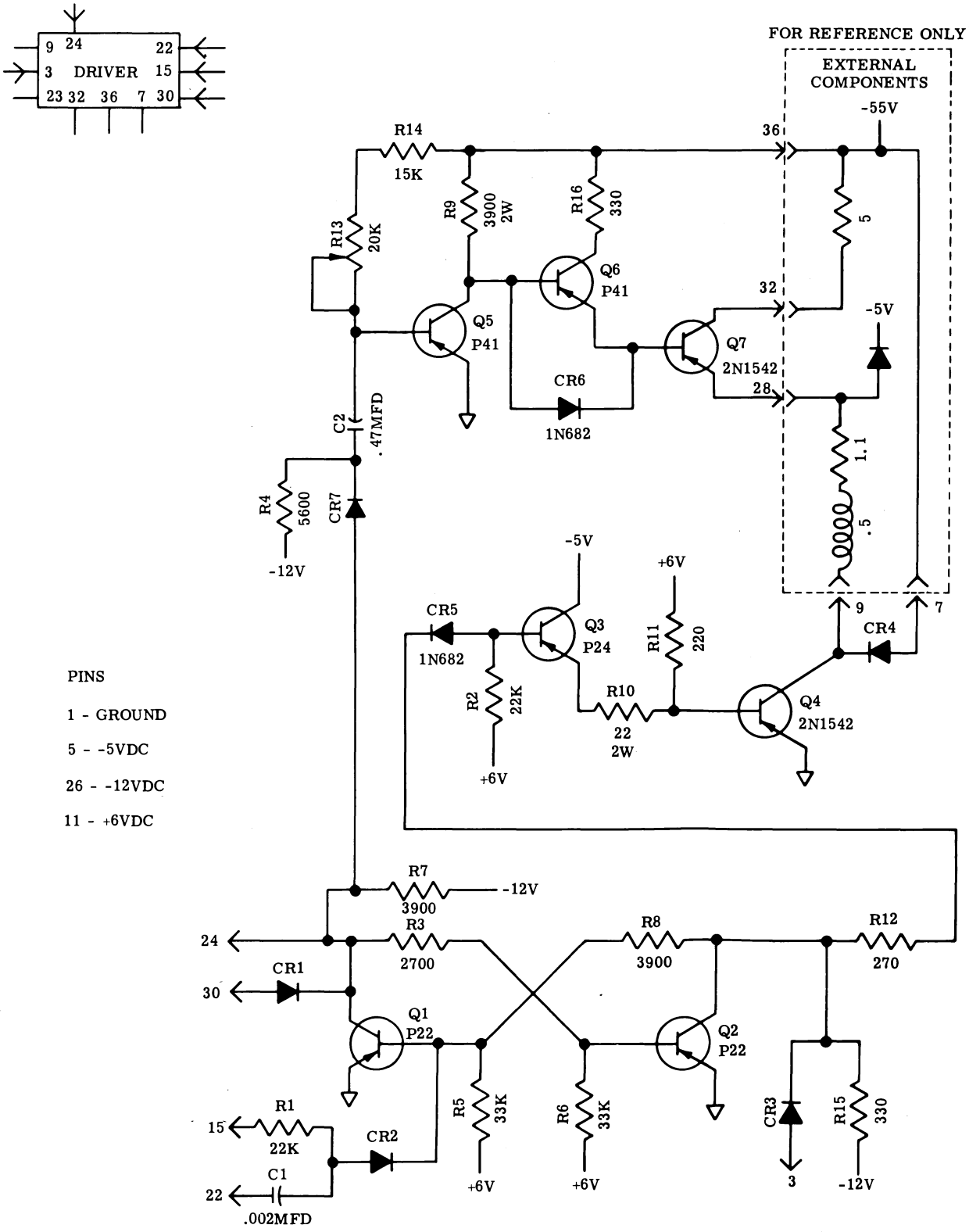

Figure 7 - Magnet Driver Circuit Card (EC678)

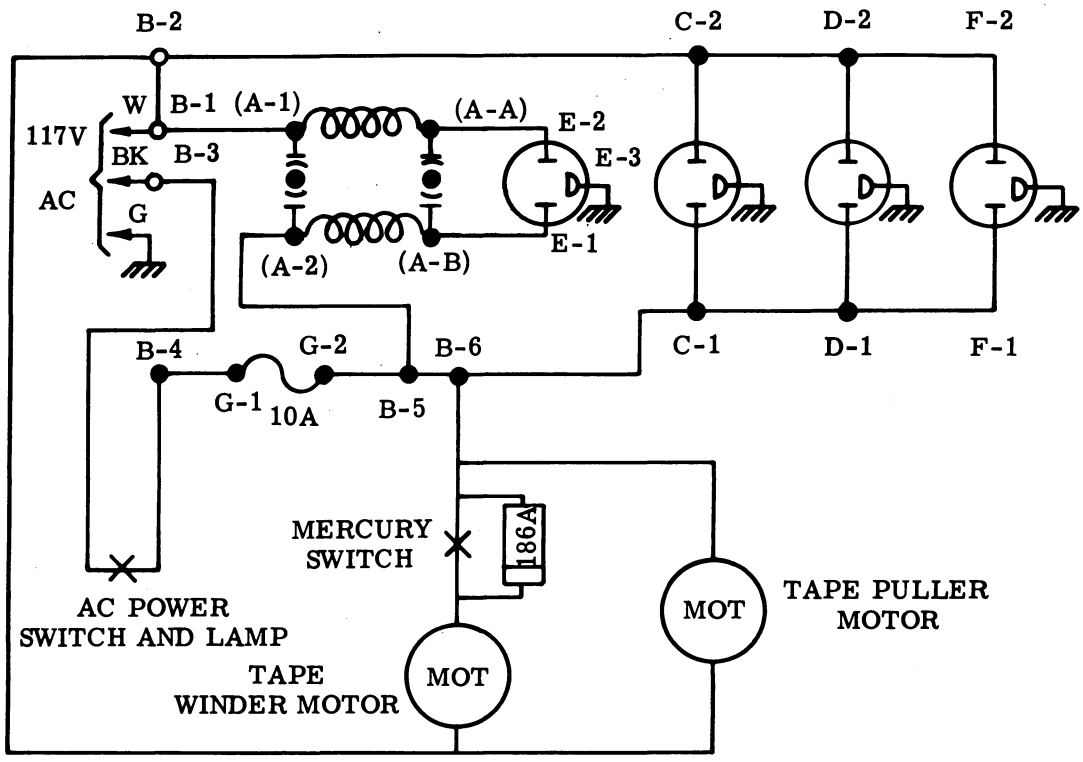

Figure 8 - Additional Wiring for Receiver 5B

not affect the -12v or +6v outputs by more than 5 percent.

(h) The power requirement of the punch control and drive module is 250 watts in both the idle condition and with all eight levels punching.

TROUBLE CHECKOUT

Note: Figures 8 and 9 show connections for 5B Receivers and the proper test tape for checking the receivers. Sections covering installation indicate wiring for every type of operation (with and without extra feature units).

TROUBLESHOOTING PROCEDURES

3.21 The following paragraphs outline preliminary checks and procedures to be followed in using Chart 1 for troubleshooting Receiver 5B.

3.22 Use a thoroughly pretested data set and line if possible. Recheck if trouble is not easily cleared.

3.23 Make arrangements to run tests with a test center; otherwise, test with a pretested 5A or 5C sender. Use the schematic and actual wiring diagrams shipped with the equipment, if available. If unusual difficulties are still encountered, check the equipment against all associated wiring diagrams and parts sections for previous emergency field modifications or other unrecorded changes.

3.24 See that all cables and connectors are properly connected and in good condition.

Note: Check internal connections, especially extra feature units.

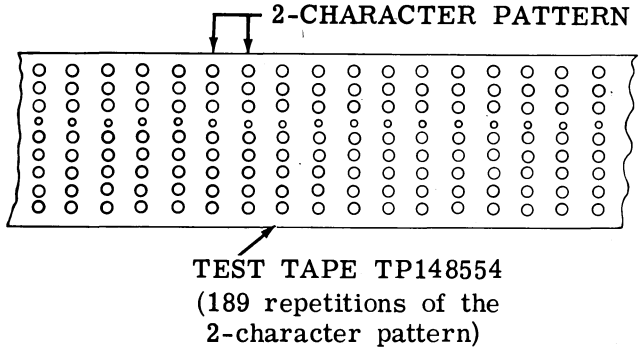

Figure 9 - Test Tape Pattern for Receiver 5B

CHART 1

TROUBLESHOOTING RECEIVER 5B

(INDEX FOR SYMPTOM OR TROUBLE REPORT)

CHART 1

TROUBLESHOOTING RECEIVER 5B

SYMPTOM OR TROUBLE REPORT	PROBABLE CAUSE	RECOMMENDED CORRECTIVE ACTION
1. No power indication. POWER indicator push-button fails to light when pressed.	a. Disconnected, loose or defective power cord assembly TP182510 on electrical service panel.	a. Plug in, tighten, or replace defective power cord (6403WD3E2).
	b. Burned-out 6 v indicator lamp, or 10 amp fuse (on electrical service panel).	b. Replace indicator lamp (6403WD2E5) or 10 amp fuse (6403WD3F2).
	c. Blown 5 amp fuse F1 (driver module), or 0.5 amp fuse F3 (-6 v dc), or 1.6 amp fuse F4 (-12 v dc).	c. Replace fuse F1 (6405WDB3) or fuses F3 and F4 (6405WD area D7).
	d. Power supply TP148850 defective (ac input present; all fuses good, but -6 v dc and -12 v dc output missing or erratic).	d. Replace power supply (6405WD).
	e. Defective ac or dc wiring, or connections. Note: All lamps and relays are dc operated.	e. Using a voltmeter, trace back (6405WD) from known failure to point where proper voltage is obtained. Replace wiring and clean, tighten or solder connections as required to re-establish circuit.
2. Cooling fan does not run when power is applied.	a. Fuse (in fan power cord) is blown.	a. Replace fuse (0.25 amp) in fan power cord TP193943 (6403WD3E8).
	b. Fan not plugged into J1701 on electrical service panel.	b. Plug in, tighten, or replace defective power cord TP193943.
	c. Fan blades touching protective screen.	c. Position protective screen to clear fan blades.
3. Tape supply puller motor does not run.	a. Fan blades in chad blower are jammed by excessive chad.	a. Remove chad and clean blades.
	b. Fan blades touching chad blower housing.	b. Reposition fan blades to clear chad blower housing.

CHART 1

TROUBLESHOOTING RECEIVER 5B (Contd)

SYMPTOM OR TROUBLE REPORT	PROBABLE CAUSE	RECOMMENDED CORRECTIVE ACTION
4. Tape take-up winder motor runs continuously regardless of tape sensing arm position.	a. Shorted arc suppression network.	a. Replace arc suppression network TP309899 (6403WD3E7).
	b. Mercury switch out of adjustment.	b. Readjust mercury switch TP149794 (6403WD3E7).
5. Tape does not feed when the BLANKS F.O. or the ALL F.O. button is depressed; or tape cannot be loaded.	a. The 25-pin connector not plugged into J103. P109 not plugged into the punch unit.	a. Plug in, tighten, or replace defective 25-pin connector TP145914 or plug P109 (TP199795).
	b. With power applied, one of the punch reeds is down.	b. Replace the -55 v fuse associated with the reed that is down. If no reeds are down, replace the fuses for +6 v, -6 v, and -12 v. Also, check the punch coil wires.
	c. Defective circuit card. Note: Turn off power before removing any circuit cards.	c. Replace the circuit card associated with the reed that is down (6403WD).
	d. Defective circuit card with reed pulling up.	d. Replace each circuit card one at a time. Check the operation after each replacement.
	e. Defective feed-out switch.	e. Replace feed-out switch (6403WD1B4).
6. Tape feed motor or tape puller motor runs continuously.	a. Defective tape puller control switch.	a. Replace tape puller control switch (6403WD3C6).
	b. Defective tape-out control switch.	b. Replace tape-out control switch (6403WD3C6).
7. POWER indicator pushbutton does not flash when tape supply is low.	a. Defective flasher DS104.	a. Replace flasher DS104 (6403WD2E4).

CHART 1

TROUBLESHOOTING RECEIVER 5B (Contd)

SYMPTOM OR TROUBLE REPORT	PROBABLE CAUSE	RECOMMENDED CORRECTIVE ACTION
8. Receiver terminates call 5 seconds after depressing DATA button.	a. Strap between pins 14 and 29 missing from strapping plug TP199793.	a. Insert strap between pins 14 and 29 (6403WD2D1).
	b. Pins 5 and 7 of RS relay open.	b. Replace RS relay K104 (6403WD2C3).
9. Receiver terminates call 30 seconds after depressing DATA button.	a. Strap between pins 21 and 30 missing from strapping plug TP199793.	a. Insert strap between pins 21 and 30 (6403WD2E1).
	b. All space signal not received.	b. Check CN relay K102-U-A. Determine if transmitter is sending an all space signal.
10. After depressing DATA button, data set fails to go into DATA RECEIVE mode.	a. Strap between pins 20 and 24 missing from strapping plug TP199793.	a. Insert strap between pins 20 and 24 (6403WD2C1).
	b. Pin 20 of P110 open when power is off.	b. Ground pin 20 of P110 (6403WD2C1).
11. Reverse channel send signal not reaching data set.	a. Strap between pins 16 and 27 missing from strapping plug.	a. Insert strap between pins 16 and 27 (6403WD2F1).
	b. Relay CN not operating.	b. Clean, adjust, repair, or replace relay K102-U-A (6403WD2E2).
	c. Open ground path to coil of RC relay K102-L-A.	c. Check contact 2. Clean, tighten or solder connection. Replace IK lead strap between pins 13 and 14 on strapping plug TP199793 (6403WD2C1).
12. Receiver does not answer call automatically.	a. No power.	a. Plug in, tighten, or replace defective power cord TP182510 (6403WD3E2).
	b. AUTO ANS. key not depressed.	b. Depress AUTO ANS. key on receiver (6403WD2D3).
	c. Strap between pins 15 and 28 missing from strapping plug TP199793.	c. Insert strap between pins 15 and 28 (6403WD2D1).
	d. Open ground path to data set on RO or RR lead.	d. Using an ohmmeter, trace back from known failure to point where continuity is established. Replace wiring, tighten or solder connections as required to re-establish circuit.

CHART 1

TROUBLESHOOTING RECEIVER 5B (Contd)

SYMPTOM OR TROUBLE REPORT	PROBABLE CAUSE	RECOMMENDED CORRECTIVE ACTION
13. SIGNAL lamp does not light when remote transmitter is in the TALK mode.	a. Burned-out 48 v indicator lamp.	a. Replace lamp (6403WD2B3).
14. SIGNAL lamp lights during message; transmission is interrupted.	a. Data set has removed ground from pin 21 of P110.	a. Check data set for any breaks in the carrier-on (CN) lead or excessive line noise.
	b. Remote sender has returned data set to talk mode.	b. Contact the remote sender and verify status of sender.
15. Receiver does not automatically terminate call after a message is completed.	a. RS relay K104.	a. Replace RS relay K104 (6403WD2C3).
16. Identifier disc does not turn after depressing TRANS START button.	a. P1104 is not plugged into J104. Ground lead on terminal C of Z 1101A.	a. Plug in, tighten, or replace defective plug. With power turned off and the TRANS START button depressed, restore ground at terminal C of Z1101A (7098WD1B2).
	b. Data set not in DATA mode.	b. Depress DATA button on the data set before depressing TRANS START button on receiver.
	c. Diode CR2 on circuit card (EC520).	c. Replace defective diode CR2 on circuit card assembly TP177520.
	d. Transistor Q1 or diode CR6 on circuit card (EC520).	d. Check for ground at points C or S, and A on circuit card assembly TP177520. If ground is not present, replace transistor Q1 and/or diode CR6.
	e. Defective clutch.	e. With power turned off and P1101 unplugged, check for a complete circuit between terminals 2 and 6 of the signal generator. If circuit is open, replace signal generator (7098WD1E5).

CHART 1

TROUBLESHOOTING RECEIVER 5B (Contd)

SYMPTOM OR TROUBLE REPORT	PROBABLE CAUSE	RECOMMENDED CORRECTIVE ACTION
17. The AR and MC relays operate; the disc turns; but the remote sender does not transmit.	a. Transistor Q2.	a. Replace transistor Q2 on circuit card assembly TP177520.
	b. Defective disc.	b. Check disc for any breaks or imperfections. Remove any dirt or finger prints from disc.
	c. Defective remote sender.	c. Have repairman check the set locally.
18. Identifier disc over-runs home position.	a. Defective clutch.	a. Replace signal generator (7098WD1E5).
19. Receiver does not answer automatically when in unattended send/receive mode.	a. Faulty installation.	a. Plug P1403 into J104 or J1103. Insert strapping plug TP199793 between pins 23 and 39 of J1402 (7104WD1D6).
	b. AUTO ANS. button not depressed.	b. Depress AUTO ANS. buttons on both the sender and receiver cabinets.
	c. Low tape at receiver and no tape at sender with ZC wiring option removed.	c. This is normal for these conditions. If unattended answer is required for all tape conditions, retain wiring options ZC and ZD, and remove wiring option R.
20. Receiver answers automatically but the TR relay does not toggle (alternately operate and release).	a. Receiver tape supply too low. No tape in the reader.	a. Put new tape supply in receiver. Insert tape at the reader.
	b. Circuit card assembly (EC579) defective.	b. Replace circuit card assembly (EC579). Ground pin D and open pin B.
	c. IK or RD relay not energizing.	c. Ground pin 13 of P1403 to energize the IK relay. (This in turn will energize the RD relay.)
21. Receiver drops call 30 seconds after toggling.	a. Recognizer relay AR times out.	a. This is normal. If the receiver does not drop call 30 seconds after toggling, repair or replace AR relay K1205 (7100WD1A6).

CHART 1

TROUBLESHOOTING RECEIVER 5B (Contd)

SYMPTOM OR TROUBLE REPORT	PROBABLE CAUSE	RECOMMENDED CORRECTIVE ACTION
22. Receiver does not lock in the receive mode when an all-space signal is received.	a. Diode CR2 defective.	a. Replace diode CR2 (7104WD1B3).
	b. Loss of circuit continuity.	b. With power turned off, check circuit continuity between pin 21 of P110, and pin 21 of P1403.
23. Receiver does not lock in the send mode when answer-back A signal is received.	a. Diode CR4 defective.	a. Replace diode CR4 (7104WD1E4).
	b. Loss of circuit continuity.	b. With power turned off, check circuit continuity between J752, pin 18 (in sender) and J1401, pin 9 (in send/receive unit).
24. After the receiver answers automatically, the answer-back signal remains on continuously.	a. Relay TO defective.	a. If relay TO does not time-out 10 seconds after relay RD is energized, repair or replace relay TO (K1407) (7104WD1C3).
	b. Loss of circuit continuity.	b. Check operation between relays TO and TO1, and P1403, pin 20.
25. Answer-back signals not operating properly.	a. Improper wiring option being used.	a. Check for proper option. For example, R option is removed when ZC and ZD options are used. If ZC is removed, R is removed. If ZC and ZD are removed, then R option must be retained.

CHART 2

RECEIVER 5B SYMBOLS, ABBREVIATIONS, AND REFERENCES

CIRCUIT ELEMENT	WIRING DIAGRAM
1. Circuit Card EC605 (TP303605)	6403WD (Sh's 1 & 2), TP303605
(a) Z103A bias (pin 34)	6403WD, 1B3
(b) Z103B bias (pin 36)	6403WD, 1F2
(c) Z103C bias (pin 35)	6403WD, 1E2
(d) Z103D bias (pin 6)	6403WD, 1E2
(e) Z103E bias (pin 5)	6403WD, 1D2
(f) Z103F bias (pin 4)	6403WD, 1D2
(g) Z103H bias (pin 3)	6403WD, 1D2
(h) Z103J bias (pin 1)	6403WD, 1D2
(i) Z103K bias (pin 2)	6403WD, 1C2

CHART 2

RECEIVER 5B SYMBOLS, ABBREVIATIONS, AND REFERENCES (Contd)

CIRCUIT ELEMENT	WIRING DIAGRAM
(j) Z103L — 55 v current limit. (pin 17)	6403WD, 2E6
(k) Z103M — 55 v current limit. (pin 16)	6403WD, 2B4
(l) Z103N — 55 v current limit. (pin 10)	6403WD, 2C3
(m) Z103P — 55 v current limit. (pin 11)	6403WD, 2B7
(n) Z103R — 55 v current limit. (pin 12)	6403WD, 2D5
(o) Z103S — 55 v current limit. (pin 13)	6403WD, 2B4
(p) Z103T — 55 v current limit. (pin 14)	6403WD, 2E3
(q) Z103U — 55 v current limit. (pin 15)	6403WD, 2C5
(r) Z103V Flasher — loading (pin 22)	6403WD, 2E5
(s) Z103W Ampl. Invert (pin 32)	6403WD, 1B4
2. Circuit Card EC672 (TP303672)	
(a) Z112 Magnet driver (pins 30, 22, 3, 15)	6403WD, 1B6 & TP303672
3. Circuit Card EC675 (TP303675)	6403WD, TP303675
(a) Z113A Gated oscillator (pin 13)	6403WD, 1B5
(b) Z113B Intergrator pulse shaper (pins 9, 3)	6403WD, 1B5
(c) Z113C Feed-out generator (pins 30, 34, 32)	6403WD, 1B4
4. Circuit Card EC678 (TP303678)	
(a) Z104 Magnet driver (pins 30, 22, 3, 15)	6403WD, 1C7
(b) Z105 Magnet driver (pins 30, 22, 3, 15)	6403WD, 1D7
(c) Z106 Magnet driver (pins 30, 22, 3, 15)	6403WD, 1D7
(d) Z107 Magnet driver (pins 30, 22, 3, 15)	6403WD, 1E7
(e) Z108 Magnet driver (pins 30, 22, 3, 15)	6403WD, 1E7
(f) Z109 Magnet driver (pins 30, 22, 3, 15)	6403WD, 1F7
(g) Z110 Magnet driver (pins 30, 22, 3, 15)	6403WD, 1F7
(h) Z111 Magnet driver (pins 30, 22, 3, 15)	6403WD, 1F7
5. Relays	
(a) Carrier On (CN) K102 — U — A	6403WD, 2E2
(b) Low tape (LT) K102 — U — B	6403WD, 2D5
(c) Power On (PO) K102 — L — B	6403WD, 2C5
(d) Reverse channel (RC) K102 — L — A	6403WD, 2B3
(e) Restore — 30 sec (RS) K104	6403WD, 2C3
6. Miscellaneous Elements and Assemblies	
Power supply	6405WD
Receiver module (punch logic)	6403WD (Sh. 1)
Receiver power distribution	6403WD (Sh. 3)
Receiver (relay logic)	6403WD (Sh. 2)
Receiver cabinet	6403WD (Sh's 2 & 3)
Electrical service panel	6403WD (Sh 3)
High speed tape punch (DRPE Type)	7131WD
Blanks feed-out — all feed-out (punch logic)	6403WD, 1C4
Aux. signal circuit TB104	6403WD, 2C5
Signal lamp (48 v)	6403WD, 2B3
Low tape lamp (48 v)	6403WD, 2E7
Power lamp (6 v)	6403WD, 2E5
Low tape (mercury gravity switch)	6403WD, 2D6
Trans. start (NL KEY)	6403WD, 2C8
Auto. ans. (NL KEY)	6403WD, 2D2
Level selector switches	6403WD, 1C8 & 1F8