

DISCRETE CALLING GENERATOR (TP199784)

FOR "DATASPEED"* TAPE RECEIVER 5B

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1. GENERAL

1.01 This section provides description, installation and checkout procedures, operating procedure, principles of operation, troubleshooting, and wiring diagrams for the TP199784 discrete calling generator used with the "DATASPEED" Tape Receiver 5B. It is re-issued to add information on unattended operation without the reverse channel option, to incorporate revised wiring diagrams, and to add a circuit card. Arrows in the margins indicate changes and additions.

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1.02 The discrete calling generator (herein referred to as an identifier) provides facilities for a Receiver to call an unattended Sender. This feature allows the receiving station to generate an identification signal from the identifier which is transmitted from the Receiver and recognized by the called, unattended sending station only if it agrees with a signal pattern stored in the recognizer apparatus unit at the Sender. The unattended Sender transmits only if the Receiver is recognized as being properly authorized to receive data.

1.03 The Tape Receivers are covered in appropriate sections. The 5B-1 and 5B-3 Receivers are the same as the 5B except that the 5B-1 is equipped with an identifier and the 5B-3 is equipped with identifier and unattended send-receive apparatus units. A 5B-2 is equipped with an unattended send-receive unit only.

2. DESCRIPTION

FUNCTION AND CONFIGURATION

2.01 The TP199784 station identifier (Figure 1) is essentially a dc code signal generator. When installed in the Tape Receiver it permits the Receiver operator to request data from an unattended Tape Sender which has a recognizer code disc modified to automatically recognize the encoded data request. The identifier is designed for installation in the accessory frame of the 5B Receiver.

2.02 The identifier performs two basic functions.

- (a) Generates the 14-bit dc discrete code signal which causes the data set to transmit the 14 bits in audible tones.
- (b) Controls the answer back and data mode of the data set.

2.03 Physically, the TP199784 station identifier consists of a signal generator which mounts on one plate and a solid state circuit card and two wire spring relays which

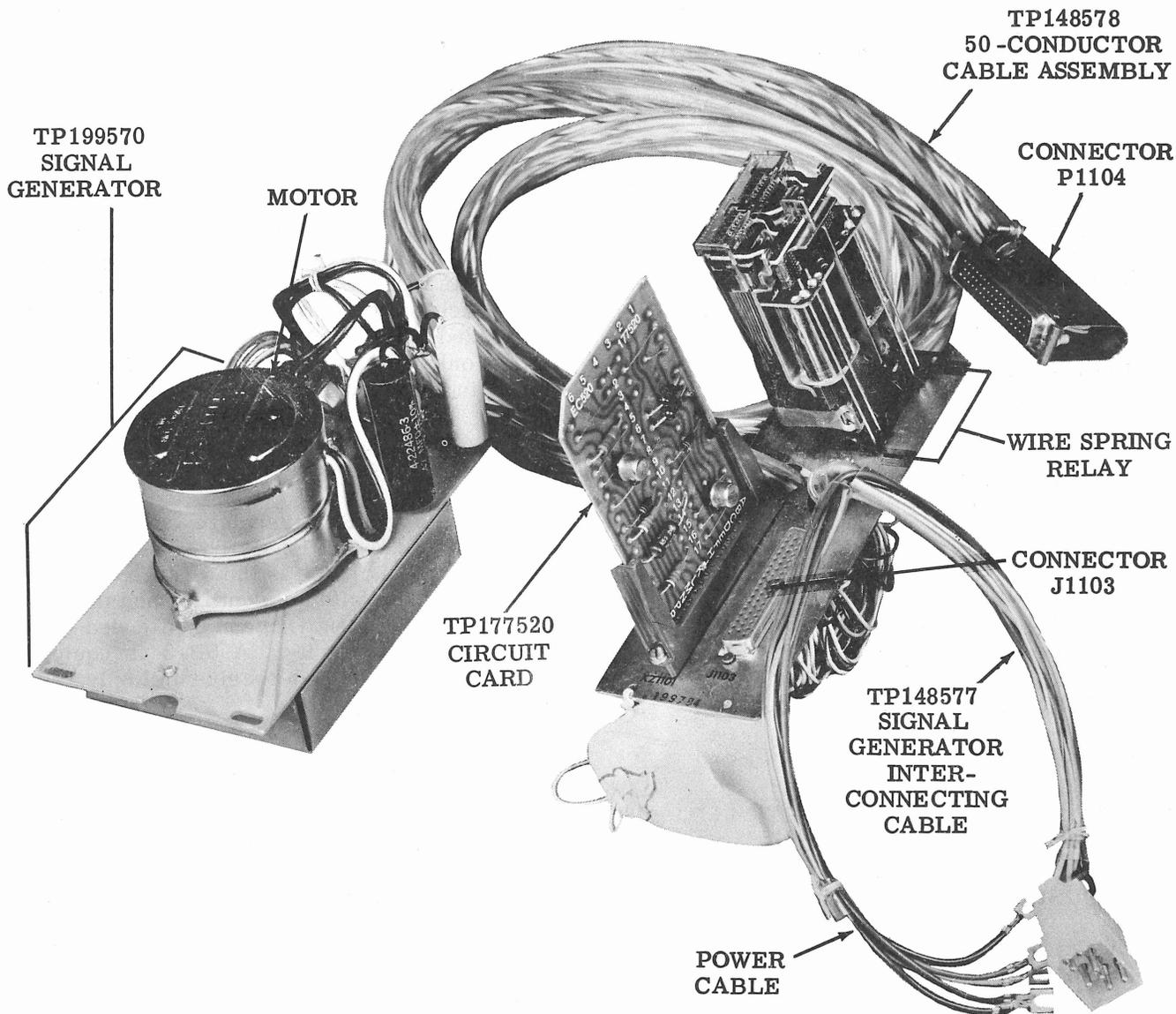


Figure 1 - TP199784 Station Identifier Apparatus Unit

mount on another plate. A cable from the relays and circuit card plugs into a jack (J1001) mounted on the signal generator mounting plate (Figure 2). The signal generator consists of a 117 v ac synchronous motor (Figure 1) and a coding disc (see attached diagram 7029WD). The disc may be coded to match an identical one in a TP198002 recognizer unit option of the distant sender by scraping away necked-down areas of etching (refer to the paragraph on CODING DISC). In operation, the motor rotates the disc which produces local signals which, in turn, are transmitted through the data set to the distant

Sender where they must be compared by the logic circuit of the recognizer and recognized before the unattended Sender can start transmitting data.

2.04 A cable from the identifier (Figures 1 and 3) plugs into the Receiver. A cable from the unattended send-receive option, if it is used, plugs into a receptacle on the identifier. If the unattended send-receive option is not used, the strapping plug is inserted in this receptacle. If neither of the above options are in use, the strapping plug will be found in the Receiver and

must be placed in the last installed unit that is used. The five spade terminals of the TP148577 power cable assembly connect to the terminal strip of the Receiver apparatus frame as indicated on attached diagram 7098WD.

2.05 The two mounting plates that mount the identifier are mounted together on the auxiliary apparatus frame of the Tape Receiver 5B. (Figure 2)

TECHNICAL DATA

A. Dimensions

Height 6-1/2 inches

Width 5-7/32 inches

Depth 6 inches

Mounted on rails with holes spaced approximately 3/4 inch horizontally and 6-3/16 inches vertically.

B. Electrical

Power Requirements

-12 v dc and -55 v dc and 117 v ac

Signal Requirements

The data signal from the identifier keys the answer-back A lead of the 402D data set. The signal has the following format:

Answer-back A on 352 milliseconds

Answer-back A off 232 milliseconds

Coded signal of
14 bits - each bit 166.7 milliseconds

3. INSTALLATION, CODING AND CHECKOUT PROCEDURES

INSTALLATION

3.01 The parts section for the Tape Receiver illustrates the arrangement of the parts referred to by TP numbers in the following instructions. Figure 3 illustrates schematically the interconnection of the identifier with other equipment.

A. Mounting

3.02 Remove the accessory frame from the lower section of the 5B Receiver cabinet (see Figure 2) and, using the hardware supplied,

mount the two mounting plates of the identifier unit to upper part of the frame. The relay and circuit card assembly plate is stamped with the numerals 199784 and the signal generator assembly plate is stamped 199570.

(a) Mount the four TP199571 posts in upper frame holes numbered 16 and 20. Mount the plate and generator assembly on the posts, using the four TP151692 screws and TP2191 lockwashers.

(b) Mount the relay and circuit card plate, using the four TP151686 screws, in upper frame holes numbered 13 and 15.

B. Connections

Note: If an unattended send-receive unit option is used, refer also to the section and wiring diagrams covering that option. Refer to the sections covering the Receiver and Receiver wiring diagrams if required.

3.03 Connect the five spade terminals from the identifier TP148577 power cable assembly to the TP148576 terminal strip in the Receiver accessory frame, observing the color code and terminal numbers of attached diagram 7098WD.

3.04 Locate the 50-pin strapping plug TP199793 and place it in the last installed unit as viewed from left to right of Figure 3 (J104 of Receiver, J1103 of identifier or J1402 of unattended send-receive unit).

3.05 Plug the 50-conductor cable TP148578 from the identifier into J104 of the Receiver.

3.06 If an unattended send-receive unit is used, plug its 50-conductor cable TP148587 into J1103 of the identifier.

3.07 Plug the short 8-conductor cable from the relay and circuit card plate of the identifier into the receptacle in the generator plate of the identifier (Figure 2).

3.08 Replace any other wiring, cables or parts that may have been removed for convenience in following installation instructions.

3.09 Connect a hand test set to the telephone line serving the Receiver. Place the data set off hook and press the DATA key. A high tone (2025 cps) should be heard in the test set for approximately five seconds, followed by

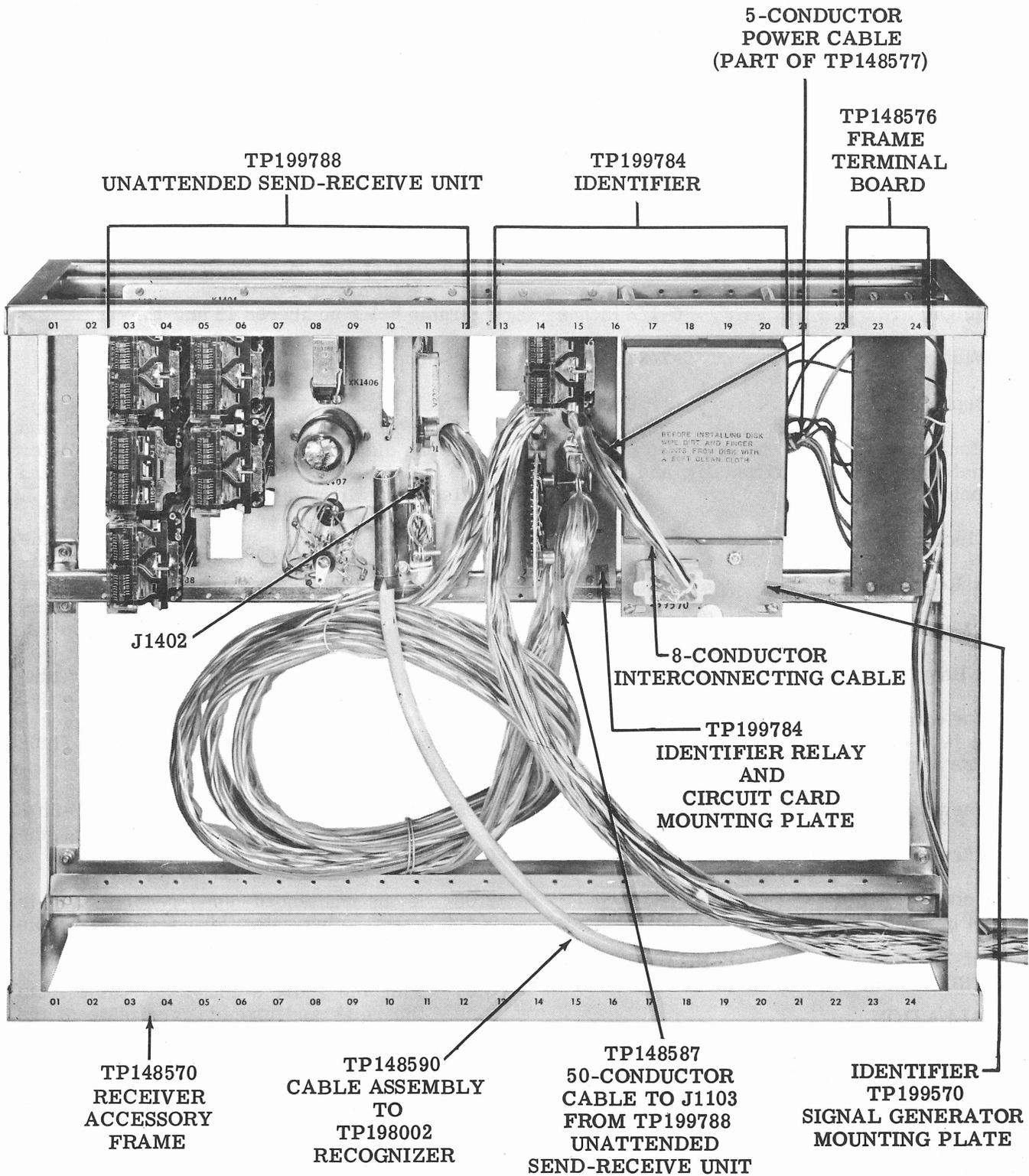


Figure 2 - Receiver Accessory Frame with Identifier and Unattended Send-Receive Unit Options - Right Side View

silence. Press the TRANS START key. No tone should be heard while the key is held down. Immediately upon releasing the key a low tone should be heard which quickly increases pitch and continues for about 3 seconds. The set should then be silent.

Note: Data sets equipped for reverse channel operation will emit reverse channel tone during the intervals described above as silent (reverse channel is a very low tone.)

CODING DISC

3.10 If the signal generator disc of the identifier has not been coded, follow the coding procedure given in the following paragraphs.

3.11 Remove the cover from the signal generator assembly plate (Figure 2). Remove the coding disc held by a wing nut from the signal generator.

3.12 The coding disc can be coded to provide 14 serial pulses in any combination of mark or space. (See insert on Schematic Diagram 7029WD.) Note that the outer ring of the coding disc comprises 15 segments. These segments are connected to a continuous common inner ring through a narrow etched section which has been necked down at one point. By scraping away etching at this necked down area, the continuity between any segment and the inner ring is broken. That section then represents a space. If continuity between the inner ring and an outer segment is maintained, that segment represents a mark. The etching which connects the first (longest) segment of the outer ring is not necked down. Continuity must always be maintained between this segment and the inner ring to provide a long marking "start" pulse. Use of combinations of all marks, all spaces, single marks, single spaces and single transitions should be avoided to prevent accidental simulation of coded signal.

3.13 Code the disc to correspond to the coding at the answering Sender, or as specified in the installation service order (see following paragraph).

3.14 Coding is accomplished by using a sharp instrument to break the etched wiring pattern for the specified signal segments at the very narrow portion of the pattern. For example, the coding portion of the service order might read "Break Segments 1, 3, 7 and 11." Looking at the face of the coding disc locate the long segment of the outer ring. The seg-

ment next to this in a counterclockwise direction is #1; and the remaining segments are numbered 2 through 14, continuing in a counterclockwise direction. Break the specified segments, checking very carefully to avoid error. Clean the coding disc with a clean, soft cloth to remove all dirt and finger prints. Replace the coding disc so that the brushes make contact with the etching and replace the cover on the signal generator plate.

CHECKOUT

3.15 After the identifier is installed, make the following checks. In most cases, corrective action is obvious. If not, refer to Parts 5 and 6.

3.16 Place a test call to a Sender arranged for unattended service and coded to respond to this identifier. Ask the operator to place a test tape in the reader, to hang up and then place the station in the unattended operation condition.

3.17 Call the unattended station and at the conclusion of the 2025 cps beep tone, press the DATA button on data set and the TRANS START key. Observe that transmission begins within 15 seconds after the TRANS START key is pressed and released. If transmission does not begin after 15 seconds re-press the TRANS START key. When satisfactory operation is achieved the station may be placed in service.

4. OPERATING PROCEDURE

4.01 When equipped with the TP199784 station identifier the 5B Tape Receiver is able to generate a coded identification signal. This identification signal is used to initiate data transmission from any unattended Sender which is equipped to recognize the coded data request signal. To initiate data transmission from an unattended Sender, the procedure is as follows:

(a) Dial the number of the desired unattended Sender using the data set 402D facilities. Listen for the high pitched answer tone, then press the DATA button at the data set and the TRANS START button at the Receiver (in that order).

(b) Within 15 seconds, data reception should start. If not, press the TRANS START key once more.

(c) When transmission is concluded, the called station removes the carrier by terminating the call approximately 30 seconds after tape out, causing the SIG lamp to light and the auxiliary signal, if any, to operate. The Receiver operator should then press the TALK button to extinguish the SIG lamp.

5. PRINCIPLES OF OPERATION

5.01 When following the circuit description for the station identifier, refer to diagram 7098WD and 7029WD (Part 7). Refer also to the schematic diagram of the Tape Receiver appearing in the related "Schematic and Actual Wiring Diagrams" section.

5.02 In the standby or normal condition, AR (automatic receive) relay K1101-U and MC (motor control) relay K1101-L are unoperated and the signal generator is at rest with the homing (identifier) brush on its open segment.

5.03 When the operator presses the TRANS START button it places a ground on the AR lead. The AR relay energizes locking up on a ground from the homing recognizer brush of the signal generator. The AR ground is also applied to the base of Q1 keeping that transistor from conducting whether the IK lead is open or grounded.

5.04 Releasing the TRANS START button opens the AR lead, and allows the base voltage at Q1 to go to -55 volts. When the IK lead becomes grounded in the data set, Q1 conducts, operating the MC relay. Contact 1 of the MC relay closes to operate the signal generator motor. Contact 2 shifts position to connect the AA lead to the collector of Q2. At this time the signal brush of the signal generator is riding a blank segment of the coding disc. Transistor Q2 is thus biased into conduction, effectively grounding the AA lead and causing the answer-back A lead to be transmitted. As the signal generator disc begins to rotate, the homing identifier brush is grounded, providing a holding path for the MC relay. Shortly thereafter, the homing recognizer brush encounters an open segment, releasing relay AR. The signal generator signal brush will enter a grounded segment, about 352 milliseconds after the signal generator starts, cutting off Q2 and effectively opening the AA lead. As rotation of the signal generator continues, the signal generator signal brush wipes over 14 coded segments which may be open or grounded. After the last segment has passed, the home position is reached and

the homing identifier brush re-enters its open segment. This releases relay MC, stopping the signal generator and restoring the circuit to normal.

UNATTENDED OPERATION

5.05 In unattended operation the circuits function as follows:

(a) In unattended Sender operation, without reverse channel, the coded answer-back A identification signal must be received at the remote Sender equipped with a recognizer before the Sender will start. If the identification signal is not received within approximately 30 seconds after automatic answering, the recognizer AR (30-second timer) relay drops the call. The AR relay also drops the call 30 seconds after the Sender goes to a tape-out condition.

(b) In remote unattended Sender operation, with reverse channel, both the reverse channel signal and the identification signal must be received at the distant sending station before the Sender will start transmission. Loss of reverse channel will stop the Sender and start the AR (30-second timer) relay in the recognizer which drops the call. If an attendant in the Sender area sees the signal light go on or hears an auxiliary alarm, the TALK key on the data set may be pushed to keep the call on line. The AR relay will time out if either the identification signal or reverse channel signal is not received within 30 seconds after the IK lead is grounded. The AR relay also drops the call 30 seconds after the Sender goes to the tape-out condition.

5.06 For unattended operation of the receive terminal, refer to the section covering the unattended send-receive apparatus unit option.

6. TROUBLESHOOTING

6.01 The operation of the circuit is relatively straight forward, as outlined in the previous paragraph. By observing the circuit as it progresses through its cycle the trouble can usually be found. (See Part 5.)

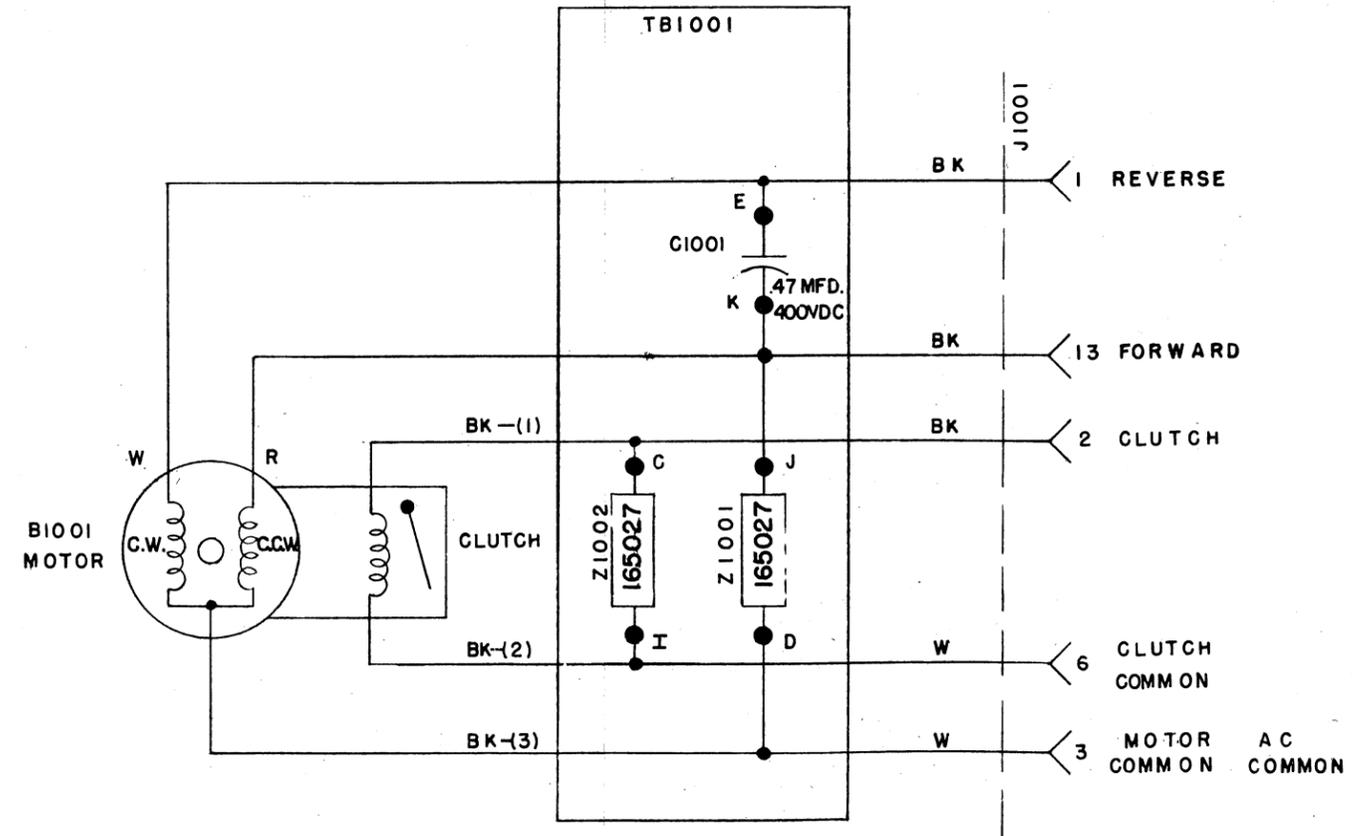
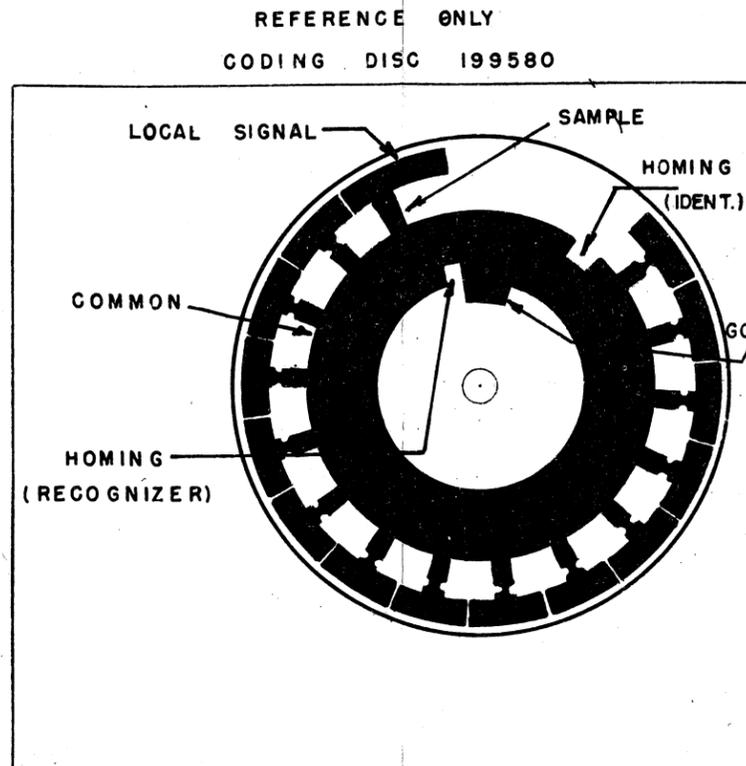
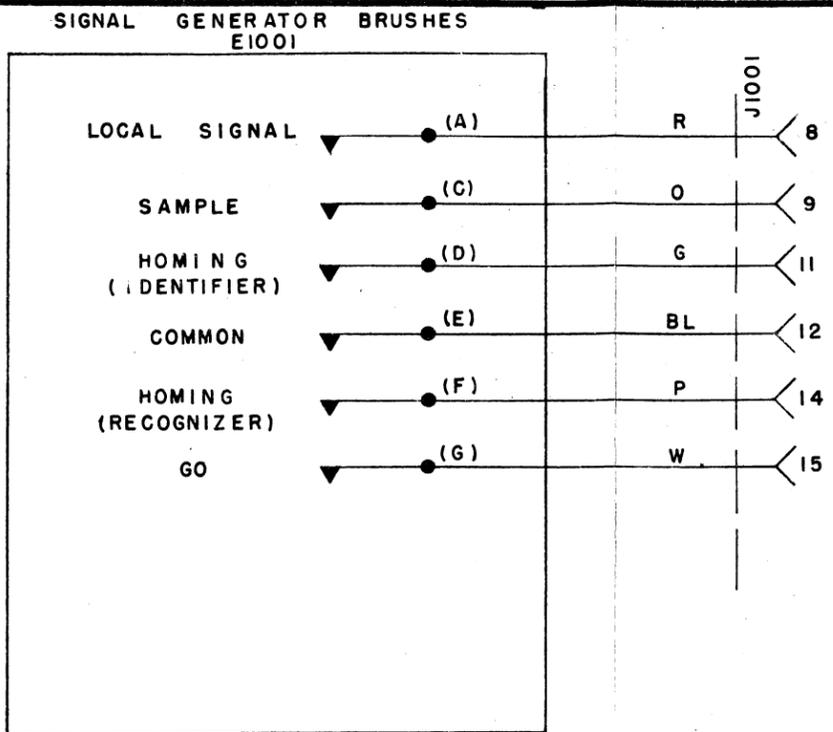
6.02 Inspect the disc and brushes. Replace the signal generator if it overruns the home position.

7. DIAGRAM INDEX AND ATTACHMENTS

TITLE	DRAWING NUMBER	ISSUE					
		1	2	3	4	5	6
→ Schematic Diagram for Signal Generator Assembly (TP199570)	7029WD	1	1	2	3		
→ Actual Wiring Diagram for Signal Generator Assembly (TP199570)	7030WD	1	1	2	2		
→ Actual Wiring Diagram for Identifier (TP199784)	7097WD	1	1	3	4		
Schematic Wiring Diagram for Identifier (TP199784)	7098WD	1	2	4	4		
→ Circuit Card (TP177520)	177520	-	-	-	3		

REVISIONS		
ISSUE	DATE	AUTH. NO.
2	8-18-65	87498
3	9-10-65	87498-2

- NO. NOTES
- REFER TO 7030WD FOR ACTUAL WIRING DIAGRAM.
 - TERMINAL DESIGNATIONS ENCLOSED IN PARENTHESES ARE NOT MARKED ON THE COMPONENT.
 - INDICATES TERMINAL ON RECEPTACLE J1001.
 - COLOR CODE:
 W - WHITE BK - BLACK
 P - PURPLE R - RED
 O - ORANGE G - GREEN
 BL - BLUE
 - J1001 TERMINAL VOLTAGES MAY VARY WITH APPLICATION AS FOLLOWS:
 A - 117 VAC E - -6VDC I - NOT USED
 B - AC COMMON F - -12VDC
 C - +6VDC G - -28VDC
 D - GRD H - -48VDC
- | ASSEMBLY USED ON | TERMINAL | | | | | | | | | |
|------------------|----------|---|---|---|---|----|----|----|----|----|
| | 1 | 2 | 6 | 8 | 9 | 11 | 12 | 13 | 14 | 15 |
| 199552 | I | A | B | G | I | G | G | A | I | I |
| 199555 | I | A | B | G | G | I | G | A | G | G |



SCHEMATIC DIAGRAM FOR SIGNAL GENERATOR ASSEM. ASSEM. NO. 199570

APPROVALS

D AND R	E O P M
<i>[Signature]</i>	<i>[Signature]</i>
E-NUMBER	
PROD. NO. 7029 WD	
DATE: 11-16-63	
P.D. FILE NO. 1-A148/134AA	
DRAWN G.J.M.	CHKD. <i>[Signature]</i>
ENGD. W.R.F.	APPD. <i>[Signature]</i>

TELETYPE CORPORATION

7029 WD

ISSUE	DATE	AUTH. NO
2	11-20-64	84989
3	6-29-65	88013
4	9-16-65	88396

See TCN 928

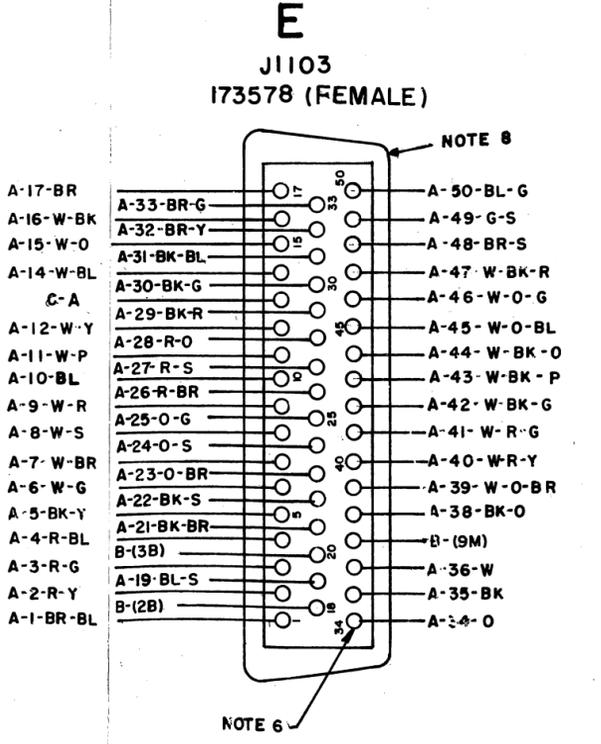
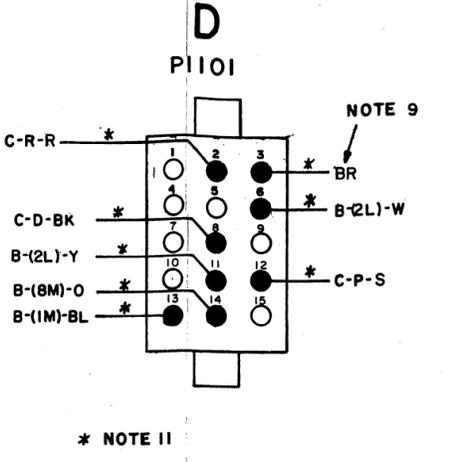
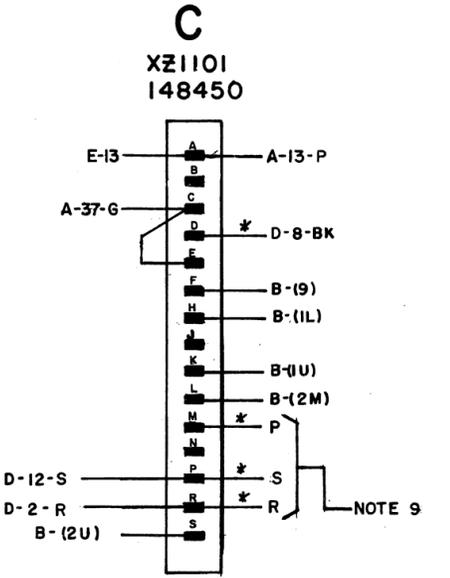
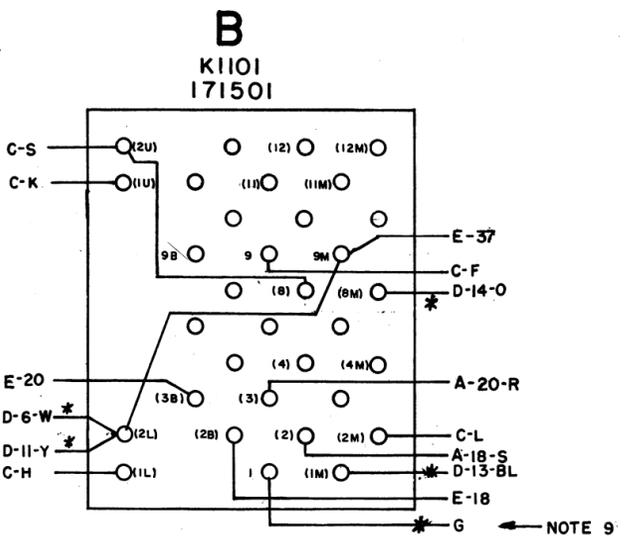
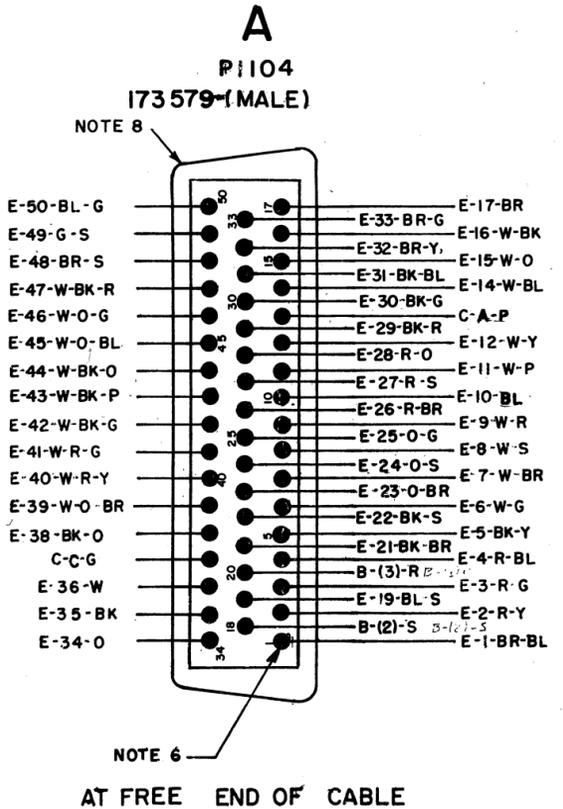
- NO. NOTES**
- WIRING LEGEND**

 DISTANT TERMINATING AREA
 DISTANT TERMINATING DESIGNATION
 WIRE COLOR CODE
 R-12-BL
 - COLOR CODE**

W - WHITE	W-BK - WHITE-BLACK
BK - BLACK	BK-Y - BLACK-YELLOW
O - ORANGE	O-S - ORANGE-SLATE
BL - BLUE	Y-G - YELLOW-GREEN
Y - YELLOW	R-BL - RED-BLUE
P - PURPLE	G-S - GREEN-SLATE
G - GREEN	BR-Y - BROWN-YELLOW
R - RED	W-O-G - WHITE-ORANGE-GREEN
S - SLATE	
BR - BROWN	
 - REFER TO 7098 WD FOR SCHEMATIC WIRING DIAGRAM
 - TERMINAL DESIGNATIONS ENCLOSED IN PARENTHESIS ARE FOR REFERENCE ONLY AND NOT MARKED ON COMPONENTS.
 - ALL SURFACE WIRE 24AWG GREEN, 31784 RM UNLESS OTHERWISE SPECIFIED.
 - USE SLEEVING WHERE REQUIRED
 - INSERT CARD BEFORE WIRE ASSEMBLY.
 - 148578 CABLE ASSEMBLY
 - 148577 CABLE ASSEMBLY
 - RUBBER STAMP .125 CHARACTERS ON THE CARDS OF THE FOLLOWING RELAYS IN WHITE INK.

RELAY	STAMPING
K1101-U	AR
K1101-L	MC

II. * IDENTIFIES 18 GAUGE WIRE OF CABLE 148577



MOUNTED ON PLATE 199790

ACTUAL WIRING DIAGRAM FOR IDENTIFIER SET OF PARTS 199784

APPROVALS

D AND R	E OF M
<i>[Signature]</i>	<i>[Signature]</i>

E-NUMBER

PROJ. NO. 7097 WD

DATE: 12-19-63

P.D. FILE NO 1-A143AA

DRAWN G.R.S. CHKD. *[Signature]*

ENGR. R.C.H. APPD. *[Signature]*

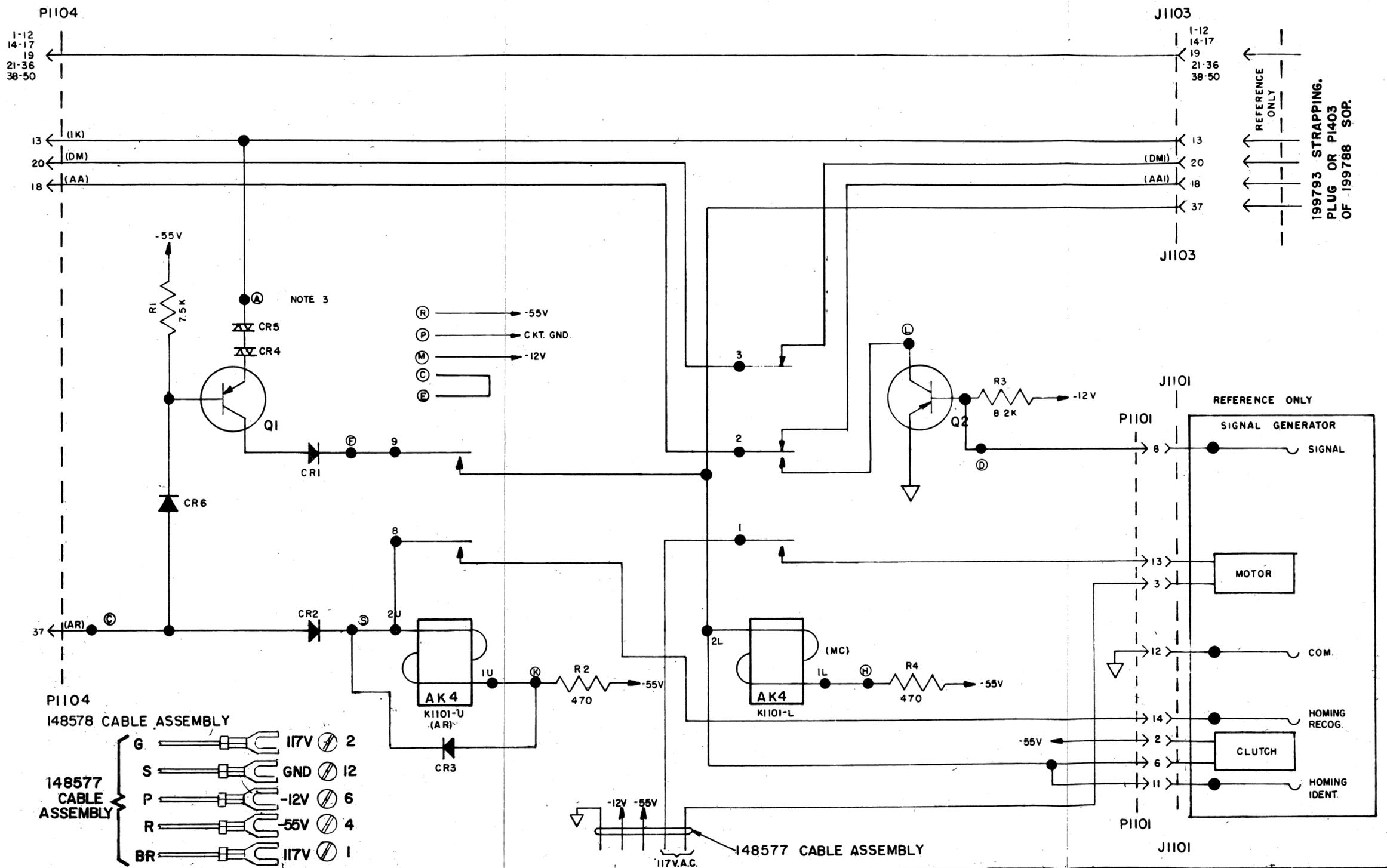
TELETYPE CORPORATION

7097 WD

7098 WD		
ISSUE	DATE	AUTH. NO.
2	9-30-64	83086
3	11-20-64	84989
4	4-29-65	86363

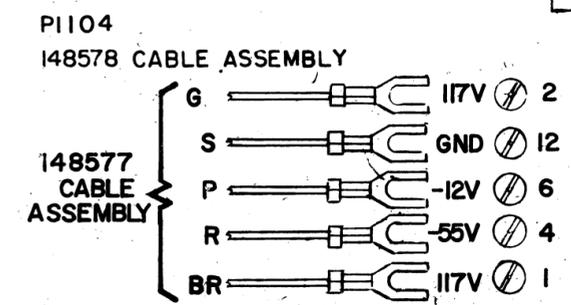
- NO. NOTES
- REFER TO 7097WD FOR ACTUAL WIRING DIAGRAM
 - ALL VOLTAGE DC UNLESS OTHERWISE SPECIFIED.
 - CHARACTER INCLOSED IN CIRCLES (C) ARE TERMINALS ON Z1101-EC520
 - ALL RESISTORS 1/2 WATT AND RESISTANCE VALUES IN OHMS, UNLESS OTHERWISE SPECIFIED.
 - INDICATES TERMINAL ON J1103
 - INDICATES TERMINAL ON P1101 AND P1104

TO J104 IN 199540 RECEIVER MODULE OR J1402 IN 199788 UNATTENDED SEND/REG. SOP.



REFERENCE ONLY
 199793 STRAPPING,
 PLUG OR P1403
 OF 199788 SOP.

See TCN 928



SCHEMATIC WIRING DIAGRAM FOR IDENTIFIER SET OF PARTS 199784

APPROVALS

D AND R E OF M

E-NUMBER

PROD. NO. 7098 WD

DATE: 12-19-63

P.D. FILE NO. 1-A143AA

DRAWN G.R.S. CHKD. [Signature]

ENGD. R.C.H. APPD. [Signature]

TELETYPE CORPORATION

7098 WD

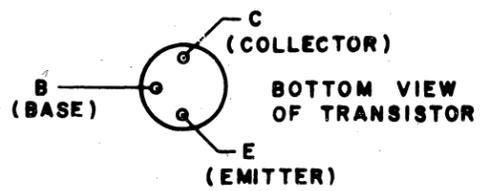
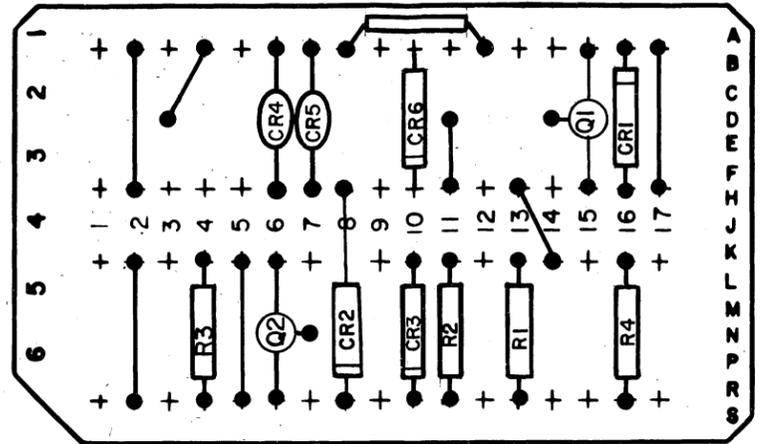
CIRCUIT BOARD

177520		
REVISION		
ISSUE	DATE	AUTH. NO.
2	3-26-64	80038
3	9-10-64	83692

THIS CARD CONTAINS TWO SPECIAL PURPOSE RELAY DRIVER USED IN THE STATION IDENTIFIER OF THE DATA SPEED 5 RECEIVER.

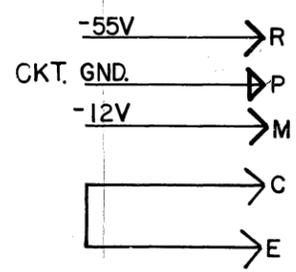
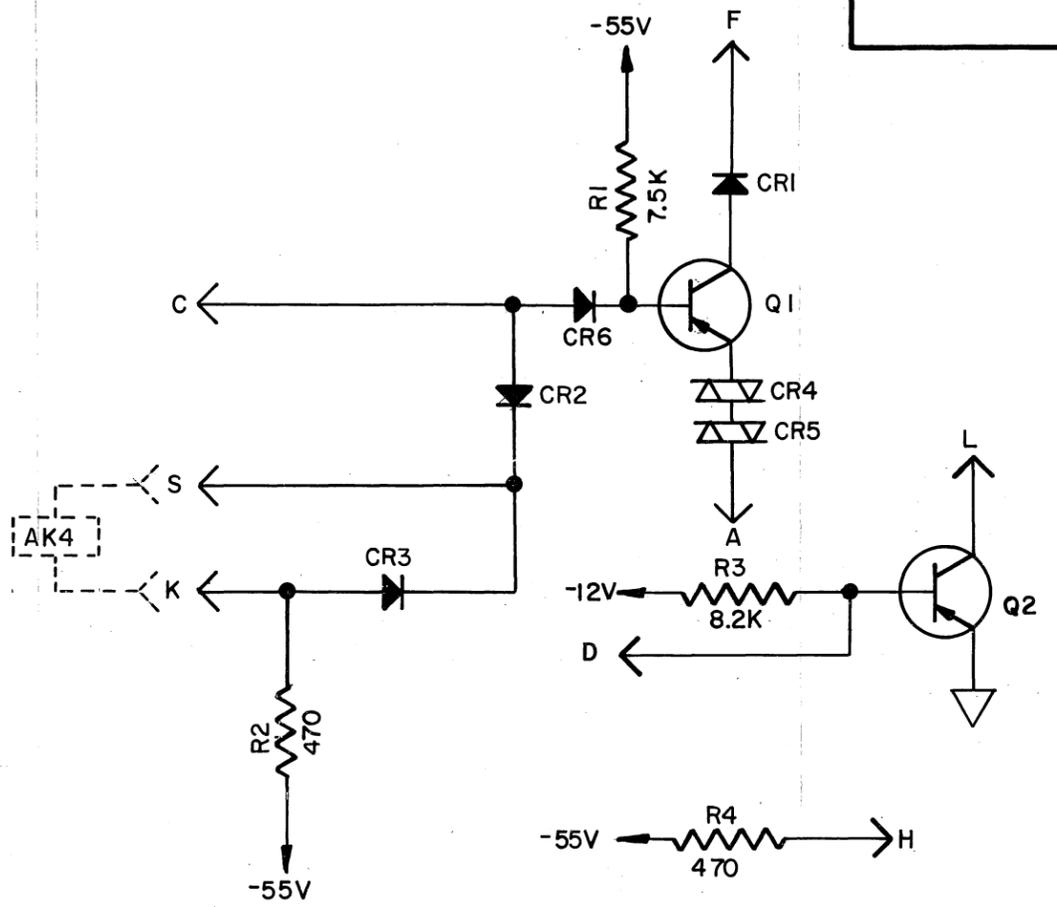
SYMBOLS

See TCN 928



NOTE
REFER TO 5016WD FOR MARKING INFORMATION

REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING	FUNCTION
R1	192934	1	RESISTOR FIXED 7.5K 2W	BIAS	
R2	137602	2	" " 470Ω	CURRENT/LIMITING	
R3	137444	1	" " 8.2K	BIAS	
R4			SAME AS R2	CURRENT LIMITING	
CR1	177611	4	DIODE IN682	CLAMP	
CR2			SAME AS CR1		
CR3			SAME AS CR1		
Q1	177224	2	TRANSISTOR 2N398 A		
Q2			SAME AS Q1		
	172067	1	CIRCUIT CARD, ETCH		
	144495	2	PAD, TRANSISTOR		
		7	STRAP 24AWG BARE		
		1	STRAP 24AWG INSUL.		
CR4	178844	2	VARISTOR 100A		
CR5			SAME AS CR4		
CR6		1	SAME AS CR1		
		1	SLEEVING		



NOTE:
CARD CONNECTIONS ARE REPRESENTED BY LETTERS
TEST POINTS ARE REPRESENTED BY NUMBERS

APPROVALS	
D AND R	E OF M
<i>[Signatures]</i>	
E-NUMBER	
PROD. NO. 177520	
DATE: 11-11-63	
P.D. FILE NO. 1-A143AA	
DRAWN G.R.S.	CHKD.
ENG. J.H.	APPD. <i>[Signature]</i>
TELETYPE CORPORATION	
177520	