

UNATTENDED SEND-RECEIVE APPARATUS UNIT (TP199788)

FOR "DATASPEED"\* TAPE RECEIVER 5B

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A. Mounting . . . . .	7	1. GENERAL	
B. Connections . . . . .	8	1.01 This section provides description, instal- lation and checkout procedures, operating procedure, principles of operation, trouble- shooting, and wiring diagrams for the optional TP199788 unattended send-receive feature (unattended S-R unit). This unit is used on a "DATASPEED" Tape Receiver 5B associated with a 5A or 5C Sender, and a TP198002 dis- crete calling recognizer feature (recognizer) to furnish unattended service at a send-receive terminal. The section is reissued to revise the text and to add installation and checkout pro- cedures, expanded circuit descriptions and illustrations. Since it is a general revision, marginal arrows ordinarily used to indicate changes and additions are omitted.	
C. Location and Removal of Wiring Options . . . . .	8	1.02 The unattended S-R unit (Figures 1 and 2), when used in conjunction with a recognizer option as part of a send-receive terminal (Figure 3) provides facilities for this terminal to send or to receive as required by the type of manually controlled calling station; ie, if a calling send-receive station is manually	
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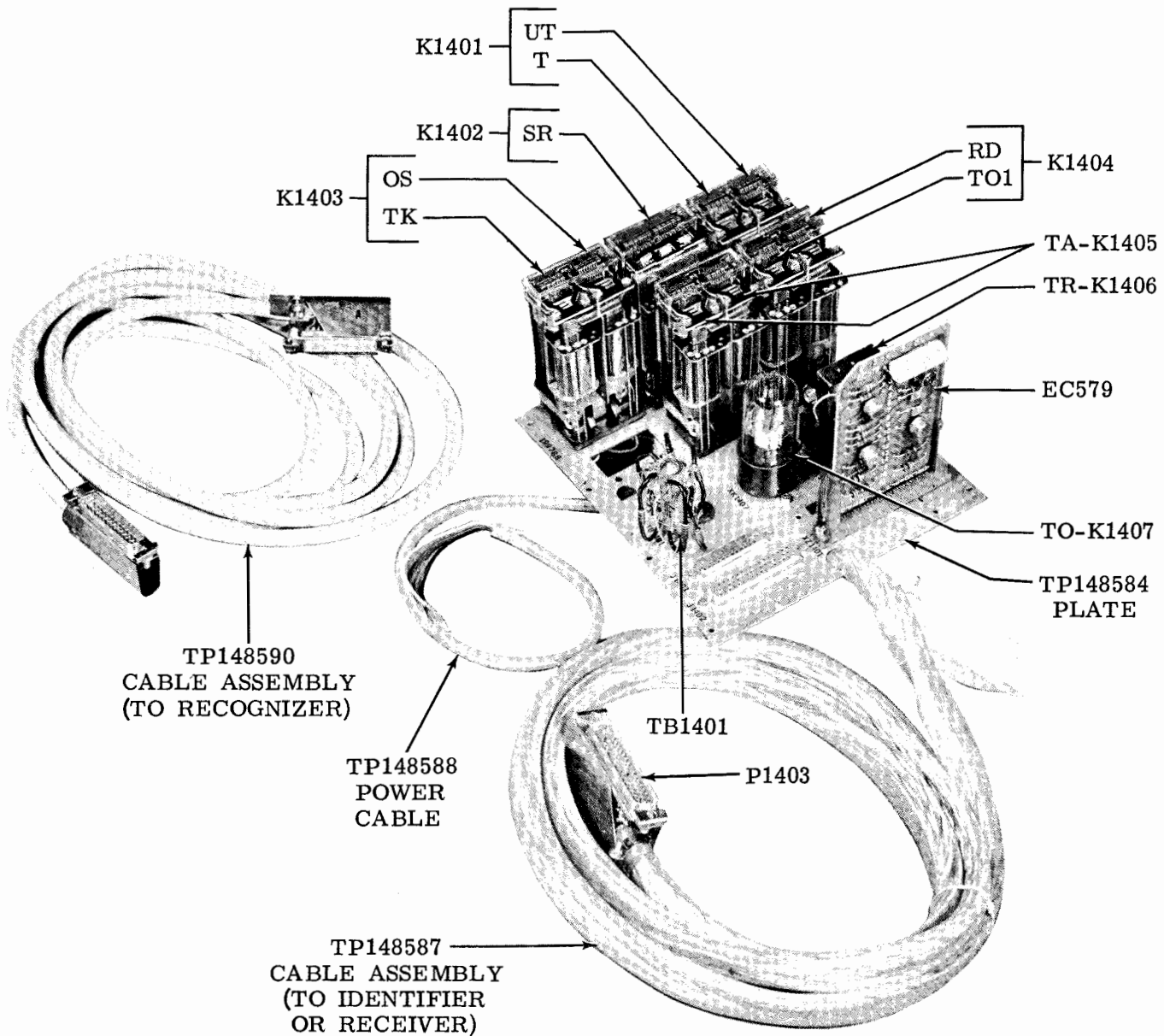


Figure 1 - TP199788 Unattended Send-Receive Apparatus Unit

switched to function as a Sender or as a Receiver, this terminal now automatically follows these switching operations.

1.03 Although the unattended S-R unit acts in conjunction with circuits of the recognizer unit (Figure 6), the primary function of the recognizer is to prevent the Sender from responding to other than authorized callers (protected answering). Information pertaining to the recognizer, 5A and 5C Tape Sender, and 5B Tape Receiver is found in their related group of sections.

1.04 If a TP199784 identifier is included in the Receiver, all leads from the unattended S-R unit to the Receiver pass through the identifier. This condition has no effect on the other circuits when operating as part of an unattended send-receive terminal.

## 2. DESCRIPTION

### FUNCTION AND CONFIGURATION

2.01 The TP199788 unattended send-receive apparatus unit option provides the facilities for unattended operation of a send-receive

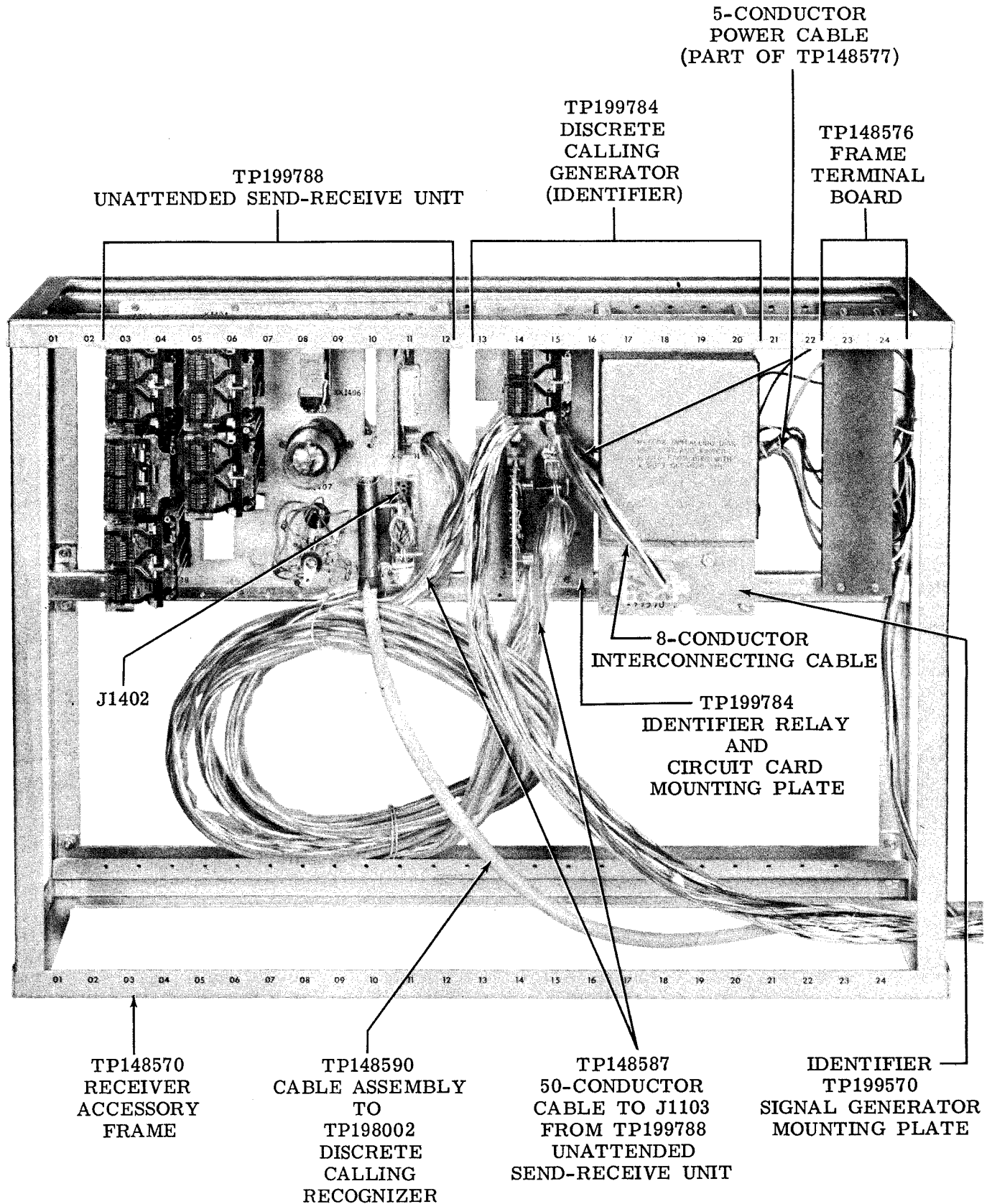


Figure 2 - Receiver Accessory Frame with Identifier and Unattended Send-Receive Units (Right Side View)

terminal over a single telephone line on a 2-wire one-half duplex basis.

2.02 After a call has been answered, the unattended S-R unit enables the terminal to automatically switch (lock-in) to either the send or the receive mode condition, depending on the type of signal that is received from a remote manually-controlled terminal. If the called unattended station is prepared for unattended answering it transmits data from tape on receipt of the 1017 cps command to send signal. It punches tape on receipt of an all-space command to receive signal. If the Receiver has a low tape condition it punches tape only if the Sender is out of tape, or is called in first and transmits to a no-tape condition, the Receiver then automatically goes on line regardless of low-tape condition.

2.03 Physically the TP199788 unattended S-R unit (Figure 1) comprises a single plate on which are mounted relays, a printed circuit card, miscellaneous components and cables. It is mounted on standard rails provided in the accessory mounting frame at the bottom of the Receiver cabinet. Mounting hardware is provided.

2.04 Two cables (Figure 3) provide electrical interconnections with the other assemblies. The TP148590 cable assembly provides connections to the recognizer unit. The TP148587 cable assembly provides connections to the Receiver (or to and through the identifier, if present). A third cable (TP148588) assembly provides four conductors with spade terminals for power connections to the TP148576 terminal board on the Receiver accessory frame.

TECHNICAL DATA

A. Dimensions (Referenced to Receiver)

- Height . . . . . 6-1/2 inches
- Width . . . . . 7-1/2 inches
- Depth . . . . . 8-7/16 inches

Mounted on rails (Figure 2) with holes spaced approximately 3/4 inch horizontally and 6-3/16 inches vertically.

B. Electrical

Power Requirements

- 12 v dc
- +6 v dc
- Ground
- 55 v dc

2.05 The UT, T, and RD relays in the unattended send-receive unit (Figure 1) require 48 v dc. These relays are operated by power supplied from the recognizer through the interconnecting TP148590 cable assembly (Figure 6).

Signal Requirements

2.06 The unattended S-R unit uses grounded and open control lead conditions that it receives from and supplies to the interfaces of the 402D and 402C data sets and the recognizer unit to furnish automatic, unattended operation at a send-receive terminal (refer to Part 5 for detailed explanation).

C. Wiring Options (Table 1)

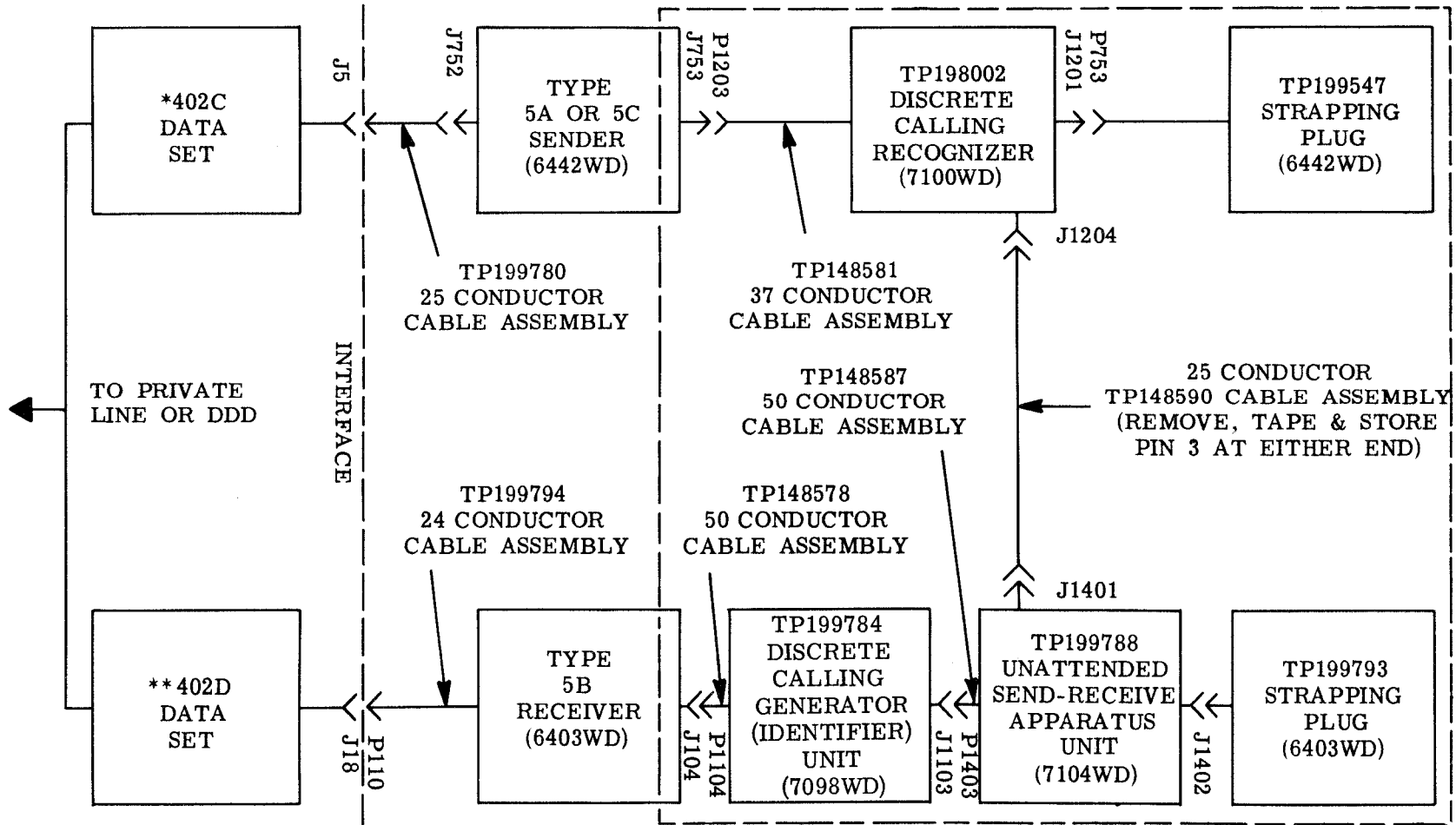
2.07 If the unattended S-R unit is wired with the ZC-ZD wiring option (R wiring option removed) and the ZC wiring present in the associated recognizer unit, the 402D data set answers automatically and then transmits the following answer-back signals:

- (a) If there is a low tape condition at the punch and the reader has no tape, the data set transmits answer-back AB.
- (b) If the punch has low tape and the reader has tape, the data set transmits answer-back A.
- (c) If the punch has adequate tape and the reader has no tape, the data set transmits answer-back B.
- (d) If the reader has tape and the punch has adequate tape, no answer-back is transmitted.

2.08 If the ZC wiring is removed from the recognizer and the R wiring is removed from the unattended S-R unit, the ZD wiring only is effective in this unit, and the data set transmits the following signals.

- (a) If the punch has low tape and the reader has no tape, the data set does not answer.
- (b) If the punch has low tape and the reader has tape, the data set transmits answer-back A.
- (c) If the punch has adequate tape and the reader has no tape, the data set transmits answer-back B.

Figure 3 - Unattended Send-Receive Terminal Interconnecting Diagram



- LEGEND: J = CONNECTOR ATTACHED TO EQUIPMENT  
P = STRAPPING PLUG OR CONNECTOR ATTACHED TO A CABLE  
→ REPRESENTS MULTIPLE CONNECTOR IN ABOVE DRAWING  
--- AREA PERTINENT TO THE TP199788 UNATTENDED SEND-RECEIVE  
OPTION UNIT IS OUTLINED BY THE BROKEN LINE. THE IDENTIFIER  
(TP199784) MAY BE OMITTED WITH P1403 CONNECTED TO J104.
- \* 402C1 - WITHOUT REVERSE CHANNEL RECEIVER
  - 402C2 - WITH REVERSE CHANNEL RECEIVER
  - \*\* 402D1 - WITHOUT REVERSE CHANNEL TRANSMITTER
  - 402D2 - WITH REVERSE CHANNEL TRANSMITTER

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(d) If the punch has adequate tape and reader has tape, no answer-back signal is transmitted.

(a) If the punch has low tape and the reader has tape, the data set transmits answer-back A.

(b) If the punch has adequate tape, the data set does not provide an answer-back signal.

(c) If the punch has low tape and reader has an out-of-tape condition, the data set does not answer the call.

2.09 If the unattended S-R unit is wired with the R option (without ZC - ZD option), and the recognizer is without the ZC option, the data set transmits the following signals:

TABLE 1

SERVICES, EQUIPMENT, AND WIRING OPTIONS FOR UNATTENDED SEND-RECEIVE TERMINAL

ADDITIONAL TYPES OF OPERATION	EQUIPMENT REQUIRED	WIRING OPTIONS	STRAPPING PLUG AND LOCATION
PERTAINING ONLY TO UNATTENDED SEND-RECEIVE TERMINAL.		Note: Always remove and tape pin 3 at one end of cable between unattended send-receive and recognizer.	Note: Remove and tape Pin 11 of TP199547. See section covering recognizer for other changes.
1. Unattended send-receive service using all 3 answer-backs; to indicate no tape, low tape and both (Answer-backs: A = low tape in Receiver. B = no tape in Sender. AB = both conditions). Station answers automatically with a low tape-no tape condition.	5A-1 or 5C-1 Send	In recognizer: Remove SO wiring; on connector card pin H, remove and tape wire to 1U of K1202-U relay.	TP199547 in TP198002 recognizer J1201
	5B-2 Receive	In unattended send-receive unit, remove R wiring; (retain ZC-ZD wiring) remove and tape one end of jumper between 9 and 9M on K1405-U relay.	TP199793 in TP199788 unattended send-receive unit J1402
2. Unattended send-receive service using 2 answer-backs (A or B) to indicate low tape in Receiver or no tape in Sender. Station will not answer automatically with a low tape-no tape condition.	5A-1 or 5C-1 Send	In recognizer: Remove ZC wiring; remove, twist together and tape two wires on 12M of K1203 relay and remove and tape wire on 3B of 1201-L relay. Remove SO wiring (same as 1 send above).	TP199547 in TP198002 unit J1201
	5-B2 Receive	In unattended send-receive unit: Remove R wiring (same as 1 receive above).	TP199793 in unattended send-receive unit J1402

TABLE 1 (Cont)

SERVICES, EQUIPMENT, AND WIRING OPTIONS  
FOR UNATTENDED SEND-RECEIVE TERMINAL

ADDITIONAL TYPES OF OPERATION		EQUIPMENT REQUIRED	WIRING OPTIONS	STRAPPING PLUG AND LOCATION
PERTAINING ONLY TO UNATTENDED SEND-RECEIVE TERMINAL.			Note: Always remove and tape pin 3 at one end of cable between unattended send-receive and recognizer.	Note: Remove and tape Pin 11 of TP199547. See section covering recognizer for other changes.
3.	Unattended send-receive service using answer-back A to indicate low tape in the Receiver. Station does not answer automatically with a low tape-no tape condition.	5A-1 or 5C-1 Send	In recognizer: Remove ZC wiring and SO wiring (same as 2 send above).	TP199547 in TP198002 recognizer unit J1201
		5B-2 Receive	In unattended send-receive unit: Remove ZD wiring; remove and tape wire on 10B of K1405-U relay. (Retain R wiring.)	TP199793 in TP199788 unattended send-receive unit J1402
4.	Unattended send-receive service, with Receiver in manual condition, capable of calling unattended Sender.	5A-1 or 5C-1 Send	In recognizer: Remove SO wiring (same as 1 send above). Either remove or retain ZC wiring (see 2 send above).	TP199547 in TP198002 recognizer unit J1201
		5B-3 Receive	In unattended send-receive unit: Remove either R or ZD wiring (same as either 1 or 3 receive above).	TP199793 in TP199788 unattended send-receive unit J1402
<p>Note: In addition to the types of operation in this table, any send or receive type of operation listed under the Sender only and Receiver only terminals, or a combination of any send and receive type so listed, may also be used at a send-receive terminal. See following list for descriptions of equipment required. Refer to appropriate section for detailed description of any set or apparatus unit option.</p> <p>5A-1 Table mounted Sender with TP198002 discrete calling recognizer.  5C-1 Floor mounted Sender with TP198002 discrete calling recognizer.  5B Floor mounted Receiver without options.  5B-1 Floor mounted Receiver with TP199784 discrete calling generator (identifier).  5B-2 Floor mounted Receiver with TP199788 unattended send-receive apparatus unit.  5B-3 Floor mounted Receiver with TP199784 discrete calling generator (identifier) and TP199788 unattended send-receive apparatus units.</p>				

Note: Refer to text paragraphs in the appropriate sections covering specific wiring options.

## 3. INSTALLATION AND CHECKOUT PROCEDURES

## INSTALLATION

3.01 A parts section for the high speed tape receiver cabinet (AC) and electrical components, type 5, illustrates the arrangement of the parts referred to by TP numbers in the following instructions. Figure 3 illustrates the interconnection of the unattended S-R unit with other equipment in the send-receive terminal.

For installation of equipment, refer to the wiring diagrams shipped with the equipment.

## A. Mounting

3.02 Remove the accessory frame (Figure 2) from the lower section of the Receiver cabinet. Mount the unattended S-R unit mounting plate to the rails using eight screws and eight lockwashers provided with the equipment. Mount the unit placing the first mounting screw into hole 04 and the last thru hole 13 on the top rail.

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### B. Connections

3.03 Remove the fiber cover from the TP148576 terminal board (Figure 2) in the accessory frame by removing the four mounting screws and lockwashers. Attach and secure the four terminal lugs (on white, brown, black, and red leads) to the terminal board in accordance with the color code and terminal designations on schematic wiring diagram 7104WD. Replace the fiber cover.

3.04 To complete terminal circuits, remove TP199793 strapping plug from J104 of 5B Receiver or from J1103 of the identifier and place it in J1402 of the unattended S-R unit (Figures 2 and 3).

3.05 If the identifier is included, connect plug P1403 of the TP148587 cable assembly to J1103 of identifier; otherwise connect this plug, P1403, to J104 of the 5B Receiver.

Note: The Sender, the Receiver, and the data sets each have their own group of sections. Each option unit has its single associated section that includes all information and wiring diagrams. Refer to the appropriate sections as required.

3.06 Replace any cables which were removed to facilitate installation.

3.07 Open one end of the 25 conductor cable TP148590 (supplied with the unattended S-R unit). Grasp the body of pin 3 (if still in place) with a long nosed pair of pliers and pull the pin out of the connector body. Tape the exposed pin, store it, and replace and secure the plug cover. Connect the 25 conductor cable between the receptacle of the unattended S-R unit and plug J1204 on the recognizer option in the Sender.

Note: Remove, tape, and store pin 11 of TP199547 strapping plug in recognizer. See Table 1 and the recognizer section.

### C. Location and Removal of Wiring Options

Note: Unless stated otherwise, wiring options are located in the unattended S-R unit. See Table 1 and Figure 6.

3.08 The ZC-ZD and R wiring options are furnished as standard factory installed equipment. At least one of these wiring options must be removed before operating the equipment. Check these wiring options and change them to fit the specific type of operation required.

(Refer to Table 1, Figure 6, and the schematic wiring diagram 7104WD.) Information on the wiring options is shown in tabular form in the sections covering installation and checkout of the Tape Sender and Tape Receiver; but the recognizer is covered in its related section.

Note 1: With ZC-ZD wiring option in (and R wiring option removed - Paragraph 3.11) all three answer-back signals are used to indicate no tape, low tape, or both.

Note 2: The removal of ZD wiring option also removes the ZC wiring option.

3.09 To remove the unattended S-R unit ZC wiring option only, locate relay K1203 in the recognizer unit. Remove the two wires from wire spring 12M of relay K1203, twist the two wires together, tape and store.

3.10 To remove the ZD wiring option locate relay K1405. Remove the wire from wire spring 10B, tape, and store.

3.11 To remove R wiring option, locate relay K1405-U. Remove and tape one side of the jumper wire between wire springs 9 and 9M on relay K1405-U.

### CHECKOUT

3.12 After the unattended S-R unit is installed, recheck to be sure that the ZC-ZD wiring options are set up; and that R wiring option is removed (Paragraphs 3.08 through 3.14 and Table 1). Then make the following checks.

Note: This checkout procedure is based on type of operation No. 1 as indicated at top of Table 1. Checkout for any other type may be modified according to the type of service used.

In most cases the corrective action is obvious. If not, refer to Part 6.

3.13 Be sure that both the Tape Sender and Tape Receiver have a full supply of tape.

3.14 Press the AUTO ANS button in both the Tape Sender and Tape Receiver. The SR and UT relays in the unattended unit should operate. (The TA relay should be operated by tape in the reader.)

3.15 Call the station from another telephone. Note that the response is a beep tone of from 2 to 7 seconds duration. (Repeat this step several times.)



- 3.16 Whistle into the telephone (simulated 1017 cps, answer-back A). This action should stop the TR cycling with TR relay locked operated. Terminate the call.
- 3.17 Manually close the Receiver low tape switch. Call the station again. You should hear a 2025 cps beep tone followed by 10 seconds of answer-back A. Terminate the call.
- 3.18 Leaving the low tape switch closed, take the tape out of the Sender. Call the station. You should hear a 2025 cps beep tone followed by 10 seconds of answer-back AB. Terminate the call.
- 3.19 Manually open the Receiver low tape switch. Leave the tape out of the Sender, and call the station. You should hear a 2025 cps beep tone followed by 10 seconds of answer-back B. Replace the tape in the Sender.
- 3.20 If this group of calls have checked out satisfactorily, the data sets and the terminal are in working order.

#### 4. OPERATING PROCEDURE

- 4.01 To prepare the unattended send-receive terminal for automatic operation, place a tape with a message to be sent in the reader, provide an adequate tape supply in the Receiver, and then press the AUTO ANS buttons at both the Tape Sender and Tape Receiver.

Note: Refer to the related description and operation sections on the Tape Sender and Receiver if necessary.

**CAUTION:** WHEN TERMINAL IS USED AS AN UNATTENDED SEND-RECEIVE STATION AND TRANSMITTER HAS GONE TO

THE TAPE OUT CONDITION, A NEW MESSAGE TAPE MAY BE PLACED IN THE READER WHILE RECEIVER IS PUNCHING ONLY IF:

- (1) RUN-STOP lever is put in STOP position before putting tape in the reader.
- (2) RUN-STOP lever is returned to the RUN position only after punch has stopped punching. Otherwise the TA and TR relays operate placing the 402C data set on line in its data mode.

- 4.02 As a remote calling station operator, follow normal, manual operating procedures for sending to or receiving from an unattended send-receive terminal except that at the conclusion of the answering 2024 cps data set tone, you may hear one of three answer-back signals for 10 seconds. These answer-back signals, transmitted from the unattended send-receive terminal, depend on the wiring option(s) in the equipment as shown in the tables in the installation and checkout procedure sections for the Sender and Receiver. As calling operator, you must listen for these answer-back tones before sending either message signals to the answering Receiver or identification signals to the answering Sender, since the answering terminal cannot respond to commands while it is transmitting an answer-back signal.

**CAUTION:** REGARDLESS OF THE WIRING OPTION COMBINATION USED (ZC-ZD, ZC, ZD, OR R), IF THE RECEIVER IS TO BE CALLED IN WHEN IT HAS A LOW-TAPE CONDITION, THE SENDER MUST BE OUT OF TAPE; OR IT MUST BE CALLED IN FIRST AND THEN, AFTER THE SENDER HAS TRANSMITTED TO AN OUT-OF-TAPE CONDITION, THE RECEIVER AUTOMATICALLY GOES "ON LINE."

#### UNATTENDED SEND-RECEIVE APPARATUS UNIT

- |   |                              |
|---|------------------------------|
| 1. Interlock (IK) relay K1403-L                                   | 13. Lead Designations:       |
| 2. Out-of-service (OS) relay K1403-U                              | (a) AA - Answer-back A       |
| 3. Relay-drive (RD) relay K1404-U                                 | (b) AB - Answer-back B       |
| 4. Send-receive (SR) relay K1402                                  | (c) AV - AUTO ANS sw ground  |
| 5. Tape-available (TA) relay K1405-U                              | (d) CN - Carrier-On          |
| 6. Tape-out (TO) relay K1407                                      | (e) DM - Data Mode           |
| 7. Tape-out-1 (TO1) relay K1404-L                                 | (f) IK - Interlock           |
| 8. Transmit (T) relay K1401-L                                     | (g) OS1 - Out-of-Service 1   |
| 9. Transmit-receive (TR) relay K1406                              | (h) OS2 - Out-of-Service 2   |
| 10. Unattended-transmitter (UT) relay K1401-U                     | (i) RO - Remote Operate      |
| 11. Pulse-generator circuit (PULSE GEN RD) Z1401 EC579 (TP177579) | (j) RR - Remote Release      |
| 12. Varistor 100A   | (k) TA1 - Tape Available 1   |
|   | (l) TR - Transmit Receive    |
|   | (m) TR2 - Transmit Receive 2 |
|   | (n) UA - Unattended Answer   |

Figure 4 - Unattended Send-Receive Unit Circuit Elements, Abbreviations, and Symbols

## 5. PRINCIPLES OF OPERATION

## GENERAL

5.01 When following the circuit description for the unattended send-receive unit, see Figure 3 for interconnections with other options in an unattended send-receive terminal equipped with all option units. See Table 1 of Part 2 for wiring option and type of operation associations. See Figure 4 for list of circuit elements abbreviations, and symbols. See Figures 5, 6, and 7 for information on the circuits. For detailed information see the diagrams at the rear of each apparatus unit option section, and the two schematic and actual wiring diagrams sections covering the 5A or 5C Sender and the 5B Receiver respectively. See schematic wiring diagram 7104WD in Part 7 of this section for the unattended S-R unit option.

Note: Relays and other circuit elements referenced in this section are a part of the unattended S-R unit unless specifically stated otherwise.

## CONTROL SIGNALS

5.02 The following is a general list of connections to ground, open circuits and between leads at the interfaces of the data sets used by the unattended send-receive unit option to automatically control its associated unattended send-receive terminal. See Figure 5 and Table 1 of Part 2 to determine whether the condition is supplied by local business machine equipment or by the data set from a remote signal. Refer to Figure 6 for control circuits.

- (a) The interlock (IK) leads from the two data sets are grounded by the data sets when the respective data sets are on line and ready to send and receive data.
- (b) The remote-release (RR) leads from the two data sets are normally grounded. These leads are opened to cause the data sets to (go on hook) terminate call.
- (c) The remote-operate (RO) and remote-release (RR) leads are connected to ground when it is desired to answer incoming calls automatically.
- (d) The AV lead is grounded by the operation of the AUTO ANS button in the Receiver, to operate the S-R relay in the unattended send-receive unit.

- (e) The out-of-service 1 (OS1) lead is grounded by the Receiver when the tape supply is low or power is off and operates the OS relay in the unattended send-receive unit.
- (f) The Receiver answer-back A (AA) lead is grounded to generate answer-back A. The Sender AA lead is grounded by the 402C data set when answer-back A is received.
- (g) The data mode (DM) lead of the Receiver is grounded when it is desired to receive data and opened when answer-back signals are to be sent.
- (h) The transmit-receive (TR) lead of the Receiver is grounded to place the 402D data set on line and opened to place the 402C data set on line.
- (i) The CN lead is grounded by 402D data set when an all-space signal is detected by the Receiver, and it remains grounded until the received carrier goes off.
- (j) The unattended answer (UA) lead is grounded by the operation of the AUTO ANS button in the Sender.
- (k) The tape-available (TA) and (TA1) leads are grounded by the Sender when tape is available for sending.

## NORMAL RESPONSE OF STATION PREPARED FOR UNATTENDED SEND-RECEIVE OPERATION

Note: The station must be prepared for operation with adequate tape as covered in Part 4.

5.03 Pressing the AUTO ANS buttons at both the Tape Sender and Tape Receiver arranges the circuits of the unattended S-R unit and its local unattended send-receive terminal to automatically answer a call and then, upon receipt of a command signal, to switch (lock-in) to either the send or receive (mode) condition. At the 1017 cps command to send signal or all-space command to receive signal of the remote, manually controlled terminal, the local unattended send-receive terminal locks into the appropriate mode for the transmission of the reception of data between the local and remote data set. This is accomplished on a 2-wire one-half duplex basis (one way at a time transmission) over a voice channel.

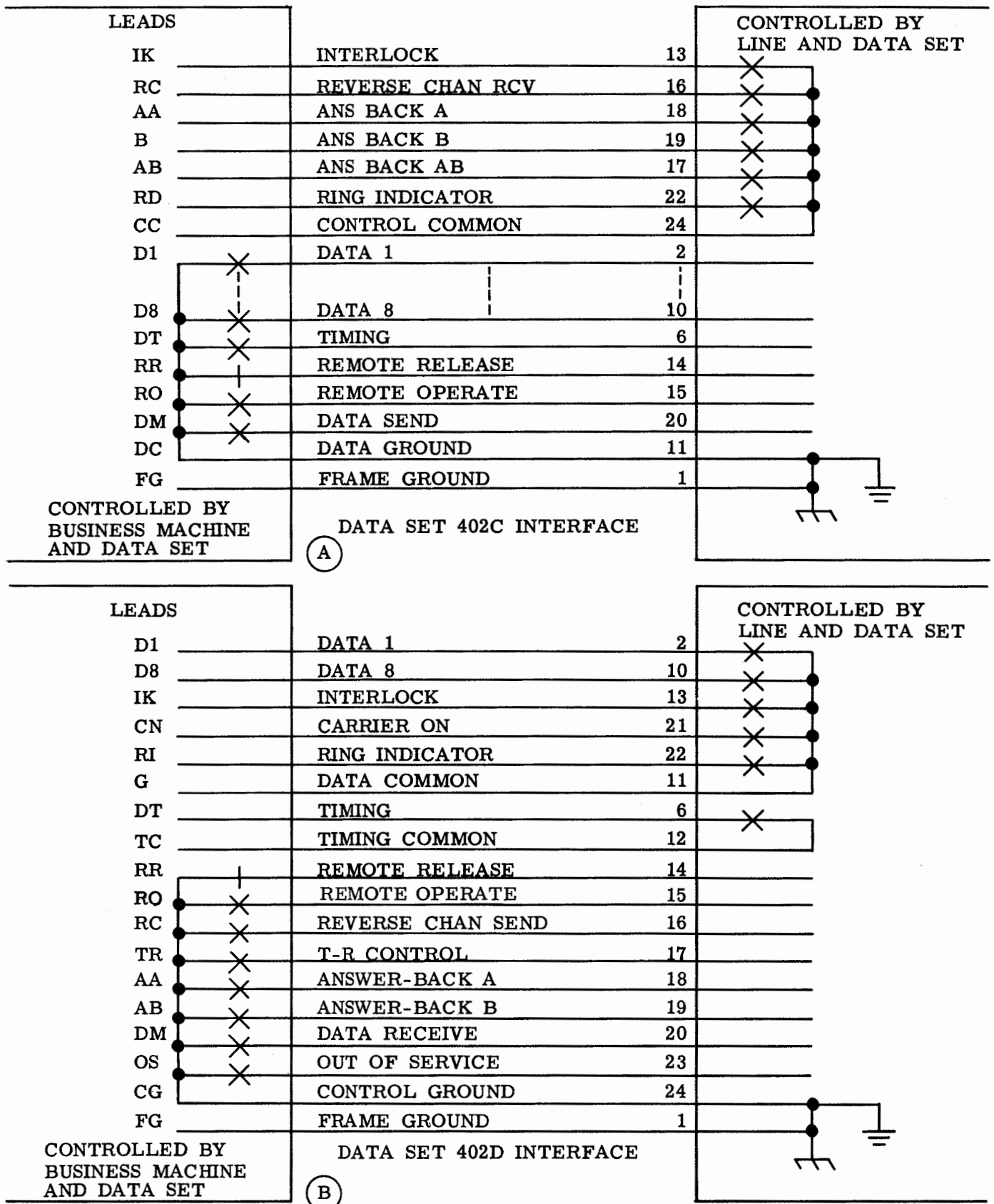


Figure 5 - Typical Interface-Contact Control Arrangements at Data Sets

(a) Pressing the AUTO ANS button of the Tape Sender (Figure 6) applies ground to the pin 28 lead of connector J753 at the local Sender. The circuit continues from pin 28 of P1203 through the recognizer UA relay coil to pin 5 of connector J1204, through UT relay coil of unattended S-R unit (from pin 5 to pin 15 of J1401) and back to the +48 v dc supply at the recognizer. The UA and UT relays are not operated. (See schematic wiring diagrams 7100WD in section covering recognizer and 7104WD for the unattended S-R unit.)

(b) Pressing the AUTO ANS button of the Tape Receiver applies ground (Figure 6) to the AV leads of the Receiver and unattended send-receive unit, through contact 8 of operated unattended-transmitter (UT) relay to coil of (operates) send-receive (SR) relay. This button also applies ground from the unoperated Receiver low-tape (LT) relay 11 and operated Receiver power-on (PO) relay contact 1 through the RO1 lead, ZB wiring option of pins 28-15 in the TP199793 strapping plug, back through the RO leads of the unattended S-R unit and Receiver to remote-operate pin 15 of the 402D data set. The RO ground enables the unattended answer feature of this data set when its remote-release pin 14 is also grounded.

(c) The results of pressing the Sender and Receiver AUTO ANS buttons are covered in the following paragraphs and Figure 6.

#### A. Recognizer Apparatus Unit

Note: Refer to Figure 6 and schematic wiring diagram 7104WD for the unattended S-R unit and to schematic wiring diagram 7100WD in the section covering the recognizer.

5.04 The Sender RO lead from remote-operate pin 15 of the 402C data set is permanently connected to RO lead in the recognizer. The Receiver RO lead is connected through a diode and send-receive (SR) relay contact 3 in the unattended S-R unit and through the RO lead in the Receiver to remote-operate pin 15 in the 402D data set. For unattended answering, the remote-operate pins of both data sets, and the remote-release (RR) pin 14 of the 402C data set are simultaneously grounded in the recognizer by the recognizer unoperated automatic-release (AR) 30-second time delay relay contact. This AR relay contact ground may be applied to the RO lead combination through the recognizer UA relay contact 12 and Z-ZC wiring option if pre-

sent; and/or it may be applied through the recognizer UA relay contact 6 and recognizer TA relay (if operated) contact 5. The recognizer AR relay contact ground to RR pin 14 of the 402C data set prevents termination of the call by this data set until 30 seconds after ground is applied to the coil of this AR relay.

(a) Because of the diode between the unattended S-R unit RO lead and the RO lead to the recognizer, the ground from the unoperated Receiver LT relay contact 11, Receiver PO relay contact 1, and pressed AUTO ANS button contact in the Receiver is applied through RO1 lead of unattended S-R unit, pins 28 and 15 (ZB wiring option) of TP199793 strapping plug, and back through RO leads to remote operate pin 15 of 402D data set only. This does not affect the 402C data set.

(b) Pressing the AUTO ANS button in the Sender operates the UA relay K1203 in the recognizer unit and the UT relay K1401-U in the unattended S-R unit.

(c) With the lever in RUN position and tape in the reader, the TA relays in both the recognizer and unattended S-R units are operated.

#### B. Discrete Calling Generator (Identifier)

5.05 All leads from the Receiver to the unattended S-R unit also pass through the identifier unit if present. This does not affect operation of the unattended S-R unit.

5.06 Refer to schematic wiring diagram 7098WD in the section covering the station identifier unit for additional circuit details.

#### C. Unattended Send-Receive Apparatus Unit (See Schematic Wiring Diagram 7104WD and Figure 6)

5.07 When the AUTO ANS button in the Sender is pressed, the UT relay K1401-U operates, with contacts performing the following functions:

(a) UT relay contact 10 closes, setting up a (tape-out) ground path from the normally closed contact 8 (open if tape is available) of the TA relay to the normally open (closed when 402D data set is in data mode) contact 5 of the IK relays through Receiver AB lead to answer-back B pin 19 of 402D data set.

(b) UT relay contact 8 closes, setting up a ground path from the AUTO ANS contacts of the Receiver to pin 32 of connector P1403 AV lead, through the coil of the S-R relay, to operate the S-R relay.

5.08 Contacts of the operated S-R relay perform the following functions:

(a) SR relay contact 1 transfers the DM lead of the 402D data set from a permanent ground to the R wiring option, if present, and to contact 9 of the TA relay and to contact 1 of the TO1 relay. The DM lead is now grounded if the TO1 relay is operated. It is also grounded by contact 8 of the out-of-service (OS) relay if it is unoperated and if at the same time, either the TA relay is operated or the R wiring option is present.

(b) SR relay contact 2 transfers the TR lead of the 402D data set from the ground TR2 lead to the INC contact of the TR relay and to ground, if this TR relay is unoperated.

(c) SR relay contact 3 connects the RO lead of the 402D data set (+18 v dc) to the RO lead in the recognizer for the 402C data set. In the recognizer, these RO leads are connected to the RR lead of the 402C data set through contact 5 of the recognizer TA relay, if operated, and through contact 6 of the operated recognizer UA relay. These RO leads are also connected to the same RR lead through the recognizer Z-ZC wiring option, if present, and contact 12 of operated recognizer UA relay. The RR lead is then grounded through the contact of the recognizer AR 30-second time delay relay if the relay is unoperated.

(d) SR relay contact 4 connects the RR lead of the 402D data set to the unused (taped and stored) pin 3 of the TP148590 cable assembly.

(e) SR relay contact 5 connects a ground from contact 9 of the RD relay, if operated, to normally open contact 9 of the OS relay and to swinger contact 10 of the TA relay. If the OS relay is operated (or if the TA relay is unoperated with ZC-ZD wiring option in place), a ground path is completed from contact 9 of the OS relay through the coil of 10-second tape-out (TO) relay and operates the TO relay. If the TA and TO1 relays are operated, the ground operates the TR relay which places the 402C data set on the line.

(f) SR relay contact 6 connects AA lead from pin 18 of the 402D data set through the Sender, recognizer, and a diode in the unattended S-R unit, to the coil of the T relay. This operates the T relay (data set 402C grounds its pin 18) on a command to send from a remote calling Receiver.

5.09 The TA relay K1405-U in the unattended S-R unit is operated by the TA relay in the recognizer if there is tape in the reader. Contacts of the unattended S-R unit TA relay K1405-U perform the following functions:

(a) TA relay contact 8 connects ground to normally open contact 12 of RD relay K1404-U. When a call is received the IK relay operates the RD relay, closing its contact 12, and applies the ground from TA relay contact 8 to the holding circuit of the T relay contact 2. If TA relay is released due to no tape in Sender, with UT and IK relays operated, this ground is applied to answer-back B pin 19 of 402D data set.

(b) TA relay contact 9 connects a ground path from normally closed contact 8 of the OS relay to the closed contact 1 of SR relay, if the TA contact 9 is not already shorted by the R wiring option. The R wiring option determines whether or not the TA relay will control one of the grounds from the DM lead to the 402D data set.

(c) TA relay contact 10 transfers a ground path from ZC-ZD wiring option, if present, and the coil of TO relay to contact 3 of TO1 relay. If TO1 contact 3 is closed, this forms part of the ground holding path for the TR relay.

(d) TA relay contact 12 connects ground through 100A varistor to connection D of pulse generator-relay drive Z1401 (drawing TP177579).

5.10 With R wiring option removed and ZC-ZD wiring option retained, the following relays are energized if the Sender and Receiver AUTO ANS buttons have been pressed and tape is available in both the Sender and Receiver: SR, UT, and TA relays in the unattended S-R unit and the UA and TA relays in the recognizer are operated with the circuits in their rest condition, the 402D data set remains on the line with its TR lead grounded through SR relay contact 2 and normally closed contact INC of TR relay. The terminal remains in this state until a call is received.

5.11 When a call comes in, the 402D data set answers automatically with a 2025 cps beep tone for 2 to 7 seconds because its TR, RO and RR leads are grounded. The 402D data set then supplies ground through the Receiver and unattended S-R unit IK leads, to the coil of the IK relay K1403-L, causing the IK relay to operate. This in turn, operates the RD relay K1404-U. Contact 8 of the RD relay connects the coil (ICO) of TR relay K1406, through contact 10 of OS relay to the output of PULSE GEN relay driver Z1401 (EC579). Relay driver Z1401 causes the TR relay to alternately operate and release, remaining in each state for approximately 120 milliseconds. This alternately pulses the TR lead to TR control pin 17 of the 402D data set to a ground condition to connect the 402D data set to the line and to open condition to connect the 402C data set to the line. The circuits continue to oscillate in this manner until either a 1017 cps command to send signal or an all-space command to receive signal is received over the line from a data set at a remote, manually controlled station; or until the AR 30-second delay relay in the recognizer operates and opens the ground path to remote-release pin 14 of the 402C data set to terminate the call.

5.12 The toggling of the TR relay in response to pulses from the relay driver Z1401 causes the IK relays to toggle because each data set grounds its IK lead as it goes on the line. The IK relay in the recognizer is slow to release because of the 10-microfarad capacitor across its coil. Contact 11 of this IK relay remains closed and completes the ground path to the heater of the recognizer AR relay. When the recognizer AR relay operates, its contact opens the ground path to the RR lead of the 402C data set. The call is then dropped when the toggling TR relay places the 402C data set on the line with its RR lead open.

5.13 If, during that part of this alternation period when the local 402C data set is on the line, the remote calling station Receiver transmits a 1017 cps command to send signal:

(a) The local 402C data set applies ground to its answer-back A pin 18, through the recognizer, the unattended S-R unit, operated SR relay contact 6, and a diode to coil T relay. This causes the transmit (T) relay to operate and lockup through its own contact 2 to ground through contact 8 of operated tape-available (TA) relay, through (operated by

call) relay-drive (RD) relay contact 12. Contact 1 of the T relay now provides a ground holding path from contact 10 of RD relay to contact 2NO of the transmit-receive (TR) relay. Relay contact 2NO is closed at this time because the 402C data set is on the line detecting answer-back A (grounds its pin 18) and locks the coil of the TR relay to ground.

(b) The remote calling station then sends its identification signal which, after acceptance by local recognizer, results in automatic message (data) transmission by the unattended S-R terminal. At the conclusion of message transmission (end of tape) the TAPE OUT-TAPE AVAIL contacts in the transmitting reader open to the TAPE OUT position. This releases and opens ground contact 1 of TA relay in the recognizer, thereby opening lead TA1 pin 2 of J1401 and releasing the TA relay in the unattended S-R unit. When the TA relay releases, its contact 12 opens the operating ground path through varistor 100A, to terminal D of PULSE GEN-RD circuit Z1401. TA relay contact 8 opens and breaks the ground holding path to the T relay coil. When the T relay releases, its contact 1 opens and breaks the ground holding path to the TR relay coil. When TR relay releases, its INC contact closes and connects ground to the TR lead of the 402D data set. This removes the 402C data set from the line and places the 402D data set on the line. The circuits thus remain in the receive condition for approximately 30 seconds, waiting for the CN lead to be grounded by carrier-on pin 21 in the 402D data set if it receives an all-space command to receive signal from the line. If the CN lead is grounded within 30 seconds after the IK lead is grounded, this ground is applied to L of PULSE GEN-RD Z1401 and at the same time to the Receiver CN relay. Contact 8 of this CN relay then connects ground to operate the Receiver reverse-channel (RC) relay. CN relay contact 11 transfers the 402D interlock pin 13 through IK lead and pins 13 to 11 of TP199793 strapping plug, from coil of the Receiver time delay 30-second RS relay to data-receive pin 20 of 402D data set so that the set holds itself in data mode as long as it receives carrier to keep its carrier-on pin 21 grounded. The contact 11 transfer also opens a ground path which prevents the Receiver 30-second RS relay from operating and terminating the call by opening the ground path to remote-release pin 14 of 402D data set.

5.14 If, during this alternation period (Paragraphs 5.11 and 5.12), the all-space command to receive signal is transmitted first by a remote calling station Sender, the 402D data set will ground its carrier-on pin 21. This grounds (operates) the Receiver carrier-on (CN) relay (through TP199793 strapping plug pins 21 and 30). This ground is also applied to pin 21 of P1403, CN lead in the unattended S-R unit, through a diode to connection B of the PULSE GEN-RD Z1401 relay drive circuit to stop pulsing of the transmit-receive (TR) relay so that during its next alternating release period it remains released and holds the 402D data set on the line in the receive condition. When incoming carrier to the 402D data set is stopped, at the conclusion of message, the ground to the CN lead and relay drive circuit Z1401 is opened. As the receiver was called in first, this allows the transmit-receive (TR) relay to resume cycling for 30 seconds until the Receiver 30-second RS relay operates and opens the 402D data set RR lead to terminate the call.

#### STATION NOT PREPARED FOR SEND-RECEIVE OPERATION

##### A. Wiring Options ZC-ZD Retained and R Removed

5.15 With ZC-ZD wiring option retained and R wiring option removed, the unattended S-R unit circuits function as follows (see Table 1 of Part 2 and Figure 6):

(a) With no tape in the Sender and low tape in the Receiver an incoming call is answered automatically and then answer-back AB is transmitted for 10 seconds because:

(1) The call is answered automatically because the remote-operate lead from the 402D data set is connected through a diode in the unattended S-R unit to the RO lead in the recognizer for the 402C data set. This RO lead combination is grounded in the recognizer through the Z-ZC wiring option, UA relay contact 12 and the contact of the AR 30-second time delay relay. The AR contact that grounds the RO leads in the recognizer also grounds the RR lead of the 402C data set. The RR lead of the 402D data set is grounded through TP199793 strapping plug pins 14 and 23 and through the Receiver RS 30-second time delay relay contact.

Note: The remote-release and remote-operate leads of the data sets must be grounded for unattended answering.

(2) After answering the incoming call, answer-back AB (no tape in Sender and low tape in Receiver) is transmitted for 10 seconds from the 402D data set because its data-receive DM lead ground path is open, leaving the set in its answer-back mode, and its AA lead and AB lead are both grounded as follows:

(3) The 402D DM lead ground path through the Receiver CN relay contact 11, TP199793 strapping plug pins 11 and 13 and back through the IK leads to its own interlock pin remains open until an all-space command to receive signal comes in from the remote station. When this all-space signal is received, the 402D data set grounds its carrier-on pin 21 to operate the Receiver CN relay and close the DM lead ground path. This removes the set from the answer-back mode and places it in the data-receive mode.

(4) The AA lead from pin 18 of the 402D data set is grounded through OS relay contact 12, IK relay contact 1, and contact 2 of (released for 10 seconds until TO operates) TO1 relay.

(5) The AB lead from pin 19 of the 402D data set is grounded through IK relay contact 5, UT relay contact 10, at TA relay contact 8.

(6) Answer-back AB is now transmitted over the line from 402D data set and lasts for approximately 10 seconds until the tape out (TO) time delay relay operates approximately 10 seconds after being energized by application of ground through OS relay contact 9, SR relay contact 5 at RD relay contact 9.

(7) When TO relay operates, its contact closes and connects ground to the coil of, and operates TO1 relay. Contact 1 of TO1 relay then closes and connects ground through SR relay contact 1, DM lead to data-receive pin 20 of 402D data set and places the set in its data mode. If an all-space command to receive signal is received from the line at the 402D data set within 20 (30-10) seconds, the 402D data set grounds its carrier-on pin 21, which grounds point B (blocks operation) of PULSE GEN-RD Z1401 in the unattended S-R unit and through TP199793 strapping plug pins 21 and 30, and operates the Receiver CN relay. Contact 11 of this CN

relay now transfers the 402D interlock pin 19 ground from the Receiver 30-second RS relay K104 coil to the 402D data-receive pin 20. The Receiver now punches an incoming data message in tape even though the transmitted answer-back AB indicates no tape in the Sender (B) and a low tape condition in the Receiver (A).

(8) If an all-space signal followed by carrier is not received by the 402D data set, the internal ground remains disconnected from carrier-on pin 21; if pin 21 is not grounded, the Receiver CN relay does not operate and the Receiver 30-second time delay RS relay remains connected to a ground path through CN relay contact 11 to 402D data set interlock pin 13. Then 30 seconds after the IK lead is grounded the contact of this RS relay opens and disconnects the ground to RR leads of 402D data set remote-release pin 14. With the RR ground broken the data set immediately terminates the call (goes on hook), and disconnects the ground in the data set from interlock pin 13. This opens a ground path and releases the IK relay which in turn releases the RD relay, returning the circuits to their original rest condition.

(b) With no tape in the Sender and adequate tape in the Receiver an incoming call is answered automatically and then answer-back B is transmitted for 10 seconds because:

(1) The RO leads from both data sets and the RR lead from the 402C data set are grounded together in the recognizer as explained in 5.15(a)(1). In this case, the RO lead from pin 15 of the 402D data set is also grounded through ZB wiring between pins 15 and 28 of TP199793 strapping plug and Receiver AUTO ANS switch, PO relay K102-L-B contact 1, LT relay K102-U-B contact 11 to ground in Receiver.

(2) After answering the incoming call, answer-back B is transmitted for 10 seconds from the 402D data set because it is on the line in the answer-back mode with its DM lead open at Receiver CN relay contact 11 as explained in 5.15(a)(3) and the answer-back B (AB) lead is grounded.

(3) The answer-back A lead from the 402D data set opens, in this case because of adequate Receiver tape, and re-

lease of the OS relay opening its contact 12. Therefore, answer-back A or AB is not transmitted.

(4) The answer-back B (AB) lead from pin 19 of the 402D data set is grounded in the unattended S-R unit through contact 5 of IK relay, and contact 10 of UT relay at contact 8 of the unoperated TA relay.

(5) Answer-back B is not transmitted over the line from 402D data set for 10 seconds until the TO time delay relay operates after being energized by application of ground through ZC-ZD wiring option, contact 10 of unoperated TA relay, contact 5 of the SR relay at contact 9 of RD relay, to ground.

(6) When the TO relay operates, its contact closes and connects ground to operate the TO1 relay. Contact 1 of the TO1 relay then closes and connects ground through the SR relay contact 1, DM lead (to open contact 11 of Receiver CN relay) and to data-receive pin 20 of 402D data set to place the set in the data mode. If an all-space command to receive signal comes in from the line to the 402D data set within 20 seconds, the Receiver punches the incoming data message in tape.

(7) If an all-space signal followed by line carrier is not received by the 402D data set, ground is not supplied by the set from its carrier-on pin 21; the Receiver CN relay is released and releases the unattended S-R unit PULSE GEN-RD Z1401. Contact 11 swinger of the Receiver CN relay connects ground from 402D data set interlock pin 13 to heater coil of Receiver 30-second RS thermal delay relays. In 30 seconds the contact of this Receiver RS relay opens and disconnects the ground to 402D data set remote-release pin 14. With this RR ground broken, the data set immediately terminates the call (goes on hook) and disconnects the internal data set ground from its interlock pin 13. This in turn, releases the unattended S-R unit relays IK and RD returning the circuits to their original rest condition.

(c) With tape in the Sender and a low tape condition in the Receiver an incoming call is answered automatically because the RO and RR leads of both data sets are grounded as described in 5.15(a)(1) and then answer-back A is transmitted for 10 seconds



because the 402D data set is in the answer-back mode with its DM lead open as described in 5.15(a)(3) and its AA lead is grounded as described in 5.15(a)(4).

(1) Answer-back A is now transmitted over the line from the 402D data set, for 10 seconds until the 10-second TO relay operates after it has been energized by application of ground through the operated OS relay contact 9, SR relay contact 5, and RD relay contact 9.

(2) When TO relay operates, its contact closes and connects ground to coil of, and operates, TO1 relay. TO1 relay contact 3 then places the 402C data set on the line by completing the ground path from RD relay contact 9, SR relay contact 5, and TA relay contact 10 to the coil of the TR relay; the TR relay, in turn, operates and opens the ground path from its INC contact through SR relay contact 2 to the transmit-receive pin 17 of the 402D data set.

Note: If the Sender has tape and if the Receiver has a low tape condition, it does not punch tape unless the Sender is called in first and transmits to an out-of-tape condition.

(3) If the 402C data set now receives a 1017 cps command to send line signal, it grounds its AA lead which operates the T relay and locks the terminal in transmit mode as described in Paragraph 5.13(a). After acceptance of the identification signal by the local recognizer, the Sender and 402C data set transmit data from the tape in the reader.

(4) When the Sender has transmitted to an out-of-tape condition it breaks the ground path to, and releases, the recognizer and unattended S-R unit relays. This releases the T and TR relays. When the TR relay releases, its INC contact closes the ground path to the TR lead of the 402D data set and places this set on the line.

(5) The 402D data set now remains on the line for 30 seconds, waiting for an all-space command to receive signal as described in 5.15(a)(7). If this signal is received, the Receiver punches tape. If the signal is not received within 30 seconds the data set terminates the call as described in 5.15(a)(8).

(d) With tape in the Sender and adequate tape in the Receiver, an incoming call is answered automatically as described in Paragraphs 5.03 through 5.12 and responds as described in Paragraph 5.13 for the 1017 cps command to send signal and Paragraph 5.14 for the all-space command to receive signal. Contact 9 of operated TA relay K1405-U supplies that portion of ground path furnished by the R wiring option before removal.

#### B. Wiring Options ZD Retained and ZC and R Removed

5.16 With ZC and R wiring options removed (remove ZC wiring in recognizer only and remove R wiring in unattended send-receive unit) and ZD wiring option retained (Type of Operation 2, Table 1 of Part 2) the circuits function as follows:

(a) With no tape in the Sender and low tape condition in the Receiver, the call is not answered automatically and answer-back AB is not transmitted because:

(1) The ground path from remote-operate pins 15 of the 402C and 402D data sets to the recognizer AR relay contact ground, has been opened by removal of the ZC wiring option from the recognizer.

(2) The alternate ground to remote-operate pin 15 of the 402D data set from Receiver is opened at Receiver LT relay contact 11 because of low tape in Receiver. Therefore, the terminal cannot answer automatically as described in Paragraph 5.15(a).

(b) With no tape in Sender and adequate tape in Receiver an incoming call is answered automatically and then answer-back B is transmitted for 10 seconds because:

(1) For automatic answering, the remote-operate pin 15 of 402D data set is grounded through Receiver and unattended send-receive unit RO leads, ZB wiring option between pins 15 and 28 of TP199793 strapping plug, back through RO1 leads and Receiver AUTO ANS switch, contact 1 of Receiver PO relay and contact 11 of Receiver LT relay to ground in the Receiver.

(2) After answering the incoming call, answer-back B is transmitted for 10 seconds from the 402D data set because:

- (3) The ground path to the data-receive pin 20 of the 402D data set is open as described in 5.15(a)(3) leaving the data set in its answer-back mode.
  - (4) The unattended S-R unit ground path to answer-back A pin 18 of the 402D data set is open at contact 12 of the OS relay because of adequate tape in the Receiver. Therefore, answer-back A is not transmitted as described in 5.15(b)(4).
  - (5) The answer-back B pin 19 of the 402D data set is grounded in the unattended S-R unit through contact 5 of IK relay, contact 10 of UT relay, at contact 8 of the unoperated TA relay as described in 5.15(b)(5).
  - (6) Answer-back B is now transmitted from the 402D data set for 10 seconds, after ground path has been completed through contact 9 of the OS relay to energize the 10-second TO time delay relay as described in 5.15(b)(5).
  - (7) When the contact of TO relay operates the TO1 relay, the 402D data set is placed on line in data mode as described in 5.15(b)(6). If an all-space signal is received within approximately 20 seconds, the Receiver punches the incoming data message in tape.
  - (8) If an all-space signal is not received, the Receiver 30-second RS thermal delay relay opens the ground path to remote-release pin 14 of the 402D data set, as described in 5.15(b)(7), and terminates the call.
- (c) With tape in the Sender and a low tape condition in the Receiver an incoming call is answered automatically because the RO leads from both data sets are grounded through the recognizer TA relay contact 5, recognizer UA relay contact 6, 402C data set RR lead and the contact of recognizer AR relay; the RR lead of the 402D data set is grounded through the contact of the Receiver 30-second time delay RS relay. After answering the call, answer-back A is transmitted for 10 seconds and the terminal first sends, then receives as described in 5.15(c)(1) through (5).
  - (d) With tape in the Sender and adequate tape in the Receiver, an incoming call is answered automatically as described in

Paragraphs 5.03 through 5.12. The circuits respond to the 1017 cps command to send signal as described in 5.13, and to the all-space command to receive signal as described in 5.14. Contact 9 of operated TA relay supplies that part of the DM lead ground path that has been opened by removal of the R wiring option from the unattended S-R unit. In the recognizer, contact 5 of the TA relay supplies the ground path for the RO leads that has been opened by removal of the ZC wiring option.

#### C. Wiring Options R Retained and ZC-ZD Removed

5.17 With ZC-ZD wiring options removed (ZC wiring in recognizer must also be removed) and R wiring option retained, the circuits function as follows:

(a) With no tape in the Sender and a low tape condition in the Receiver, an incoming call is not answered automatically and answer-back AB is not transmitted for the same reasons given in 5.16(a)(1) and (2).

(b) With no tape in the Sender and adequate tape in the Receiver an incoming call is answered automatically; however, because of the presence of R wiring option, answer-back B is not transmitted because:

(1) For automatic answering the remote-operate pin 15 of the 402D data set is grounded as described in 5.16(b)(1).

(2) The R wiring option connects ground from contact 8 of OS relay through contact 1 of SR relay to DM lead, through the Receiver to data-receive pin 20 of the 402D data set, thereby holding the set in its data mode and preventing answer-back. A ground path to the 10-second time delay TO relay is also eliminated by removal of the ZC-ZD wiring. Therefore, answer-back B is not transmitted even though contact 8 of the TA relay completes a ground path to answer-back B pin 19 of the 402D data set.

(c) With tape in the Sender and a low-tape condition in the Receiver, an incoming call is answered automatically and then answer-back A is transmitted for 10 seconds as described in 5.15(c), except that: the alternate ground path for the RO leads of the data sets, furnished by the recognizer Z-ZC wiring option, has been eliminated by re-

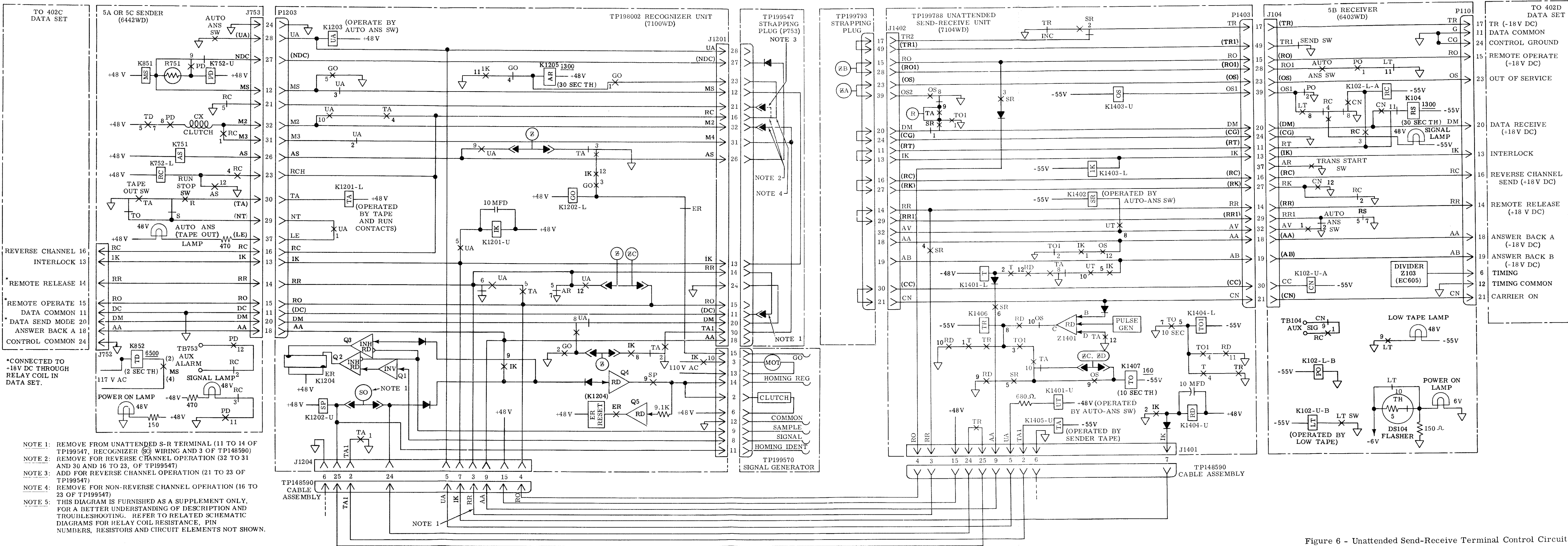
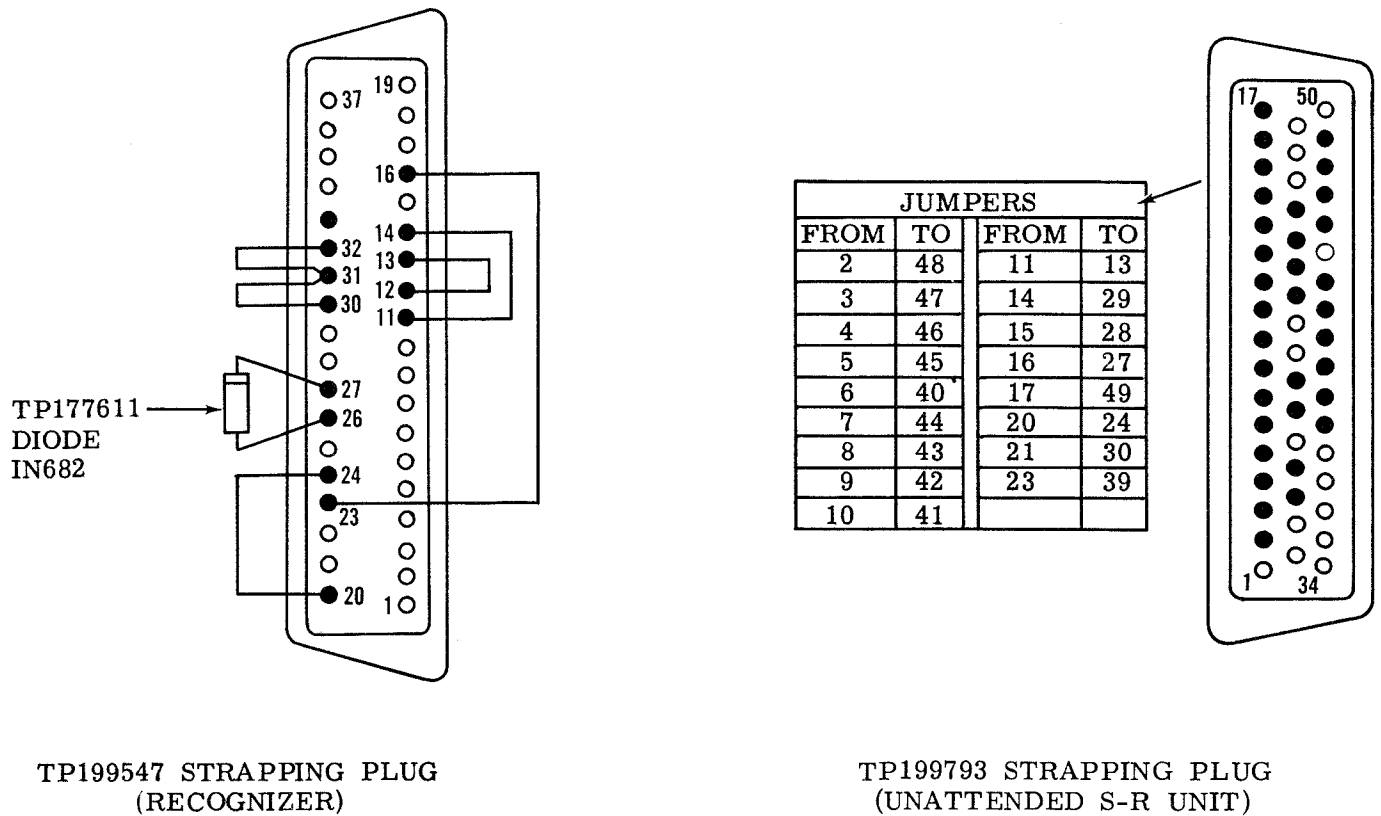


Figure 6 - Unattended Send-Receive Terminal Control Circuits



TP199547 STRAPPING PLUG  
(RECOGNIZER)

TP199793 STRAPPING PLUG  
(UNATTENDED S-R UNIT)

Figure 7 - TP199547 and TP199793 Strapping Plugs

removal of the ZC wiring and is completed only through contact 5 of the operated recognizer TA relay and contact 6 of the recognizer UA relay to the recognizer AR relay contact ground.

(d) With tape in the Sender and adequate tape in the Receiver, an incoming call is answered automatically as described for normal response in Paragraphs 5.03 through 5.12. After answering, the circuits respond to a remote stations 1017 cps command to send signal as described in 5.13. They respond to an all-space command to receive signal as described in 5.14.

6. TROUBLESHOOTING

Note: The unattended S-R unit may affect and/or be affected by all other sets and units at both station terminals. Use test center facilities to the extent of availability; otherwise transmit to, and receive from, another station and refer to appropriate sections as required. Use the wiring diagrams shipped

with the equipment if possible; otherwise, use the diagrams of Part 7.

6.01 If trouble arises, check the following for proper functioning in both manual and unattended operation:

- (a) 402C data set.
- (b) 5A or 5C Sender and recognizer.
- (c) 402D data set.
- (d) 5B Receiver, identifier unit, if present, and unattended S-R unit.

(A properly working identifier has no effect on the unattended S-R unit.)

6.02 Check the following items at the unattended S-R unit:

- (a) Interconnecting cables and strapping plugs (see Figures 3, 4, 6, and 7).

(b) Power supply (see Figure 2 and schematic wiring diagram 7104WD).

(c) With the AUTO-ANS buttons pressed at both Sender and Receiver, and with tape in the Sender and adequate tape in the Receiver, the following relays in the unattended S-R unit are operated (Figure 6):

- (1) Tape-available (TA) relay K1405-U.
- (2) Unattended transmitter (UT) relay K1401-U.
- (3) Send-receive (SR) relay K1402.

(d) With the AUTO ANS buttons and tape the same as in 6.02(c), and with the terminal in the rest condition (402D data set on the line, before a call comes in), the following (all remaining) relays in the unattended S-R unit are unoperated (Figure 6):

- (1) Transmit-receive (TR) relay K1406.
- (2) Tape-out (TO) relay K1407.
- (3) Tape-out-1 (TO1) relay K1404-L.
- (4) Transmit (T) relay K1401-L.
- (5) Relay-drive (RD) relay K1404-U.
- (6) Out-of-service (OS) relay K1403-U.
- (7) Interlock (IK) relay K1403-L.

6.03 Check remaining circuits, voltages, grounds, contacts and other elements until trouble is found. Refer to Table 1, Part 2 and Figures 1 through 7, to the diagrams and attachments with the equipment; and the following:

(a) Part 3, INSTALLATION AND CHECK-OUT PROCEDURES with special attention to the following:

- (1) Figures 2 and 3 show connections and interconnections. Paragraphs 3.03 through 3.08 furnish a detailed explanation of connections. Figure 4 is a list of unattended S-R unit circuit elements and leads with their symbols and abbreviations.
- (2) Table 1, Part 2 lists the basic types of operation with the equipment and wiring options required for each type. Paragraphs 3.08 through 3.11 cover the location and removal of wiring options.

(3) Figure 6 is a diagram illustrating the terminal control circuits. Paragraphs 3.12 and 3.20 cover the checkout procedure.

(b) Part 4 furnishes information on operating procedure and preparation for normal response explained in Part 5.

(c) Part 5 covers the principles of operation with detailed circuit descriptions and an explanation of what to expect from a station prepared for normal operation and from an unprepared station using different wiring option combinations in the unattended S-R unit option. To determine the wiring options in use at an unattended send-receive terminal, refer to Table 1 of Part 2, and to Part 3 of this section as indicated in 6.03(a) and check the following:

- (1) Sections covering 402C and 402D types of data sets (402C2 and 402D2 may be wired for reverse-channel operation).
- (2) Installation and checkout procedure sections for both the 5A or 5C Sender and 5B Receiver.

Note: If the identifier is present and is working properly, it does not affect unattended operation.

(3) The installation and checkout part of the section covering the recognizer unit option.

(d) With the aid of a test center, if available, or a remote, manually controlled send-receive station, operate the terminal to the full extent of its capabilities and check thoroughly against the principles of operation as explained in Part 5 of this section:

- (1) Paragraph 5.02 explains the control circuits illustrated in Figure 6.
- (2) Paragraphs 5.03 through 5.14 explain the normal response of an unattended send-receive terminal prepared for unattended send-receive operation.
- (3) Paragraphs 5.15 through 5.17 explain the response of an unattended send-receive terminal not prepared for send-receive operation (no tape in Sender and/or low tape in Receiver) when using different combinations of wiring options in the unattended S-R unit.

## 7. DIAGRAM INDEX AND ATTACHMENTS

TITLE	DRAWING NUMBER	SECTION ISSUE					
		1	2	3	4	5	6
Actual Wiring Diagram for Unattended Send-Receive Apparatus (TP199788)	7102WD	2	4	9			
Schematic Wiring Diagram for Unattended Send-Receive Apparatus (TP199788)	7104WD	2	4	9			
Circuit Board EC579 (TP177579)	177579	3	4	7			

**CAUTION:** USE DIAGRAMS SHIPPED WITH EQUIPMENT IF POSSIBLE; HOWEVER, IF NECESSARY, USE THE DIAGRAMS IN THIS SECTION.

# 7102 WD

## REVISIONS

ISSUE	DATE	AUTH. NO.
2	6-4-64	81278
3	8-18-64	83081
4	10-7-64	84000
5	11-9-64	84255
6	11-20-64	84889
7	2-24-65	86785
8	6-29-65	88013
9	9-2-65	88015

- NO. NOTES**
- WIRE LEGEND  
D-DISTANT TERMINATING AREA  
D-DISTANT TERMINATING DESIGNATION  
C-COLOR CODE LEGEND  
A1-BK
  - COLOR CODE LEGEND  
W-WHITE P-PURPLE  
G-GREEN Y-YELLOW  
R-RED BL-BLUE  
S-SLATE BK-BLACK  
O-ORANGE BR-BROWN
  - REFER TO 704WDFOR SCHEMATIC WIRING DIAGRAM.
  - TERMINAL DESIGNATIONS IN PARENTHESIS ( ) ARE FOR REFERENCE ONLY AND NOT MARKED ON COMPONENTS.
  - ALL SURFACE WIRE 24 AWG GREEN, 31784RM UNLESS OTHERWISE SPECIFIED.
  - ALL STRAPPING WIRE 24 AWG BARE, 39603RM. USE SLEEVING WHERE REQUIRED. DO NOT PULL TAUT BETWEEN TERMINALS.
  - INSERT CARD BEFORE WIRING UNIT.
  - 148588 CABLE ASSEMBLY
  - 177611 DIODE
  - 137602 RESISTOR 470Ω 1/2 WATT
  - 
  - 
  - 100A VARISTOR 178844.
  - 10MFD CAPACITOR 171831.
  - 181666 RESISTOR 680Ω 2W
  - RUBBER STAMP .125 CHARACTERS ON THE CARDS OF THE FOLLOWING RELAYS IN WHITE INK.

RELAY	STAMPING
K1401-U	UT
K1401-L	T
K1403-U	OS
K1403-L	IK
K1404-U	RD
K1404-L	TO1
K1405-U	TA

RUBBER STAMP .125 CHARACTERS ON THE CORE PLATE OF THE FOLLOWING RELAY IN BLACK INK.

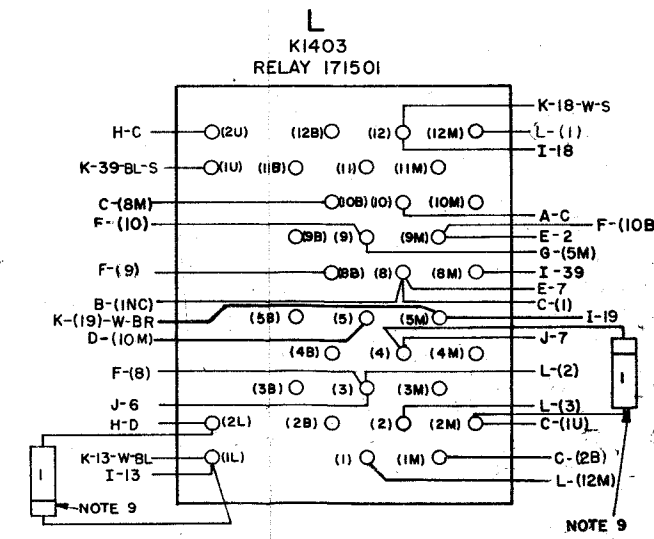
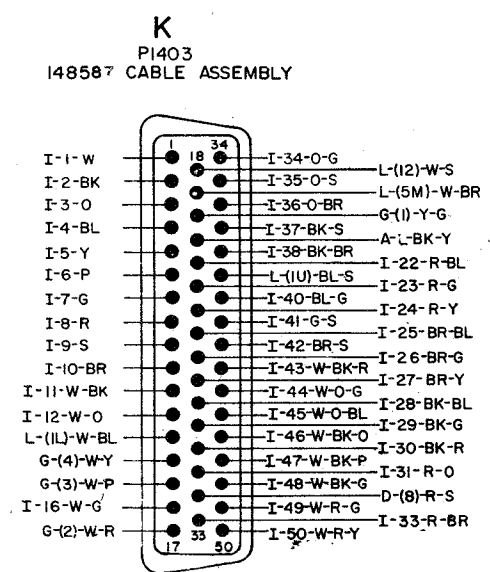
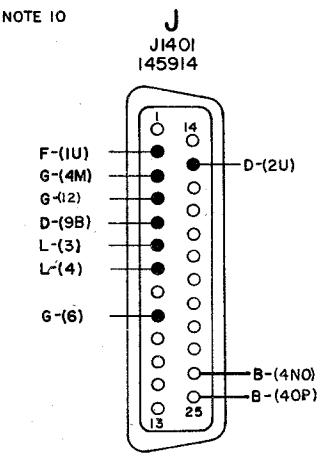
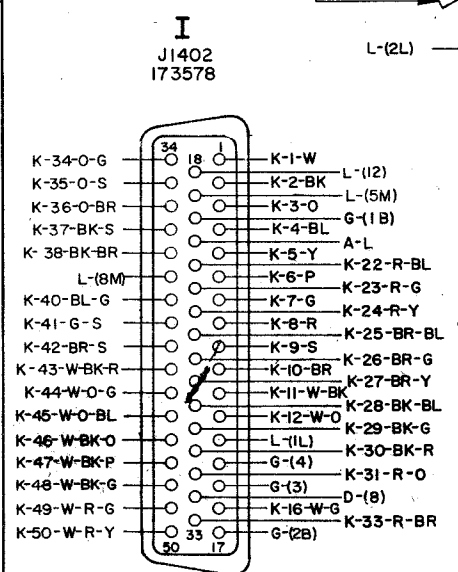
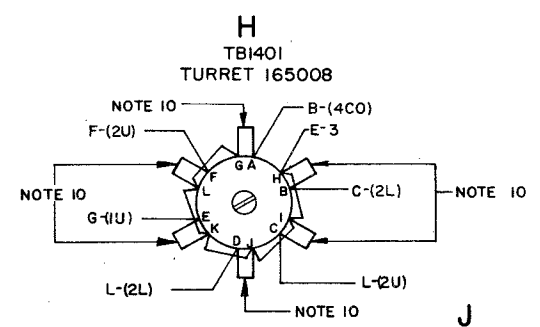
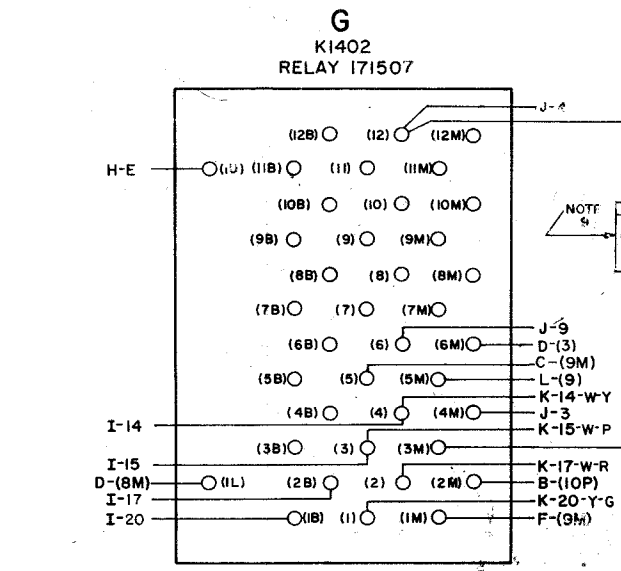
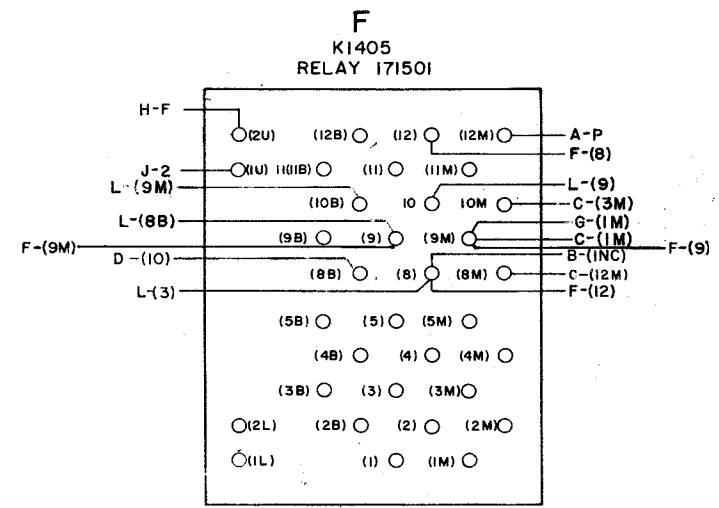
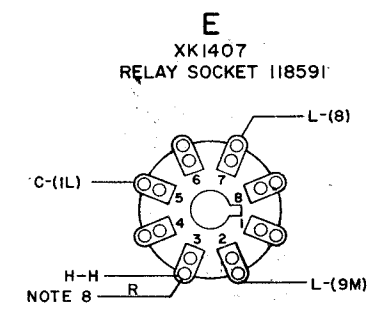
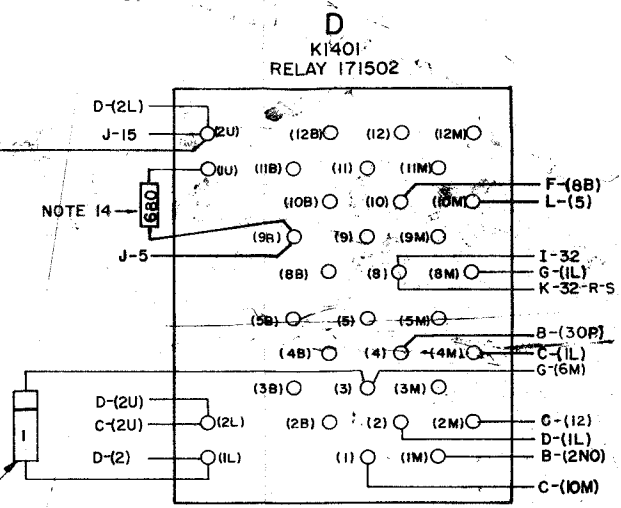
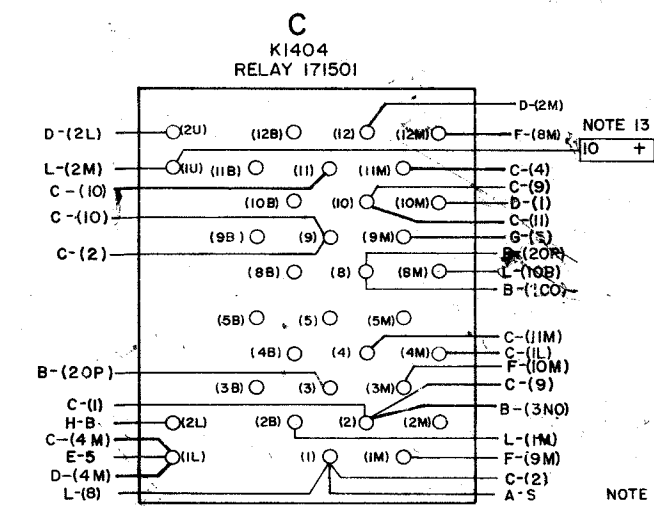
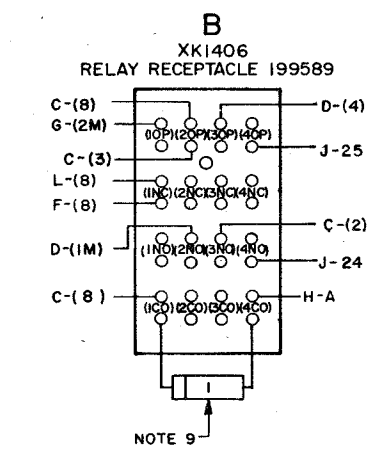
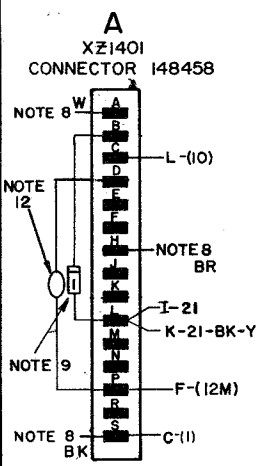
RELAY	STAMPING
K1402	SR

RUBBER STAMP .125 CHARACTERS ON THE TOP OF THE FOLLOWING RELAY IN BLACK INK.

RELAY	STAMPING
K1406	TR

RUBBER STAMP .125 CHARACTERS NEAR SOCKET OF THE FOLLOWING RELAYS IN BLACK INK.

RELAY	STAMPING
K1406	TR
K1407	TO



ACTUAL WIRING DIAGRAM FOR UNATTENDED SEND / RECEIVE APPARATUS

ASSEMBLY NO 199788

APPROVALS

D AND R	E OF M
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E-NUMBER

PROD. NO. 7102 WD

DATE 1-27-64

P.D. FILE NO. 1-A143AA

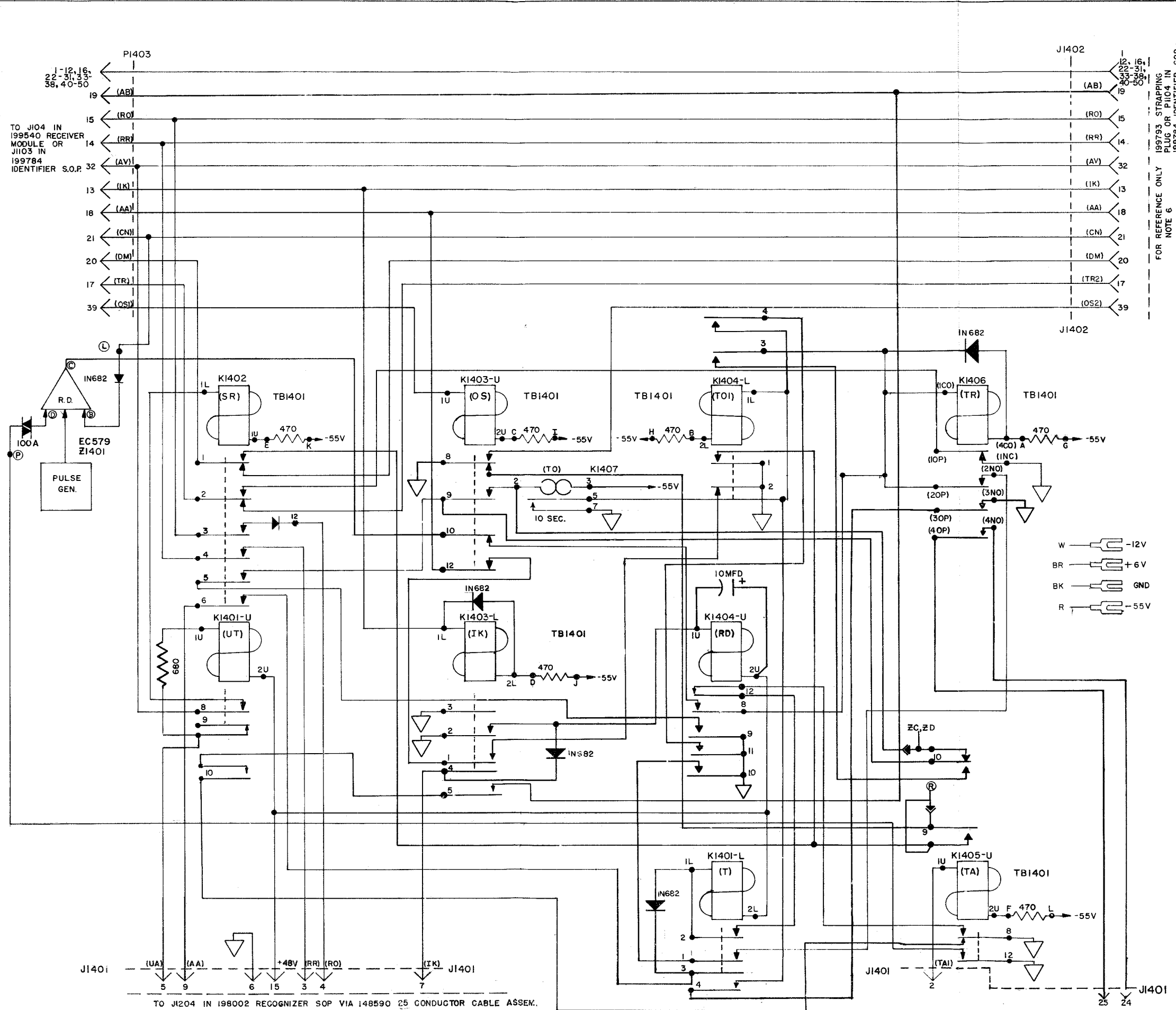
DRAWN G.R.S. CHKD.

ENGD. R.C.H. APPD.

TELETYPE CORPORATION

# 7102 WD

- NOTES
- REFER TO 7102WD FOR ACTUAL WIRING DIAGRAM.
  - ALL VOLTAGES DC UNLESS OTHERWISE SPECIFIED.
  - TERMINAL DESIGNATIONS IN PARENTHESIS ( ) ARE FOR REFERENCE ONLY AND NOT MARKED ON COMPONENTS.
  - ALL RESISTORS 1/2 WATT AND RESISTANCE IN OHMS UNLESS OTHERWISE SPECIFIED.
  - INDICATES TERMINALS ON Z1401-EC579
  - ← INDICATES TERMINAL ON MALE CONN J1401, P1403  
 ) INDICATES TERMINAL ON RECEPTACLE J1402
  - ∇ INDICATES COMMON RETURN.
  - zc AND zd OPTIONS PROVIDE SENDER NO-TRAFFIC SIGNAL. zc OPTION PROVIDES ANSWERING WHEN RECEIVER HAS LOW TAPE AND SENDER HAS NO TAPE. zc OPTION REQUIRES zc WIRING IN ASSOCIATED 198002 RECOGNIZER APPARATUS UNIT. USE R WIRING WHEN zc AND zd IS NOT PROVIDED.



7104 WD		
REVISIONS		
ISSUE	DATE	AUTH. NO.
2	6-4-64	81278
3	8-18-64	83081
4	10-7-64	84000
5	11-9-64	84265
6	11-20-64	84989
7	2-24-65	86188
8	4-29-65	86363
9	9-2-65	88015

FOR REFERENCE ONLY  
 199793 STRAPPING PLUG OR P1404 IN NOTE 6  
 199784 IDENTIFIER SOP-

SCHMATIC WIRING DIAGRAM FOR UNATTENDED SEND / RECEIVE APPARATUS

ASSEMBLY NO 199788

APPROVALS

D AND R	E OF M
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E-NUMBER

PROD. NO. 7104WD

DATE 1-29-63

P.D. FILE NO. 1-A143AA

DRAWN G.R.S.	CHKD.
ENGD. R.C.H.	APPD.

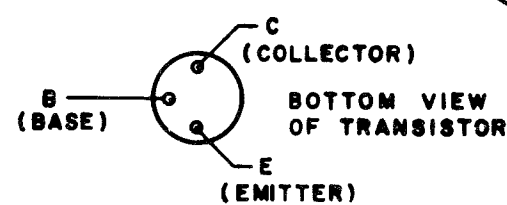
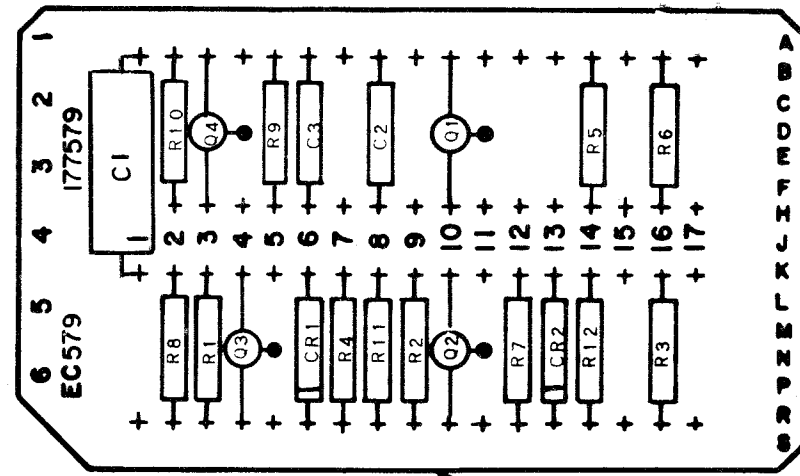
TELETYPE CORPORATION

7104 WD



EC 579

177579



148589

BOTTOM VIEW OF UNIJUNCTION TRANSISTOR

NOTE:  
REFER TO 5016WD FOR MARKING INFORMATION

REF. DESIGN	TELETYPE PART NO.	TOTAL QTY.	NAME AND DESCRIPTION	LOCATING FUNCTION
R1	137441	2	RESISTOR, FIXED 1.2K OHMS	COLLECTOR LOAD
R2			SAME AS R1	" "
R3	129851	2	RESISTOR, FIXED 3.3K OHMS	FEED BACK
R4			SAME AS R3	" "
R5	118144	1	RESISTOR, FIXED 2.7K OHMS	BASE BIAS
R6	118180	3	RESISTOR, FIXED 10K OHMS	" "
R7	118177	2	RESISTOR, FIXED 22K OHMS	" "
R8			SAME AS R7	" "
R9	143658	1	RESISTOR, FIXED 150 OHMS	LOAD
R10	95282	1	RESISTOR, FIXED 240K OHMS	TIMING
R11			SAME AS R6	BASE BIAS
R12			SAME AS R6	" "
CR1	177611	2	DIODE IN 682	GATE
CR2			SAME AS CR1	" "
C1	193159	1	CAPACITOR .82 MFD	TIMING
C2	171567	2	CAPACITOR .005 MFD	COUPLING
C3			SAME AS C2	" "
Q1	177224	1	TRANSISTOR 2N398A	
Q2	177105	2	TRANSISTOR P22	ACTIVE SWITCH
Q3			SAME AS Q2	" "
Q4	177610	1	TRANSISTOR UNJ. 2N1671	OSCILLATOR
EC	148589	1	ETCHED CIRCUIT BOARD	
	144495	4	PAD, TRANSISTOR	

ET 09147  
TC255(6-54)

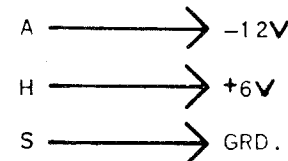
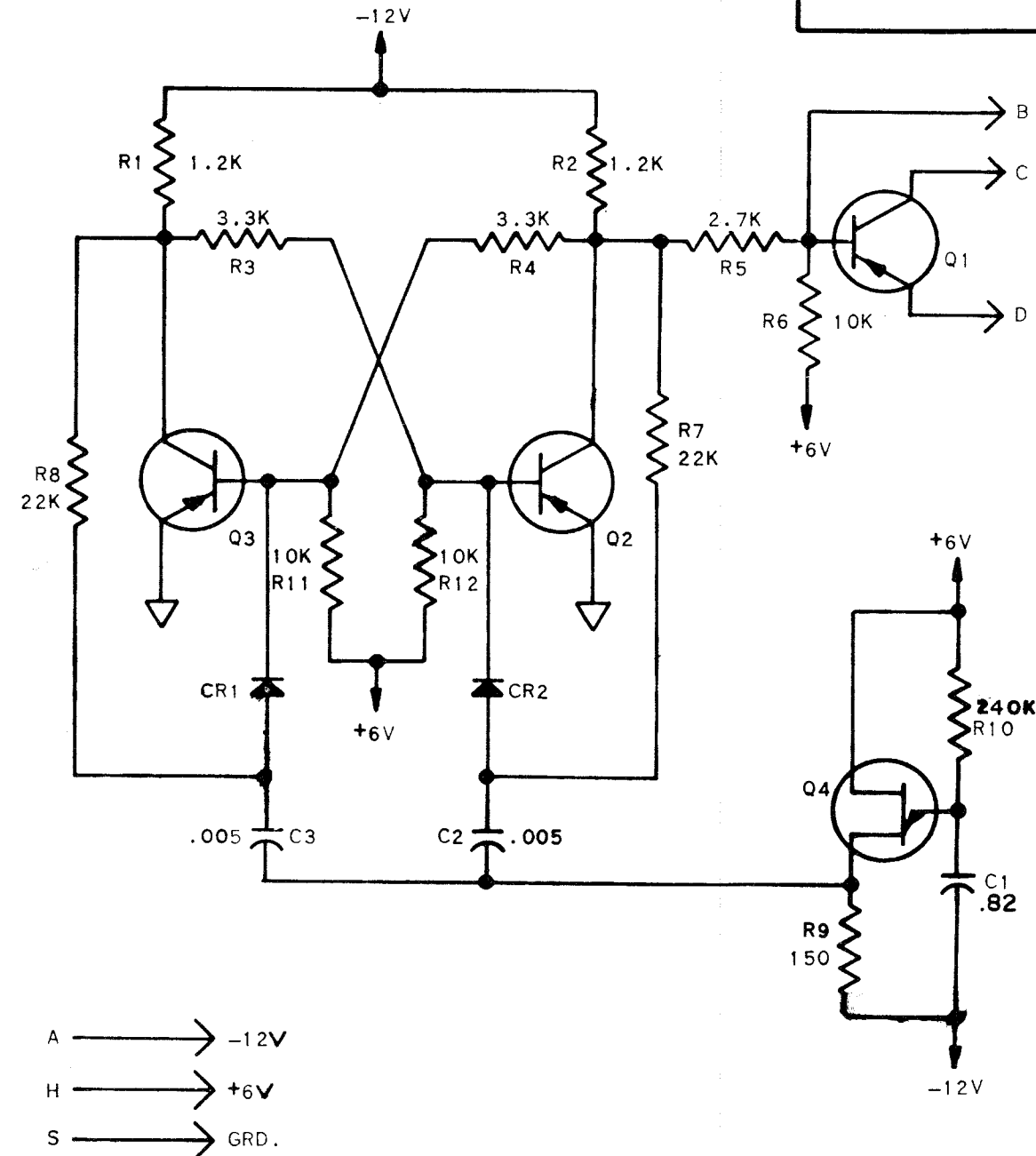
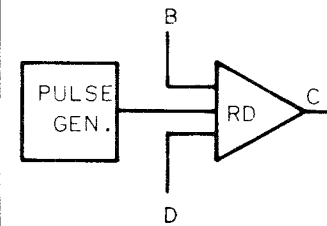
PULSE GEN. - RELAY DRIVER

CIRCUIT BOARD EC

177579

THIS CIRCUIT DRIVES THE SEND-RECEIVE ALTERNATING RELAY IN THE DATA SPEED 5 UNATTENDED SEND-RECEIVE ASSEMBLY. Q4 IS A UNIJUNCTION OSCILLATOR WITH A PERIOD OF 95 TO 140 MILLISECONDS. Q2 AND Q3 ARE CONNECTED AS A FLIP-FLOP PROVIDING AN ALTERNATING ON-OFF SIGNAL TO THE RELAY DRIVER Q1 AT A RATE DETERMINED BY THE OSCILLATOR. OPENING LEAD D OR GROUNDING LEAD B FORCES THE RELAY TO REMAIN RELEASED. IF THE PERIOD FROM 95 TO 140 MILLISECONDS IS NOT MET THE UNIJUNCTION MUST BE REPLACED.

SYMBOLS



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

REVISIONS

ISSUE	DATE	AUTH. NO.
2	5-6-64	81996
3	6-4-64	81278
4	7-29-64	83080
5	11-9-64	84264
6	5-11-65	87390
7	11-11-65	88023

APPROVALS

D AND R: [Signature] E OF M: [Signature]

E-NUMBER

PROD. NO. 177579

DATE: 1-28-63

P.D. FILE NO. 1-A143AA

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

ENGD: J.H.H. APPD: [Signature]

TELETYPE CORPORATION

177579