TP199610 SEND-RECEIVE TERMINAL MODIFICATION KIT ("Y" CABLE)

FOR TYPE 2 "DATASPEED*" TAPE-TO-TAPE SYSTEM

CONTENTS PAGE

1. GENERAL

1.01 This section provides information on description, installation, checkout and operating procedures, principles of operation, troubleshooting and wiring diagrams for the TP199610 Send-Receive Terminal Modification Kit ("Y" Cable) when used with a DATASPEED 2A Sender and a 2B Receiver connected to a common data set.

1.02 This feature will give two-wire (half-duplex) or four-wire (full duplex) transmission capabilities to a tape-to-tape system. It is intended for use with the TP199550 Protected Unattended Transmitter Modification Kit (Discrete Calling Identifier) and a TP199551 Protected Unattended Transmitter Modification Kit (Discrete Calling Recognizer) but it can be used without the discrete calling feature.

2. DESCRIPTION

2.01 The "Y" cable kit (TP199610) provides send-receive service from a single data set for a station consisting of a sender and a receiver. This feature is used with either a 202C (voice and data — for telephone network) or a 202D (data only — for private line installation) data set. The station can then operate attended or unattended in send, receive, send-receive, or be placed in test when wired for two-wire transmission. When wired for four-wire transmission, the station will operate in attended or unattended send or receive modes.

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Prepared for American Telephone and Telegraph Company by Teletype Corporation

2.02 The "Y" cable kit consists of a TP199620 cable assembly, a TP146534 blank panel and a TP199630 front panel. The TP199620 cable contains three connectors and a rotary switch. The three connectors are: DS (Data Set) a 25 pin male connector, ST (Sender Terminal) a 25 pin female connector and RT (Receiver Terminal) another 25 pin female connector. The rotary switch is a four position switch with 48 solder points. The four position switch, when mounted on the sender panel, will indicate what interconnection is taking place between the sender, the receiver, and the data set. Four modes of operation can be selected:

SEND — Manual or Unattended Transmitting
RECEIVE — Manual or Unattended Receiving
SEND-RECEIVE — Transmitting or Receiving
TEST — Terminal Testing (two-wire transmission); Manual or Unattended Transmitting and Receiving (four-wire transmission).

2.03 The four-wire transmission (customer option) splits the line connections between the transmitter and receiver to allow independent transmit and receive paths. Common usage can be four-wire to central office or four-wire to one or two private lines (DDD). Use of an 804A2 Auxiliary Data Set is required for voiceband usage. It should also be kept in mind that the reverse channel feature is not available for four-wire transmission.

Options

2.04 A TP326713 local control cable assembly (Adapter) is used with, but not provided with, the TP199610 "Y" cable feature. The local control cable allows a send-receive terminal to operate back-to-back without placing an on-line call. With this feature, local tapes are generated (sender to receiver) or local testing is done (receiver to sender) without putting the data set in an on-line condition. Although the data set is used to supply positive voltages (+17.5 v) to the control leads, installation of the Telephone Company's data set and its wiring option are not covered in this section. Only its plug-in installation is described (3.06, 3.07, and 3.16).

2.05 The TP320296 mode switch modification kit provides control of the send-receive mode of a station by turning the data set reverse channel on and off. With this kit, a send-receive terminal has the ability to go automatically from the send mode to the receive mode and back again indefinitely under the control of a remote send-receive station (such as a computer). Without this kit, it is necessary to terminate the call to return a station to the receive mode. With this kit, after a call is established between two send-receive terminals, the called station is initially in the receive mode. If it is required that the called station becomes a sender, the TRANSMITTER START button on the calling receiver is depressed. The called station is then in the send mode. After the called station's message has been sent, it will return to the receive mode in approximately 30 seconds. The TP320296 is intended for stations equipped with a reverse channel type data set, TP199610 "Y" cable and a TP199551 discrete calling recognizer unit.

3. INSTALLATION AND CHECKOUT PROCEDURES

3.01 Test the sender and receiver terminals individually, for satisfactory operation, before installing the TP199610 "Y" cable modification kit. The troubleshooting provided in Part 6 only pertains to this unit and presumes the terminals are normal before installation.

3.02 Only a few simple tools are required; TP129536 wrench (1/2 inch open end), screwdriver, TP110271 wrench (no. 8 hexagon key) and a pair of side cutters.

A. Installation at 2A Sender Terminal

WARNING: DISCONNECT ALL POWER FROM THE TERMINAL BEFORE PROCEEDING WITH INSTALLATION.

3.03 The following installation instructions are for a 2A Tape Sender terminal and are given in a sequence that should normally be followed.

3.04 To remove the TP145967 front panel (Figure 1), pull slide assembly forward, three mounting screws can now be reached and removed. Retain the three screws and leave the speed nuts in position. Remove the panel from the cabinet by pulling it away from the cabinet and lifting up. Discard the TP145967 front panel.

3.05 Remove rear panel from cabinet by turning captive screw and lifting panel out of cabinet.

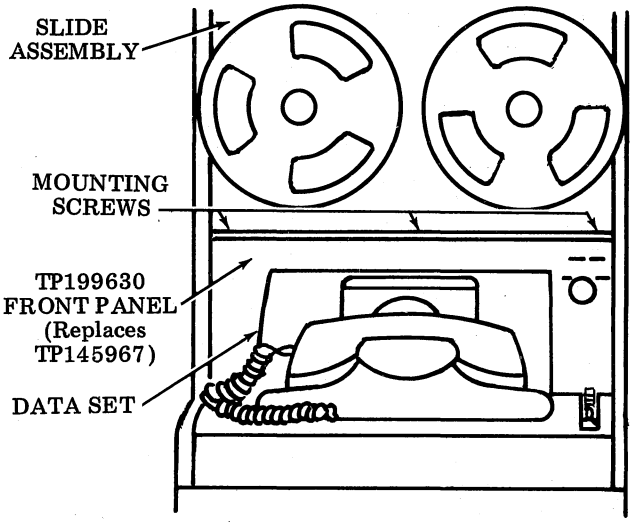


Figure 1 - TP199630 Front Panel Mounting

3.06 Bring the S-R rotary mode switch (part of the TP199620 cable assembly) to front of cabinet by routing cable along right side of data set shelf. Mount mode switch (Figure 2)

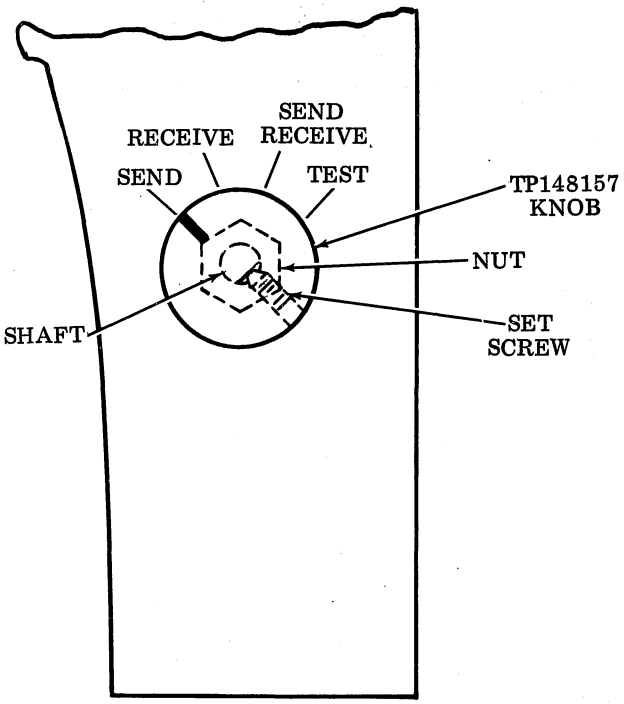


Figure 2 - S-R Rotary Mode Switch

to new TP199630 front panel, nut friction tight. Turn switch shaft counterclockwise to its final position. By turning the switch, align flat on the shaft to opposite the SEND switch position and secure the nut. Position the TP148157 knob, line to SEND position, and secure set screw. Install the front panel and secure with the three screws, retained from 3.04.

B. Installation at Sender Terminal Without Options (Figure 3)

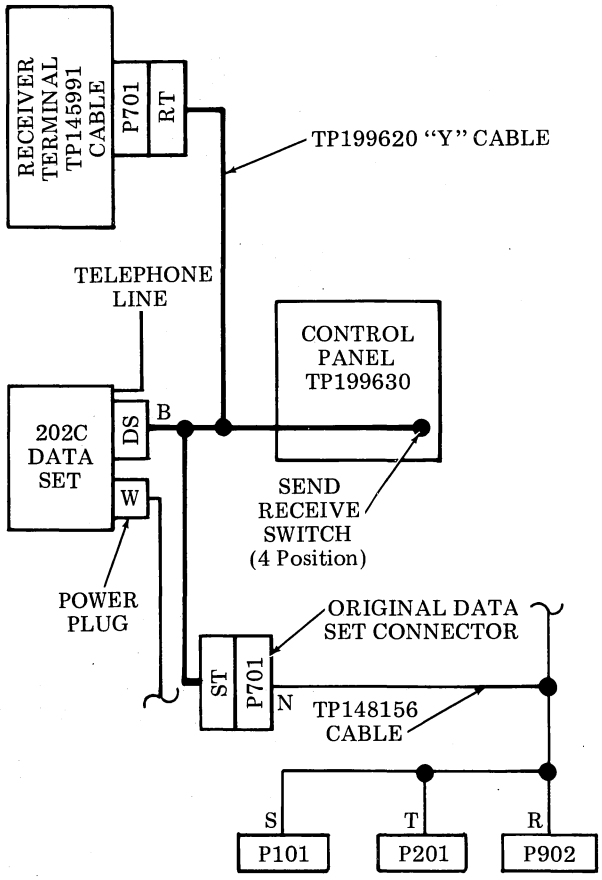


Figure 3 - Installation Without Options

3.07 Disconnect connector P701 from data set. Secure connector DS, of the TP199620 cable, to data set. Mount connector ST, of the TP199620 cable, into slot on dust shield (Figure 4) and secure with attached locknuts. Plug connector P701 into connector ST.

3.08 Remove ac power cord from cable entry hole at bottom of cabinet. Push connector RT, of the TP199620 cable, out of the cabinet through the hole. It may be necessary to

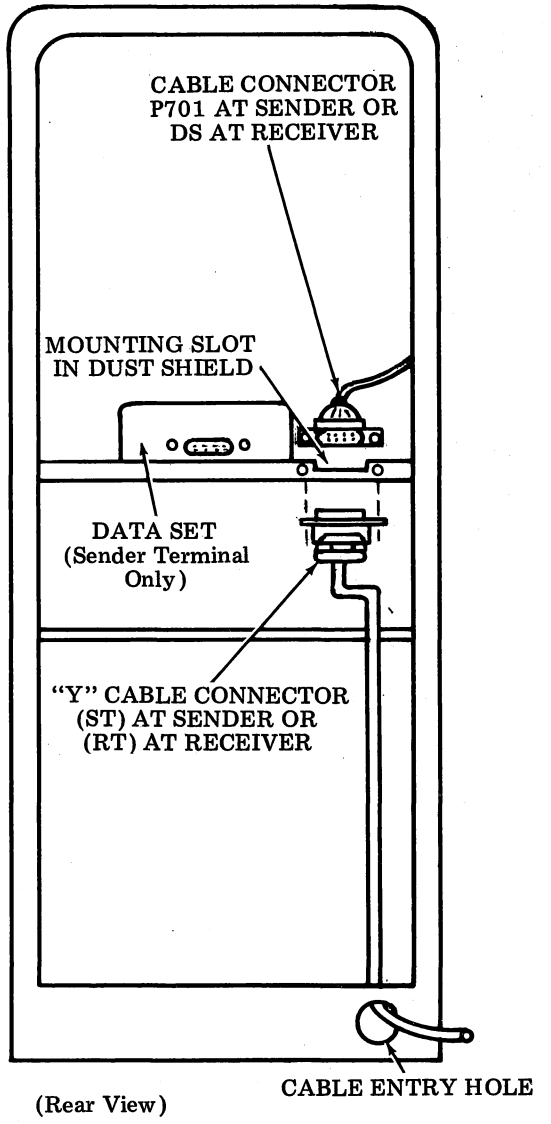


Figure 4 - Cable Routing Positions

remove the cable clamp from connector RT, to get connector through the hole. Now push ac power cord out the hole. Lace new cable to existing cabling. Then replace and secure rear panel to cabinet.

C. Installation at Receiver Terminal Without Options

3.09 The following instructions are for a 2B Tape Receiver terminal and are given in a sequence that should normally be followed.

3.10 To remove TP145967 and TP145907 front panels, pull slide assembly forward, three mounting screws can now be reached; then open module enclosure door to reach three more mounting screws. Remove and retain all six screws, leave the six speed nuts in position. Remove upper panel by pulling panel away from cabinet and lifting up. To remove lower panel, first remove ground terminal at dust shield and retain screw, pull forward and lift. Remove and retain nameplate and six mounting screws, hexagon and ring nuts securing lampholders and switches; also remove switch faceplate and identification card. Discard stripped TP145907 panel. Remove rear panel from cabinet by turning captive screw and lifting panel out of cabinet.

3.11 Disconnect from the data set connector P701, power plug W and two Telephone Company lines. Remove data set from receiver terminal.

3.12 Assemble all retained components (3.10) to new TP146534 blank front panel (Figure 5). Secure ground terminal to dust shield with retained screw. Position new front panel and secure with six screws retained.

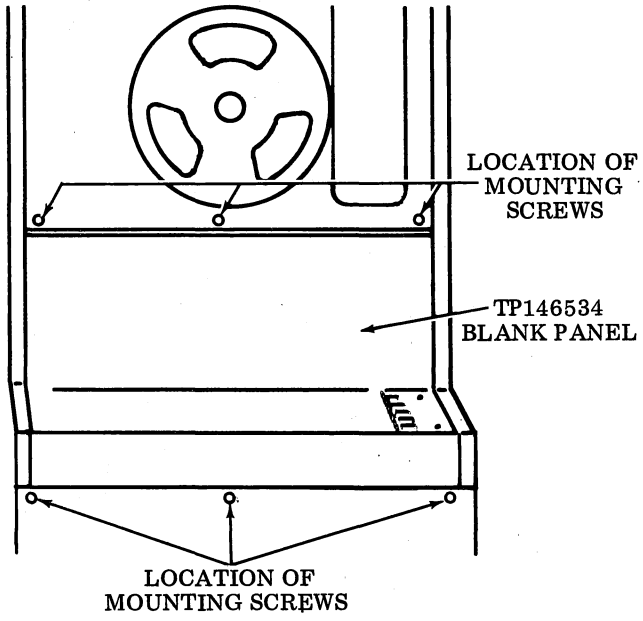


Figure 5 - TP146534 Blank Panel Mounting

3.13 Remove ac power cord from cable entry hole at bottom of cabinet (Figure 4). Push connector RT, of the TP199620 cable, into cabinet through the hole. It may be necessary to remove the cable clamp from connector (RT), to get connector through the hole. Now push ac power cord out the hole.

3.14 Secure connector RT to connector P701.

3.15 Tape terminals of Telephone Company lines. Lace new cable to existing cabling, then replace and secure rear panel to cabinet.

D. Installation at Sender Using the TP199551 Recognizer Unit

3.16 Follow instructions in 3.04 and 3.05.

3.17 Follow instructions in 3.06, remove resistor R2001 (2.7K) at S-R switch (Figure 6) section 3 pin 40 to section 2 pin 28, then remove strap A at section 3 pin 46 to 45 (yellow wire).

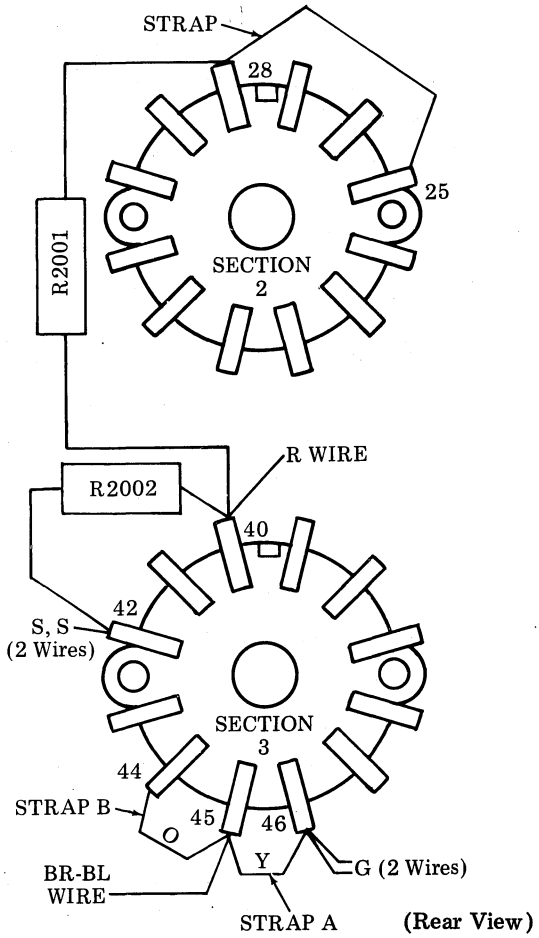


Figure 6 - S-R Switch Wiring

3.18 Disconnect connector DS of TP199556 cable from data set. Secure connector DS, of the TP199620 cable, to data set (Figure 7).

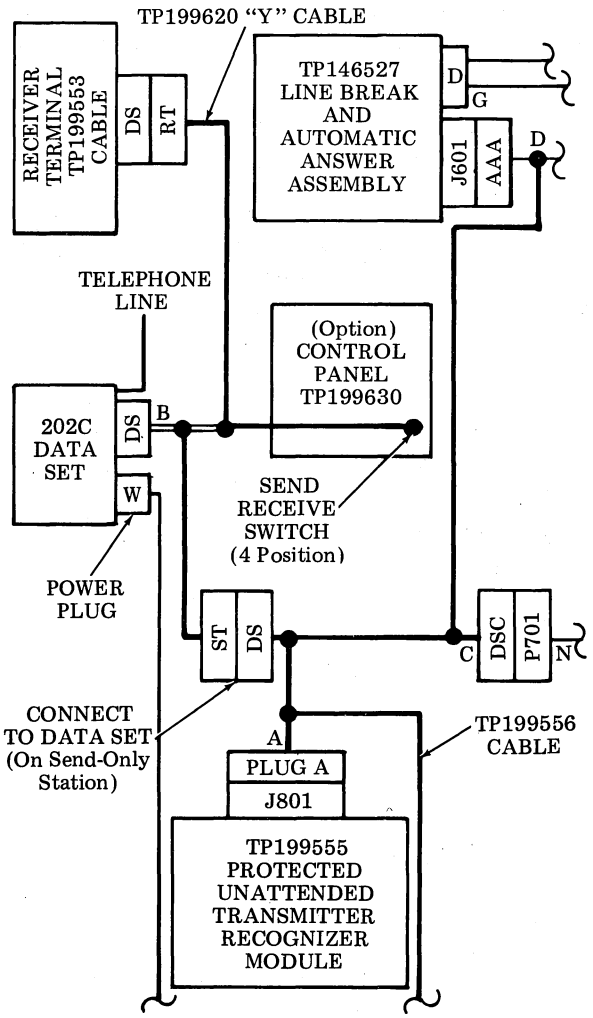


Figure 7 - Installation With Use of Recognizer and Identifier Modules

3.19 Mount connector ST, of TP199620 cable, into slot on dust shield (Figure 4) and secure with attached locknuts. Plug connector DS into connector ST, then follow instructions in 3.08.

E. Installation at Receiver Using the TP199550 Identifier Unit

3.20 Remove rear panel from cabinet by turning captive screw and lifting panel out. Disconnect from the data set, connector DS of the TP199553 cable, power plug W and the two Telephone Company lines. Remove data set from receiver terminal. Follow instructions in 3.13, then secure connector RT of TP199620

cable (Figure 7) to connector DS of TP199553 cable in receiver terminal. Now follow instructions in 3.15.

F. Reinstalling the SA120 Parity Failure Detector Feature at Sender

3.21 To reinstall the SA120, secure connector DS of TP199620 cable to connector P701F of TP327647 cable (Figure 8) and secure connector P701M to data set.

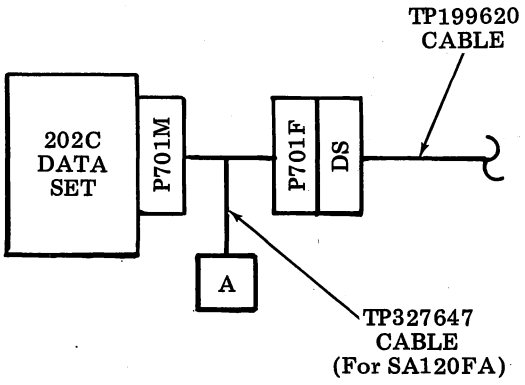


Figure 8 - Installation of SA120 Cable at Sender

G. Reinstalling the TP326713 Local Control Cable (Adapter) at Sender

3.22 To reinstall the TP326713 local control cable, secure connector DS of TP199620 cable to connector BL of TP326713 cable (Figure 9) and secure connector AL to data set.

H. Checkout Procedures

3.23 Complete testing is to be done after installation. The following testing will indicate any needed repair in the sender or receiver installations. See Part 6 for recommended corrective action, if trouble occurs.

3.24 Off-line testing of rotary switch position TEST, is as follows:

(a) Check power cords are properly connected to 120 v ac receptacles, that ON-OFF switches at power supplies are on and all POWER lamps are on.

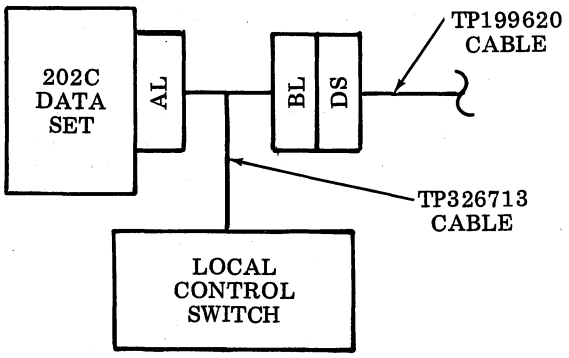


Figure 9 - Installation of TP326713 Cable at Sender

(b) At sender terminal, the RUN-STOP-FREE lever is at STOP, test tape is inserted at reader (TP146606 test tape for 8-level units or TP146861 for 6-level with advanced feed hole). Recheck level indicator positions.

(c) At receiver terminal, check for adequate tape supply and recheck positioning of OMIT switches.

(d) AUTO-MANUAL switch to MANUAL.

(e) Turn SEND-RECEIVE rotary switch to TEST, punch and reader motors start.

(f) Place OPR/TEST switch in sender at TEST.

(g) Call station from a nearby telephone. When the data set rings, lift the handset, and depress the DATA key. The DATA key lamp should light.

(h) Move the RUN-STOP-FREE lever to RUN; tape transmission starts and the tape punch starts to perforate the test message.

(i) Move the RUN-STOP-FREE lever to STOP; the reader stops and the tape punch stops.

(j) Hang up handsets and inspect tape perforated by punch.

3.25 Off-line testing of TP199610 "Y" cable with TP326713 local control cable adaptor is as follows:

(a) Condition sender and receiver as in 3.24 (a), (b), and (c).

(b) SEND-RECEIVE switch to SEND and LOCAL switch to LOCAL.

Note: If SA120 is present on sender, its PARITY CHECK switch must be in OFF for all testing, except tests on the SA120 Parity Failure Detector.

(c) Depress READER key. Reader and winder motors run.

(d) WINDER switch at receiver on. Winder motor runs.

(e) Depress PUNCH key. Punch motor runs.

(f) RUN-STOP-FREE lever to RUN. Sender sends message and receiver punches message.

3.26 On-line testing of the send-receive rotary switch positions SEND, RECEIVE, and SEND-RECEIVE as follows:

Note: To test SEND-RECEIVE positions completely, a call must be placed to a Data Test Center equipped with a send-receive station. But, if the customer will not use automatic switching from the sender to the receiver on a single call, any Test Center capable of testing DATASPEED Type 2 will do.

(a) Call the Data Test Center and request the exact test required. Inform the operator of the following:

(1) Type of station being tested, Type 2 DATASPEED send-receive station.

(2) Stations' optional features; TP199551 recognizer unit (coding of disc), reverse channel, etc.

(3) Type of test; MANUAL or AUTO, in SEND, RECEIVE, or SEND-RECEIVE.

(4) Desired length of test, 45 seconds or more of transmission.

(5) Phone number of station being tested.

(b) The Data Test Center operator will report any abnormal procedures and all errors in data transmission at completion of test.

Note: Should any errors knowingly be transmitted by the calling station, notify the Test Center and request retesting.

(c) Condition sender and receiver as in 3.24 (a), (b), and (c).

(1) SEND-RECEIVE switch to SEND, AUTO-MANUAL switch to AUTO, RUN-STOP-FREE lever to RUN and handset on-hook.

(2) Data set rings when Test Center calls back, DATA and TALK key lamps come on, and motors (reader and winder) start.

(3) Within 10 seconds reader transmits, and after 45 seconds the Test Center will go into talk mode (as prearranged).

(4) Reader stops feeding tape; lift handset, depress the TALK key and obtain test report.

(5) Instruct the operator that testing of the RECEIVE position is required. Test Center will call back in the send mode after handset is put on-hook.

(d) Move SEND-RECEIVE switch to RECEIVE, replace handset, depress AUTO key and observe the following:

(1) Data set rings, DATA and TALK key lamps light and motors (punch and winder) start.

Note: The Test Center sender goes to data mode.

(2) Tape punch perforates tape for 30 seconds, as prearranged with Test Center, and stops.

(3) Now lift handset, depress the TALK key and obtain test report.

(4) Instruct the operator that testing of the SEND-RECEIVE position is required.

Note: Test Center procedure: after the handset is on-hook, the Test Center calls back in the receive mode, send transmitter start codes (if required) and after any line break will go to send mode.

(e) Move SEND-RECEIVE switch to SEND-RECEIVE, replace handset, depress AUTO key and observe the following:

(1) Data set rings, DATA and TALK key lamps light, and motors (reader, punch, and winders) start.

Note: If a recognizer unit is present at the station, the Test Center receiver will transmit two discrete transmitter start codes (invalid then valid). In response to this code, the recognizer disc will rotate once for each.

(2) Within 10 seconds, tape transmission starts.

(3) Create a tape-out condition by releasing the tape lid. Reader should stop, alarm bell rings and Line Break lamp lights.

Note: Test Center punch will stop and in a few seconds the Test Center starts transmitting.

(4) Receiver terminal punch starts and perforates tape for 45 seconds as prearranged with Test Center operator.

Note: Test Center need not be called back unless operation is abnormal. Likewise, the Test Center will only call back if transmission is abnormal.

(5) Handset on-hook concludes testing.

4. OPERATING PROCEDURES

4.01 The following attendant's actions will prepare the send-receive station for operation as an attended or unattended station on two-wire telephone grade channels.

TWO-WIRE TRANSMISSION (Half-Duplex Operation)

A. Attended Operation for Send Mode

(1) Check that Power lamps are on at sender and receiver, if not; turn on POWER switches (in lower cabinet enclosures). Insert message tape in reader. Check level selector for proper setting. Place RUN-STOP-FREE lever at STOP. Move mode switch at sender to SEND.

(2) Place call in a normal telephone manner (lift handset, depress TALK button and dial number). If remote receiver is unattended, a signal tone will be heard when call is answered, giving indication that the receiver is ready. If the remote receiver is attended, inquire if remote station is set to receive. Now move AUTO-MANUAL switch to MANUAL and RUN-STOP-FREE lever to RUN and hang up.

(3) Within 10 seconds reader will transmit tape. When reader stops feeding tape (end of message or RUN-STOP-FREE lever to STOP); lift handset, depress TALK button and inform remote operator of transmission condition (ended, stopped, interrupted, or trouble).

(4) If message is not to be continued, return to STOP and hang up.

(5) If message is to be continued return to RUN and hang up. Steps (3) and (4) will be repeated.

B. Attended Operation for Receive Mode

(1) Check that Power lamps are on at sender and receiver, if not; turn POWER switches on (in lower cabinet enclosures). Check for adequate tape supply and correct tape routing to the punch. Move mode switch at sender to RECEIVE.

(2) Place the call in normal telephone manner (lift handset, depress TALK button and dial number). Inquire if remote station is ready to send. If remote station is unattended and in send mode, a signal tone (1200 Hz) will be heard in the handset. In either an attended or unattended sender, this tone indicates the called station is in the data mode. Now, depress DATA button at

data set. If a TRANSMITTER START switch is present at the receiver, depress it and hang up.

(3) After a short pause the punch will start perforating a message tape. When punching stops, disconnect soon follows if receiving from an unattended station. If receiving from an attended station, lift handset, depress TALK button and inform remote operator of transmission condition.

(4) If message is to be continued; depress DATA button, depress TRANSMITTER START switch (if present) and hang up.

(5) If message is complete, hang up.

C. Unattended Operation for Send Mode

(1) Check that Power lamps are on. Place message tape in sender. Check level selection dial on reader. Move AUTO-MANUAL switch to AUTO. Move RUN-STOP-FREE lever to RUN. Leave READER pushbutton unoperated.

Note: If SA120 Parity Failure Detector is present at sender, turn PARITY CHECK switch to ON (OFF is testing station). If TP199555 module is present, turn it off for stations without reverse channel and on for stations with reverse channel.

(2) Move mode switch at sender to SEND. With the sender in this condition a station will answer unattended, send its message, and then disconnect.

(3) To restore a station to attended service, depress TALK button at data set; if desired, reset the mode switch, RUN-STOP-FREE lever and remove tape.

D. Unattended Operation for Receive Mode

(1) Check that Power lamps are on. Check for adequate tape supply and correct tape routing. Set OMIT switches and tape guides for message level expected. Depress AUTO button at data set.

(2) Move mode switch at sender to RECEIVE. With the sender and receiver in this condition a station will answer unattended, punch tape, and then disconnect.

(3) To restore a receiver to attended service, depress TALK button at data set; if desired, reset the mode switch.

E. Unattended Operation for Send-Receive Mode

(1) Check that Power lamps are on. Check for adequate tape supply at receiver. Insert message tape at sender. Depress AUTO button at data set. Position mode switch at SEND-RECEIVE.

(2) With the station in this condition, the sender will be called in first to send its message. If none have been inserted or when the message is completed, the station will go to the receive mode.

(3) To restore a station to attended service, depress the TALK button at the data set and reset the mode switch as desired.

F. Attended Operation for Test Mode

(1) Check that Power lamps are on. Position mode switch at TEST. Move AUTO-MANUAL switch at sender to MANUAL position. Depress DATA button at data set. Insert message tape at sender and check tape supply at receiver. Move RUN-STOP-FREE lever to RUN.

(2) The receiver terminal punches the message transmission from the sender.

4.02 The following attendant's actions will prepare a send-receive station for operation as an attended or unattended station on four-wire telephone grade channels. This is a field installed customer requested option.

FOUR-WIRE TRANSMISSION (Full Duplex Operation)

A. Attended Operation

(1) Check for adequate tape supply at receiver and insert message at sender. Check that Power lamps are on.

(2) Move mode switch to TEST. Depress TALK button at data set. Move AUTO-MANUAL switch at sender to MANUAL.

(3) Proceed in a normal telephone manner calling each number of the distant station. After calls have been made and held

(AUX-HOLD button depressed) depress DATA button to start transmission or receiver punching. To terminate the two calls, depress TALK button.

Note: If the distant station is communicating when called, an audible ring will be heard in the handset but the called station will not answer.

B. Unattended Operation

(1) To set-up for unattended operation, check that Power lamps are on, that tape supply at punch is adequate, and message is properly inserted at sender.

Note: For stations using the discrete calling feature, the BREAK FEATURE switch on the TP199555 module must be in the OFF position (because data sets used for four-wire transmission do not have the reverse channel feature).

(2) Move mode switch to TEST. Move AUTO-MANUAL switch at sender to AUTO and depress AUTO button at data set.

(3) To restore a station to attended service, all that need be done is to depress the TALK button at the data set and return AUTO-MANUAL switch to MANUAL.

5. PRINCIPLES OF OPERATION

5.01 The following circuit description may be aided by referring to Figure 10 and Table A Wiring Diagram 7024WD in Section 582-100-400.

5.02 The TP199620 "Y" cable assembly (Figure 10) connects the sender and receiver together to a 202C or D data set through its S-R (rotary) mode switch, and RT, ST, and DS connector.

5.03 The S-R (rotary) mode switch has four positions. In clockwise rotation, the switch positions are SEND, RECEIVE, SEND-RECEIVE, and TEST.

A. Send Mode

5.04 The SEND position will allow manual or unattended send-only operation. The data set ready lead operates the sender. The sender in turn, controls the send data, request to send, and remote control common leads of the data set. The request to send lead is controlled by send terminal interface lead 4 (request to send A/M). This lead is used for either unattended (AUTO) or manual operation.

B. Receive Mode

5.05 The RECEIVE position will allow manual or unattended receive-only operation. The data set ready lead operates the receiver and the receiver then controls data leads — send data, request to send, ready, and remote control common.

C. Send-Receive Mode

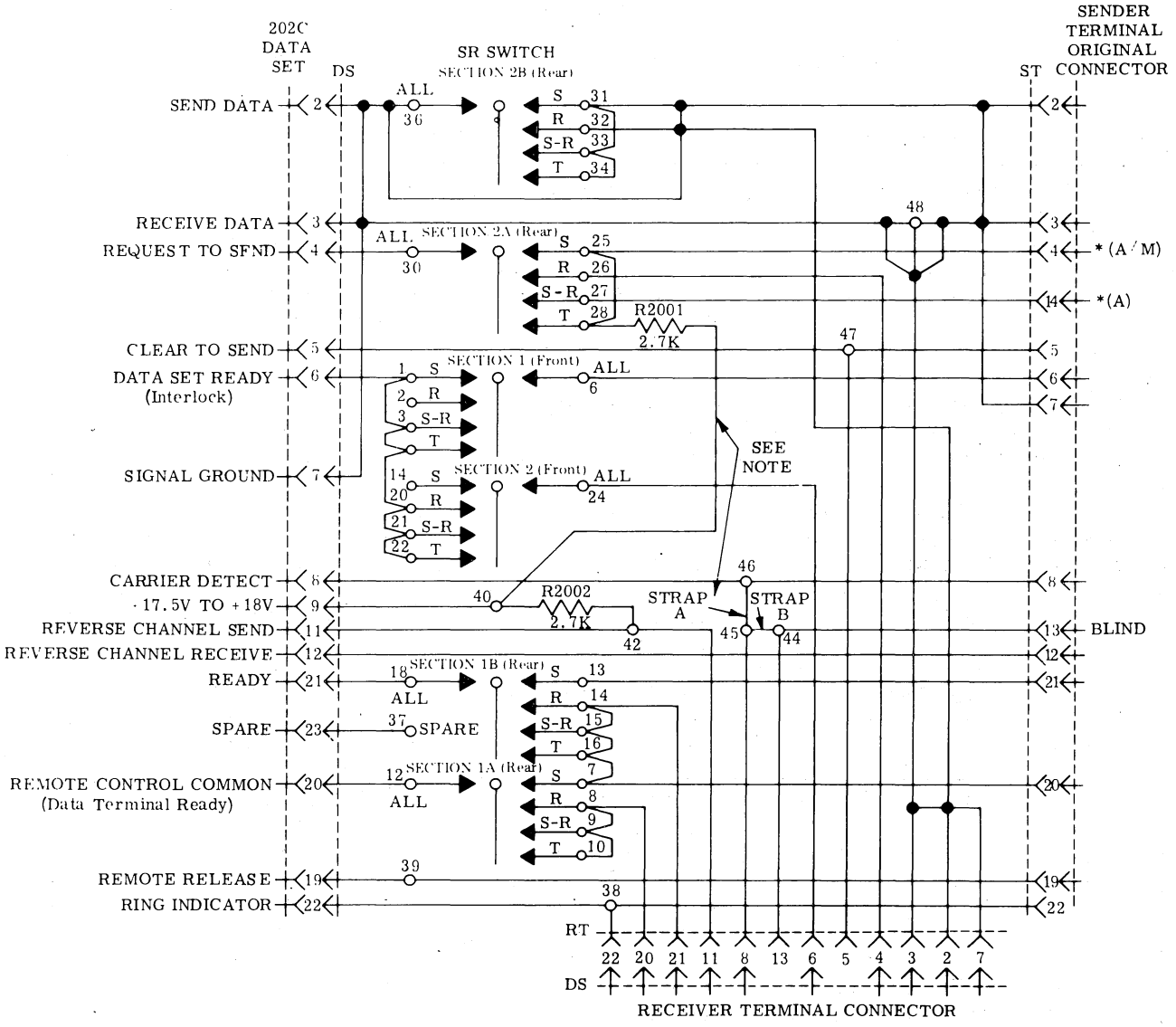
Note: Terminal operation in Send-Receive mode; (1) the sender will be called in first, (2) message is sent if present at the reader, (3) when the message is completed or if no message is present at the reader, the terminal goes to the receive mode, (4) a message may then be received, and (5) after receiving the message, the terminal times out and goes off-line.

5.06 The SEND-RECEIVE position will allow unattended sending or receiving operation. In this position, the sender and receiver portions of the terminal are operated by the data set ready lead. The sender controls the data leads — send data and request to send. The receiver is in control of data leads, ready and remote control common.

5.07 The request to send lead is controlled by the sender's interface lead 14 (request to send A/M). The interface lead is used when the sender is operated in the unattended (AUTO) mode.

5.08 The 202D data set has contact interface for automatically answering a call if terminal 20 and 21 of the receiver terminal RT connector are closed, and the AUTO button on the data set is depressed.

5.09 After a call is answered by the data set it is necessary for terminals 20 and 21 of the RT connector to remain closed, along with terminals 19 and 20 of the ST connector. This prevents the data set from dropping the call. At the end of transmission, the sender will open terminals 20 and 21 of the ST connector in order to automatically drop the call.



*Request to Send

Note: Remove when TP199551 protected unattended transmitter kit is used.

Figure 10 - Terminal Connections for TP199620 "Y" Cable Assembly

D. Test Mode

5.10 The TEST position allows terminal testing for two-wire transmission (half-duplex) or manual or unattended send-receive operation for four-wire transmission (full duplex). The sender and receiver are operated by the data set ready lead. The sender controls the data set leads, send data and request to send and the receiver controls the data set leads, ready and remote control common. The request to send lead is controlled by the sender interface lead 4 (request to send A/M). The interface lead is only used when a sender permanently applies a request to send signal.

TABLE A

202 DATA SET — CONNECTOR LEAD FUNCTIONS

PIN	DESCRIPTION	FUNCTION
1	Protective Ground	Frame and power cord ground.
2	Send Data	For transmission of data to receiving station.
3	Receive Data	On a send only station, used to receive discrete transmitter start code (when recognizer unit is present). On a send-receive station, used for all incoming data.
4	Request to Send	Conditions data set to transmit.
5	Clear to Send	Indicates data set is prepared to transmit data.
6	Data Set Ready (Interlock)	Indicates data set is in DATA mode.
7	Signal Ground	Establishes the common ground for all signaling.
8	Carrier Detect	Indicates data carrier tones (from a remote sender) are being received.
9	+17.5 v to +18 v	Provides voltage for permanent control functions.
11	Reverse Channel Send	Conditions data set to transmit reverse channel.
12	Reverse Channel Receive	Indicates reverse channel (from a remote sender) is being received.
19	Remote Release	Connected to pin 20 to accept or retain incoming calls; disconnected from 19 to terminate call. (This connection is permanent when recognizer unit is not used.)
20	Remote Control Common (Data Terminal Ready)	Connected to 19 and/or 21 as explained in Remote Release and Ready.
21	Ready	Connected to 20 for automatic answering of incoming calls.

5.11 The data set leads receive data, clear to send, signal ground, and ring indicator are connected to the sender at connector ST and to the receiver at connector RT. The data set leads carrier detect and reverse channel receive are connected to the sender through connector ST. The data set lead release is connected to the sender for automatic disconnect (initiated by sender). The data set lead reverse channel send is only connected to the receiver (at connector RT).

5.12 Two resistors (R2001 and R2002) are wired to the four position rotary switch and are tied to the data set +17.5 voltage. Resistor R2001 is used to supply a permanent request to send in either the SEND or TEST switch positions. Resistor R2001 is removed if station is equipped with a TP199551 discrete calling recognizer. Resistor R2002 is used to supply a permanent reverse channel send to the rotary switch.

5.13 Two straps (A and B) wired to the rotary switch may be removed to provide optional conditions. Strap A, at rotary switch terminals 45 to 46, is used to connect data set lead carrier detect to the receiver through connector RT. Strap A is removed if the

TP199551 discrete calling recognizer is used. Strap B, at rotary switch terminals 44 to 45, is used to connect interface carrier detect from the receiver at connector RT, lead 8, to the sender at connector ST, lead 13 (interface blind).

E. Options

5.14 Optional Local Control (TP326713 Modification Kit) operates as follows: With control switch in LOCAL and the rotary switch at SEND position, the send data lead (2) and the receive data lead (3) are opened at the data set blocking any incoming signals. The carrier detect (8) and reverse channel receive (12) leads are opened at the data set and a positive voltage is applied to both leads, to simulate the reverse channel and carrier detect functions.

6. TROUBLESHOOTING

6.01 Tools required for troubleshooting are listed in Section 570-005-800. A volt-ohm-milliammeter (VOM) is also required.

6.02 Special terms used in Table B troubleshooting are defined as follows:

(a) Loss of continuity — no current flow.

(b) Continuity — current able to flow.

(c) Energize (regarding a relay or magnet) — to pull up or operate.

TABLE B

TROUBLESHOOTING ANALYSIS

NO.	TROUBLE	RECOMMENDED ACTION
1	Rotary switch (SEND, RECEIVE, SEND-RECEIVE, and TEST) does not change modes properly.	Inspect wiring at rotary switch. Check wiring at connectors RT, DS, and ST for improper solder connections or loose wiring. Recheck that all connectors are seated properly. If TP199551 recognizer is used, check that resistor R2001 and strap A have been properly removed (3.17). If TP199621 rotary switch is found to be defective, replace it or replace entire TP199620 cable assembly.
2	Garbled transmission (no obvious pattern) or all spaces are sent or received.	Check connections at ST to DS of cable TP199556, DS of cable TP199620 to data set connector, or pin 2 at DSC to P701 and pin D10 of P201 to T at TTSC, for loose or open connections, bent or damaged connector parts.
3	Receiver terminal does not answer automatically (in unattended send-receive or receive modes).	Check for low tape condition. Inspect connection at RT to DS in receiver for loose or broken wiring. Check that connectors are seated properly. Check strapping connections at terminals 19, 20, and 21 of data set; all should be strapped together. Check ZD wiring option, at data set (Auto Answer) permanent strap on TB2 terminal 50 to 51.

TABLE B

TROUBLESHOOTING ANALYSIS (Continued)

NO.	TROUBLE	RECOMMENDED ACTION
4	Receiver does not drop call approximately 30 seconds after message completion.	Inspect connection at RT to DS in receiver for loose or broken wiring. Check that connectors are seated properly. If relay K502 (in auto answer assembly) energizes; check connector DS at data set and examine contact pins 19 and 20 and their wiring. Check continuity between pins 19 and 20 in data set.

6.03 Testing before installation is intended and has been mentioned in Part 3. For troubles found in elements other than the "Y" cable, except for those caused during installation, refer to Section 582-100-315.

6.04 Continuity checking is used to locate open circuits. Remove power before making any of these checks. Connect the leads from a volt-ohm-milliammeter (VOM) so that current can flow only through the suspected circuit or component. Be sure no other part of the circuit is in parallel with the circuit being checked. If necessary, disconnect some wires but do not disturb more wiring than necessary.

6.05 Troubles isolated to the 202 Data Set or the signal line are not covered in this section. Other standard BSPs should be consulted for testing and correcting these troubles.