REFERENCE

507, 509, 532, 533, 535, 536, 557, AND 559 TYPES TELEPHONE SETS

1. GENERAL

1.01 This section provides identification, maintenance, and connection information for amplifier type telephone sets rated MD previously contained in Sections 502-520-100, 502-520-400, 502-520-402, 502-520-404, and **502**-520-406 which are hereby canceled.

Features provided by these sets may be obtained through the use of special handsets. Refer to practice in Division 501.

1.02 Code numbers, such as 507AR/BR, cover both manual and dial versions of each type telephone set. This permits converting to either without changing the code number stamped on the base. The letter R has been added to indicate that the sets are equipped with retractile handset cords.

1.03 Description and maintenance of telephone set components (ie, handsets, ringers, dials, etc) may be found in the section pertaining to these items.

1.04 All components are mounted on a metal base. The network, line switch, and amplifier are riveted to the baseplate and are not to be replaced in the field.

1.05 Amplifier-type telephone sets are for use in common battery areas, manual or dial.

1.06 These sets are equipped with 7-type dials. Service centers will replace 7-type dials with a 95-type apparatus blank when manual sets are specified.

1.07 These amplifier sets are equipped with a C4A ringer. The volume of these ringers may be adjusted to one of four levels. A modification can be made to provide bell cutoff when authorized locally. Earlier sets were manufactured with the C2A ringer.

1.08 The 500-type amplifier sets are equipped with G-type handsets.

1.09 To provide receiver or transmitter amplification where required, or to compensate for transmission difficulties on long loops, these sets employ a 151-type amplifier. A 419A semi-conductor diode provides a line polarity guard for the amplifier. These sets also use a 425-type network.

2. IDENTIFICATION

2.01 ***Telephone Sets for Long Loop Operation:*** The 507-, 509-, 557-, and 559-type telephone sets (Fig. 1 through 6) are intended for use on long loops (1500- to 2500-ohm resistance) beyond the transmission capabilities of sets without amplifiers. These sets utilize a 419A semi-conductor diode, a 425C sidetone balancing network especially designed for use on loaded cable and open wire loops, and a 151C or 151F fixed gain amplifier in the transmitting circuit. In addition, the 509- and 559-type telephone sets use a 426A- or 425A-type cold cathode, gas filled tube in the ringing circuit.

2.02 ***Telephone Sets for Impaired Hearing:*** The 532- and 533-type telephone sets are for use where customers require receiver amplification (see Fig. 7, 8, and 9). They operate on normal line voltage and do not require power from local batteries. The line is connected to the input of the amplifier and the receiver is connected across the output of the amplifier. The volume of the amplifier is controlled by moving the potentiometer knob clockwise to increase receiver amplification and counterclockwise to decrease amplification. A 426A- or 425A-type cold cathode, gas filled tube is used in the ringing circuit of the 533-type set.

2.03 ***Telephone Set for Noisy Locations:*** The 535-type telephone set is for use at noisy

Fig. 1—507- or 509-Type Set, Exterior (MD)

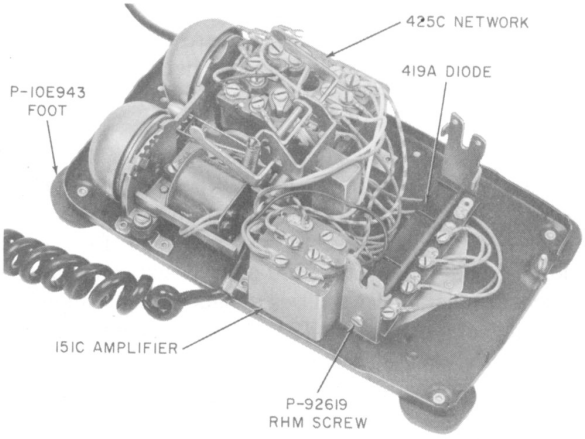


Fig. 2—507-Type Set, Interior

locations (see Fig. 10 and 11). It provides limited receiver amplification and limited reduction of transmitter and sidetone levels with the handset push-to-listen button in normal position. At high noise levels, it provides full receiver amplification and almost complete disabling of the transmitter when the handset push-to-listen button is operated. The operating current for the amplifier is obtained from the central office line. Rotating the potentiometer knob clockwise will increase amplification.

2.04 ***Telephone Set for Speech Amplification:*** The 536-type telephone set is used for customers requiring speech amplification or for whispered confidential conversations (see Fig. 7 and 12).

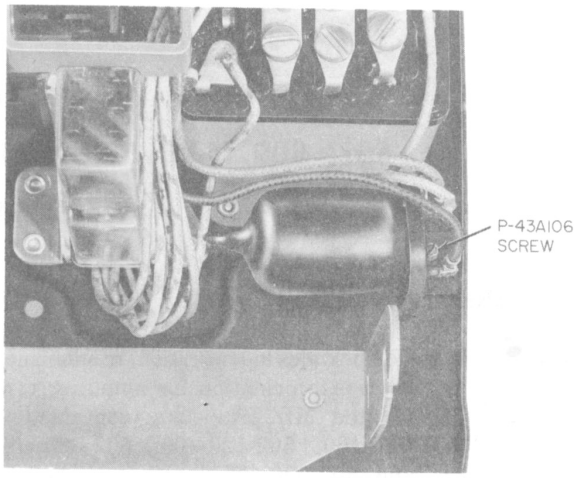


Fig. 3—509-Type Set, Tube Assembly

Fig. 4—557- or 559-Type Set, Exterior (MD)

2.05 The 532-, 535-, and 536-type telephone sets are not recommended for use with 1A key telephone equipment on long loops. The increase in set resistance will cause the release of held lines. First preference is the 1A1 key telephone equipment.

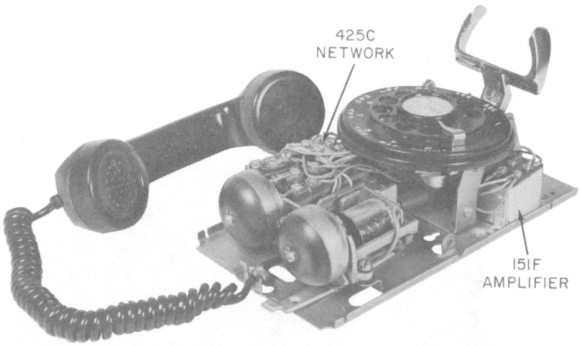


Fig. 5—557-Type Set, Interior

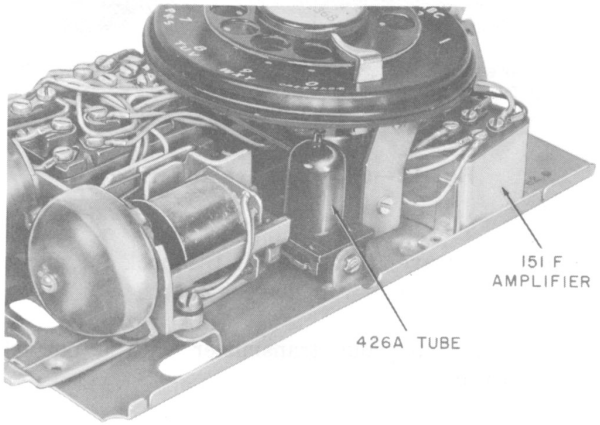


Fig. 6—559-Type Set, Tube Assembly

Fig. 7—532-, 533-, or 536-Type Set, Exterior (MD)

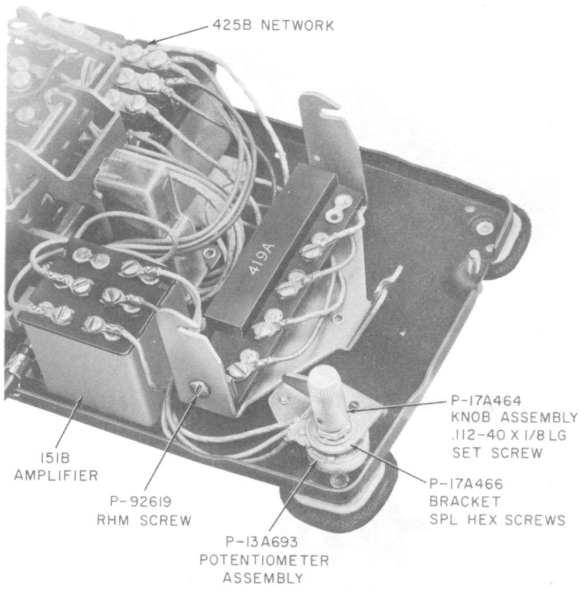


Fig. 8—532-Type Set, Interior

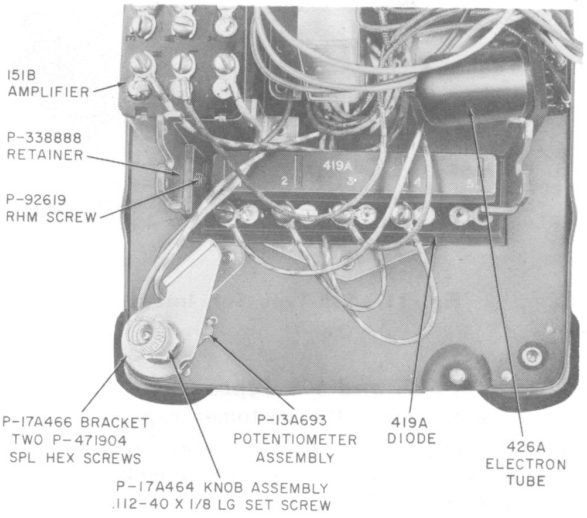


Fig. 9—533-Type Set, Exterior

3. MAINTENANCE

3.01 This section covers only specific maintenance items pertaining to the 507-, 509-, 532-, 533-, 535-, 536-, 557-, and 559-type telephone sets.

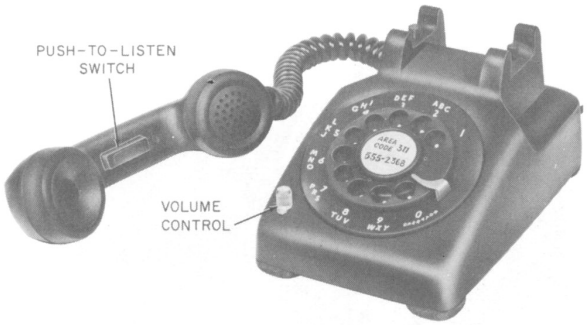


Fig. 10—535-Type Set, Exterior (MD)

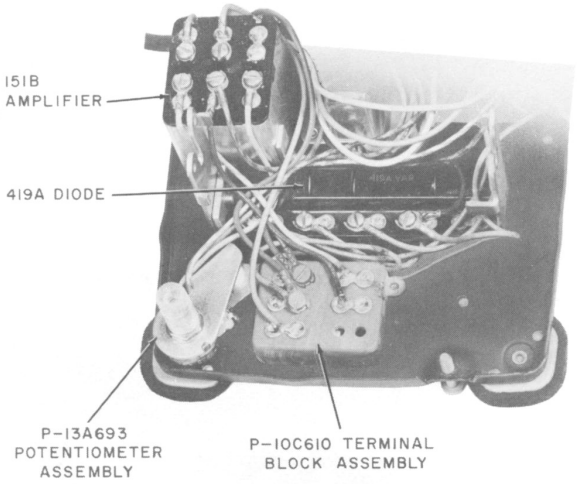


Fig. 11—535-Type Set, Interior

3.02 ***509, 557, and 559 Types (Long Loop):*** In cases where the customer reports that the distant party cannot hear or that his own voice sounds too loud (excessive sidetone), make a sidetone talking test as follows:

(1) Remove red strap from the D or R terminal of 425C network. (The factory places this strap on terminal D.)

(2) Dial the 900-ohm test line.

(3) If no 900-ohm test line is available, dial any convenient local number such as assignment office or test desk. Ask the called party to leave telephone off the hook for about 30 seconds while you make a test.

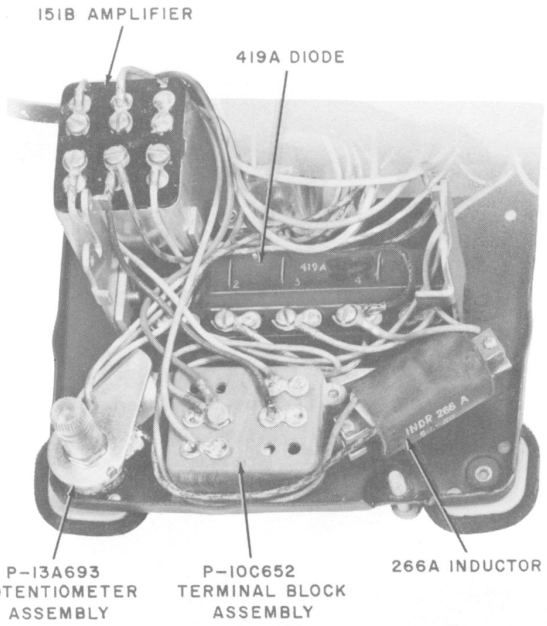


Fig. 12—536-Type Set, Interior

(4) Talk into your transmitter with a normal voice.

(5) Listen to your own voice while alternately making firm contact with the red strap to D and R terminals of the 425C network.

(6) Connect the red strap to the terminal having the least sidetone.

(7) If no difference in sidetone is noted, connect red strap to D terminal.

(8) This test may also be made while carrying on a normal conversation with the called party.

(9) Always connect the red strap so that your own voice, as heard in your receiver, is at the lowest level.

Note: The connection (R or D) is not determined by how well you hear the distant party.

3.03 ***532 and 533 Types (Impaired Hearing):*** To test these sets as a 500-type set, proceed as follows:

(1) Disconnect amplifier leads (Y-BR) and (R-W) from GN and R terminals.

(2) Move the (W) receiver lead from W on amplifier to GN on network.

(3) Remove leads from the 419A varistor.

(4) Connect (S-W) line switch lead to (S-BR) line switch lead to C on network.

3.04 If set functions properly as a normal 500-type set, reconnect leads to original terminals and check possible trouble indications and corrective measures as listed in Table A.

3.05 The operating current for the amplifier is obtained from the central office line through L and V terminals of the amplifier to the transmitter (network terminals R and B).

3.06 The input to the amplifier is connected in place of the receiver (network terminals R and GN), and the receiver is connected across the output of the amplifier (network terminal R, amplifier terminal W).

3.07 Proper polarity of the central office line is maintained across the amplifier by the 419A diode. It is connected between the network terminals (C and F for dial sets and C and RR for manual sets), and the line contacts of the line switch assembly.

3.08 ***535-Type (Noisy Locations):*** To test 535-type as a 500-type set:

(1) Move (W) handset from W of amplifier to GN of network.

(2) Move (BL) handset lead to R and (BK) handset lead to B of network.

(3) Disconnect (Y-BR) from GN on network.

(4) Disconnect (R) lead from T terminal block.

(5) Disconnect leads from the 419A diode.

(6) Connect (S-W) and (S-BR) line switch leads to F and C of network.

3.09 If set functions properly as a 500-type set, reconnect leads to original terminals and check possible trouble indications and corrective measures (Table A).

TABLE A

TROUBLE INDICATIONS

TROUBLE	PROBABLE CAUSE	CORRECTIVE MEASURE
Noisy set.	Potentiometer arm not making contact at times.	Replace potentiometer or set.
Volume of entire set low (below normal set).	Open or short in amplifier.	Replace set.
Does not amplify.	Open potentiometer. Open or short in amplifier.	Replace potentiometer or set. Replace set.
Entire set dead.	Open semiconductor diode.	Replace semiconductor diode or set.
Maximum volume cannot be turned down.	Shorted potentiometer.	Replace potentiometer or set.

3.10 With the handset push-to-listen button normal:

(a) A resistor, in series with the potentiometer, limits maximum receiver amplification. (A resistor is located between T and D of terminal block assembly.)

(b) A shunt (S to T) and a series (S to Y) resistor at the transmitter reduce transmitter and sidetone levels.

(c) Sidetone should increase noticeably as the potentiometer knob is advance clockwise, increasing amplification.

3.11 With the handset push-to-listen button operated:

(a) Receiver amplification is increased by shorting out series (D to T) resistor.

(b) Transmitter and sidetone levels are further reduced by an additional series resistor (H to T of the terminal block assembly).

(c) Receiving volume should increase as potentiometer is advance.

(d) The transmitter is essentially dead in this condition.

3.12 The G5E (push-to-listen) handset should be serviced the same as other G types, except that repairs or adjustments of pushbutton contact springs should not be made in the field. Replace handsets having defective switches.

3.13 ***536-Type (Impaired Speech):*** To test the 536-type set as a 500-type set:

(1) Move the (BK) handset lead to B of network.

(2) Disconnect the (R-BK) and (BR-BK) leads from B of network.

(3) Remove leads from the 419A diode.

(4) Connect (S-W) and (S-BR) line switch leads to F and C of network.

3.14 ***In the 536-Type Set:***

(a) The transmitter output is connected through a capacitor (H to T of the terminal block assembly) to the input of the amplifier.

(b) The output of the amplifier is connected through a series capacitor (S to U of the terminal block assembly) across the network terminals R and B.

(c) The inductor is used to isolate the input from the output of the amplifier.

(d) The operating current for the amplifier is obtained from the central office line by connecting L and V terminals of the amplifier across network terminals R and B.

(e) Amplification increases as the potentiometer is rotated clockwise.

3.15 If set functions properly as a 500-type set, reconnect leads to original terminals and check trouble indications and corrective measures. Refer to Table A.

TABLE B

LINE AND RINGER CONNECTIONS FOR 507- AND 557-TYPE TELEPHONE SETS

Wire or Lead			Indiv. or Bridged*	Ring Party*	Tip Party No Ident Ground*	Tip Party Ident Ground					
						Normal Connections		Ringer Reversal When Connected to Long Line Equip.		To Silence Ringer Permanently	
						1000Ω	2650Ω	1000Ω	2650Ω	1000Ω	2650Ω
Ringer		R	L2	L2	L2	K	B	B	G	‡	B
		BK	L1 Note 3	G	G	G	B	B	K	G	‡
		S	K	K	K	B	K	G	B	B	K
		S-R	A	A	A	B	G	K	B	‡	G
Line Switch		S	L2	L2	L2	A†	A†	A†	A†	L2	L2
Line Wire or Mtg Cord in Set	Ring	R	L2	L2	L1	L1	L1	L1	L1	L1	L1
	Tip	G	L1	L1	L2	L2	L2	L2	L2	L2	L2
	Grd	Y	Note 3	G	G	G	G	G	G	G	G

* To silence ringer for all classes of service except tip party identification, connect S and BK ringer leads on K terminal of 425C network.

† When moving the S switchhook lead from L2 to A, be sure the lead does *not* contact the metal housing of the network; otherwise, the finger stop of the desk set or finger stop and handset cradle of the wall set will be energized by ringing current.

‡ Insulate and store.

TABLE C

SET MODIFICATION FOR TIP PARTY IDENTIFICATION FOR 507- AND 557-TYPE TELEPHONE SETS

Wire or Lead		From			To		
		419A Diode	Amplifier	Network	Network	Line Switch	419A Diode
Line Switch	S-BR	4			R-G Lead*		
	S-W	2			F		
	S-BK		X†		R		
Network	R-G	3				S-BR Lead*	
Amplifier	BR-BK			B			3
	Y-BR			R			1
Transmitter	R			R			1
Dial	W		V		R		
Strap	G	1					4
				F	B		
Strap	M1W Cord or Equiv				R		2

*Use D-161488 connector to terminate these leads.

† Solder connection.

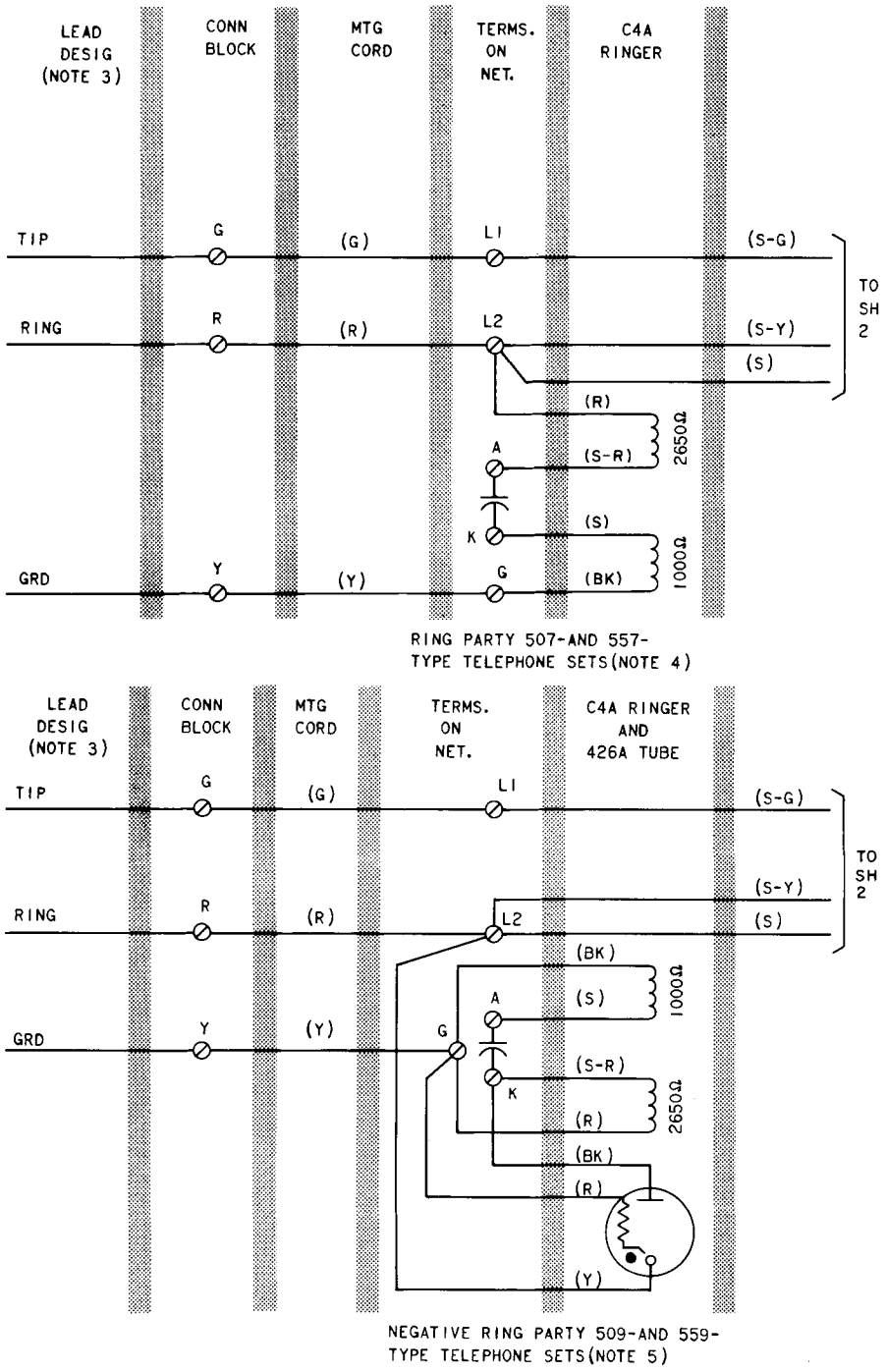
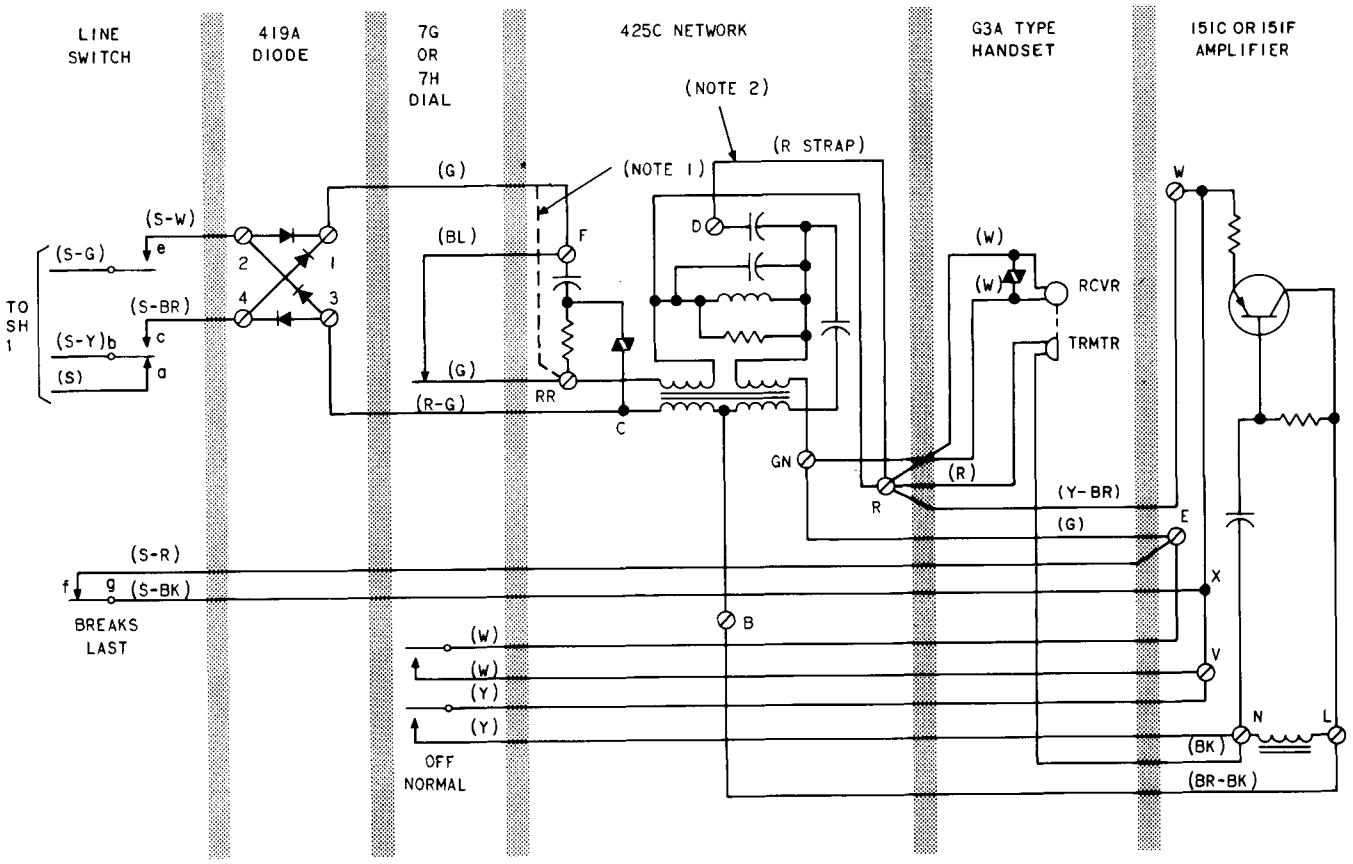


Fig. 13—507-, 509-, 557-, and 559-Type Sets, Connections (Sheet 1 of 2)



NOTES:
1. GREEN DIODE LEAD IS CONNECTED TO "F" TERMINAL IN DIAL SETS AND TO "RR" TERMINAL IN MANUAL SETS.
2. WHEN UNUSUALLY HIGH SIDETONE IS EXPERIENCED, TRANSFER "RED STRAP" FROM "D" TERMINAL TO "R" TERMINAL.
3. FOR 557-AND 559-TYPE WALL SETS CONNECT TIP, RING, AND GRD LEADS DIRECTLY TO TERMINALS ON NETWORK.
4. SEE TABLE A AND B FOR ADDITIONAL LINE AND RINGER CONNECTIONS AND TIP PARTY IDENTIFICATION MODIFICATIONS FOR 507-AND 557-TYPE SETS.
5. SEE TABLES C AND D FOR ADDITIONAL LINE, RINGER, AND TUBE CONNECTIONS FOR 509-AND 559-TYPE SETS.

Fig. 13—507-, 509-, 557-, and 559-Type Sets, Connections (Sheet 2 of 2)

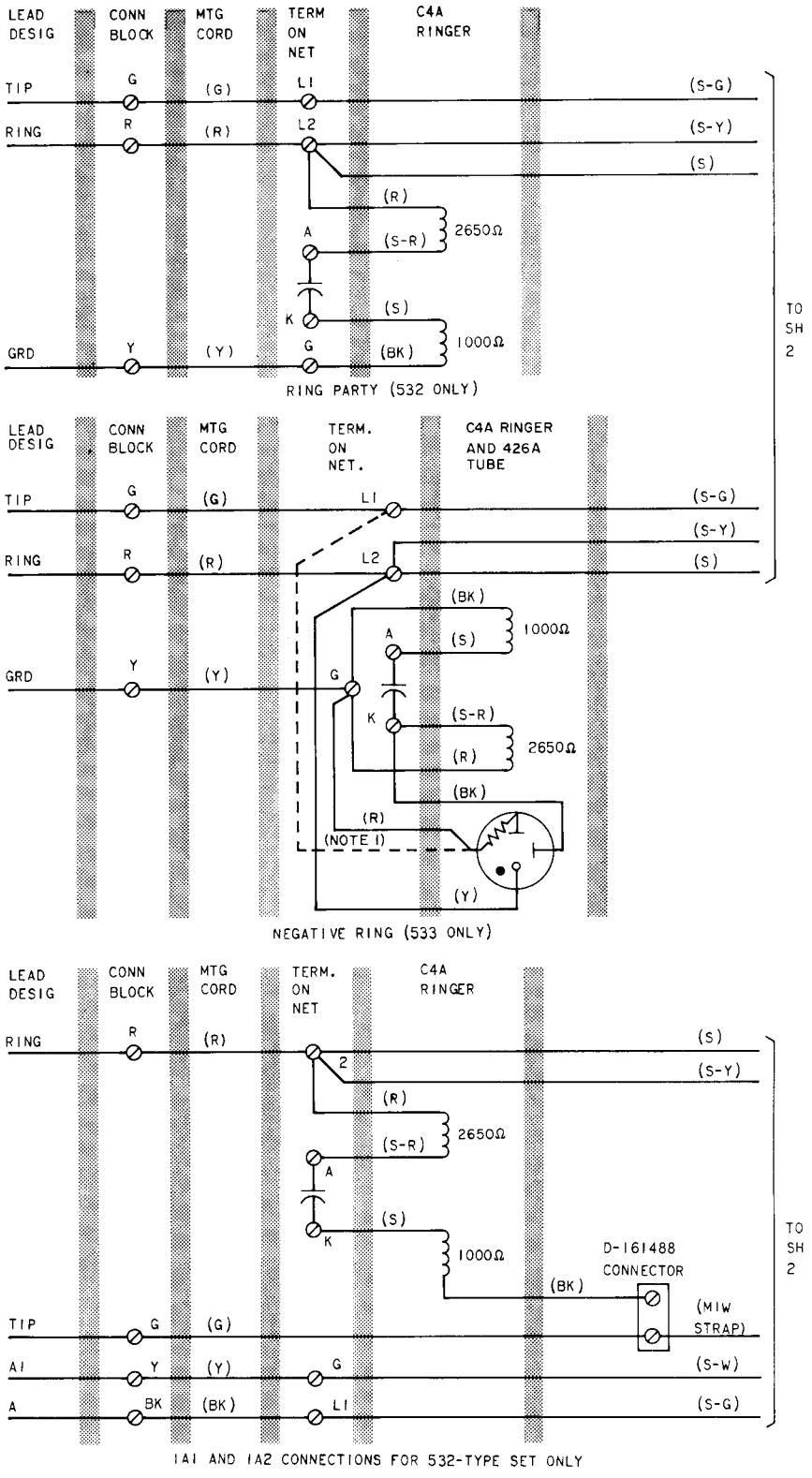


Fig. 14—532- and 533-Type Sets, Connections (Sheet 1 of 2)

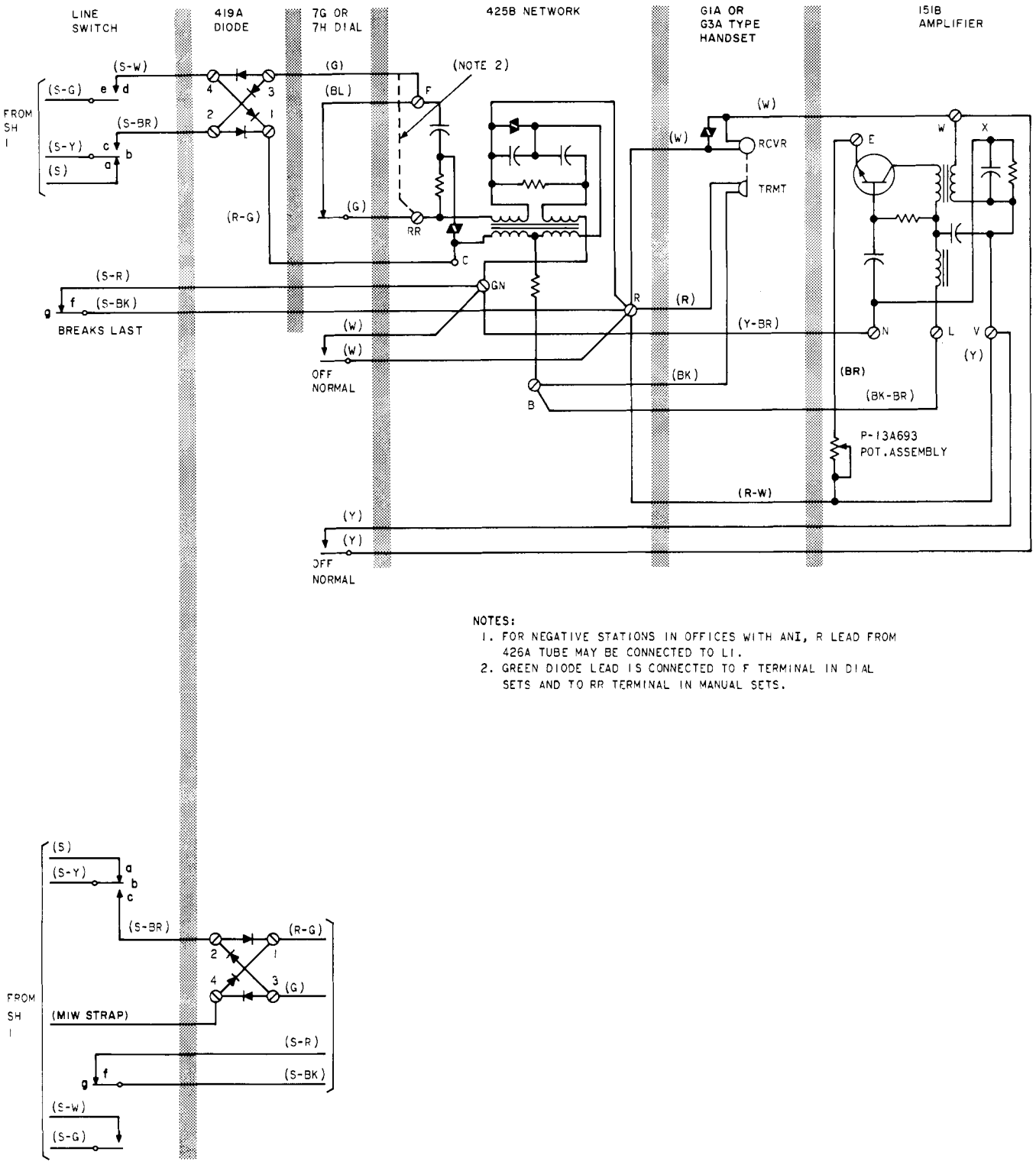


Fig. 14—532- and 533-Type Sets, Connections (Sheet 2 of 2)

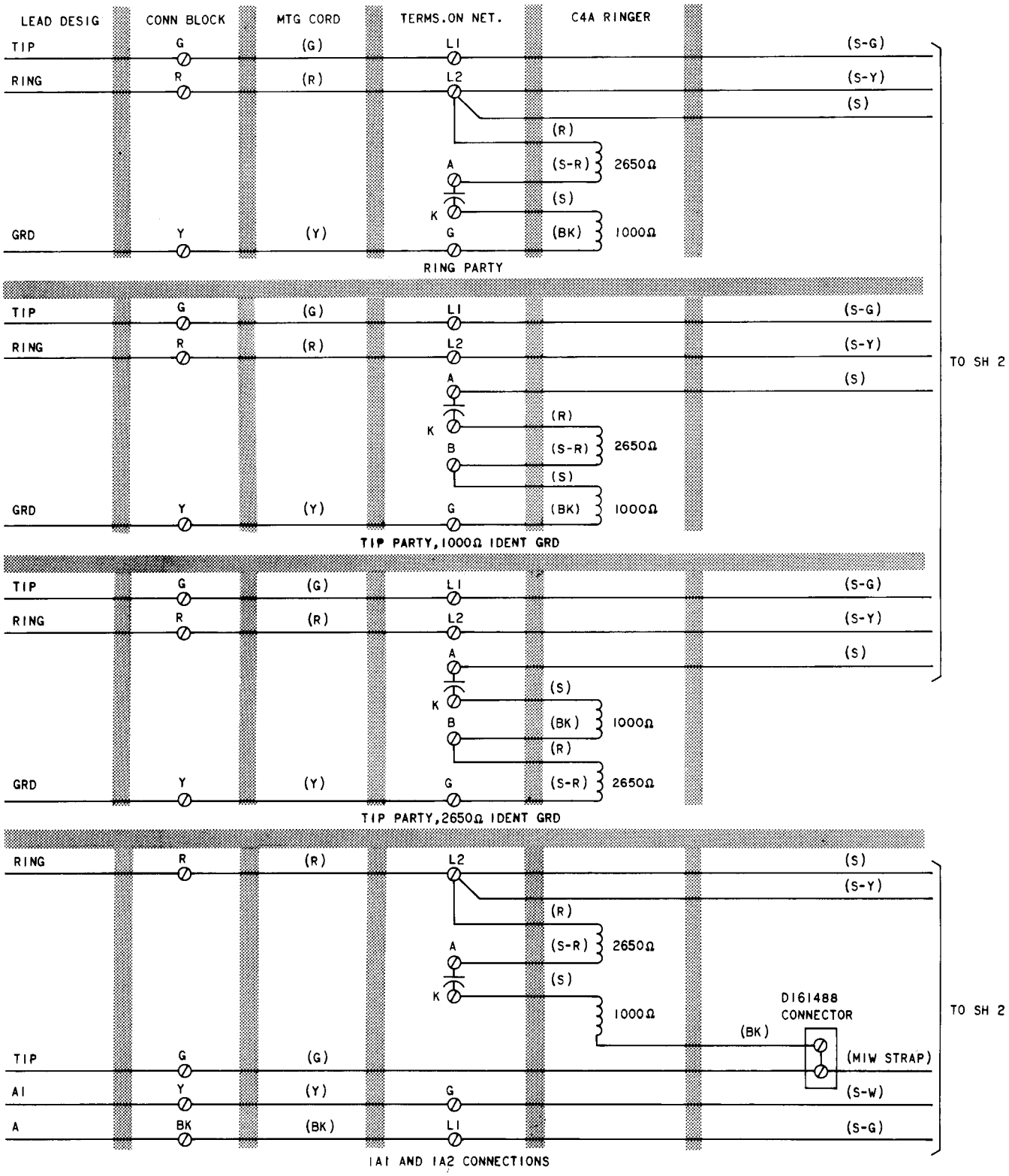


Fig. 15—535A and B Telephone Sets, Connections (Sheet 1 of 2)

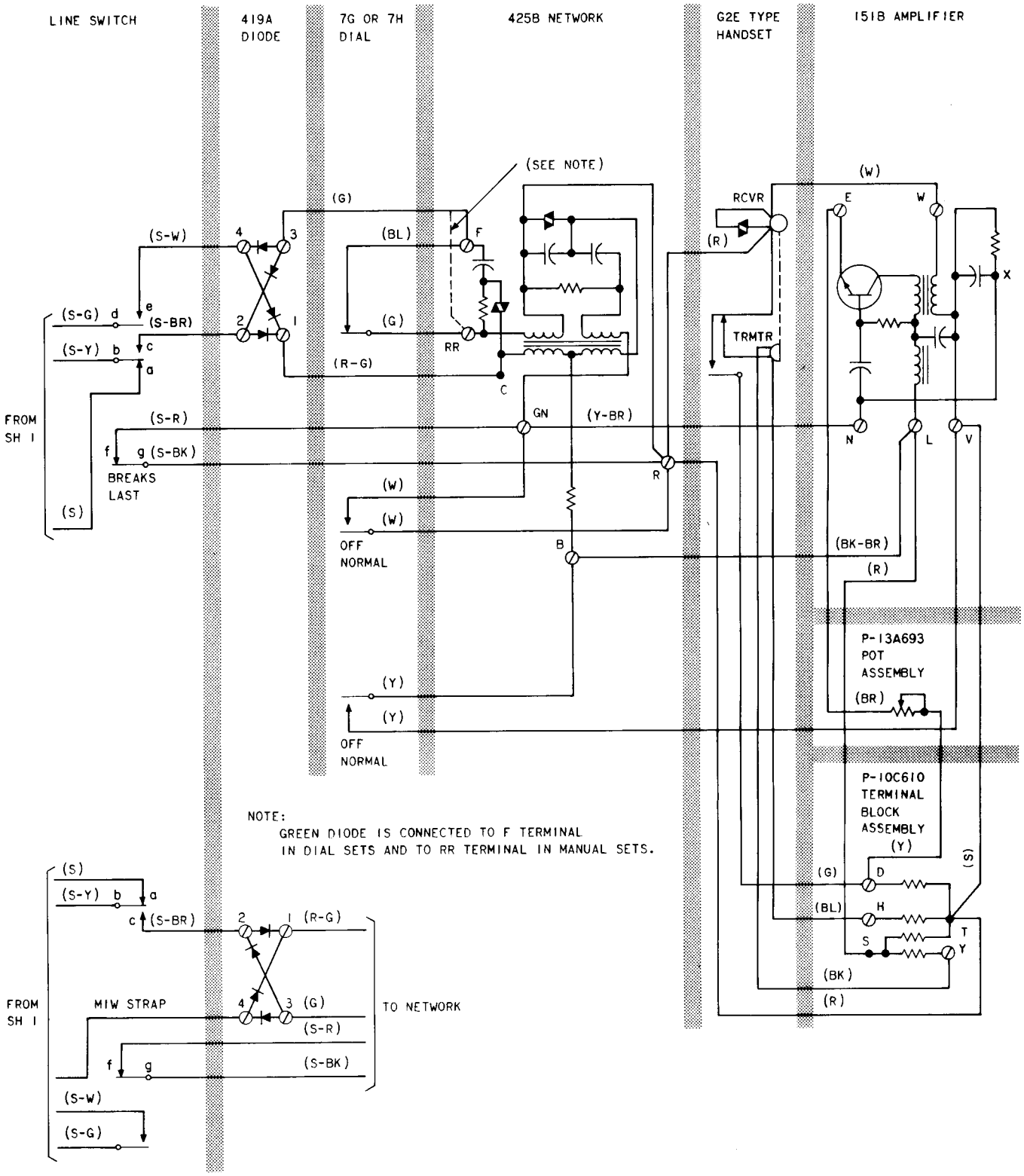


Fig. 15—535A and B Telephone Sets, Connections (Sheet 2 of 2)

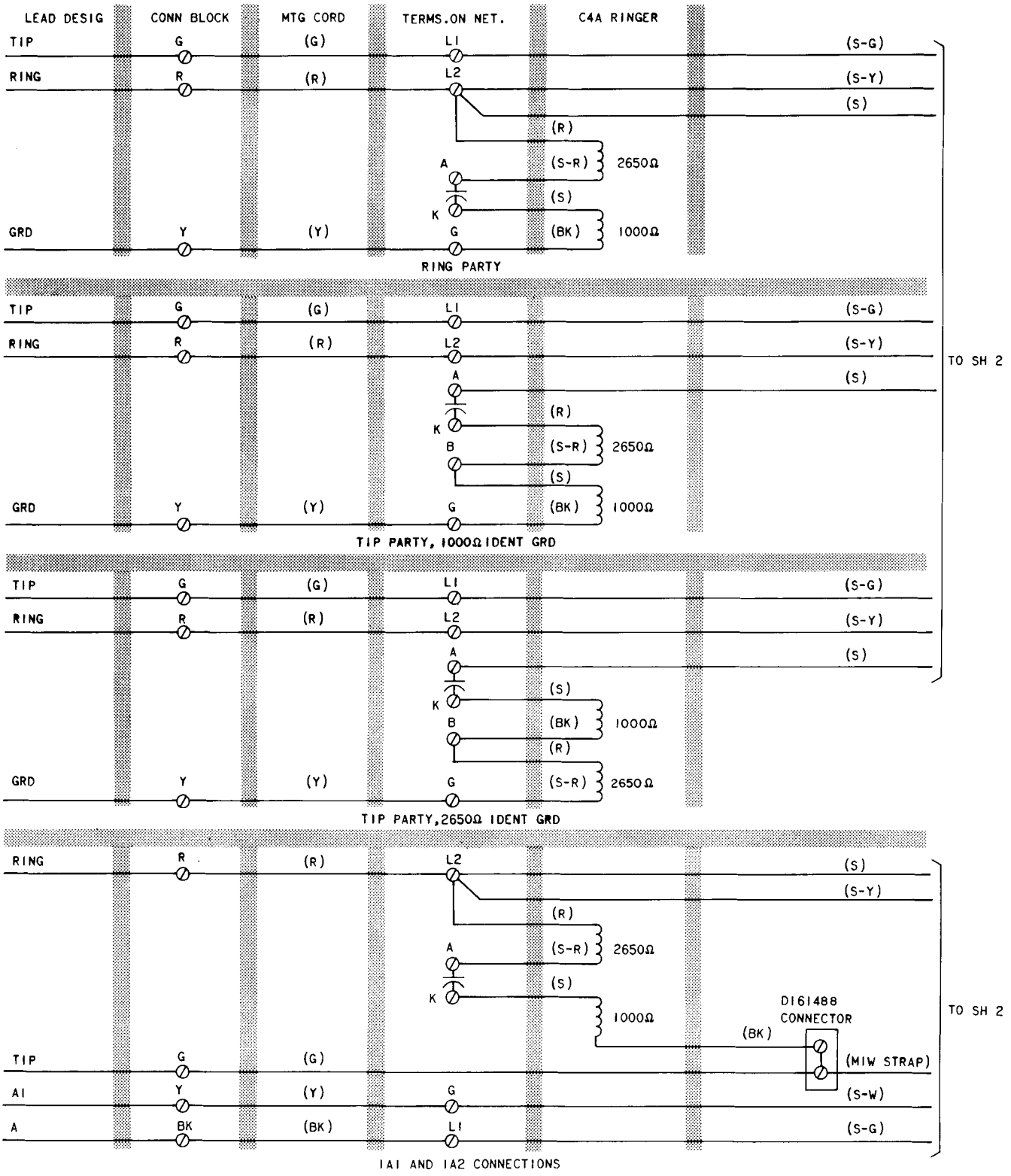


Fig. 16—536A and B Telephone Sets, Connections (Sheet 1 of 2)

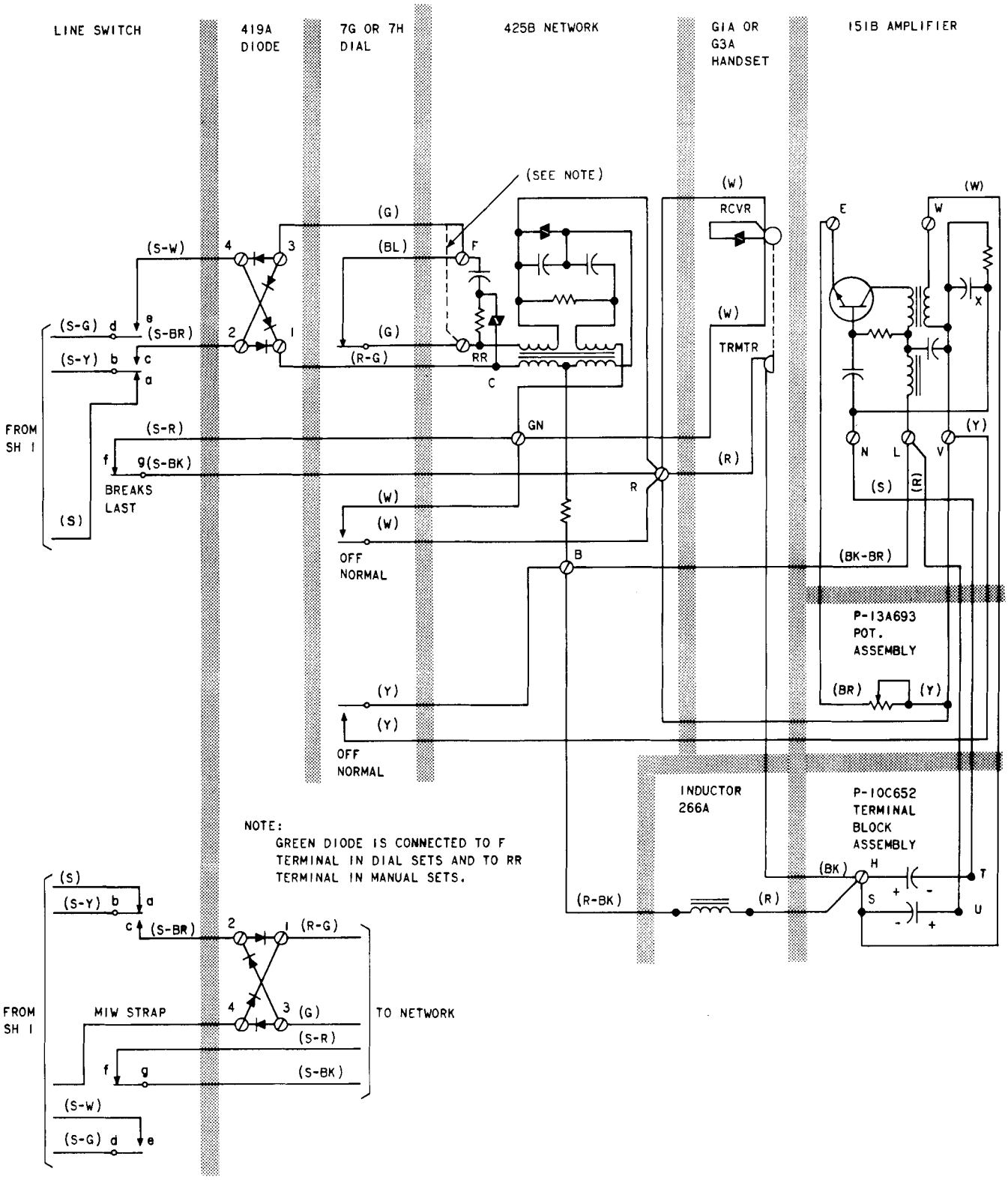


Fig. 16—536A and B Telephone Sets, Connections (Sheet 2 of 2)

TABLE D

LINE AND RINGER CONNECTIONS FOR 509-, 533-, AND 559-TYPE TELEPHONE SETS

Wire or Lead			Negative (—) Parties		Positive (+) Parties	
			Ring	Tip	Ring	Tip
Line Wire or Mounting Cord in Set	Ring	R	L2	L1	L2	L1
	Tip	G	L1	L2	L1	L2
	Grd	Y	G	G	G	G
Ringer		R	G	G	L2	L2
		BK	G	G	L2	L2
		S	A	A	A	A
		S-R	K	K	K	K
426A Tube		R	G	G	L2	L2
		BK	K	K	K	K
		Y	L2	L2	G	G

TABLE E

TUBE LEAD CONNECTIONS FOR INDUCTIVE INTERFERENCE FOR 509-, 533-, AND 559-TYPE TELEPHONE SETS

Lead		Negative (—) Ring or Tip Parties		Positive (+) Ring or Tip Parties
		Average Induction	Severe Induction	Average or Severe Induction
425A Tube	R		L1	L2
	G		L2	L1
	BK		G	K
	Y		K	G
426A Tube	R	G		
	BK	K		
	Y	L2		

Note 1: For additional information concerning inductive interference, refer to section on inductive noise.

Note 2: To silence ringer permanently, connect yellow mounting cord lead to same terminal as red mounting cord lead at connecting block.

TABLE F

LINE AND RINGER CONNECTIONS FOR 532-, 535-, AND 536-TYPE TELEPHONE SETS

WIRE OR LEAD		COLOR	INDIV OR * BRIDGED	RING PARTY*	1A1 OR 1A2 KEY TEL SYS	TIP PARTY NO IDENT GRD*	TIP PARTY IDENT. GROUND					
							NORMAL CONN		RINGER REVERSED WHEN CONN TO LONG LINE EQUIP.		TO SILENCE RINGER PERMANENTLY	
							1000Ω	2650Ω	1000Ω	2650Ω	1000Ω	2650Ω
Ringer		R	L2	L2	L2	L2	K	B	B	G	†	B
		BK	L1	G	4	G	G	B	B	K	G	†
		S	K	K	K	K	B	K	G	B	B	K
		S-R	A	A	A	A	B	G	K	B	†	G
Line Switch		S	L2	L2	L2	L2	A	A	A	A	L2	L2
		S-W	4	4	G	4	4	4	4	4	4	4
Line Wire or Mtg Cord in Set	Ring	R	L2	L2	L2	L1	L1	L1	L1	L1	L1	L1
	Tip	G	L1	L1	4	L2	L2	L2	L2	L2	L2	L2
	Grd or A1	Y	G	G	G	G	G	G	G	G	G	G
	A	BK			L1							

*For classes of service except tip party ground identification, connect (Y) mounting cord lead to same terminal as (R) mounting cord lead at connecting block. For 1A1 or 1A2 key telephone systems, connect (R) and (BK) ringer leads on L2 terminal.

†Insulate and store.