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## TELEPHONE SETS

660-, 663-, 1660-, AND 1663-TYPES

### IDENTIFICATION, INSTALLATION, MAINTENANCE, AND CONNECTIONS

#### 1. GENERAL

1.01 This section is reissued to:

- Add connections for the 242B amplifier to the 663A1 and 1663A1 telephone sets.
- Change Fig. 14 and 16 to agree with manufacturing information.
- Add speakerphone connection for 1660A1 telephone set (Fig. 15 and Table K).
- Change title.

1.02 Due to extensive changes, marginal arrows have been omitted.

#### 2. IDENTIFICATION

2.01 The 660-, 663-, 1660-, and 1663-type telephone sets (Fig. 1 and 2) are similar in appearance to other card dialer sets.

2.02 These telephone sets have the electrical and transmission characteristics of 500-type sets and are available in the following colors:

Black (-3)	Pink (-59)
Green (-51)	Light Beige (-60)
Yellow (-56)	Light Gray (-61)
White (-58)	Aqua Blue (-62)
Turquoise (-64)	

2.03 These sets are furnished wired for individual or bridged, and ring and tip parties. With wiring changes, they may also be used for tip party identification or with 1A1 or 1A2 key telephone systems. In addition, the 660A1 and 1660A1 telephone sets can be wired for use with the 3-type speakerphone. This requires replacement of the mounting cord and wiring changes within the set.

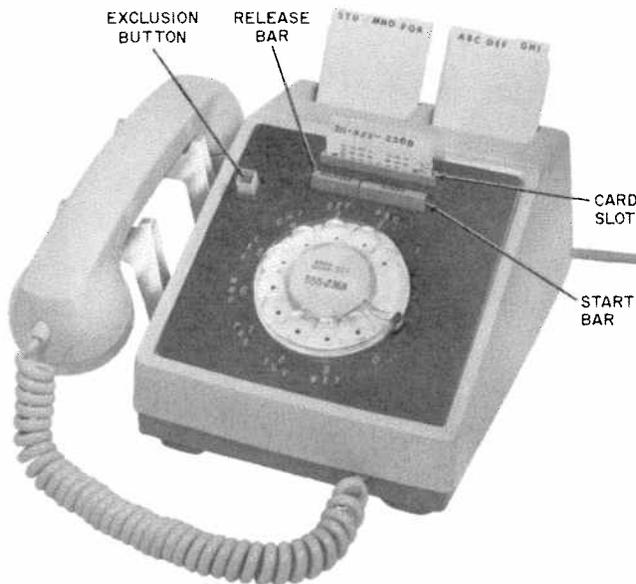


Fig. 1 — 660-Type Telephone Set



Fig. 2 — 1660-Type Telephone Set

**2.04** The 660- and 663-type telephone sets feature both an 8C dial and a 41-type dial (Fig. 3). The 41-type dial is an electromechanical dial driven by an ac synchronous motor. The motor requires a low voltage power supply (Table B).

**2.05** To operate the 41-type card dial, insert a coded card in the card slot. Depressing the START bar closes the start contacts allowing the motor to drive the commutator disc. The card feeds past the reader mechanism and the coded portion of the card controls the dial output. Pressing the RELEASE bar ejects the card at any time without further pulsing.

**2.06** Early 1660- and 1663-type telephone sets use a 26B dial. Later sets use a 26D dial (Fig. 4). On the 26D dial, (S-BK) lead replaces the (BL-W) lead and is wired to the RR punching instead of R. A 26D dial can replace a 26B, but a 26B cannot replace a 26D.

**2.07** The 26B dial consists of a mechanical dialer and a 25D TOUCH-TONE dial combined as one unit. The 26D dial consists of a dialer and a 26M dial. The mechanical card dialer uses the electrical circuitry of the TOUCH-TONE dial for multifrequency dialing.

**2.08** Automatic dialing is accomplished by coding a card. The punched card causes two sets of contacts to close at one time for each digit. This generates the proper pair of frequencies for the digit desired. This same function is accomplished when a button is depressed on the TOUCH-TONE dial.

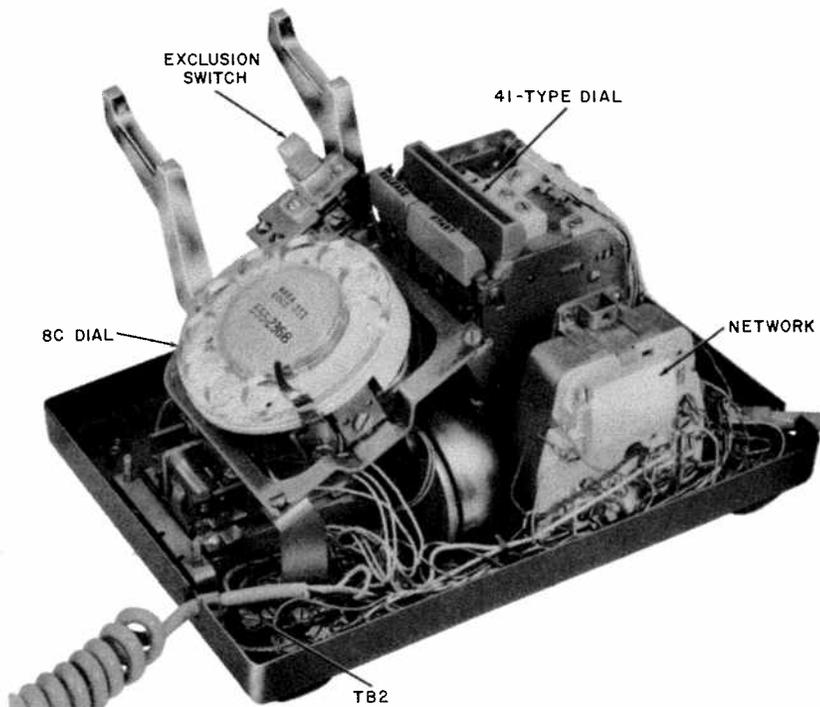
**2.09** Two P-24E238 packages, each containing twenty code cards and one P-13E363 set of nine index cards are supplied with each set.

**RINGER VOLUME**

**2.10** The volume of the ringer is adjustable through the base of the set.

**EXCLUSION**

**2.11** The exclusion feature, if provided, is actuated by pulling up on the plastic button (Fig. 1 and 2) at the top left of the faceplate. The exclusion switch is connected to the switch hook assembly by a wire link so that exclusion is cancelled when the handset is restored. Sets can be converted to provide exclusion by the installation of a kit of parts. (See Table A.)



**Fig. 3 — 660-Type Telephone Set, Cover Removed**

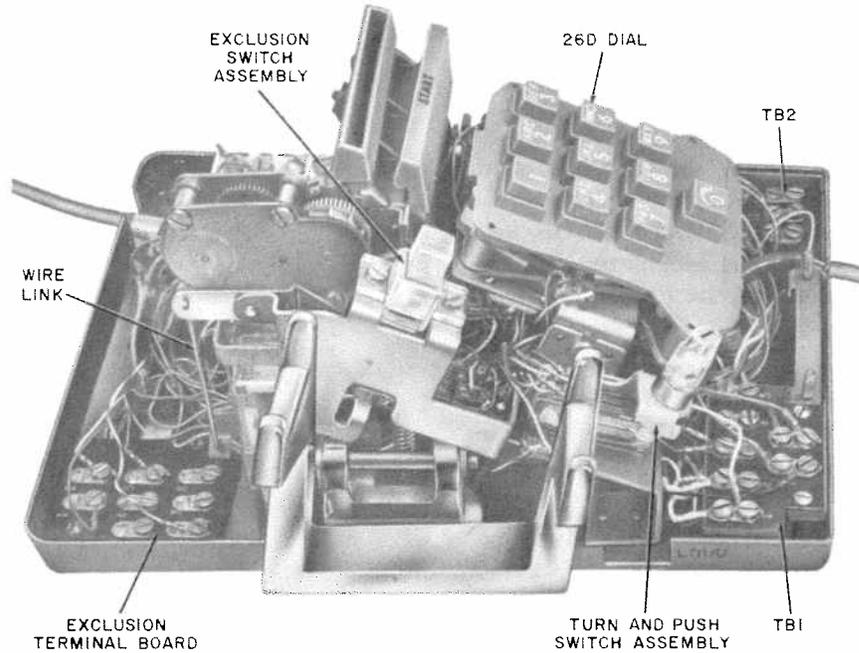


Fig. 4 — 1660-Type Telephone Set, Cover Removed

TABLE A  
PIECE PART INFORMATION

SET CODE*	CORD*	REGULAR FACEPLATE	NONGLARE FACEPLATE†	EXCLUSION CONVERSION KIT†	HOUSING*	EXCLUSION PROVIDED	2-LINE PICKUP PROVIDED	RINGER
660A1	D6AF	P-24E979	P-25E605		P-82B0-	No	No	C4A
660A2	D10L	P-24E978	P-25E604	D-179888‡		Yes		
1660A1	D3BN	P-25E894	P-26E625			No	Yes	M1A
1660A2	D6AF	P-25E895	P-26E626	D-179949 §		Yes		
1660A3	D10L	P-25E897	P-26E628	D-179950 §		No		
1660A4		P-25E896	P-26E627	D-179951 §	Yes			
663A1	D6AF	P-26E820	P-27E707		P-87C2-	No	No	C4A
1663A1		P-26E938	P-27E708			No		M1A

\*Add suffix for desired color:

(-03) Black

(-51) Green

(-56) Yellow

(-58) White

(-59) Pink

(-60) Light Beige

(-61) Light Gray

(-62) Aqua Blue

(-64) Turquoise

† Kit contains parts necessary to add exclusion to these sets, less cord. Both must be ordered separately.

‡ Add D-179888 kit to 660A1 to convert to 660A2.

§ Add these kits to the 1660A1 set to convert to these codes.

¶ Must be ordered separately.

## SECTION 502-660-120

**2.12** The 1660-type set is arranged to accommodate an exclusion switch and a 2-line pickup key. The addition of these features changes the set code. (See Table A.)

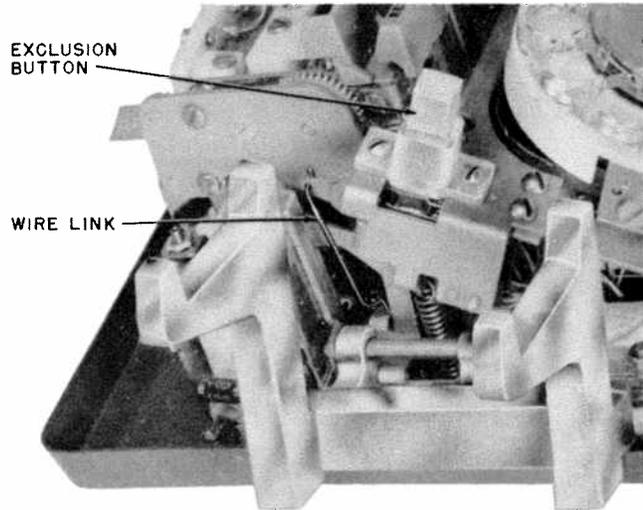
**2.13** The 663- and 1663-type sets are equipped with headset jacks to permit either handset or headset operation. The HEADSET ON key is located at the top left of the faceplate. No provision is made for exclusion in these sets.

**2.14** The 660-type set without exclusion may be converted by the addition of a D-179888 Kit of Parts (Table A). A D10L cord of the proper color must also be separately ordered.

**2.15** To add exclusion to 660-type telephone sets:

- (1) Remove 8C dial.
- (2) Attach exclusion switch assembly to dial adapter with two screws provided. (See Fig. 5.)
- (3) Dress exclusion switch leads along left side of 41-type dial and between control relay and switch hook assembly so that terminal board is in position at rear of set.
- (4) Connect wire link to exclusion switch assembly by placing end of wire link having two 90 degree bends into hole provided in switch assembly. (See Fig. 5.) Start link from left side of assembly.
- (5) Remount 8C dial making sure that wire link enters hole provided in switch hook assembly. Tighten dial mounting screws.
- (6) Mount terminal board to base with screws provided. (See Fig. 6.)
- (7) Replace D6AF cord with D10L cord.
- (8) Replace faceplate with one providing an opening for exclusion button.
- (9) Replace housing and check set for proper operation.

**2.16** The 1660-type sets may be converted to furnish either exclusion, 2-line pickup and signaling, or both. See Table A for proper conversion kit.



**Fig. 5 — Exclusion Switch Assembly**

**2.17** To add exclusion to 1660-type sets:

- (1) Connect wire link to exclusion switch assembly. The wire link has two 90 degree bends on both ends. Insert short end of wire link (Fig. 4) into hole provided at rear of switch assembly.
- (2) Mount switch assembly to switch hook mounting bracket. Be sure wire link enters hole provided in arm of switch hook. Fasten assembly with three furnished screws.
- (3) Dress wiring between switch hook and dial so terminal board is located at left rear of set (Fig. 4).
- (4) Fasten terminal board to base with two furnished screws.
- (5) Replace D3BN with D6AF mounting cord and make proper connections.
- (6) Replace faceplate with one supplied in kit of parts.
- (7) Replace housing and check set for proper operation.

**2.18** To add 2-line pickup and signaling to 1660-type sets:

- (1) Mount turnbutton-pushbutton switch assembly (Fig. 4) on left side of set in front of switch hook. Use two shouldered screws furnished in kit.

- (2) Dress wiring across front of dial so terminal board is located at right front of set. Fasten terminal board to base with two furnished screws.
- (3) Replace D3BN with D10L mounting cord and make proper connections.
- (4) Replace faceplate with one supplied in kit of parts.
- (5) Replace housing and check set for proper operation.

### 3. ASSEMBLY

**3.01** Table A contains piece part information for the 660-, 663-, 1660-, and 1663-type telephone sets.

**3.02** To remove housing, loosen four captive screws through access holes in base of set. Lift housing straight off.

**3.03** To remove 8C dial:

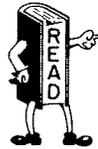
- (1) Loosen three screws holding dial adapter.
- (2) Shift dial to left until adapter clears screws.
- (3) Lift dial straight up and out. On sets with exclusion, disengage wire link from switch hook assembly.

**3.04** To replace 8C dial.

- (1) Remove dial from set as shown in 3.03.
- (2) Disconnect spade tipped dial leads.
- (3) Loosen two screws holding dial to adapter, and remove dial.
- (4) Attach replacement dial to adapter making sure dial is positioned properly.
- (5) Reterminate dial leads.
- (6) On sets with exclusion, start wire link from exclusion switch into hole on switch hook assembly. (See Fig. 5.)
- (7) Slide slots of dial adapter under dial mounting screws.
- (8) Move dial to right as far as possible and tighten screws.
- (9) Check operation of 8C dial and exclusion switch if provided.

**3.05** To replace 41-type dial:

- (1) Temporarily disconnect 18-volt ac power supply to dial.



*If dial receives its power from a common source such as 101G power supply, take care that other services are not affected.*

- (2) Disconnect wiring from terminal strip on rear of dial (Fig. 6).
- (3) Turn set on side and remove three screws holding dial to baseplate. Dial can now be removed.
- (4) Place new dial in position taking care not to pinch any wiring between dial and baseplate.
- (5) Fasten dial to baseplate with three mounting screws.
- (6) Reterminate leads to dial on terminal strip.
- (7) Reconnect power supply.
- (8) Using properly coded card, check operation of the dial.

**3.06** To remove 26D dial:

- (1) Remove housing as shown in 3.02.
- (2) Disconnect spade tipped dial leads from network and TB1 (Fig. 4).
- (3) Lay set on side and remove two screws holding dial to base. Dial can then be lifted out.

**3.07** To replace 26D dial:

- (1) Dress spade tipped leads towards components on which they terminate.
- (2) Move dial into position. Be sure locating tabs on dial mounting enter slots in base.
- (3) Fasten dial to base with two (26B) or three (26D) mounting screws.

*Note:* Take extreme care not to pinch wiring between dial and base or dial and other components. Also be sure that wiring or components on bottom of dial are not resting on gong. This reduces ringer volume.

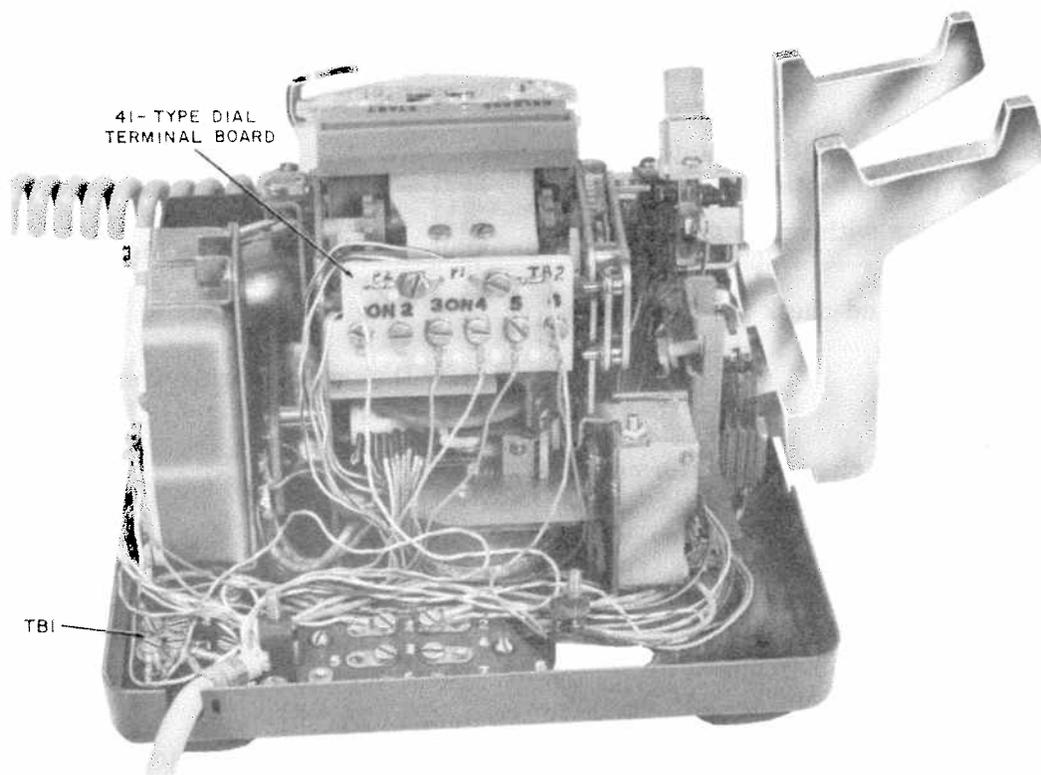


Fig. 6 — 660-Type Telephone Set, Terminal Boards

- (4) Reterminate spade tipped dial leads.
- (5) Replace housing and check manual dialing operations. Use properly coded card to check card dialer.

### 3.08 To remove M1A ringer:

- (1) Remove housing and place telephone set on side.
- (2) Remove two screws holding dial to base.
- (3) Lift dial straight up and back toward network to expose ringer. Dial leads are of sufficient length and need not be disconnected.
- (4) Disconnect ringer leads from TB1.
- (5) Remove two screws holding ringer to base and remove ringer.

**3.09** To replace ringer, reverse procedure shown in 3.08, again taking care that no wiring is pinched between components.

## 4. INSTALLATION

*Caution: Never connect 48-volt test battery across tip and ring of set without placing a current limiting resistor in series with the battery. Use a KS-13490, List 1 (1000 ohm 1/2 watt) resistor or equivalent. Failure to do so will result in damage to the pulsing switch or the start switch of the 41-type dial.*

**4.01** Table B shows the capacities of power supplies used with 660-, 663-, 1660-, and 1663-type card dialers.

**4.02** To install station number card (TOUCH-TONE sets), remove faceplate as follows:

- (1) Place KS-16750, List 1 releaser at edge of faceplate catch (Fig. 2).
- (2) Push catch toward rear of set until releaser hits notched portion of faceplate.
- (3) Turn point of releaser under faceplate and raise.

**TABLE B**  
**POWER SUPPLY CAPACITIES USED WITH 660-, 663-, 1660-, AND 1663-TYPE SETS**

POWER SUPPLY (SEE NOTE 1)	CAPACITY OF POWER SUPPLY	MAXIMUM DISTANCE BETWEEN DIAL AND POWER SUPPLY (IN FEET)		
		CABLE BUA (22 GA)	CABLE D, 1W (24 GA)	JKT (20 GA)
101G or 101J	6 Dials	1200	800	2050
KS-16886, L2 Transformer	3 Dials	1150	700	1850
2075A Transformer (See Note 2)	1 Dial	675	425	1075

**Note 1:** This table is based on the premise that the power supply is used for powering 41-type dials (rotary dials only) wired independently back to the power supply. If the power supply is used for other services such as lamps, buzzers, etc, or if it is necessary to power more than one dial per conductor loop, check the voltage at the dial. When checking the voltage, any auxiliary equipment should be operating to ensure that the load placed on the power supply is typical of normal operation.

**Note 2:** For mounting the 2075A transformer, use two No. 6 by 3/4-in. wood screws.

- (4) Slide number card behind number card retainer.
- (5) Replace faceplate using releaser to hold catch until faceplate is in position.

## 5. CONNECTIONS

**5.01** Connections for 660-, 663-, 1660-, and 1663-type telephone sets are shown in Fig. 9 through 16 and in Tables C through L.

## 6. CODING CARD

**6.01** It is important to properly punch and check cards for accuracy to ensure satisfactory results. (See Fig. 7 and 8.)

**6.02** Code cards as follows:

- (1) Write name and telephone number in spaces provided as shown in Fig. 7 and 8.
- (2) Convert exchange letters to numbers. For example: use 2 for A, B, or C and 7 for P, R, or S.

**Note:** There are two groups of numbers 1 through 0 on the card. (See Fig. 7.)

- (3) In Fig. 7 the first digit of the telephone number is 5. In column 1, locate digit 5 in the first group of numbers and punch out the perforation with a pencil or ballpoint pen. In the same column, locate digit 5 in the second group of numbers and again punch out the perforation.

**Note:** The STOP in column 1 is already punched.

- (4) Repeat this procedure for each digit in the telephone number. The digit 0 must be punched out in each group of numbers just as any other digit.

- (5) For DDD calls, punch out the access code.

**6.03** On a PBX extension where a code (such as 9) is required to reach a central office line, prepare a card for dialing an access code (Fig. 8) as follows:

- (1) Punch out the access code in column 1.
- (2) If a second dial tone is required, punch out the STOP in column 2.
- (3) Beginning in column 2, punch out in the regular manner the directing or area code, if any, and telephone number.

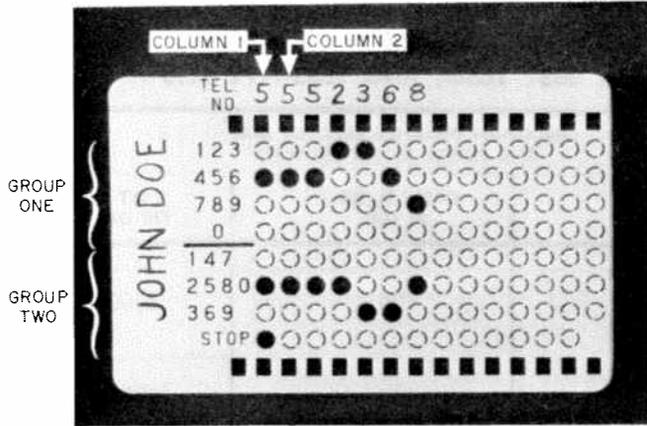


Fig. 7 — Card Coded for 7-Digit Telephone Number

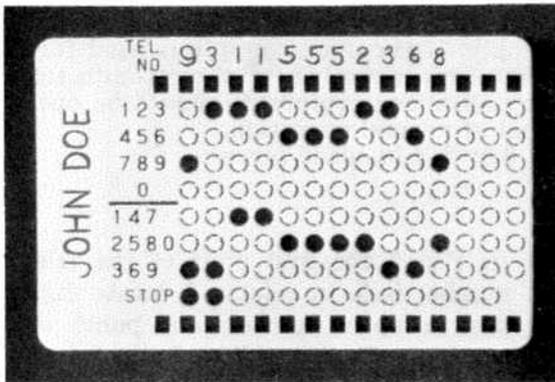


Fig. 8 — Card Coded for Access Code (9), Stop, Area Code (311), and 7-Digit Telephone Number

**6.04** Check card before using to be sure it is properly punched for the number desired. There should be at least two holes in each column, three if stop is needed. Punch holes out completely.

## 7. OPERATION

**7.01** Operate card dialer as follows :

- (1) Insert punched card into dialer slot with name on top, facing front of set. Push card down completely.
- (2) Remove handset and listen for dial tone.
- (3) Depress dialer START bar (Fig. 1 and 2). Card dialer will “read out” punched card.

(4) The 26D dialer will “read out” in 2 to 3 seconds. The card can be removed following “read out”, since there is no STOP punched at the end of the number.

(5) After completing call, replace handset.

(6) To abandon call with a 26D or 41-type dialer, restore handset. Card dialer will continue to read entire card.

**7.02** For cards coded for an access code, repeat steps 1 and 2 in 6.01. Depress START bar. After access code is dialed, card will stop. When second dial tone is heard, depress START bar again and the remaining digits will be dialed.

**7.03** The card dialer can be dialed manually in the normal manner.

## 8. MAINTENANCE

**8.01** See appropriate sections for maintenance of components such as handset, ringer, etc.

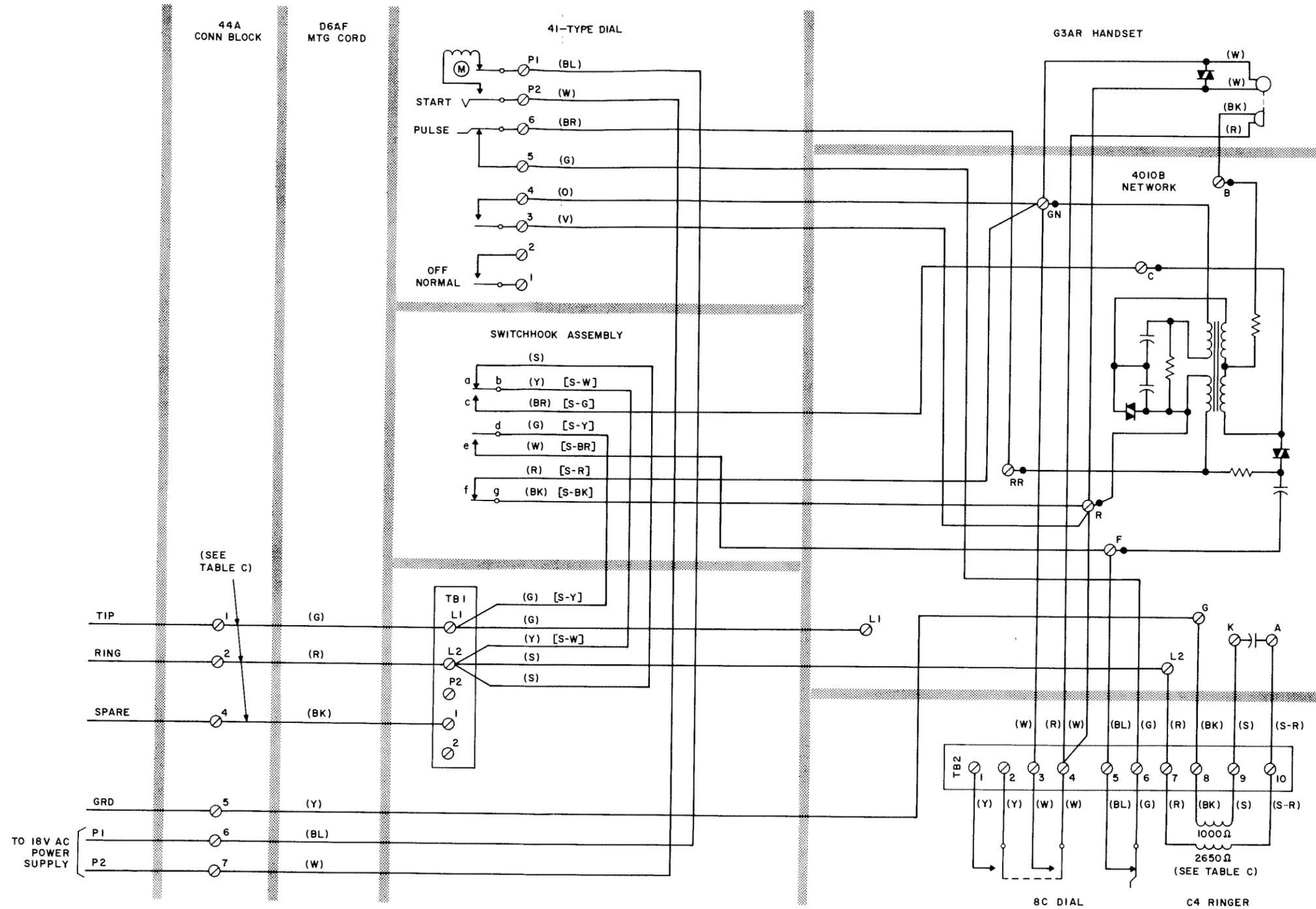
**8.02** Maintenance of the card dialer is limited to the following :

- (a) Sticking cards — make visual inspection of dialer for loose parts or wire interfering with dialer.
- (b) Foreign material — check for material such as paper clips, hairpins, etc lodged in card slot.
- (c) Faulty cards — check cards for proper size by comparing with a working card. Replace bent or mutilated cards.
- (d) Inoperative dial — check polarity of line (26D only). The 26D dial requires negative battery on the (O-BK) lead of the dial and ground or positive potential on the (G) lead.
- (e) Wrong numbers — check at least twice on each line with a test code card. Check operation of TOUCH-TONE dial or rotary dial in the normal manner.

**8.03** If trouble tests in the card dialer, replace dialer.

**Note:** Do not make any adjustments of card dialer in the field.

**8.04** A nonglare faceplate (Table A) is available for replacement at locations where there are light reflections in the dial area. See 4.02 for removal of faceplate.



( ) INDICATES CURRENT COLOR CODE.  
 [ ] INDICATES MD COLOR CODE.

Fig. 9 — 660A1 Telephone Set, Connections

Table C and Fig. 9

**TABLE C**  
**LINE AND RINGER CONNECTIONS — 660A1 TELEPHONE SET**

WIRE OR LEAD		INDIV OR BRIDGED	RING PARTY	TIP PARTY			1A1 OR 1A2 KEY TEL SYSTEM†
				NO IDENT GROUND	IDENTIFYING GROUND		
					1000Ω	2650Ω	
Line Wire	Tip		1	1	1	1	1
	Ring		2	2	2	2	2
	Grd A1		5*	5	5	5	5
	A	Connecting Block	4	4	4	4	4
Mounting Cord	G		1	1	2	2	1
	R		2	2	1	1	2
	Y		1	5	5	5	5
	BK		4	4	4	4	4
Mounting Cord in Set	G	TB1	L1	L1	L1	L1	L1
	R		L2	L2	L2	L2	L2
	Y		G†	G†	G†	G†	2
	BK		1	1	1	1	1
Ringer Leads	R	TB2	7	7	7	7	7
	BK		8	8	8	8	8
	S		9	9	9	9	9
	S-R		10	10	10	10	10
Ringer Straps	R	Ntwk	L2	L2	L2	K	B
	BK		G	G	G	B	L1
	S		K	K	K	K	K
	S-R		A	A	A	B	G
Switch Hook Leads	S	TB1	L2	L2	L2	A†	2
	[S-W] (Y)		L2	L2	L2	L2	2
	[S-G] (BR)		C†	C†	C†	C†	1

\* Ground may be omitted if not required for service. Not required for protection of 41-type dial power supply.

† Terminals on network.

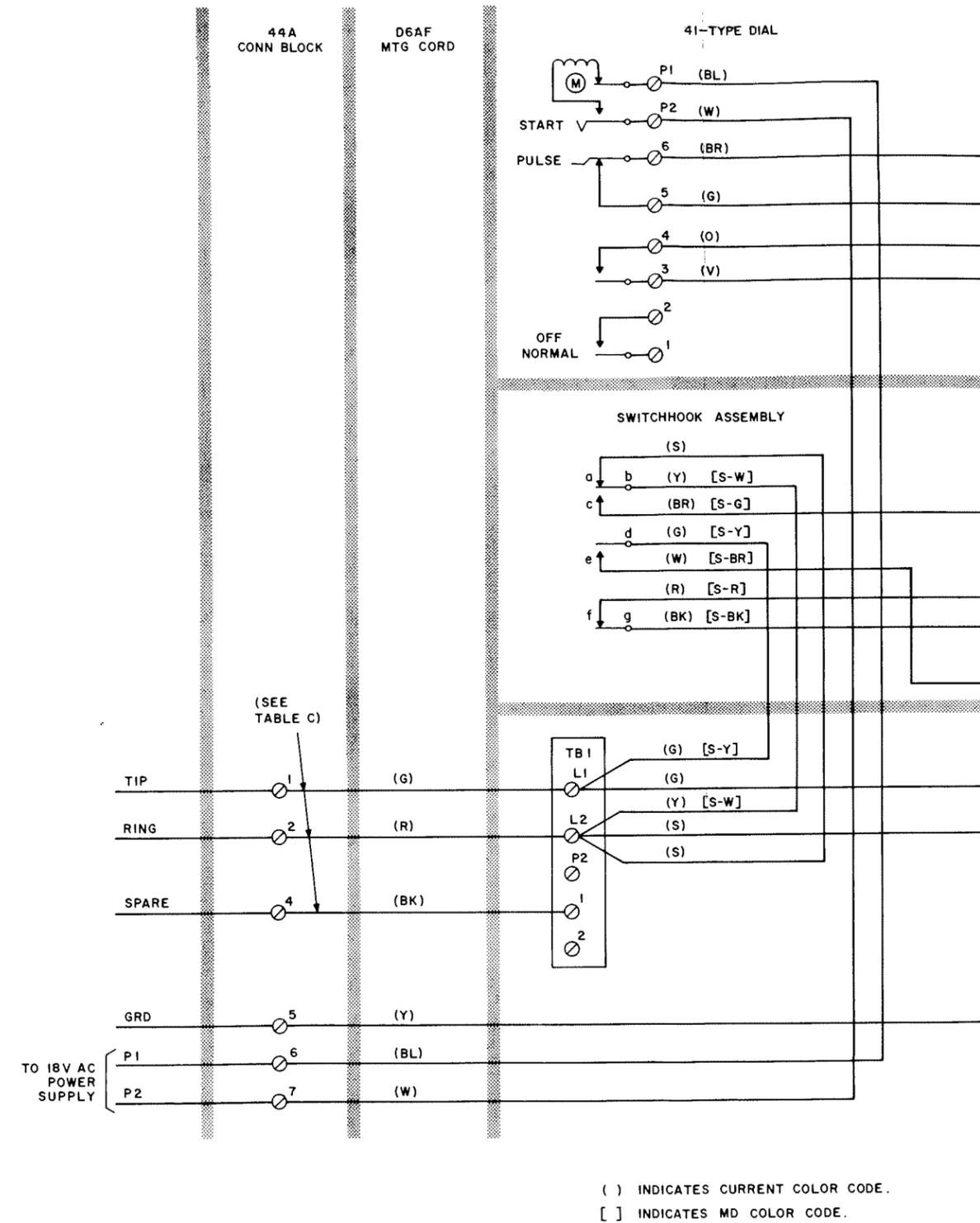
‡ For 1A1 or 1A2:

● Move (R) and (S) from L2 of network to C of network.

● Move (BK) from G of network to L1 of network.

( ) Indicates current color code.

[ ] Indicates MD color code.



**Fig. 9 — 660A1 Telephone Set, Conn**

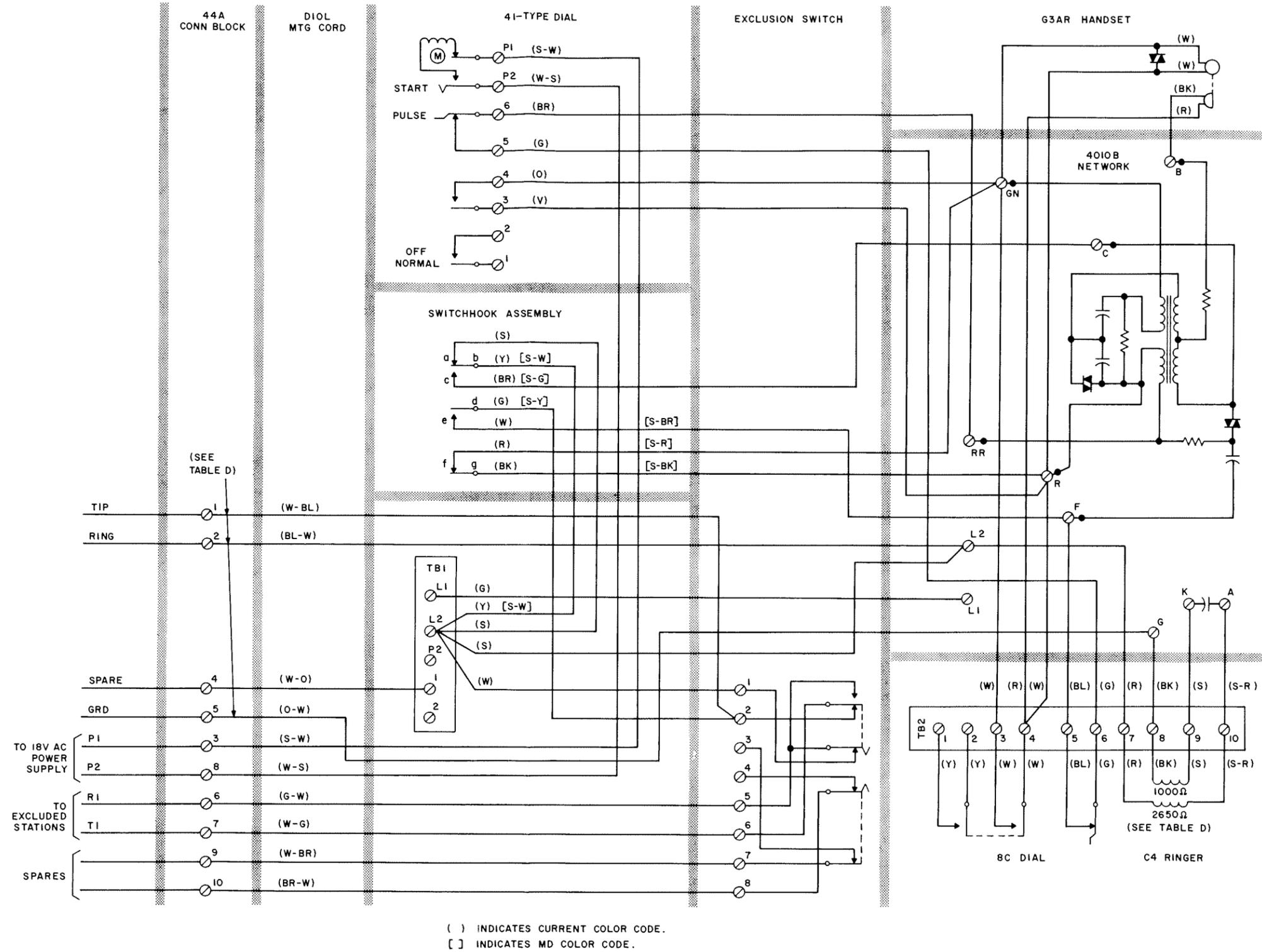


Fig. 10 — 660A2 Telephone Set, Connections

Table D and Fig. 10

**TABLE D**  
**LINE AND RINGER CONNECTIONS — 660A2 TELEPHONE SET**

WIRE OR LEAD		INDIV OR BRIDGED	RING PARTY	TIP PARTY			1A1 OR 1A2 KEY TEL SYSTEM†	
				NO IDENT GROUND	IDENTIFYING GROUND			
					1000Ω	2650Ω		
Line Wire	Tip		1	1	1	1	1	
	Ring		2	2	2	2	2	
	Grd A1		5*	5	5	5	5	
	A	Connecting Block	4	4	4	4	4	
Mounting Cord	W-BL		1	1	2	2	1	
	BL-W		2	2	1	1	2	
	O-W		1	5	5	5	5	
	W-O		4	4	4	4	4	
Mounting Cord in Set	W-BL		2†	2†	2†	2†	2†	
	BL-W		L2‡	L2‡	L2‡	L2‡	1†	
	O-W		G‡	G‡	G‡	G‡	P2§	
	W-O		1§	1§	1§	1§	1§	
	Ringer Leads	R BK S S-R	TB2	7 8 9 10	7 8 9 10	7 8 9 10	7 8 9 10	7 8 9 10
Ringer Straps	R	Ntwk	L2	L2	L2	K	B	C
	BK		G	G	G	G	B	G
	S		K	K	K	B	K	K
	S-R		A	A	A	B	G	A
Switch Hook Leads	S	TB1	L2	L2	L2	A‡	A‡	P2§
	[S-W] (Y)		L2	L2	L2	L2	L2	P2§
	[S-G] (BR)		C‡	C‡	C‡	C‡	C‡	1†

\* Ground may be omitted if not required for service. Not required for protection of 41-type dial power supply.

† Terminal on exclusion switch terminal board.

‡ Terminal on network.

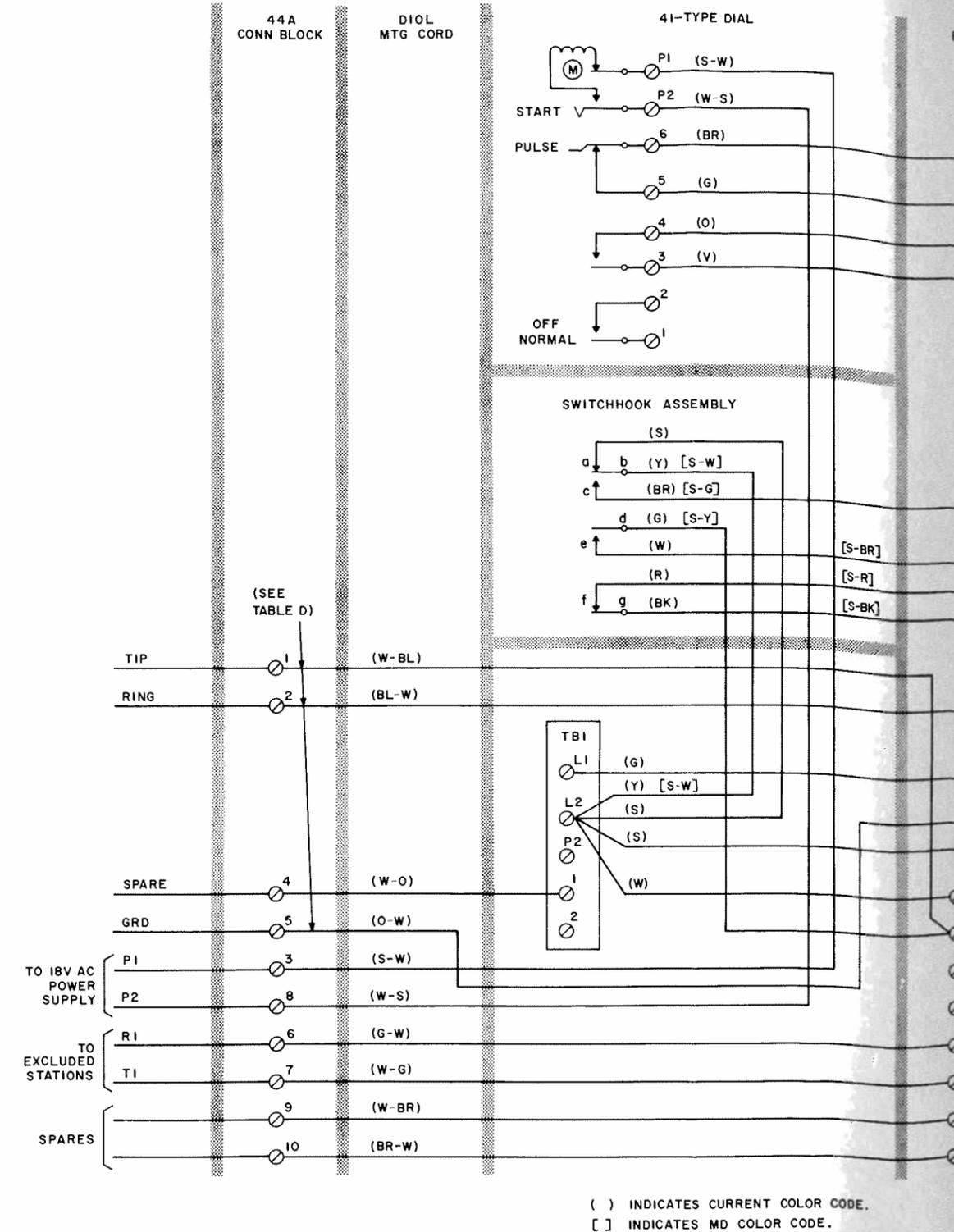
§ TB1.

• For 1A1 or 1A2:

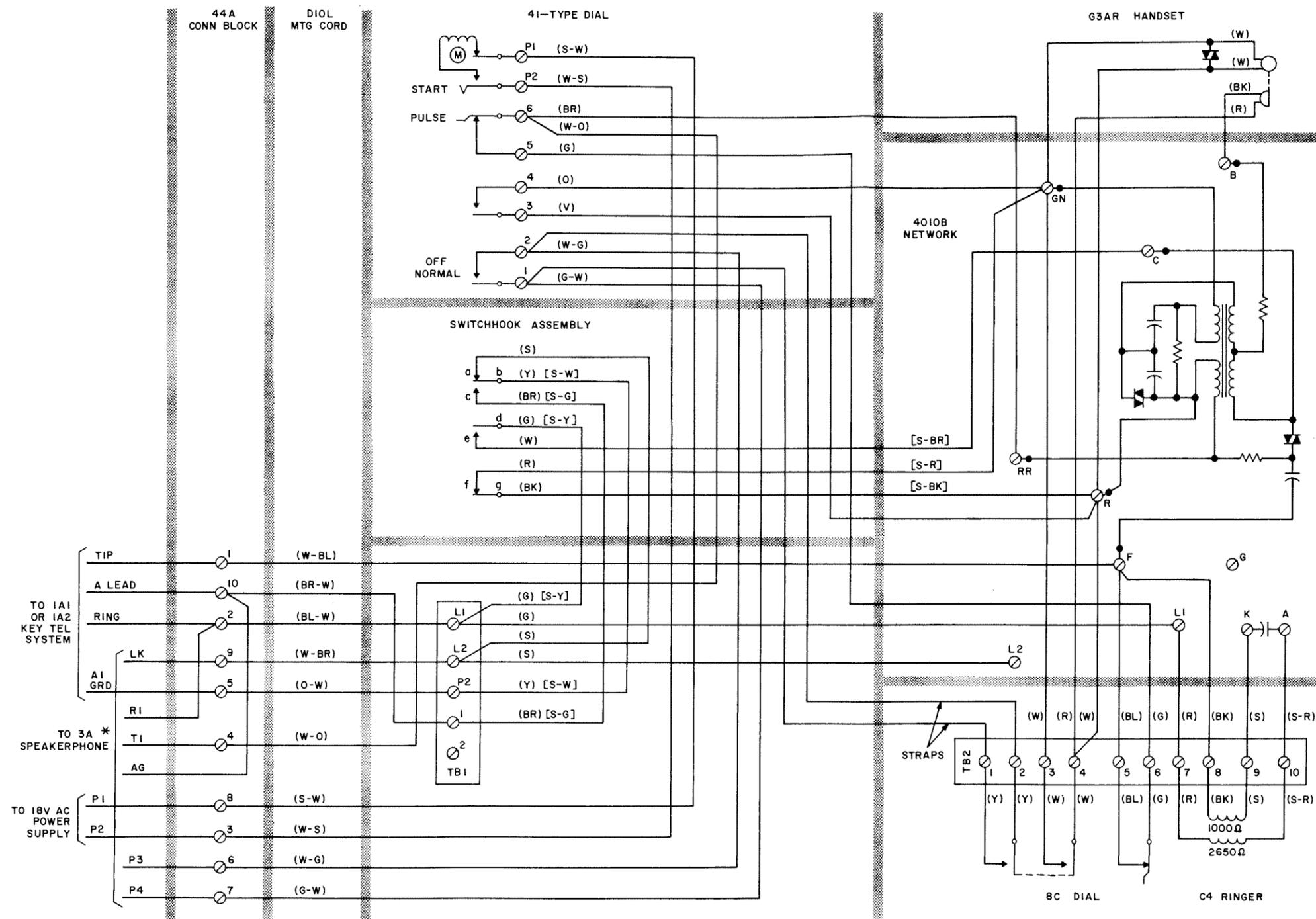
- Move (W) from L2 of TB1 to C of network.
- Remove (G) strap from L1 of TB1 to L1 of network.
- Place (G) strap from 2 of exclusion switch to G of network.

( ) Indicates current color code.

[ ] Indicates MD color code.



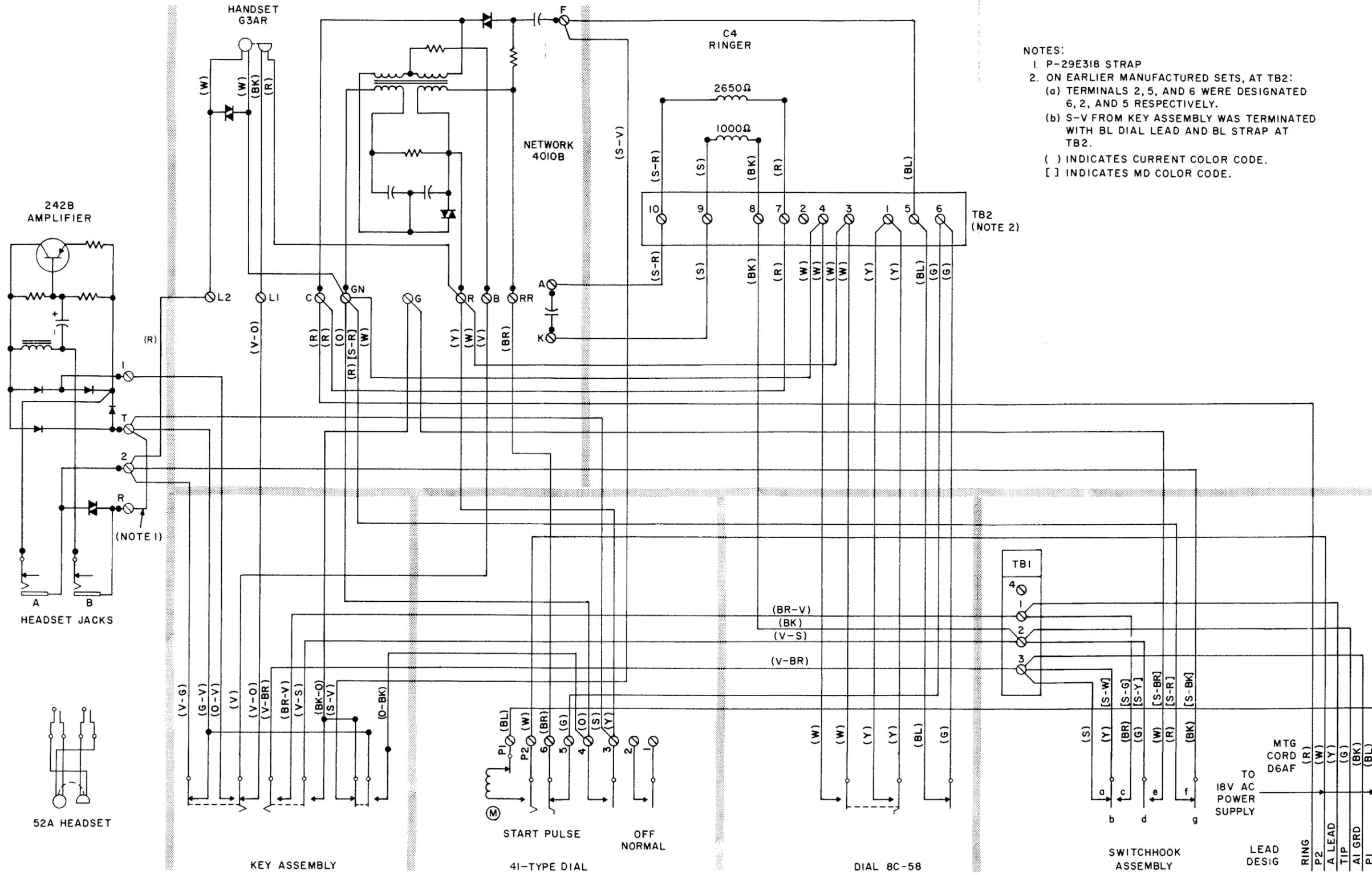
**Fig. 10 — 660A2 Telephone Set, Con**



\* A1 GRD FOR SPEAKERPHONE CONTROL FURNISHED AT CONTROL UNIT.  
 ( ) INDICATES CURRENT COLOR CODE.  
 [ ] INDICATES MD COLOR CODE.

Fig. 11 — 660A1 Telephone Set, Speakerphone Connections





- NOTES:
1. P-29E318 STRAP
  2. ON EARLIER MANUFACTURED SETS, AT TB2:
    - (a) TERMINALS 2, 5, AND 6 WERE DESIGNATED 6, 2, AND 5 RESPECTIVELY.
    - (b) S-V FROM KEY ASSEMBLY WAS TERMINATED WITH BL DIAL LEAD AND BL STRAP AT TB2.
- ( ) INDICATES CURRENT COLOR CODE.  
 [ ] INDICATES MD COLOR CODE.

Fig. 12 — 663A1 Telephone Set, Connections

Table F and Fig. 12

TABLE F  
LINE AND RINGER CONNECTIONS — 663A1 TELEPHONE SET

WIRE OR LEAD		INDIV OR BRIDGED	RING PARTY	TIP PARTY			
				NO INDENT GROUND	IDENT GROUND		
					1000Ω	2650Ω	
Line Wire	Tip	Connecting Block	1	1	1	1	
	Ring		2	2	2	2	
	Grd A1		5*	5	5	5	
	A		4	4	4	4	
Mounting Cord	G	Connecting Block	1	1	1	1	
	R		2	2	2	2	
	Y		4	4	4	4	
	BK		5	5	5	5	
Mounting Cord in Set	G	TB1	2	2	2	2	
	R		C†	C†	C†	F†	F†
	Y		1	1	1	1	1
	BK		3	3	3	3	3
Ringer Leads	R	TB2	7	7	7	7	
	BK		8	8	8	8	
	S		9	9	9	9	
	S-R		10	10	10	9	9
Ringer Straps	R	Ntwk	C	C	2‡	K	3‡
	BK		2‡	3‡	3‡	3‡	K
	S		K	K	K	B	B
	S-R		A	A	A	B§	B§
Switch Hook Leads	[S-BR] (W)	Ntwk	Q	G	G	G	G
Key Assembly Leads	S-V	F	F	F	F	C	C

\* Ground may be omitted if not required for service. Not required for protection of 41-type dial power supply.

† Network terminal.

‡ TB1.

§ Place M1W cord or equivalent from A of network to 2 of TB1.

( ) Indicates current color code.

[ ] Indicates MD color code.

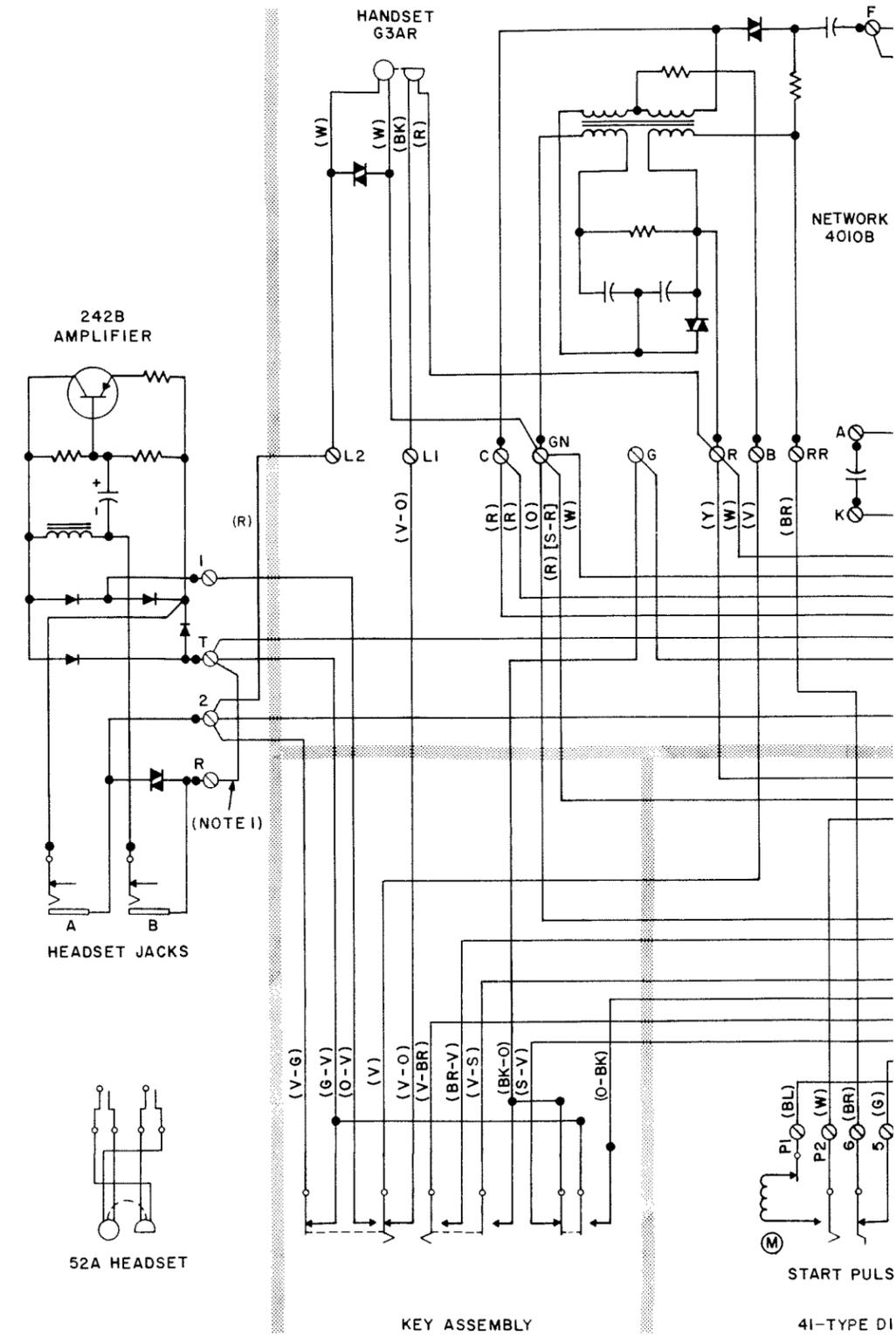


Fig.

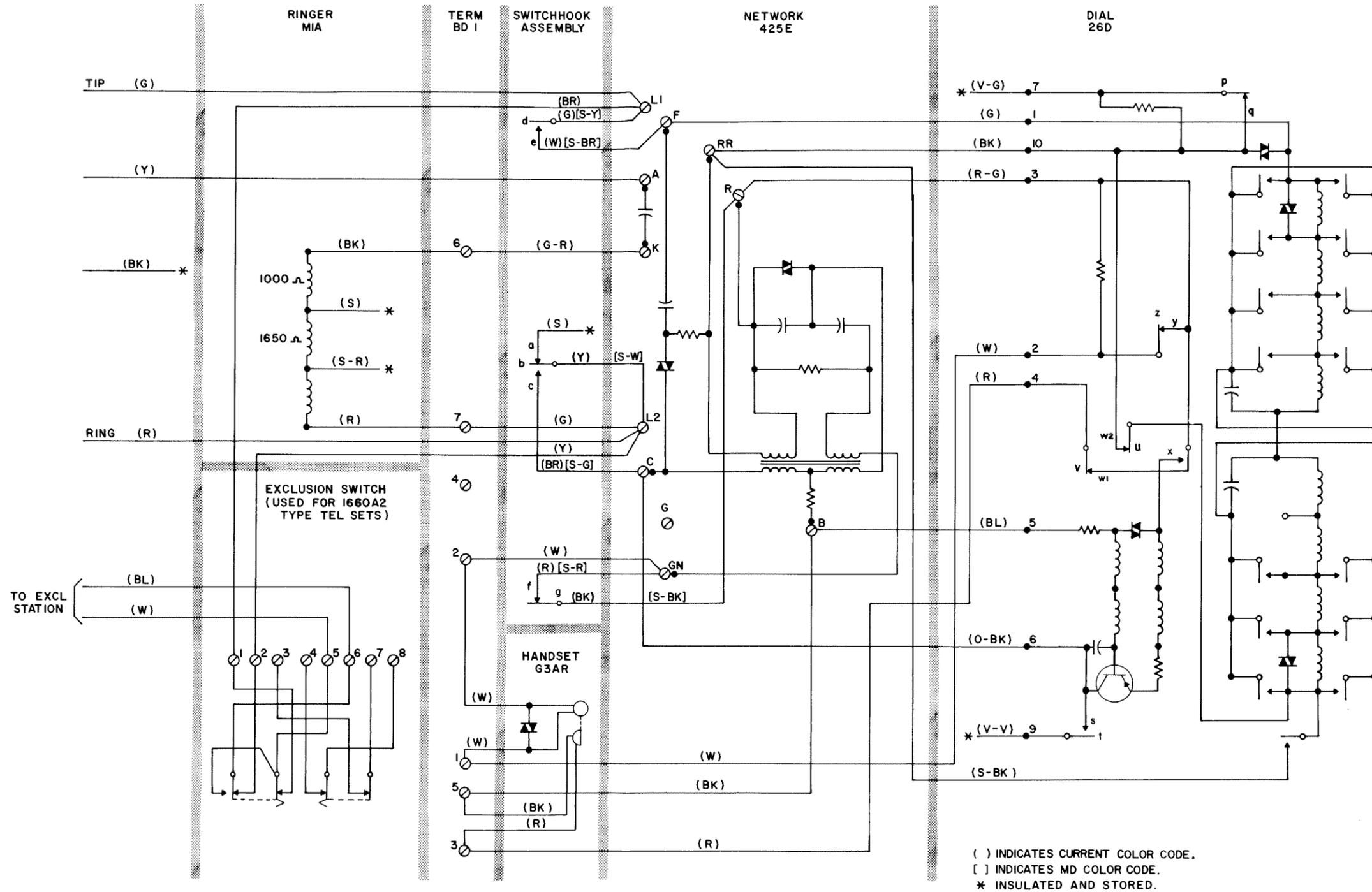


Fig. 13 — 1660A1 and 1660A2 Telephone Sets, Connections

Table G and Fig. 13

TABLE G

LINE AND RINGER CONNECTIONS — 1660A1 AND 1660A2 TELEPHONE SETS

WIRE OR LEAD		INDIV OP BRIDGED	RING PARTY	TIP PARTY			1A1 OR 1A2* KEY TEL SYSTEM	EXCLUSION†	
				NO IDENT GROUND	IDENT GROUND				
					1000 Ω	2650 Ω			
Mounting Cord at Connecting Block	Tip	G	G	G	G	G	G	1	
	Ring	R	R	R	R	R	R	2	
	Grd A1	Y	G	Y	Y	Y	Y	4	
	A	BK					BK	5	
	ET	BL						6	
	ER	W						7	
Mounting Cord in Set	Tip	G	L1	L1	L1	L2	L2	A	L1
	Ring	R	L2	L2	L2	L1	L1	C	L2
	Grd A1	Y	A	A	A	G	G	G	A
	A	BK						L2	§
	ET	BL							6 §
	ER	W							5 §
Ringer Leads	R	7	7	7	7	7	7	7	7
	BK	6	6	6	6	6	6	6	6
	S	‡	‡	‡	5	§	‡	‡	‡
	S-R	‡	‡	‡	‡	5	‡	‡	‡
Switch Hook Leads	[S-BR](W)	F	F	F	C	C	F	F	F
	[S-G](BR)	C	C	C	F	F	L2	C	C
	S				K	K			
	[S-Y](G)	L1	L1	L1	L1	L1	A	L1	L1
	[S-W](Y)	L2	L2	L2	L2	L2	G	L2	L2
Ringer Straps	G	7 to L2	7 to L2	7 to L1	7 to A	7 to A	7 to C	7 to L2	
	G-R	6 to K	6 to K	6 to K	6 to G	6 to G	6 to K	6 to K	
Exclusion Straps	BR								1 to L1 §
	Y								2 to L2 §

\* Replace D3BN with D4BK mounting cord.

† Replace D3BN with D6AF mounting cord.

‡ Insulate and store.

§ Terminals on exclusion terminal board.

( ) Indicates current color code.

[ ] Indicates MD color code.

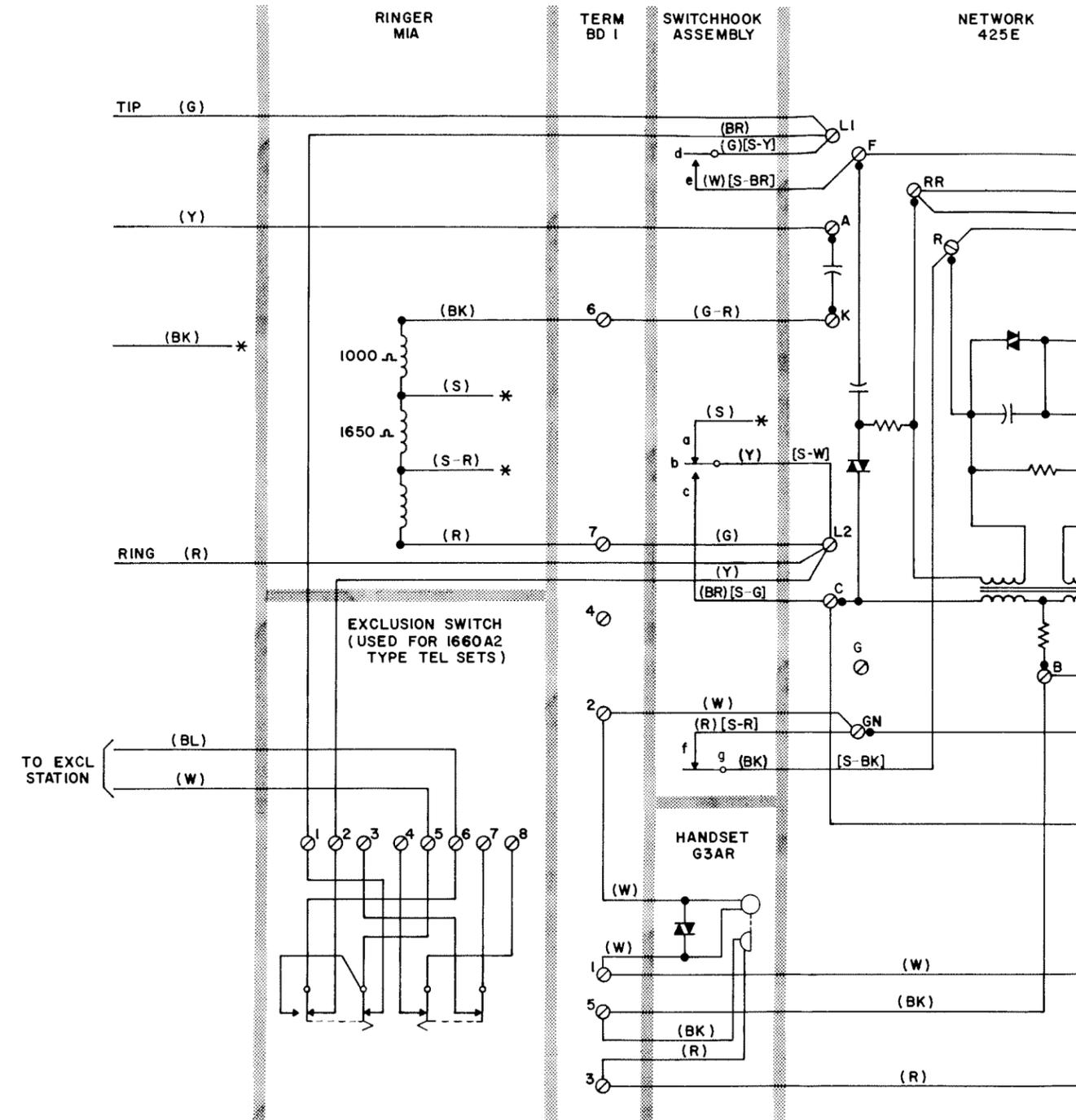


Fig. 13 — 1660A1 and 1660A2 Telephone Sets, Co

**TABLE H**  
**LINE AND RINGER CONNECTIONS — 1660A3 TELEPHONE SET**

CONNECTIONS TO TERMINALS IN SET													EXTERNAL CONNECTIONS TO MOUNTING CORD													
MOUNTING CORD LEADS								TURN KEY LEADS			RINGER STRAPS (NOTE)		LINE 1				LINE 2			CUTOFF CIRCUIT			COMMON OR PRIVATE RINGER CIRCUIT		SIGNAL CIRCUIT	
W-O	O-W	W-G	G-W	W-BR	BR-W	W-S	S-W	O-W	G-BK	S-R	V	G	TIP	RING	A	A1-SG	TIP	RING	A	TIP	RING	A	R	B	S	G
G	L2	1	2	7	*	3	9	G	F	5	F	5	W-BL	BL-W	W-O	O-W				W-G	G-W	W-BR			W-S	S-W
G	L2	1	2	7	*	3	9	G	F	5	1	2	W-BL	BL-W	W-O	O-W				W-G	G-W	W-BR			W-S	S-W
7	L2	8	4	6		3	9	G	F	5	1	2	W-BL	BL-W	W-O	O-W	W-G	G-W	W-BR					W-S	S-W	
7	L2	8	4	6	3	A	7†	G	F	5	*	*	W-BL	BL-W	W-O	O-W	W-G	G-W	W-BR			W-S	S-W	BR-W	†	

nal F (network).

ringing on Line 1. For ringing on Line 2 move (V) and (G) to terminals 8 and 4.

**TABLE J**  
**LINE AND RINGER CONNECTIONS — 1660A4 TELEPHONE SET**

CONNECTIONS TO TERMINALS IN SET													EXTERNAL CONNECTIONS TO MOUNTING CORD																	
MOUNTING CORD LEADS							TURN KEY LEADS			EXCLUSION KEY LEADS (NOTE 1)			RINGER STRAPS (NOTE 2)		LINE 1				LINE 2			CUTOFF CIRCUIT			EXCLUDED CIRCUIT			SIGNAL CIRCUIT		
O-W	W-G	G-W	W-BR	BR-W	W-S	S-W	O-W	G-BK	S-R	BR	S	R-G	V	G	TIP	RING	A	A1	TIP	RING	A	TIP	RING	A	TIP	RING	A	S	G	
L2	1	2	7	8†	6†	5†	G	F	5	5	F	G	1†	2†	W-BL	BL-W	W-O	O-W				W-G	G-W	W-BR	W-S	S-W	BR-W			
L2	1	2	7	*	3	9	G	F	5	5	F	*	5†	6†	W-BL	BL-W	W-O	O-W				W-G	G-W	W-BR			W-S	S-W		
L2	3	9	*	8†	6†	5†	G	F	5	5	F	G	1	2	W-BL	BL-W	W-O	O-W							W-S	S-W	BR-W	W-G	G-W	
L2	8	4	6	8†	6†	5†	G	F	5	2	1	7	1	2	W-BL	BL-W	W-O	O-W	W-G	G-W	W-BR					W-S	S-W	BR-W		
L2	8	4	6	*	3	9	G	F	5	2	1	*	5†	6†	W-BL	BL-W	W-O	O-W	W-G	G-W	W-BR					W-S	S-W			

inals 8, 4, and 6, respectively.

.4.

Table H and J

**TABLE H**  
**LINE AND RINGER CONNECTIONS — 1660A3 TELEPHONE SET**

NO. OF LINES PICKED UP	FEATURES						CONNECTIONS TO TERMINALS IN SET													EXTERNAL CONNECTIONS TO MOUNTING COR							
	SIGNALING	RINGER IN SET USED AS		TURN KEY USED TO CUT OFF		MOUNTING CORD LEADS	TURN KEY LEADS						RINGER STRAPS (NOTE)		LINE 1			LINE 2									
		LINE RINGER	COM. OR PVT. LINE RINGER	EXT. STA. OR EXT. RINGER	RINGER IN SET																						
		W-BL	BL-W	W-O	O-W																W-G	G-W	W-BR	BR-W	W-S	S-W	O-W
1	●	●		●		F	5	G	L2	1	2	7	*	3	9	G	F	5	F	5	W-BL	BL-W	W-O	O-W			
1	●	●		●	●	F	5	G	L2	1	2	7	*	3	9	G	F	5	1	2	W-BL	BL-W	W-O	O-W			
2	●	●				1	2	7	L2	8	4	6		3	9	G	F	5	1	2	W-BL	BL-W	W-O	O-W	W-G	G-W	W-BR
2	●		●			1	2	7	L2	8	4	6	3	A	7†	G	F	5	*	*	W-BL	BL-W	W-O	O-W	W-G	G-W	W-BR

\* Insulate and store

† Place strap between terminal 9 (TB2) and terminal F (network).

‡ TB1

Note: Two-line pickup connections provide for ringing on Line 1. For ringing on Line 2 move (V) and (G) to terminals 8 and 4.

**TABLE J**  
**LINE AND RINGER CONNECTIONS — 1660A4 TELEPHONE SET**

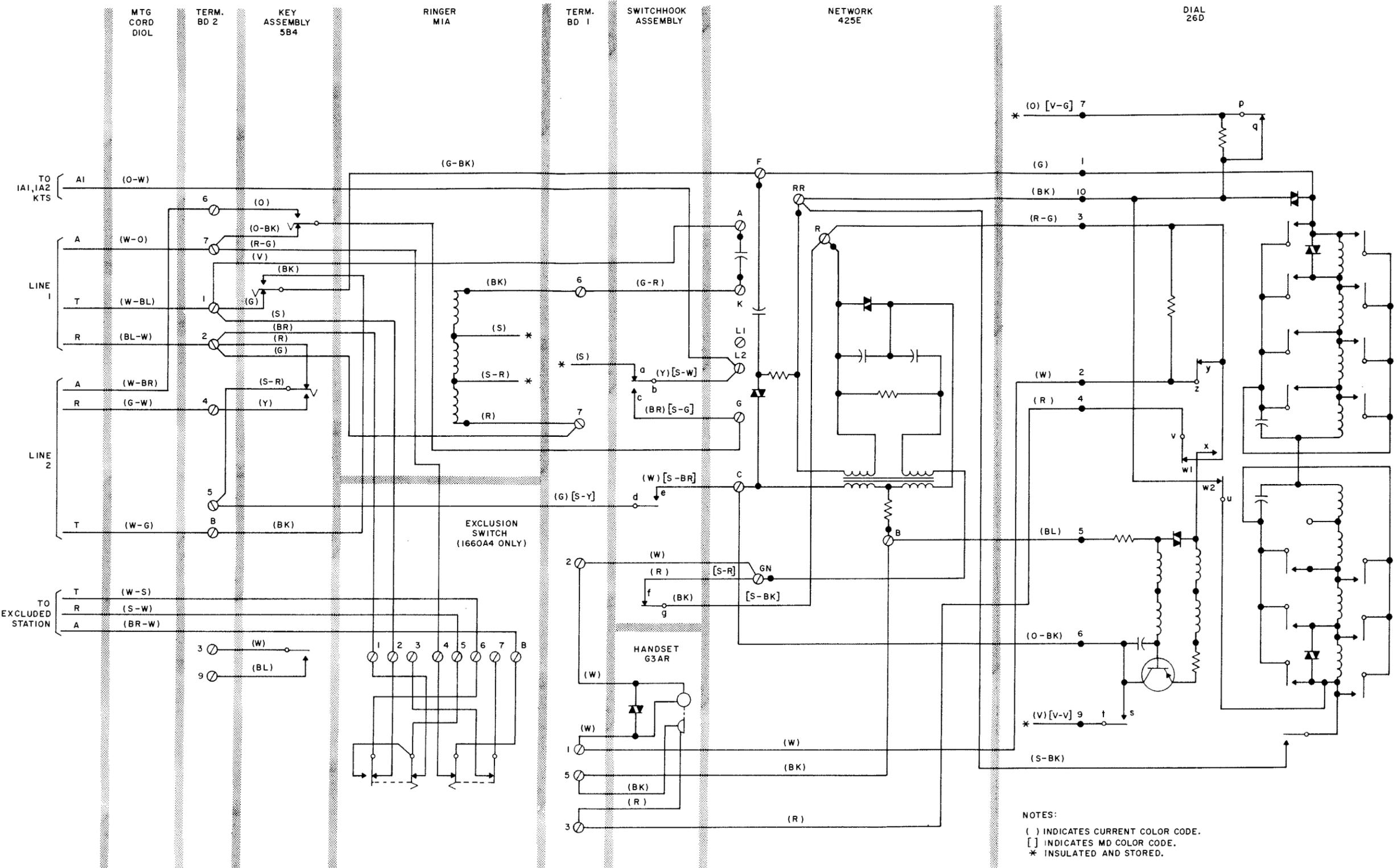
NO. OF LINES PICKED UP	FEATURES						CONNECTIONS TO TERMINALS IN SET													EXTERNAL CONNECTIONS TO MOUNTING COR												
	SIGNALING	RINGER IN SET USED AS		TURN KEY USED TO CUTOFF		EXCL. KEY USED TO CUTOFF		MOUNTING CORD LEADS	TURN KEY LEADS						EXCLUSION KEY LEADS (NOTE 1)			RINGER STRAPS (NOTE 2)		LINE 1			LINE 2									
		LINE RINGER	COM. OR PVT. LINE RINGER	EXT. STA. OR EXT. RINGER	RINGER IN SET	EXT. STA. OR EXT. RINGER	RINGER IN SET																									
		W-BL	BL-W	W-O	O-W	W-G	G-W																			W-BR	BR-W	W-S	S-W	O-W	G-BK	S-R
1		●		●		●		F	5	G	L2	1	2	7	8†	6†	5†	G	F	5	5	F	G	1†	2†	W-BL	BL-W	W-O	O-W			
1	●	●		●		●		F	5	G	L2	1	2	7	*	3	9	G	F	5	5	F	*	5†	6†	W-BL	BL-W	W-O	O-W			
1	●	●			●	●		F	5	G	L2	3	9	*	8†	6†	5†	G	F	5	5	F	G	1	2	W-BL	BL-W	W-O	O-W			
2		●				●		1	2	7	L2	8	4	6	8†	6†	5†	G	F	5	2	1	7	1	2	W-BL	BL-W	W-O	O-W	W-G	G-W	W-BR
2	●	●				●		1	2	7	L2	8	4	6	*	3	9	G	F	5	2	1	*	5†	6†	W-BL	BL-W	W-O	O-W	W-G	G-W	W-BR

\* Insulate and store.

† Exclusion switch terminal board.

Note 1: For exclusion on Line 2, move (S), (BR), and (R-G) to terminals 8, 4, and 6, respectively.

Note 2: For ringing on Line 2, move (V) and (G) to terminals 8 and 4.



NOTES:  
 ( ) INDICATES CURRENT COLOR CODE.  
 [ ] INDICATES MD COLOR CODE.  
 \* INSULATED AND STORED.

Fig. 14 — 1660A3 and 1660A4 Telephone Sets, Connections

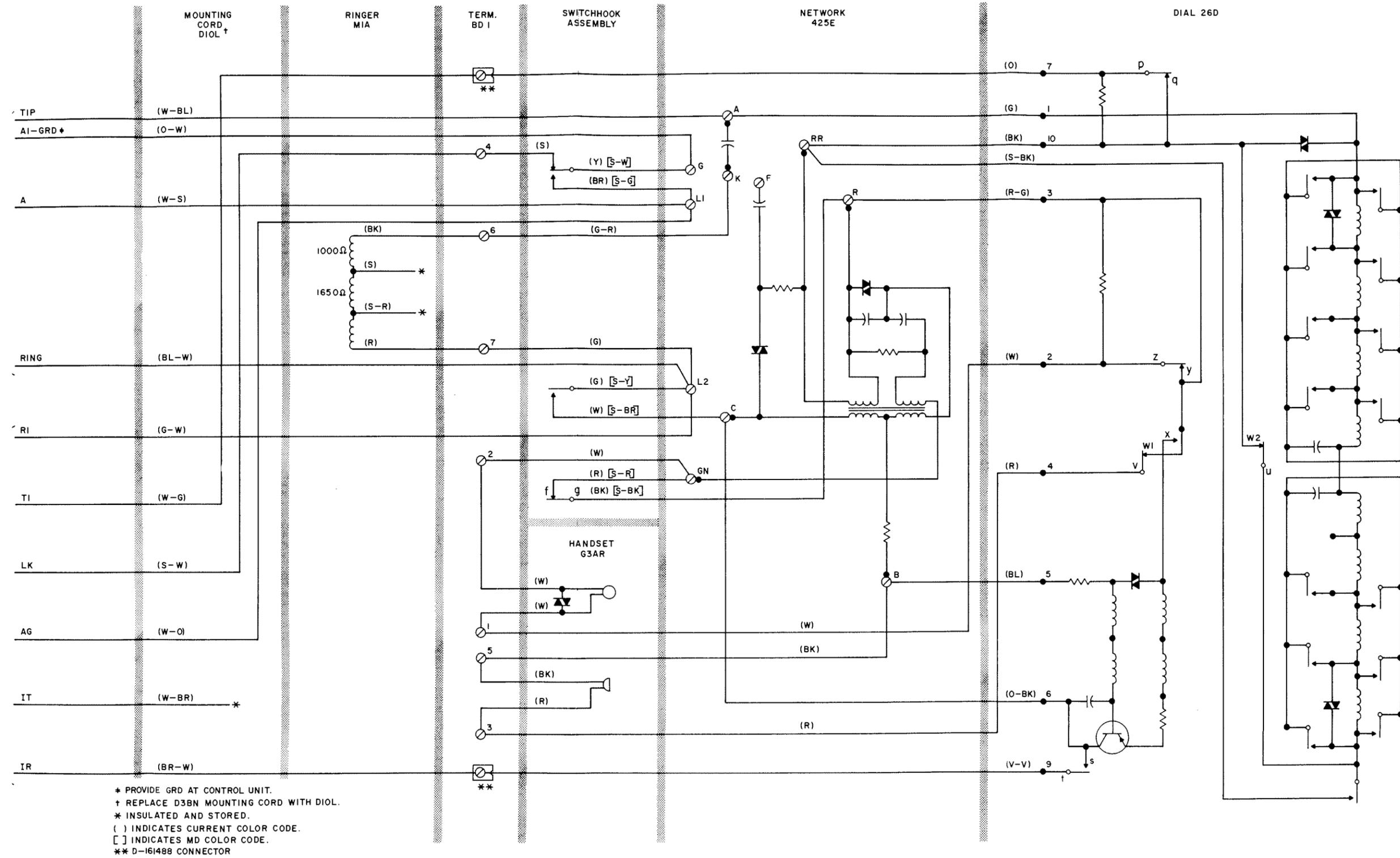


Fig. 15 — 1660A1 Telephone Set, Speakerphone Connections

Table K and Fig. 15

**TABLE K**  
**SPEAKERPHONE CONNECTIONS — 1660A1 TELEPHONE SET**

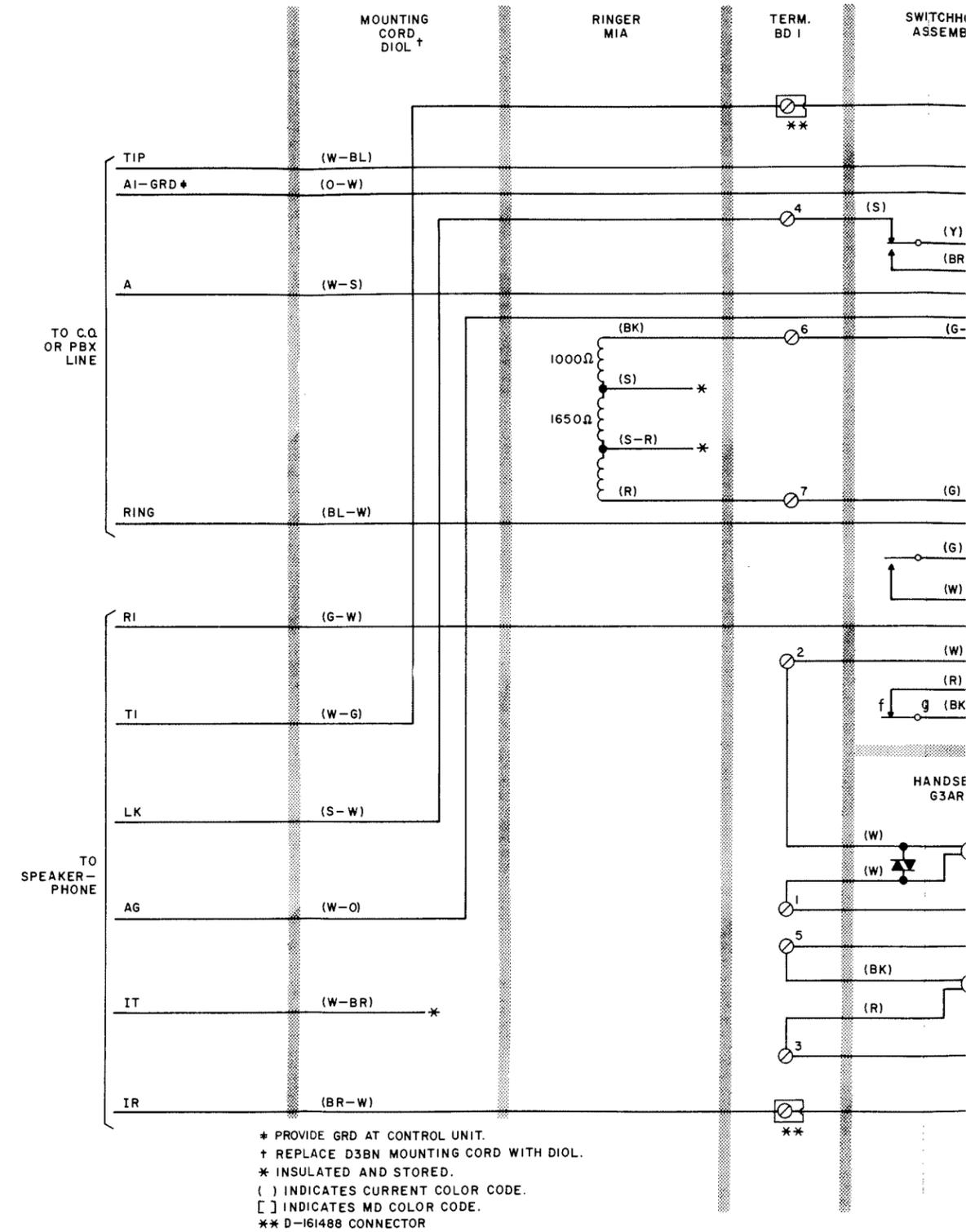
WIRE OR LEAD	INDIV OR BRIDGED	RING PARTY	TIP PARTY				1A1 OR 1A2 KEY TEL SYSTEM
			NO IDENT GROUND	IDENT GROUND			
				1000Ω	2650Ω		
Switch Hook	[S-G] (BR)	*	*	*	*	*	L1
	[S-W] (Y)	G	A	G	G	G	G
	[S-Y] (G)	L2	L2	L2	L2	L2	L2
	[S-BR] (W)	C	C	C	C	C	C
Mounting Cord	W-BL	A	G	A	A	A	A
	O-W	G	A	G	G	G	G
Dial	G	A	G	A	A	A	A
Ringer Straps	G-R	K	K	K	G	G	K
	G	L2	L2	G	K	K	L2
Ringer Leads	R	7	7	7	7	7	7
	BK	6	6	6	6	6	6
	S	*	*	*	B	*	*
	S-R	*	*	*	B	B	*

\* Insulate and store.

( ) Indicates current color code.

[ ] Indicates MD color code.

**Note:** Replace D3BN mounting cord with D10L and arrange wiring as shown in Table K and Fig. 15.



**Fig. 15 — 1660A1**

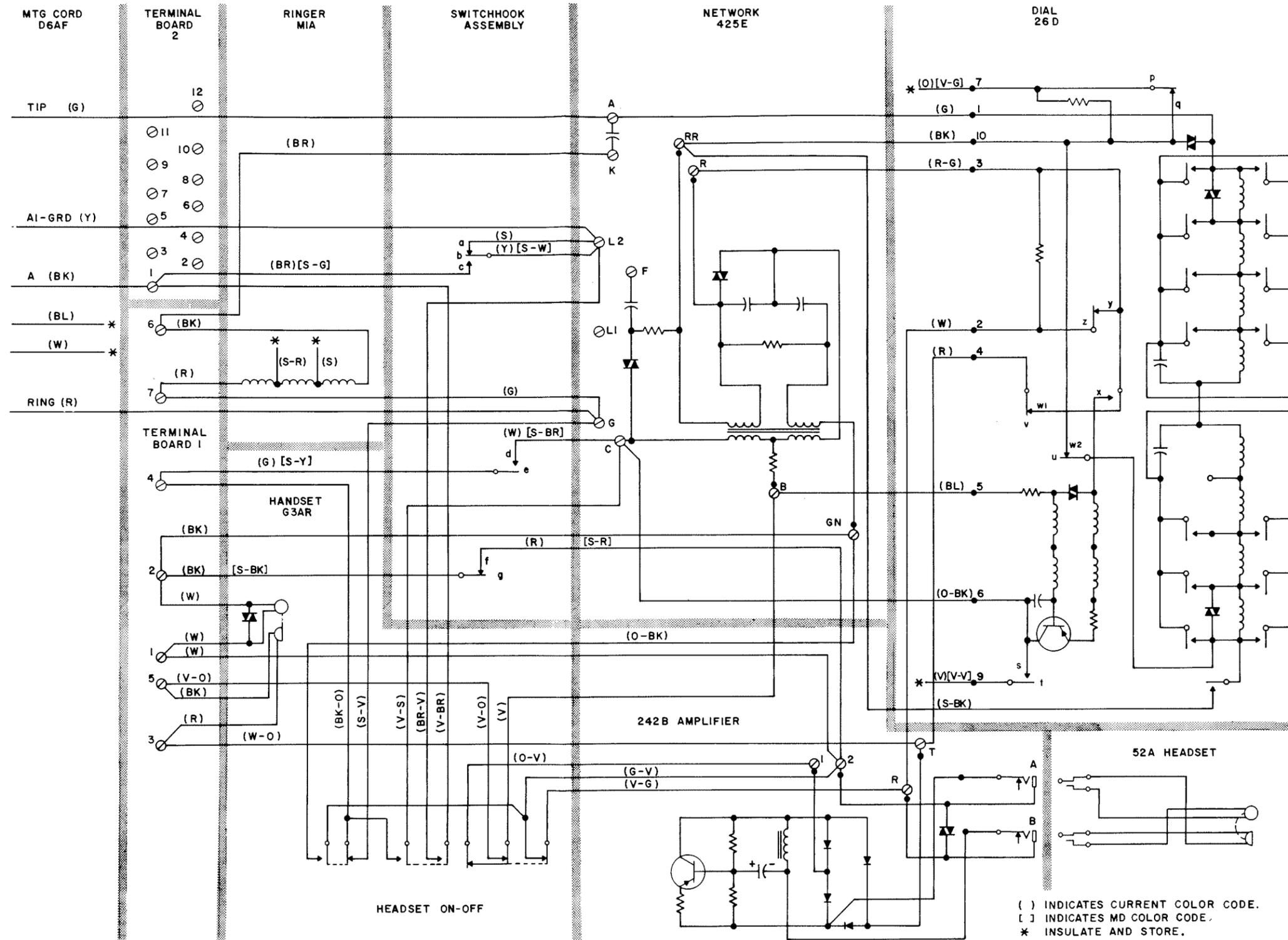


Fig. 16 — 1663A1 Telephone Set, Connections

Table L and Fig. 16

TABLE L  
LINE AND RINGER CONNECTIONS — 1663A1 TELEPHONE SET

WIRE OR LEAD	INDIV OR BRIDGED	RING PARTY	TIP PARTY			1A1 OR 1A2 KEY TEL SYSTEM
			NO IDENT GROUND	IDENT GROUND		
				1000 Ω	2650 Ω	
Line Wire at Connecting Block	Tip	1	1	1	1	1
	Ring	2	2	2	2	2
	Grd A1	4	4	4	4	4
	A					5
Mounting Cord at Connecting Block	G	1	2	1	2	1
	R	2	1	2	1	2
	Y	4	4	4	4	4
	BK	5	5	5	5	5
	BL	6	6	6	6	6
Mounting Cord in Set	W	7	7	7	7	7
	G	A	A	A	A	A
	R	G	G	G	G	G
	Y	L2	L2	L2	L2	L2
	BK	1	1	1	1	1
Ringer Leads	BL	*	*	*	*	*
	W	*	*	*	*	*
	S-R	*	*	*	*	*
Ringer Straps	R	7	7	7	6	6
	BK	6	6	6	7	7
Dial Leads	S	*	*	*	B	*
	S-R	*	*	*	B	B
Ringer Straps	BK	K	K	K	K	K
	G	G	L2	L2	L2	L2
Dial Leads	G	A	C	A	C	C
	O-BK	C	A	C	A	A

\* Insulate and store.

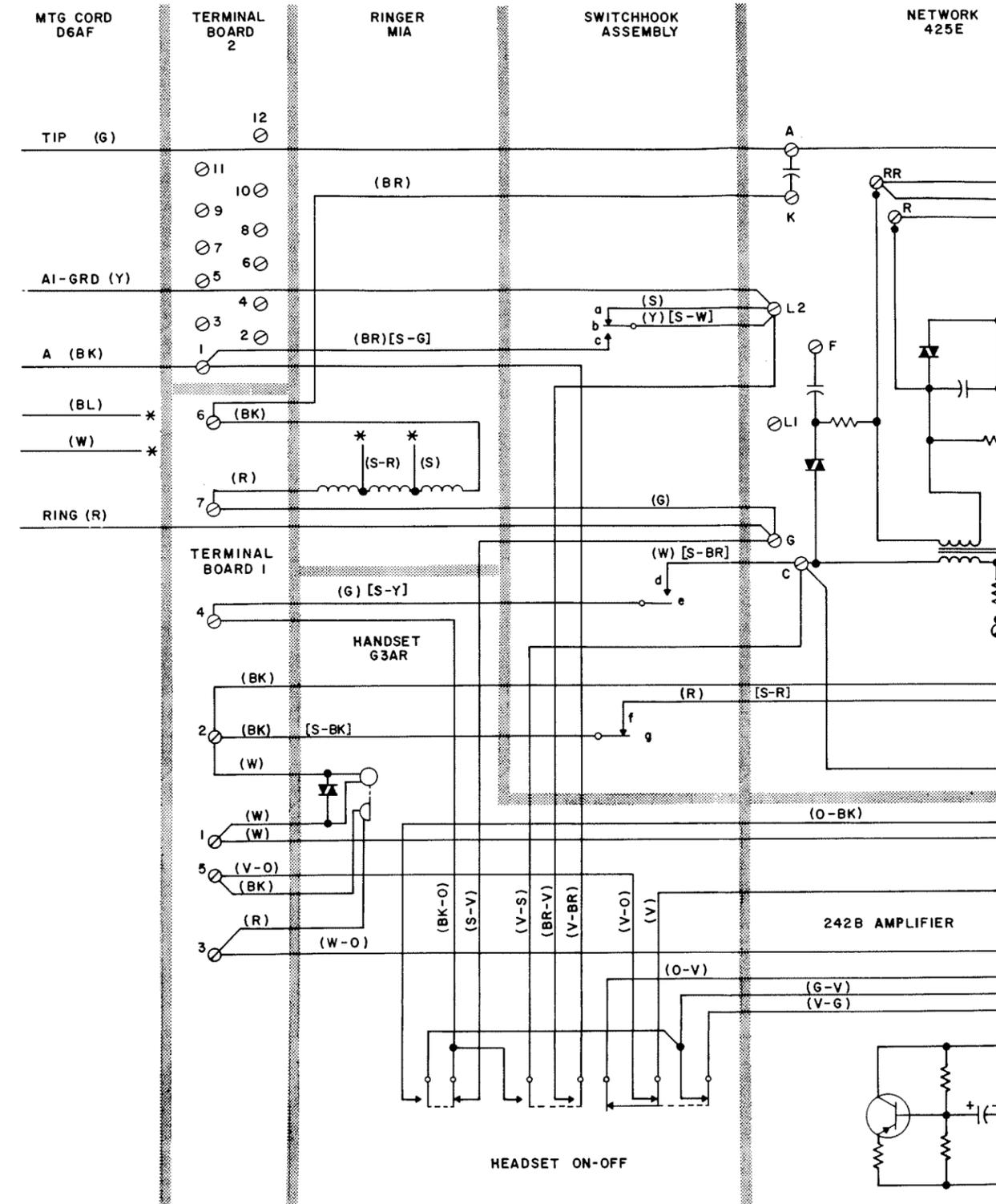


Fig. 16 — 1663A1 Telephone Set, Conne