TELEPHONE SETS

660 TYPE

1.00 GENERAL

1.01 This practice contains information on the 660-type telephone sets.

1.02 The 660-type telephone set provides the following features:

- Card dialer (41A dial)
- Exclusion feature when desired
- Provision for converting sets without exclusion to one with exclusion by means of a kit of parts.

1.03 The 660-type telephone set has the electrical and transmission characteristics of the 500-type telephone set.

2.00 IDENTIFICATION

2.01 The 660-type telephone set (Fig. 1 and 2) is similar in appearance to other card dialer-type sets.

2.02 The 662-type telephone set is manufactured in four colors - white (-58) green (-51), light beige (-60), and light grey (-61). The set is also available on special order in black (-3), yellow (-56), rose pink (-59), aqua blue (-62) and turquoise (-64). These special color sets are not to be promoted and should be ordered only on specific request of the customer.

2.03 These sets are shop wired for individual or bridged, ring and tip parties. With wiring changes they may also be used for tip-party identification or with 1A1 or 1A2 key telephone systems. (See Tables C and D.) In addition, the 660A1 telephone set can be wired for use with 3A speakerphone. This requires the replacement of the D6AB mounting cord with a D10L cord and wiring changes within the set. (See Fig. 9.)

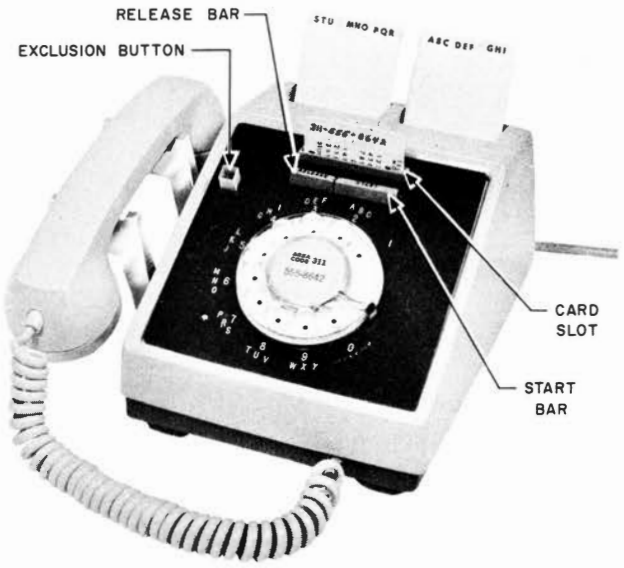


Fig. 1 - 660-Type Telephone Set

2.04 In addition to an 8C rotary dial, the 660-type telephone set features an electromechanical dial (41A). The dial is driven by an ac synchronous motor which requires a low-voltage power supply. (See Table B.)

2.05 To operate the card dialer, a coded card is inserted in the card slot. Depressing the START bar closes the start contacts allowing the motor to drive the commutator disc. The card is fed past the reader mechanism and the coded portion of the card controls the output of the dial. If for any reason the user wishes to stop the dial, depressing the RELEASE bar ejects the card without further pulsing.

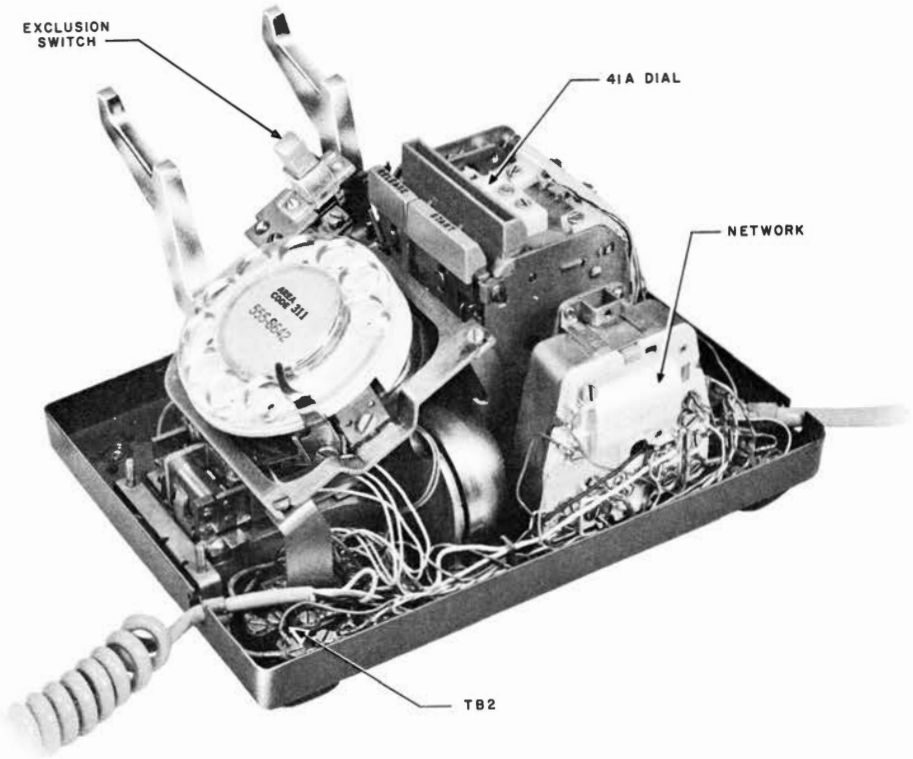


Fig. 2 - 660-Type Telephone Set, Cover Removed

2.06 Two packages (P-13E353), each containing twenty code cards and one set (P-13E363) of nine index cards, are supplied with each set.

2.07 The volume of the C4 ringer is adjustable between low and high volume by means of the knurled volume control wheel. An opening is provided in the bottom of the set for the wheel.

TABLE A

PIECE PART INFORMATION - 660-TYPE TELEPHONE SET

Set Code*	Cord*	Regular Faceplate	Nonglare Faceplate	Exclusion Conversion Kit#	Housing*	Exclusion Provided
660A1	D6AB	P-24E979	P-25E605	D-179888	P-82B0	No
660A2	D10L	P-24E978	P-25E604		P-82B0	Yes

*Add suffix for desired color:

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

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

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

3.00 ASSEMBLY

3.01 Table A contains the piece part information for the 660-type telephone set.

3.02 To remove housing, loosen four captive screws through access holes in bottom of base. 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 switchhook assembly.

3.04 To replace 8C dial:

1. Remove dial from set as shown above.
2. Disconnect spade-tipped dial leads.
3. Loosen two screws holding dial to adapter and remove dial.

TABLE B

POWER SUPPLY CAPACITIES

Power Supply	Capacity Of Power Supply	Maximum Distance Between Dial And Power Supply (in feet)		
		Cable BUA (22 ga)	Cable D, I.W. (24 ga)	JKT (20 ga)
101G or 101J	6 Dials	1200	800	2050
KS-16886, L2 Transformer	3 Dials	1150	700	1850
2075A Transformer	1 Dial	675	425	1075

Note: Capacities of various power supplies are given in Table B. This table is based on the premise that the power supply is used for powering card dialers only and each dialer is 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 found necessary to power more than one dial per conductor loop, it will be necessary to 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 what can be expected during normal operation.

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 switchhook assembly. (See Fig. 3.)

7. Start slots in dial adapter under 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.

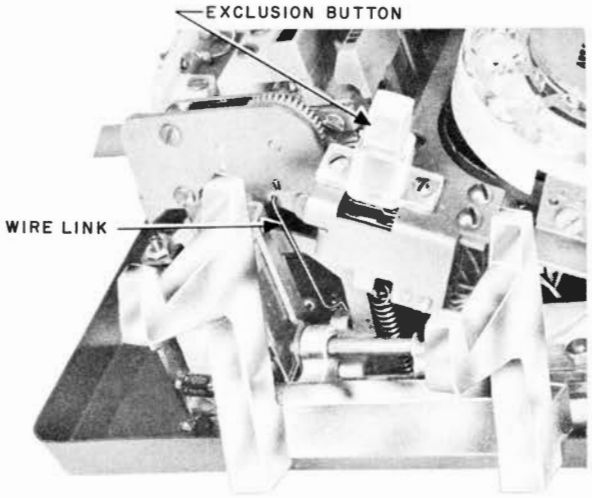


Fig. 3 - Exclusion Switch

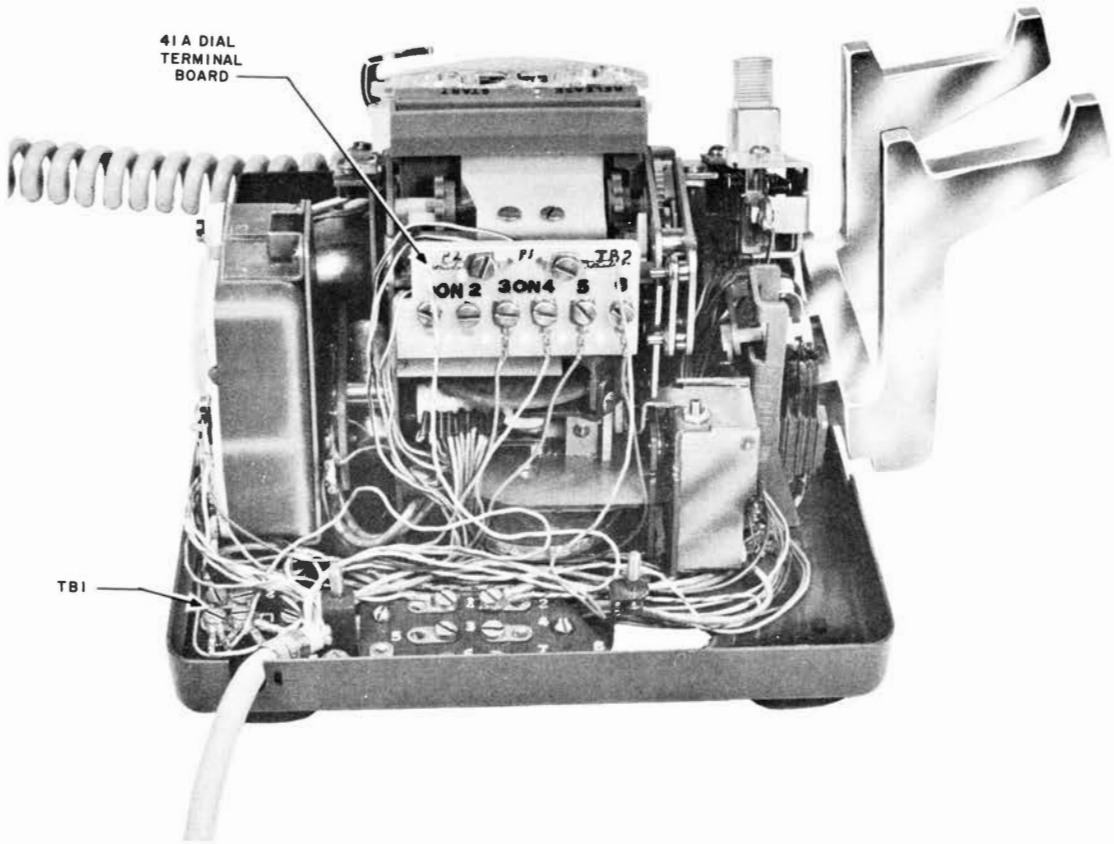


Fig. 4 - 660-Type Telephone Set, Terminal Boards

3.05 To replace 41A dial:

1. Temporarily disconnect 18V supply to dial.

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

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

3.06 Sets without conversion may be converted by the addition of a kit of parts. (See Table A.) The kit contains:

- Exclusion switch assembly with leads and terminal board attached
- Wire link
- Faceplate with opening for exclusion key
- Necessary hardware.

3.07 In addition to the kit of parts, a D10L cord of the proper color must be ordered.

3.08 To convert set from nonexclusion to exclusion:

1. Remove 8C dial as shown in 3.03.
2. Attach exclusion switch assembly to dial adapter with two screws provided. (See Fig. 3.)
3. Dress exclusion switch leads along left side of 41A dial and between control relay and switchhook 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. 3.) Link should be started from left side of assembly.
5. Remount 8C dial making sure that wire link enters hole provided in switchhook assembly. Tighten dial mounting screws.
6. Mount terminal board to base with screws provided. (See Fig. 4.)
7. Replace faceplate with one providing opening for exclusion button.
8. Replace D6AB cord with D10L cord.
9. Replace housing and check set for proper operation.

4.00 INSTALLATION

Caution: Never place 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 one of equivalent value. Failure to do so will result in damage to the pulsing switch or the start switch of the 41A dial.

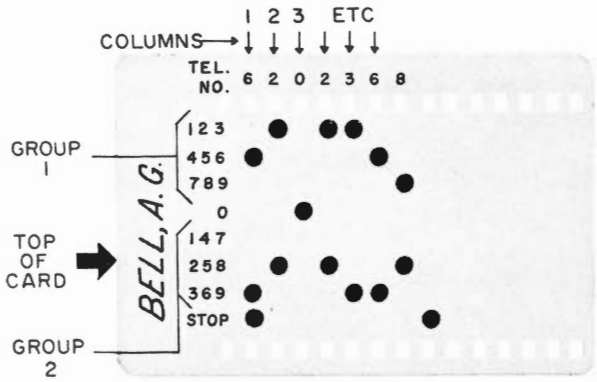


Fig. 5 - 7-Digit Card Coded for Telephone Number 620-2368 (MAin 0-2368).

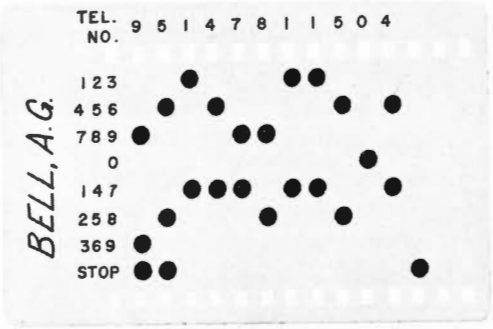


Fig. 6 - 11-Digit Card Coded "9" (Access Code for Central Office Dial Tone), "STOP", "514" (Area Code), "781-1504" (SUnset 1 - 1504, Local Telephone Number.

4.01 It is important that the cards be properly punched and checked for accuracy in order to ensure satisfactory performance. Coding instructions for cards (Fig. 5 and 6) are as follows:

1. Write the name and the desired telephone number in the spaces provided as shown in Fig. 5 and 6. Convert the two exchange letters to numbers by referring to your telephone dial. (For example, use 2 for A or B or C.)

2. Note that there are two groups of numbers 1 through 9 at the left of the card, as shown. Zero appears only once. Each digit in the telephone number heads a column.

3. In column 1 locate the first digit of the telephone number in group 1 and punch out the perforation with a pencil or ballpoint pen. (In Fig. 5 the number is 6.) In the same column locate the same number in group 2 and punch out the perforation. If not already removed, punch out the STOP in the same column.

4. Repeat this procedure for each digit in the telephone number. If the number is zero, only one hole is punched.

5. In the column immediately following the last digit, punch out the STOP hole. (This will stop the card and immediately prepare the telephone for talking even though the card has some distance to travel.)

4.02 For DDD calls, punch out the required digits including the directing code if required, area code, and 7-digit local telephone number.

4.03 To prepare a card for dialing an access code, the STOP column must be used where a pause is required between digits. This occurs in certain PBX systems where the access code 9 is dialed to obtain central office dial tone.

1. Punch out the proper holes in the access code number.

2. In the next column, punch out the STOP and starting in this same column, punch out the remainder of the telephone number including the area code, in the regular manner. If the last column is used for the fourteenth digit, no STOP is required.

3. Check the card before using it to make sure it is properly punched for the number desired. There should be two holes in each column except where zero appears; in those columns there will be only one. It is important that each hole be punched out completely.

4.04 The operation of the card dialer is as follows:

1. Remove handset.
2. Listen for dial tone.
3. Insert punched card into dialer slot; push down all the way. Card can be inserted only with name on top, facing front of set.
4. Depress dialer START bar.
5. After call is completed, replace handset.
6. Depress RELEASE bar.
7. Remove card from dialer.
8. Operation of RELEASE bar will release card at any time.

4.05 Cards coded for the STOP feature operate the same as in Steps 1 through 4. After dialer dials access code, it stops. After the second dial tone is heard, depress the START bar again and the remaining digits will be dialed. Steps 5 through 8 in 4.04 then apply.

4.06 The 41A dial requires 12.5 volts to 19 volts ac for proper operation. Power for the dial can be obtained from one of the following sources:

- 101G or 101J power supply
- KS-16886, L2 transformer, terminals 4 and 6
- 2075A transformer.

4.07 Although the capacity of the 2075A transformer is listed as one set, it can be used to power more than one 660-type telephone set on the same line since only one dialer can be used at a time.

5.00 MAINTENANCE

5.01 Maintenance on the 660-type telephone set is limited to the following items:

- Check all lines for proper polarity
- 41A dial -- On mechanical trouble reports such as cards sticking, etc, make a visual inspection of dial for loose parts or wires interfering with the dialer. Check to see if any foreign material (paper clips, hairpins, etc) is lodged in the card slot. Faulty cards should be checked for proper size by comparison with a working card. Bent or mutilated cards should be replaced. Do not attempt to adjust springs or dialer contacts
- For electrical troubles, such as dialing wrong numbers, use a card coded with a local test number. Check at least twice on each line with test code card. Inspect customer cards for proper coding. Check power supply at dial for proper voltage
- See appropriate sections for maintenance of 8C dial, 41-type dial, G3-type hand set, and ringer
- If trouble still persists, replace set.

5.02 A nonglare faceplate (Table A) is available for placement at those locations where subscribers are experiencing trouble dialing due to light reflections in the dial area.

TABLE C

LINE AND RINGER CONNECTIONS - 660A1 TELEPHONE SET

Wire or Lead		Individual or Bridged	Ring Party	Tip Party			1A1 or 1A2 Key Equipment*
				No Identifying Ground	Identifying Ground		
					1000 ohm	2650 ohm	
Line Wire at Connecting Block	Tip	1	1	1	1	1	1
	Ring	2	2	2	2	2	2
	Grd A1	5*	5	5	5	5	5
	A	4	4	4	4	4	4
Mounting Cord at Connecting Block	G	1	1	2	2	2	1
	R	2	2	1	1	1	2
	Y	1	5	5	5	5	5
	BK	4	4	4	4	4	4
Mounting Cord In Set	G	L1	L1	L1	L1	L1	L1
	R	L2	L2	L2	L2	L2	L2
	Y	G	G	G	G	G	2
	BK	1	1	1	1	1	1
Ringer Leads	R	7	7	7	7	7	7
	BK	8	8	8	8	8	8
	S	9	9	9	9	9	9
	S-R	10	10	10	10	10	10
Ringer Straps At Network	R	L2	L2	L2	K	B	C
	BK	G	G	G	G	B	L1
	S	K	K	K	B	K	K
	S-R	A	A	A	B	G	A
Switch-hook Lead	S	L2	L2	L2	A	A	2
	S-W	L2	L2	L2	L2	L2	2
	S-G	C	C	C	C	C	1

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

#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

TABLE D

LINE AND RINGER CONNECTIONS - 660A2 TELEPHONE SET

Wire or Lead		Individual or Bridged	Ring Party	Tip Party			1A1 or 1A2 Key Equipments§
				No Identifying Ground	Identifying Ground		
					1000 ohm	2650 ohm	
Line Wire at Connecting Block	Tip	1	1	1	1	1	1
	Ring	2	2	2	2	2	2
	Grd-A1	5*	5	5	5	5	5
	A	4	4	4	4	4	4
Mounting Cord at Connecting Block	W-BL	1	1	2	2	2	1
	BL-W	2	2	1	1	1	2
	O-W	1	5	5	5	5	5
	W-O	4	4	4	4	4	4
Mounting Cord In Set	W-BL	2#	2#	2#	2#	2#	2#
	BL-W	L2‡	L2‡	L2‡	L2‡	L2‡	1#
	O-W	G‡	G‡	G‡	G‡	G‡	P2
	W-O	1	1	1	1	1	1
Ringer Leads	R	7	7	7	7	7	7
	BK	8	8	8	8	8	8
	S	9	9	9	9	9	9
	S-R	10	10	10	10	10	10
Ringer Straps At Network	R	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	A	A
Switch-hook Lead	S	L2	L2	L2	A	A	P2
	S-W	L2	L2	L2	L2	L2	P2
	S-G	C	C	C	C	C	1

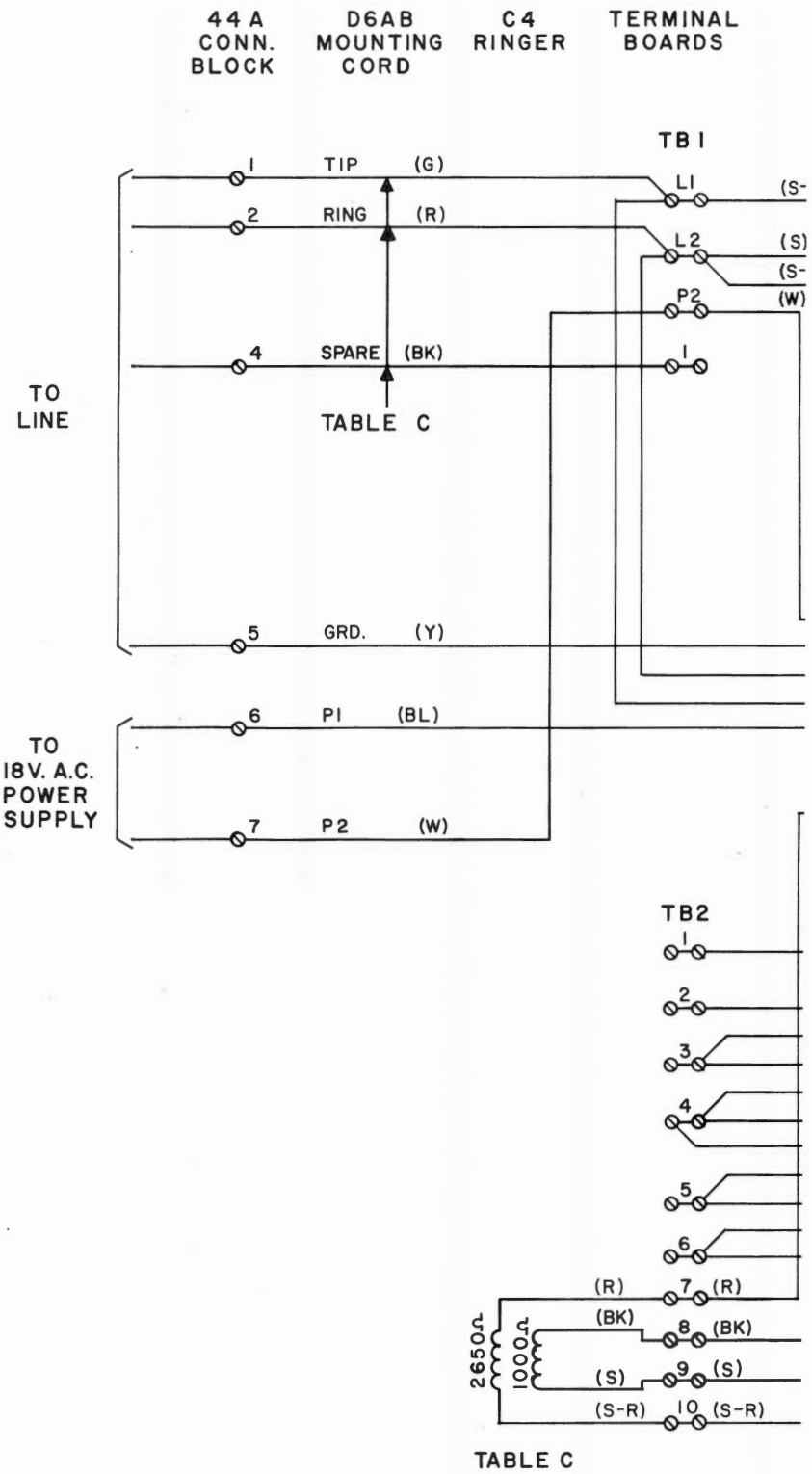
*Ground may be omitted if not required for service. Not required for protection of 41A dial power supply.

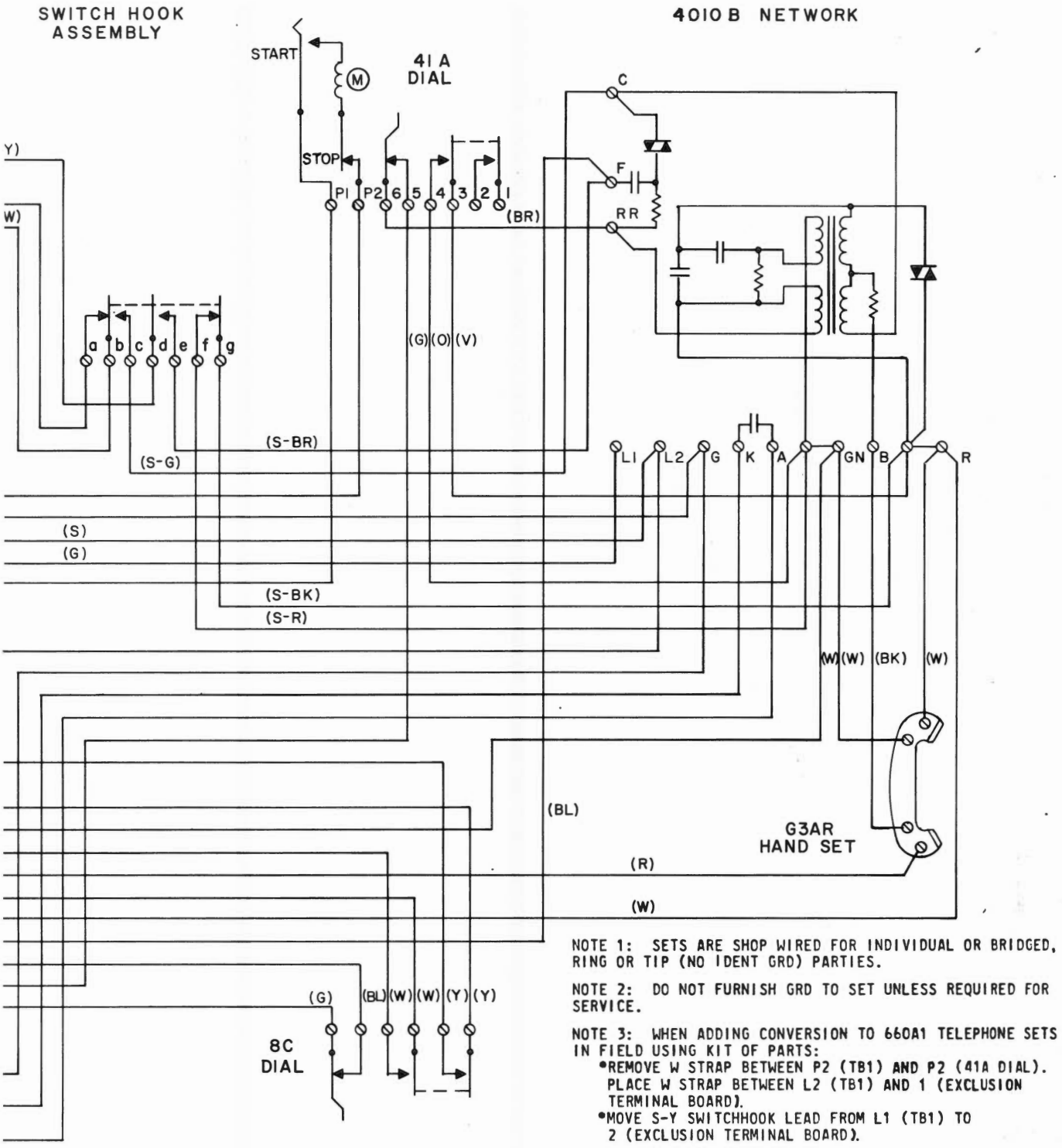
#Terminal on exclusion switch terminal board

‡Terminal on network

§For 1A1 or 1A2:

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


44A CONN. BLOCK
D6AB MOUNTING CORD
C4 RINGER
TERMINAL BOARDS
TB1
1 TIP (G)
2 RING (R)
4 SPARE (BK)
TABLE C
TO LINE
5 GRD. (Y)
6 P1 (BL)
TO 18V. A.C. POWER SUPPLY
7 P2 (W)
L1
L2
P2
1
(S-
(S)
(S-
(W)
TB2
1
2
3
4
5
6
(R) 7 (R)
(BK) 8 (BK)
(S) 9 (S)
(S-R) 10 (S-R)
2650Ω
1000Ω
TABLE C

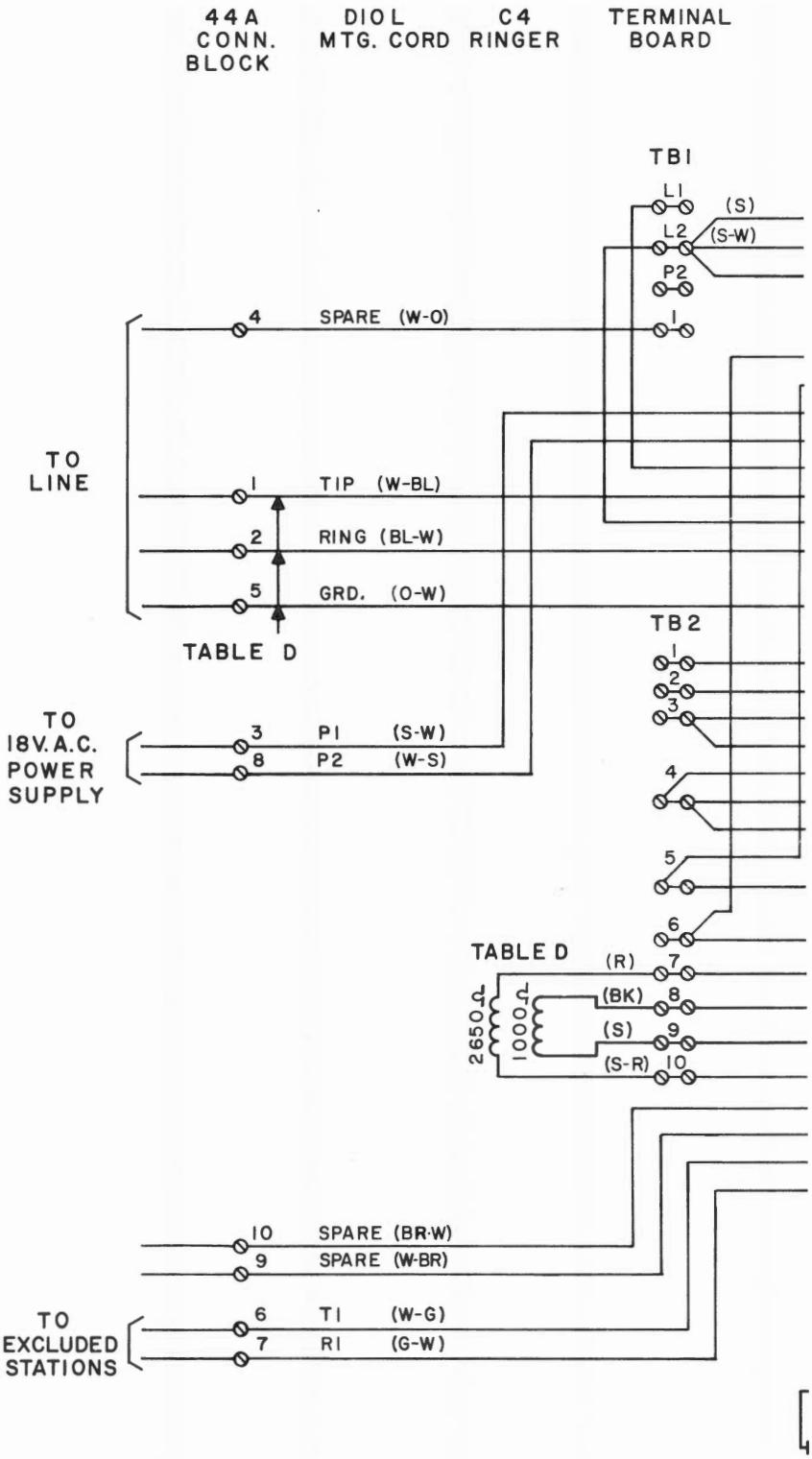


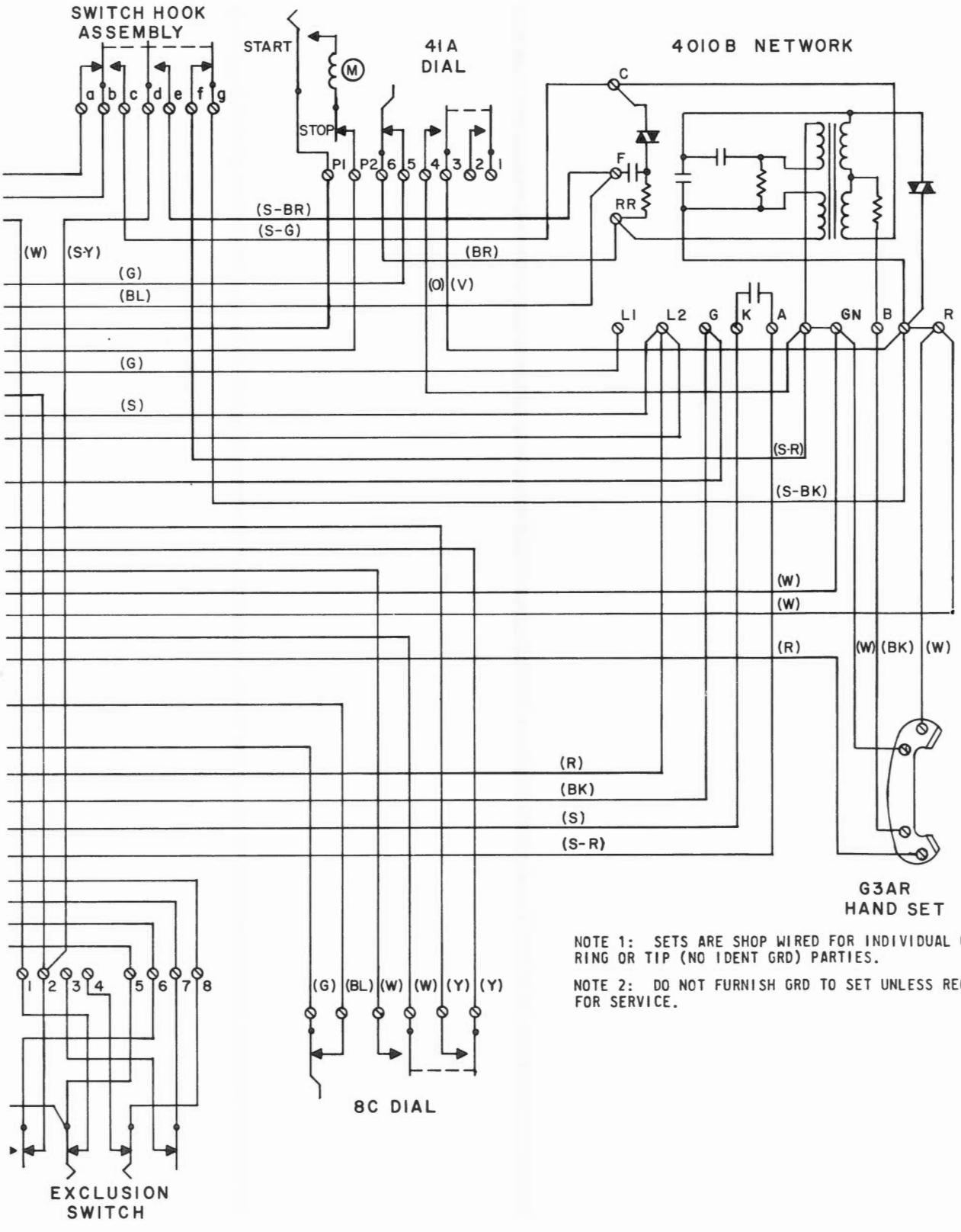
NOTE 1: SETS ARE SHOP WIRED FOR INDIVIDUAL OR BRIDGED, RING OR TIP (NO IDENT GRD) PARTIES.

NOTE 2: DO NOT FURNISH GRD TO SET UNLESS REQUIRED FOR SERVICE.

NOTE 3: WHEN ADDING CONVERSION TO 660A1 TELEPHONE SETS IN FIELD USING KIT OF PARTS:
- *REMOVE W STRAP BETWEEN P2 (TB1) AND P2 (41A DIAL). PLACE W STRAP BETWEEN L2 (TB1) AND 1 (EXCLUSION TERMINAL BOARD).
- *MOVE S-Y SWITCHHOOK LEAD FROM L1 (TB1) TO 2 (EXCLUSION TERMINAL BOARD).

Fig. 7 - 660A1 Telephone Set

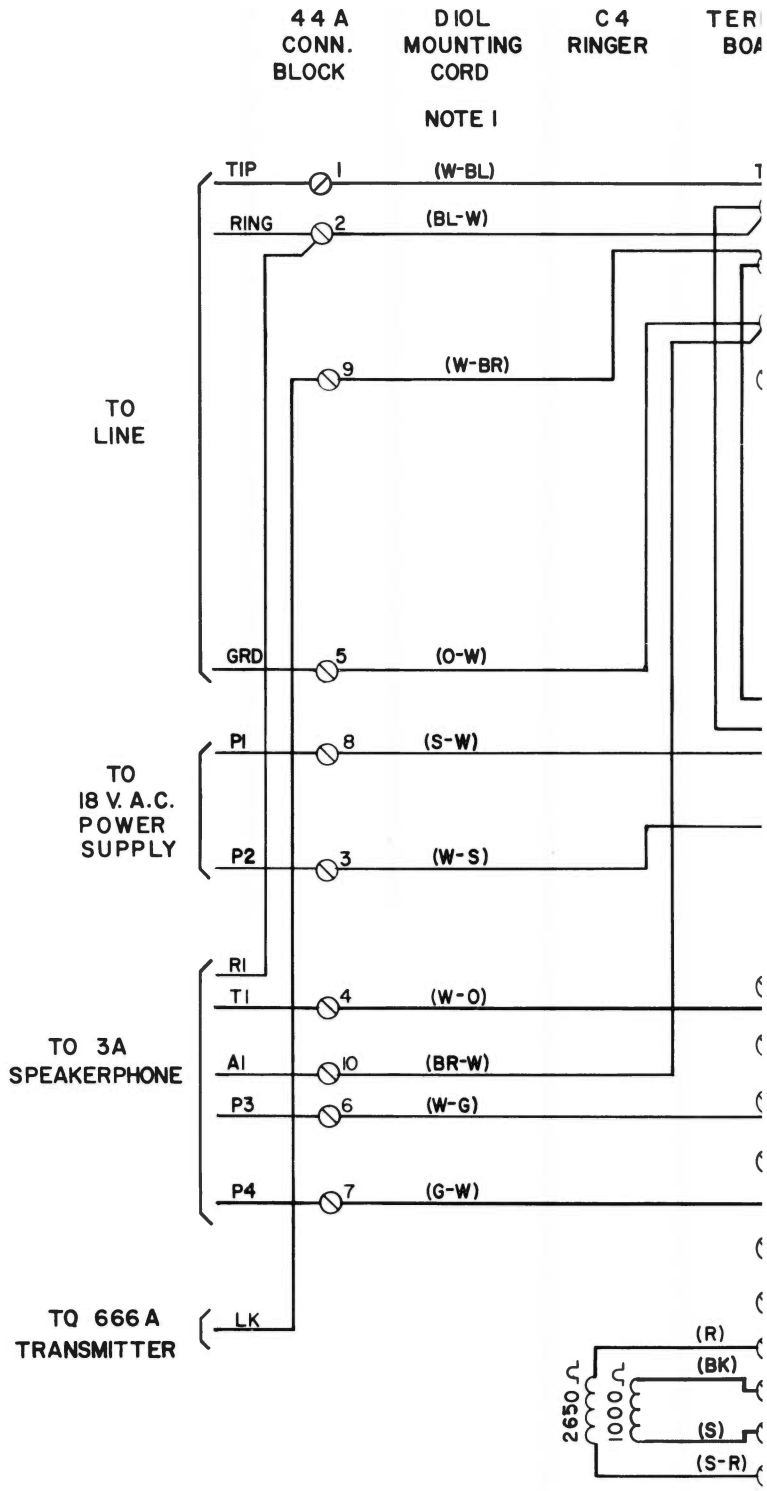

44A CONN. BLOCK
DIOL MTG. CORD
C4 RINGER
TERMINAL BOARD
TB1
L1
(S)
L2
(S-W)
P2
1
4
SPARE (W-O)
TO LINE
1
TIP (W-BL)
2
RING (BL-W)
5
GRD. (O-W)
TABLE D
TB2
1
2
3
4
5
6
TABLE D
(R) 7
(BK) 8
(S) 9
(S-R) 10
2650Ω
1000Ω
TO 18V.A.C. POWER SUPPLY
3
P1 (S-W)
8
P2 (W-S)
10
SPARE (BR-W)
9
SPARE (W-BR)
TO EXCLUDED STATIONS
6
T1 (W-G)
7
R1 (G-W)



NOTE 1: SETS ARE SHOP WIRED FOR INDIVIDUAL OR BRIDGED, RING OR TIP (NO IDENT GRD) PARTIES.

NOTE 2: DO NOT FURNISH GRD TO SET UNLESS REQUIRED FOR SERVICE.

Fig. 8 - 660A2 Telephone Set


44A CONN. BLOCK
D1OL MOUNTING CORD
C4 RINGER
TER BOA
NOTE 1
TIP
RING
GRD
P1
P2
RI
T1
A1
P3
P4
LK
1
2
9
5
8
3
4
10
6
7
(W-BL)
(BL-W)
(W-BR)
(O-W)
(S-W)
(W-S)
(W-O)
(BR-W)
(W-G)
(G-W)
TO LINE
TO 18 V. A.C. POWER SUPPLY
TO 3A SPEAKERPHONE
TO 666A TRANSMITTER
2650Ω
1000Ω
(R)
(BK)
(S)
(S-R)

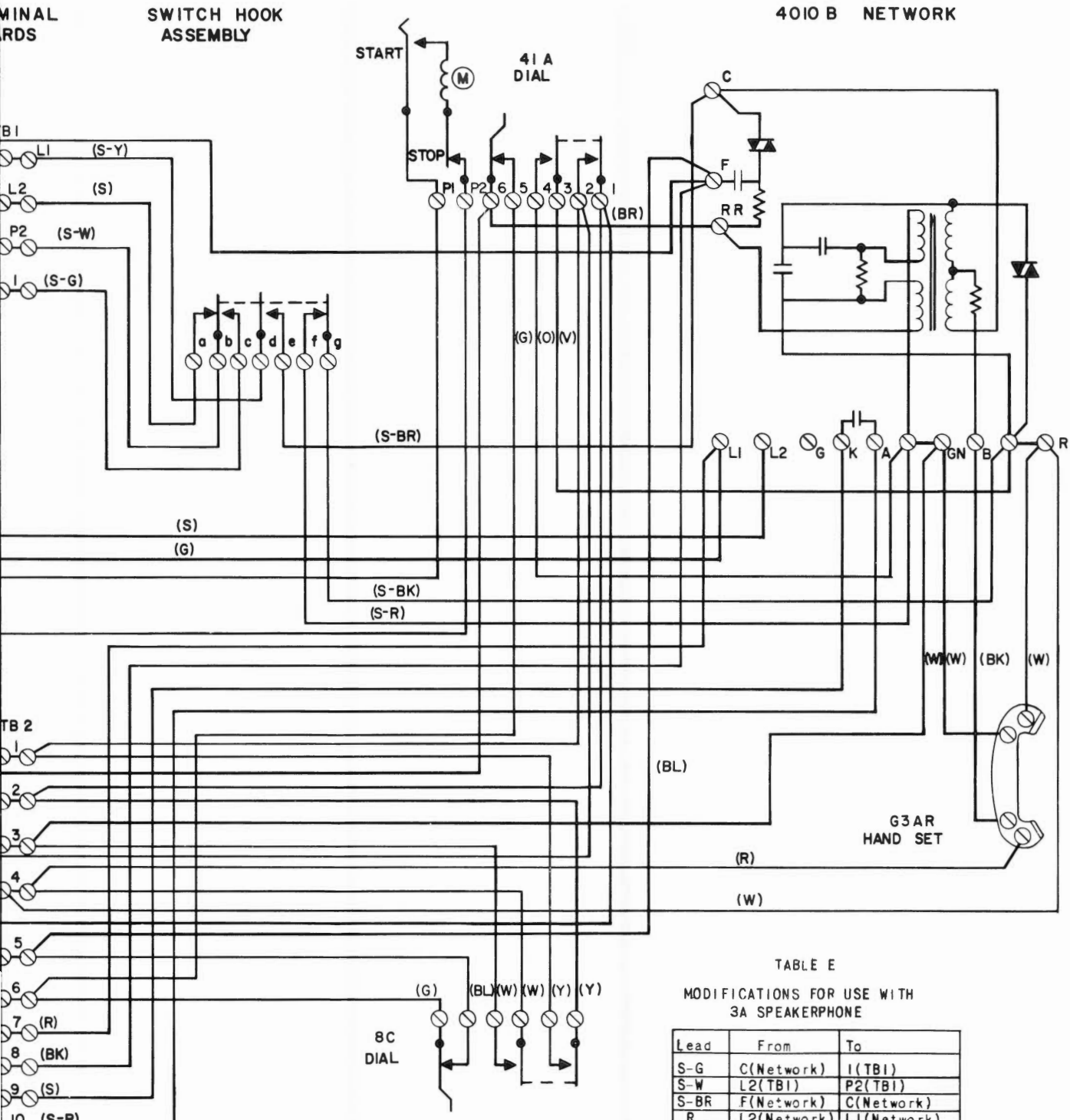


TABLE E

MODIFICATIONS FOR USE WITH
3A SPEAKERPHONE

Lead	From	To
S-G	C(Network)	1(TB1)
S-W	L2(TB1)	P2(TB1)
S-BR	F(Network)	C(Network)
R	L2(Network)	L1(Network)
BK	G(Network)	F(Network)

Strap 1 and 2 (TB2) to 1 and 2 (41A Dial). Disconnect W strap from P2 (TB1) to P2 (41A Dial) and store.

Note 1: D6AB cord furnished with set must be replaced with D10L cord of proper color. In addition modifications as shown in Table E must be made.

Note 2: Do not furnish ground to set unless required for service.

Fig. 9 - 3A Speakerphone, Connections