

## STATION DIAL—53A

### 1. GENERAL

1.01 This section contains identification, installation, operation, connections, and maintenance information on the 53A dial.

1.02 This section is reissued to:

- Revise Fig. 4, 5, 6, and 9
- Revise 4.04.

1.03 The 53A dial (Fig. 1) is an automatic, preset TOUCH-TONE® dial for use where a single telephone number is repeatedly dialed.

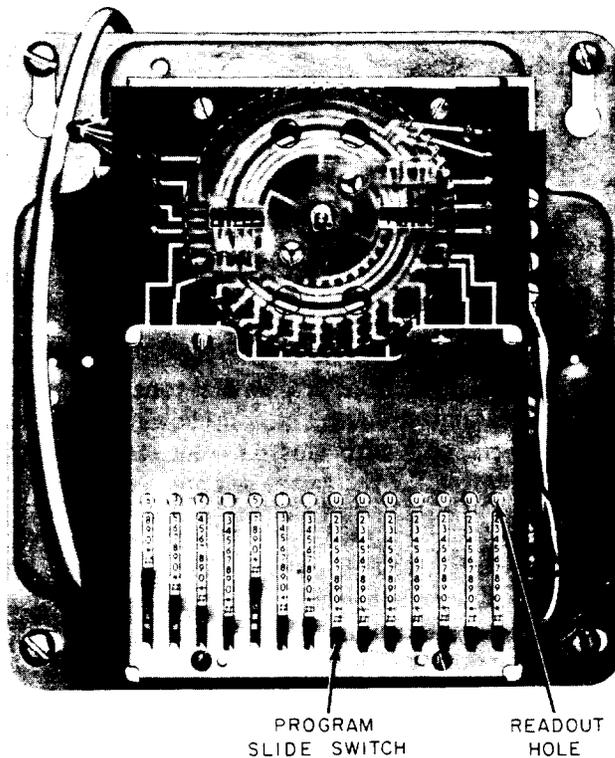


Fig. 1—53A Dial With Cover Removed

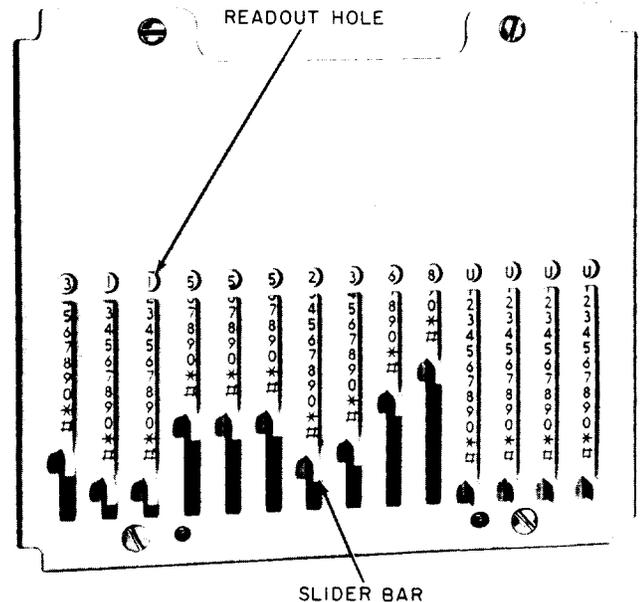


Fig. 2—53A Dial Coding Board

1.04 It can be used with most standard telephone sets. In the restricted mode the dialing function can be started by a momentary contact closure provided by a nonlocking button or key (call button) or by installing a 1A350 tone detector, ordered separately, which will start the dial automatically when precise (TOUCH-TONE signal) dial tone is present. If dialing is not started by the call button or tone detector within 8 to 15 seconds, an internal timer will initiate dialing. In the unrestricted mode a momentary contact closure is required to start the dial.

### 2. IDENTIFICATION

#### Ordering Guide

#### 2.01 Basic Dial:

- Dial, 53A.

#### NOTICE

Not for use or disclosure outside the  
Bell System except under written agreement

**2.02 Associated Apparatus or Equipment (ordered separately):**

- Backboard (See Table A)
- Set, Telephone
- Transformer, 2012B or equivalent.

**TABLE A  
BACKBOARDS FOR MOUNTING DIAL  
ON WALL**

BACKBOARD	COLOR	NO. OF DIALS MOUNTED
KS-5796L1 KS-5796L2 KS-5796L3	Black	1 2 3
KS-5796L7 KS-5796L8 KS-5796L9	Olive Gray	1 2 3

**2.03 Optional Apparatus or Equipment (ordered separately):**

- Detector, Tone, 1A350
- Guard, Polarity, 419A
- Ringer, E- or F-Type (required when dials are multiplied).

**2.04 Replaceable Components:**

- 814775573 (P-47G557) Cover.

**Design Features**

**2.05** The 53A dial permits:

- Slide switch programming with linear readout of telephone number (Fig. 2). Up to a maximum of 14 digits may be programmed
- Programming for stops after first, second, or third digits (Table C)
- Restricted or unrestricted dialing
- Multiplying of dials

- Used with most single line or key telephone sets.

**TABLE B**

**MAXIMUM LOOP LENGTHS BETWEEN 53A DIAL  
AND 2012B TRANSFORMER**

LOOP RES	D-STA WIRE 22 GAUGE	JKT STA WIRE 20 GAUGE	DIW CABLE 24 GAUGE
50 Ohm Loop WO 1A350 Tone Detector	1470 FT.	960 FT.	940 FT.
20 Ohm Loop With 1A350 Tone Detector	580 FT.	380 FT.	370 FT.

**2.06** The dialer as factory-wired, prevents manual dialing from the associated telephone set by line switch manipulation or use of the TOUCH-TONE buttons (restricted mode).

**2.07** Wiring options are provided where manual dialing or reception of incoming calls is desired (unrestricted mode).

**2.08** The 53A dials, as furnished from the factory, require a call button or 1A350 tone detector to start the dialing function after reception of dial tone. The call button can be furnished from the associated telephone set, if so equipped, or from an external key. The dials internal timer may also be used to initiate dialing if stops are not required.

**2.09** The 1A350 tone detector responds to the 350 Hz component of precise dial tone after about one second and simulates a contact closure to the dial. When used with this detector, the 53A dial should be wired for the restricted mode of operation only.

**2.10** When associated with a key telephone set, the dial can be used on all the lines terminated in that set. When associated with a particular line, the dial can be used by all the telephones sharing that line (dedicated preset line) on the telephone system.

**2.11** Since no handset receiver shorting circuit is provided during automatic dialing, it is recommended that only these sets equipped with a varistor across the receiver (G-type handset or equivalent) be used.

**3. INSTALLATION**

**3.01** The 53A dial is housed in a 105C apparatus box and can be wall or rack mounted using

**TABLE C**  
**53A DIAL OPTIONS**

OPTION	53A DIAL SPADE-TIPPED LEADS (TERMINALS ON 53A DIAL)						
	BR	BK	BL	V	S-R	G-V	Y-BR
Restricted Dialing	4	8					
Unrestricted Dialing	8	4					
No Dialing Stops			3	3			
Stop After 1st Digit			8	3			
Stop After 2nd Digit†			3	8			
Stop After 3rd Digit			3	8			
Stop After 1st and 2nd Digit†			8	8			
Stop After 1st and 3rd Digit			8	8			
Ringling Start Protection					2		
Associated Tel Set TOUCH-TONE Dial (Unrestricted Mode)						1	
All Sets (Restricted Mode)						*	
Short Loop (under 1100 ohms total)							*
Long Loop (over 1100 ohms total)							2

\*Insulate and store.

† Put 3rd slider switch in "U" position for stop after 2nd digit.

the vertical and horizontal mounting holes which are spaced 5-7/8 inches and 6-1/16 inches apart, respectively. It should be placed at an indoor location which is inaccessible to the public but available for maintenance purposes.

**3.02** For proper operation, this dial requires between 17 and 28 volts ac, 60 Hz power at the dial terminals while dialing. A 2012B transformer or equivalent power source is required

for each dial installed. The loop length between the power source and dial must be within the limitations of Table B which is based on a maximum loop resistance of 50 ohms. With a 1A350 tone detector, the maximum loop resistance between the 2012B transformer and the dial is 20 ohms.

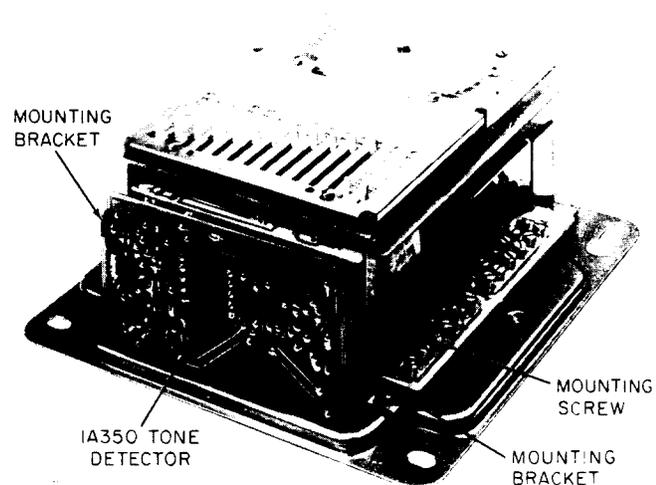


**Ensure that the power source is connected to an ac outlet not under control of a switch.**

**3.03** The call button, if required, should be located within a 150 ohm loop from the dial.

**3.04** When connecting the dial into a key telephone system on a dedicated line, the key telephone set intended for use with the dial should have two unused line buttons, one to pick up the preset line and one converted to signaling for use as the call button unless dial is equipped with a tone detector in which case a call button is not required.

**3.05** The 1A350 tone detector circuit board is added to the basic 53A dial in the position shown in Fig. 3. Use brackets and mounting screws furnished with detector to fasten board as described in detailed instruction sheet packed with each detector. Table D gives lead connections. Disregard references to a call button when the 1A350 tone detector is provided.



**Fig. 3—1A350 Dial Tone Detector, Installed**

TABLE D  
1A350 TONE DETECTOR CONNECTIONS

WIRE OR LEAD FROM	COLOR	CONNECT TO DIAL TERM. BD
1A350 Tone Detector (Ordered Separately)	W	*
	G	2
	R	7
	BK	6
	BL	9

\* Insulate and store.

**3.06** The 53A dial will not dial properly if battery-ground is reversed. When a polarity guard is required to allow end-to-end signaling, install guard externally to the 53A dial as shown in Fig. 10. Use inside wire to make the necessary circuit connections between the polarity guard and central office line.

**3.07** Multiple 53A dials may be connected when the customer desires to dial more than one number. Refer to Fig. 10 for installation layout and necessary wiring arrangements.



***At unattended public locations, the station number card on the associated telephone set should use number assignments in accordance with Section 682-000-012, entitled Numbering and Identifying Special Services and Channels unless otherwise specified by local instructions.***

### **Programming a Telephone Number**

**3.08** Set coding board slide switches (Fig. 2) as follows.

- (1) Position each slide switch, reading from left to right until the desired telephone number appears in readout holes located above slide switches on coding board.
- (2) All unused digits must be programmed in the *U* position.
- (3) If stops after the first, second, or third digit are to be included, refer to Table C for dial wiring changes to be made. If system has no

delays between first and second dial tones, stops should not be programmed.

**3.09** To check installation of dial which requires a call button to start dialing operation in restricted mode.

- (1) Remove handset from the associated telephone set. Dial tone should be present.
- (2) Verify that dial tone cannot be broken by manipulation of line switch of associated telephone set.
- (3) Actuate call button, verify that preset number programmed on the coding board is automatically dialed. After called station answers, conversation should be possible.
- (4) Replace associated telephone handset on hook.

**3.10** To check installation of dial which is equipped with 1A350 tone detector (restricted mode only).

- (1) Remove handset from the associated telephone set.
- (2) Dialing should automatically start within two seconds after dial tone is heard. Verify the present number programmed on the coding board is automatically dialed. After called station answers, conversation should be possible.
- (3) Replace associated telephone handset on hook.
- (4) Refer to instruction sheet packed with tone detector for additional details of operation.

**3.11** To check installation of dial in the unrestricted mode.

- (1) Remove handset from the associated telephone set. Dial tone should be present.
- (2) Verify that dial tone can be broken by dialing a digit or by manipulation of line switch of associated telephone set.
- (3) Restore handset momentarily to obtain dial tone again then repeat operation.
- (4) Actuate call button, verify that preset number programmed on the coding board is

automatically dialed. After called station answers, conversation should be possible.

(5) Replace associated telephone handset on hook.

#### 4. OPERATION

##### ***Restricted Mode (Single Dial Installation, Fig. 10 or 11)***

**4.01** The dial responds to an off-hook condition of the associated telephone set, steps off home position, seizes the preset line, and isolates the telephone set transmitter from the line.

**4.02** After the dial seizes the preset line, operation of the line switch has no effect during dialing. When either the call button or tone detector is operated the dial will proceed through the programmed number to the talk position unless interrupted by a programmed stop. If stops are programmed for a second or third dial tone the 1A350 tone detector will automatically resume the dialing cycle. If a tone detector is not provided another momentary closure of the call button is required. If the call button or 1A350 tone detector is not operated within 8 to 15 seconds an internal timer will start the dial. At TALK position telephone transmitter circuit is restored. After completion of a call going on-hook at the associated telephone set causes the dial to set to the home position.



***Manual dialing from the associated telephone set is not possible on the preset line when the 53A dial is in the restricted mode, nor can incoming calls be received, therefore the telephone set ringer should be silenced.***

**4.03** When the telephone set ringer is connected for some reason (such as testing), refer to Table C (Ringing Start Protection) for wiring connections required to prevent relay K8 from operating on ringing current.

**4.04** ♦ If a call is abandoned by placing the handset on-hook after the dialing sequence has been started, but has not been completed, the dialer will continue to.

(a) Dial the programmed number.

(b) Proceed through all unused positions.

(c) Step to the talk position, and

(d) After a delay of 600 to 700 milliseconds will step to the home position. The line will not be released until the dial steps off the talk position. In the event that a stop is wired in to the dialer and the call is abandoned before the stop is reached, the dialer internal timer will eventually restart the dial and the preceding events will occur.♦

##### ***Unrestricted Mode (Single Dial Installation, Fig. 10 or 11)***

**4.05** This mode permits both automatic (preset) and normal dialing from the associated telephone set. Even if the preset dial is disabled, ie. loss of ac power, the station can manually dial. See Table C for required wiring connections.

**4.06** In this mode, when the associated telephone set goes off-hook, the loop is closed from the central office. It is therefore possible to dial either manually or automatically.

**4.07** If the dial is started by a contact closure, it will seize the line, dial the preset number, and return the line to the associated telephone set.

##### ***Restricted Mode (Multiple Dial Installations, Option D, Fig. 10)***

**4.08** The first dial response to an off-hook condition of the associated telephone set, steps off home position seizes the line, effectively isolating the remaining preset dial(s) and the associated telephone set from the line.

**4.09** After the first preset dial seizes the line operation of the telephone line switch and/or dial will have no effect during dialing of the first preset number. When the call button or 1A350 tone detector associated with the first dial is operated, the preset dialer will proceed through the programmed numbers and all unused digits to the talk position, unless interrupted by a programmed stop. If the call button or 1A350 tone detector is not operated within 8 to 15 seconds, an internal timer will start the dial. At the talk position the telephone set is reconnected to the line.

4.10 The remaining preset dial(s), 53A only, may be used for end-to-end signaling purposes by operating the appropriate call button(s).

4.11 The TOUCH-TONE dial in the associated telephone set (if so equipped) may also be used for end-to-end signaling after the first preset dial (43A or 53A) completes its call. When the remaining preset dial(s) is started by a momentary closure of its call button the digits programmed on the coding board will be automatically dialed. During the dialing cycle the associated telephone set will be isolated from the line. When the preset dial completes its dialing cycle it will stop in the home position and restore the associated telephone set to the line.

4.12 Going on-hook at the associated telephone set will reset the first preset dial to the home position.

***Unrestricted Mode (Multiple Dial Installation, Option C, Fig. 10)***

4.13 This mode permits automatic dialing from any of the preset dials in the series and normal dialing from the associated telephone set.

4.14 When the associated telephone set goes off-hook the loop is closed from the central office. Any one of the preset dials may be started by operating its call button. The preset dial will start from the home position, dial the number programmed on its coding board and return to the home position.

## 5. CONNECTION INDEX

Table C—53A Dial Options

Table D—1A350 Tone Detector Connections

Fig. 5—53A Dial, Restricted Mode, Used With Desk-Type Telephone Set

Fig. 6—53A Dial, Unrestricted Mode, Used With Wall-Type Telephone Set

Fig. 7—53A Dial, Unrestricted Dialing on Any Line in Key Telephone Set

Fig. 8—53A Dial, Dialing on Preset Dial Line at Key Telephone Set or Extensions

Fig. 9—53A Dial, Transfer Between Restricted and Unrestricted Mode

Fig. 10—Multiple 53A Dial Connections

Fig. 11—53A Dial Connections, Factory Wired

## 6. MAINTENANCE

6.01 Maintenance is limited to checking wiring for secure and correct connections. ***Do not attempt any maintenance to the dial mechanism.***



***Ensure that the power source is connected to an ac outlet not under control of a switch.***

6.02 Verify that the correct number is programmed on the coding board.

6.03 When the 53A dial is equipped with a 1A350 tone detector, after it seizes the CO line it should detect dial tone for approximately one second and automatically start the dial. If the time is greater than two seconds, the 1A350 tone detector is not operating properly and should be replaced.

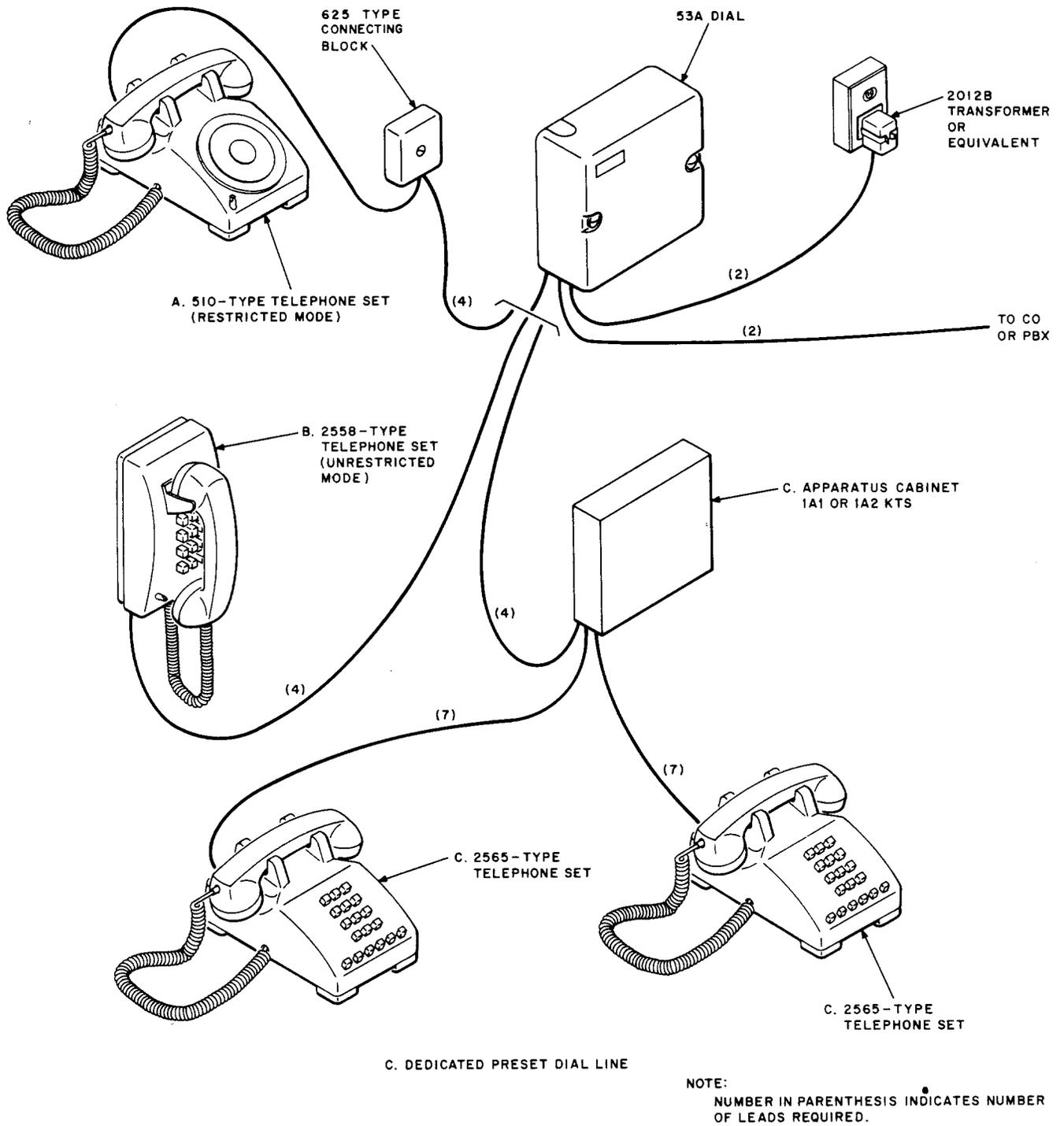
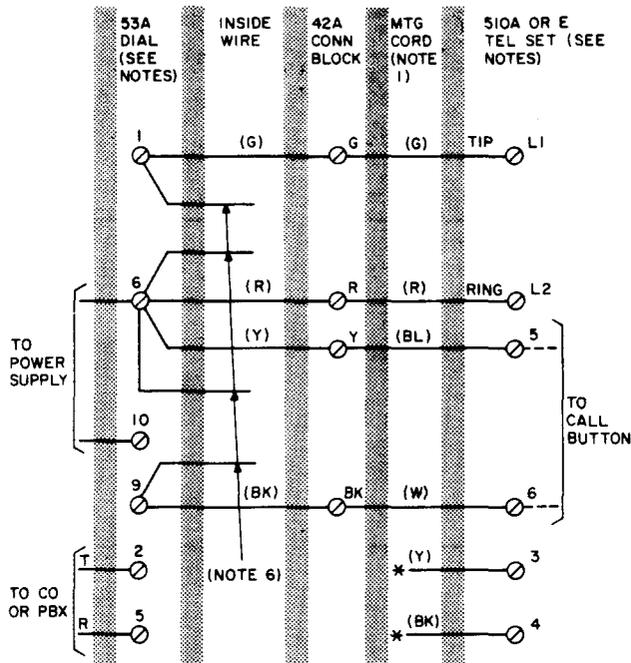


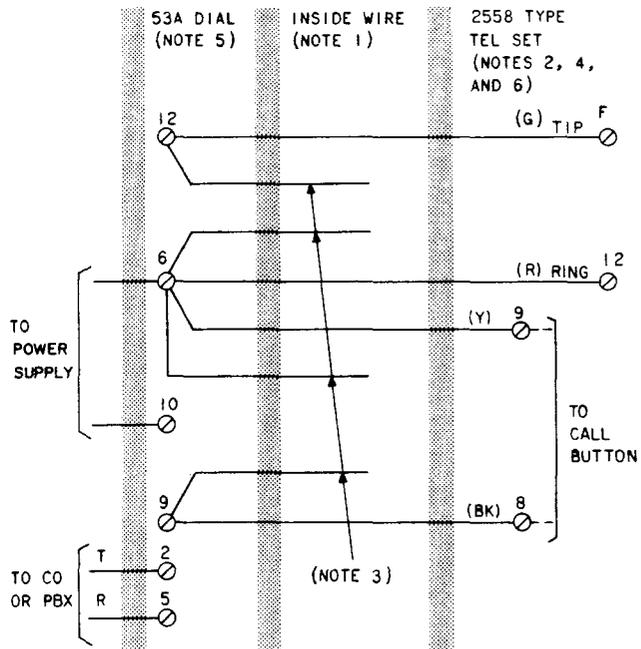
Fig. 4—Typical Installation Layouts, 53A Dial



NOTES:

1. CONNECTIONS SHOWN ARE FOR DESK TYPE SETS. IF WALL SET IS USED, OMIT CONNECTING BLOCK AND RUN IW DIRECTLY TO TELEPHONE SET
  2. IF DIAL EQUIPPED SET IS USED, REMOVE DIAL AND REPLACE WITH A 95-TYPE APPARATUS BLANK. MOVE (W) [S-W] LINE SWITCH LEAD FROM F TO RR ON NETWORK (SEE NOTE 8).
  3. MOVE (G) AND (R) MOUNTING CORD LEADS FROM TERMINAL 2 AND 1 TO L1 AND L2 OF NETWORK RESPECTIVELY (SEE NOTE 8).
  4. USE PUSHBUTTON PORTION OF TURN-PUSHBUTTON AS 53A DIAL CALL BUTTON.
  5. IF INCOMING CALLS ARE NOT TO BE RECEIVED AT TELEPHONE SET, DISCONNECT, INSULATE AND STORE (R) RINGER LEAD.
  6. TO EXTENSION STATIONS HAVING ACCESS TO 53A DIAL.
  7. WIRE 53A DIAL FOR FOLLOWING OPTIONS PER TABLE C:  
 (A) RESTRICTED MODE  
 (B) RINGING START PROTECTION  
 (C) OTHER OPTIONS AS REQUIRED
  8. CONNECTIONS SHOWN BYPASS TURN KEY. WHERE REQUIRED, THE PRESET DIAL LINE CAN BE CONNECTED TO TERMINALS 1 AND 2 AND A SECOND LINE TO 3 AND 4.
- \* INSULATE AND STORE  
 ( ) CURRENT COLOR CODE  
 [ ] MD COLOR CODE

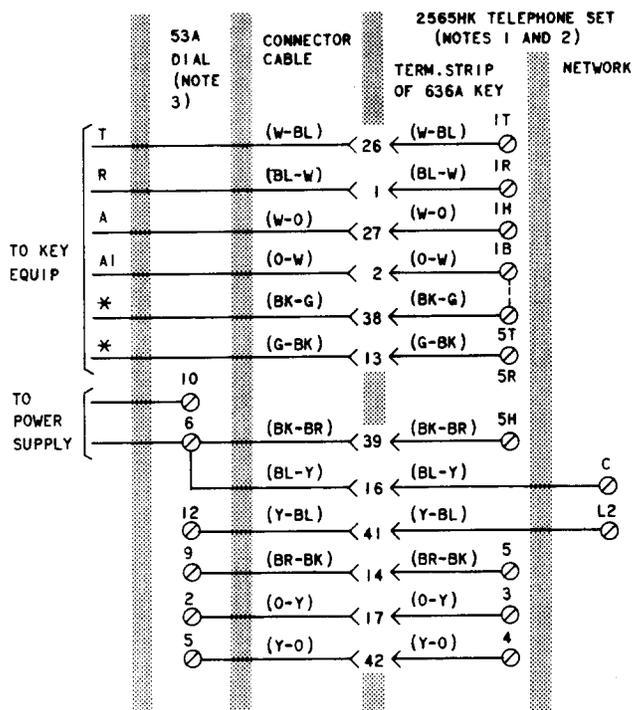
Fig. 5—53A Dial, Restricted Mode, Used With Desk-Type Telephone Set



NOTES:

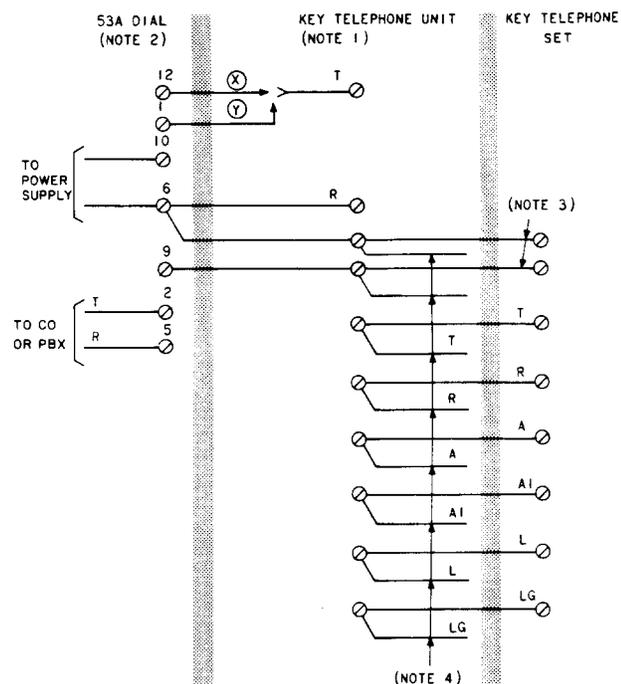
1. CONNECTIONS SHOWN ARE FOR WALL TELEPHONE SETS. IF DESK TYPE SETS ARE USED, USE 42A CONNECTING BLOCK TO BRIDGE IW TO MOUNTING CORD
2. IF INCOMING CALLS ARE NOT TO BE RECEIVED AT TELEPHONE SET, DISCONNECT, INSULATE AND STORE (R) RINGER LEAD.
3. TO EXTENSION STATIONS HAVING ACCESS TO 53A DIAL.
4. USE PUSHBUTTON PORTION OF TURN-PUSHBUTTON AS 53A DIAL CALL BUTTON.
5. WIRE 53A DIAL FOR FOLLOWING OPTIONS PER TABLE C:  
 (A) UNRESTRICTED DIALING  
 (B) OTHER OPTIONS AS REQUIRED
6. CONNECTIONS SHOWN BYPASS THE TURN KEY. WHERE DESIRED THE PRESET LINE CAN BE CONNECTED TO TERMINALS 1 AND 2 AND A SECOND LINE TO 3 AND 4.
7. CONNECT (G-V) 53A DIAL LEAD TO TERMINAL 1 OF DIAL.

Fig. 6—53A Dial, Unrestricted Mode, Used With Wall-Type Telephone Set



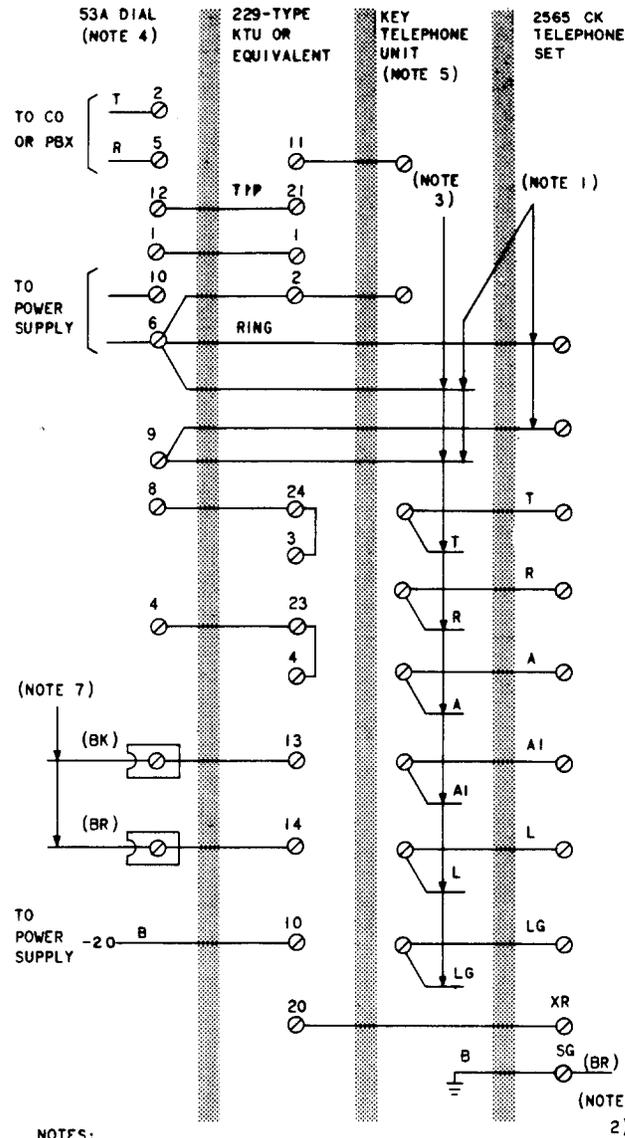
- NOTES:
1. CONNECTIONS SHOWN ARE FOR 2565HK TELEPHONE SET. SPEAKERPHONE CANNOT BE USED WHEN 53A DIAL IS CONNECTED IN THIS CONFIGURATION. IF OTHER TYPE SETS ARE USED, TERMINAL POINTS AND CONDUCTORS MAY VARY.
  2. MODIFY 2565HK AS FOLLOWS:
    - (A) MOVE (G) KEY STRAP FROM L2 TO 3.
    - (B) MOVE (W) LINE SWITCH LEAD FROM C TO 4.
    - (C) MOVE (BR-BK) KEY STRAP FROM X TO 5, ALSO CONNECT STORED (BR-BK) MOUNTING CORD LEAD TO 5.
    - (D) MOVE (BL-Y) MOUNTING CORD LEAD FROM STORED LOCATION TO C.
    - (E) MOVE (Y-BL) MOUNTING CORD LEAD FROM 2 TO L2.
  3. WIRE 53A DIAL FOR FOLLOWING OPTIONS PER TABLE C:
    - (A) UNRESTRICTED MODE.
    - (B) OTHER OPTIONS AS REQUIRED.
  4. CONNECT INSULATED AND STORED (G-V) 53A DIAL LEAD TO TERMINAL 1 OF DIAL.
- \* INSULATE AND STORE, CONVERT 5TH LINE BUTTON AS CALL BUTTON.

Fig. 7—53A Dial, Unrestricted Dialing on Any Line in Key Telephone Set



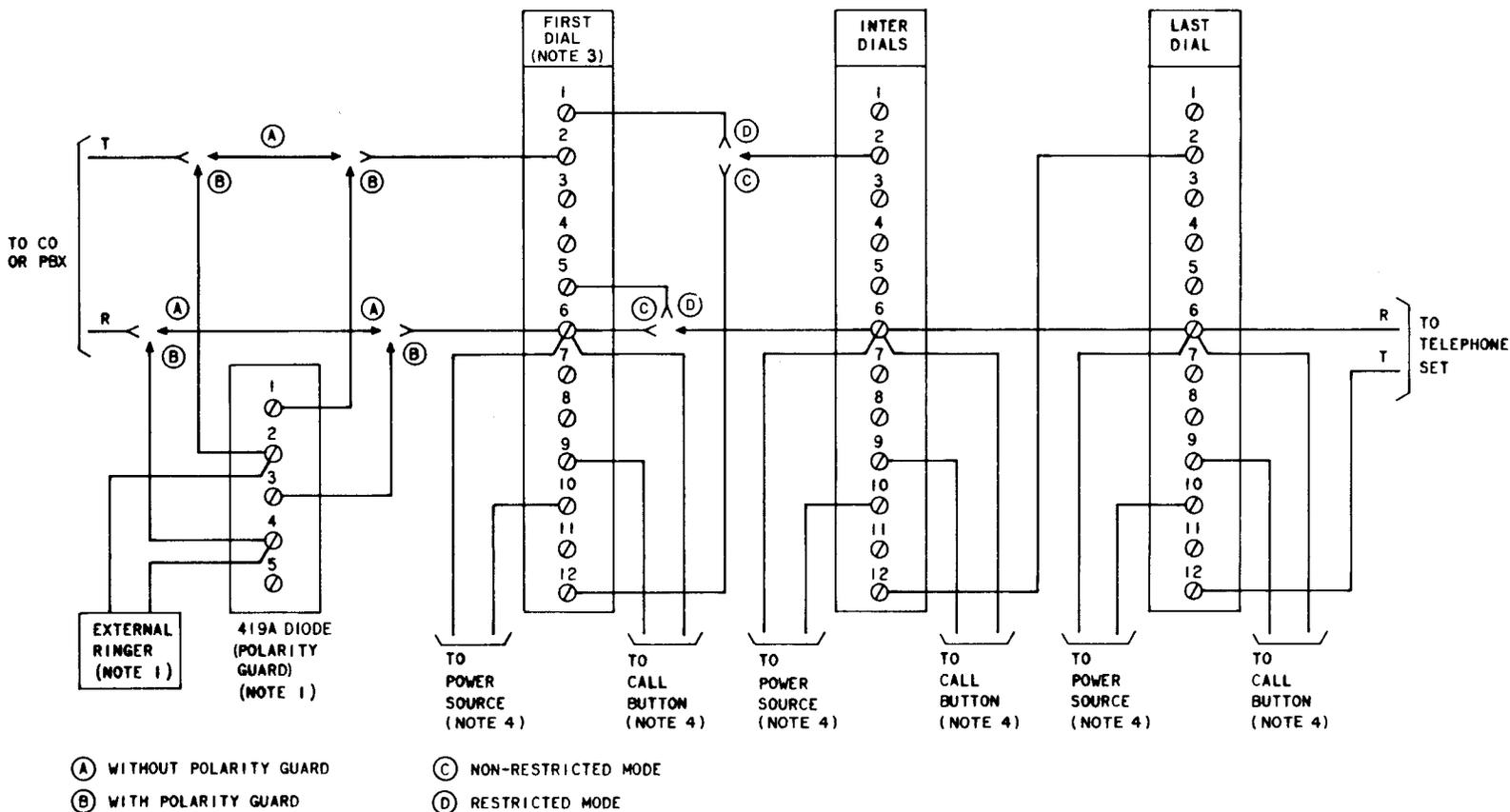
- NOTES:
1. CONNECT OUTPUT OF 53A DIAL TO INCOMING CO OR PBX LINE TERMINALS OF KTU LINE CIRCUIT ASSIGNED TO PRESET LINE. STATION CONNECTIONS ARE MADE IN THE NORMAL MANNER.
  2. WIRE 53A DIAL FOR FOLLOWING OPTIONS PER TABLE C:
    - (A)  $\otimes$  UNRESTRICTED OR  $\odot$  RESTRICTED MODE
    - (B) RINGING START PROTECTION
    - (C) OTHER OPTIONS AS REQUIRED
  3. TO CONVERTED PICKUP KEY OR PUSHBUTTON USED AS CALL BUTTON.
  4. MULTIPLE ALL STATIONS HAVING ACCESS TO PRESET DIAL LINE ON STATION SIDE OF KTU.
- $\otimes$  UNRESTRICTED MODE  
 $\odot$  RESTRICTED MODE

Fig. 8—53A Dial, Dialing on Preset Dial Line at Key Telephone Set or Extensions



- NOTES:
1. TO CONVERTED PICKUP BUTTON USED AS CALL BUTTON.
  2. MOVE (BR) TURNBUTTON LEAD FROM 2R TO SG AT TERMINAL STRIP. CONNECT SG GRD AT EQUIPMENT.
  3. TO EXTENSION STATION USED FOR RESTRICTED MODE. SET MUST BE WIRED FOR A LEAD CONTROL.
  4. WIRE 53A DIAL FOR FOLLOWING OPTIONS PER TABLE C:  
 (A) RINGING START PROTECTION  
 (B) OTHER OPTIONS AS REQUIRED
  5. LINE CIRCUIT OF CO OR PBX ASSIGNED TO PRESET LINE.
  6. CONNECT INSULATED AND STORED (G-V) 53A DIAL LEAD TO TERMINAL 1 OF DIAL.
  7. (BK) LEAD WAS CONNECTED TO TERMINAL 8 AND (BR) LEAD TO TERMINAL 4 OF DIAL, PROVIDE D-161488 CONNECTORS TO EXTEND LEADS TO KTU.

Fig. 9—53A Dial, Transfer Between Restricted and Unrestricted Mode



NOTES:

1. FOR END-TO-END SIGNALING APPLICATIONS, INSTALL A 419A DIODE (ORDERED SEPARATELY) OPTION B, MAKE CONNECTIONS USING INSIDE WIRE. IF INCOMING CALLS ARE TO BE RECEIVED CONNECT RINGER ACROSS THE LINE AHEAD OF THE POLARITY GUARD.
2. FOR UNRESTRICTED DIALING, OPTION C, CONNECT THE DIALS AS SHOWN IN TABLE C. 43A AND 53A DIALS MAY BE MIXED AT RANDOM (NOTE 4).
3. FOR RESTRICTED DIALING, OPTION D, MAY BE USED WITH THE FOLLOWING RESTRICTIONS:
  - A. ONLY THE FIRST DIAL IN THE SERIES MAY BE OPERATED IN THE RESTRICTED MODE.
  - B. THE FIRST DIAL MAY BE 43A OR 53A DIAL, ALL OTHER DIALS MUST BE 53A.

- C. THE NUMBER PROGRAMMED ON THE FIRST DIAL MUST ALWAYS BE THE FIRST NUMBER TO BE DIALED AFTER GOING OFF HOOK.
- D. INCOMING CALLS MAY NOT BE RECEIVED, PARA. 4.02.
- E. THE 1A350 TONE DETECTOR MAY BE USED IN THE FIRST DIAL INSTEAD OF A CALL BUTTON.
4. CALL BUTTON AND POWER SOURCE CONNECTIONS ARE FOR 53A DIAL ONLY. REFER TO SECTION 501-165-101 FOR 43A DIAL CONNECTIONS.

Fig. 10—Multiple 53A Dial, Connections

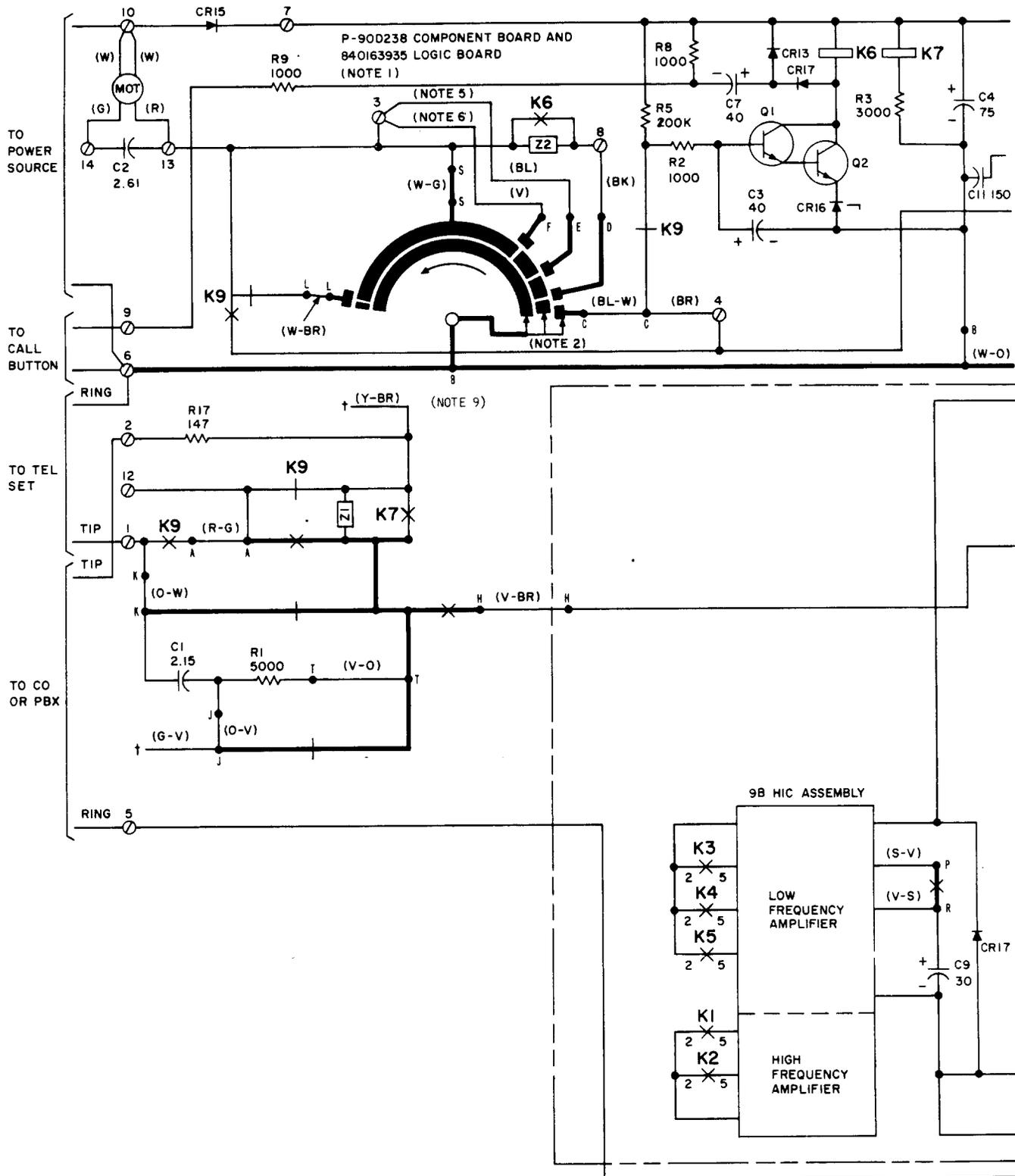


Fig. 11—53A Dial Connections, Factory Wired (Sheet 1 of 2)

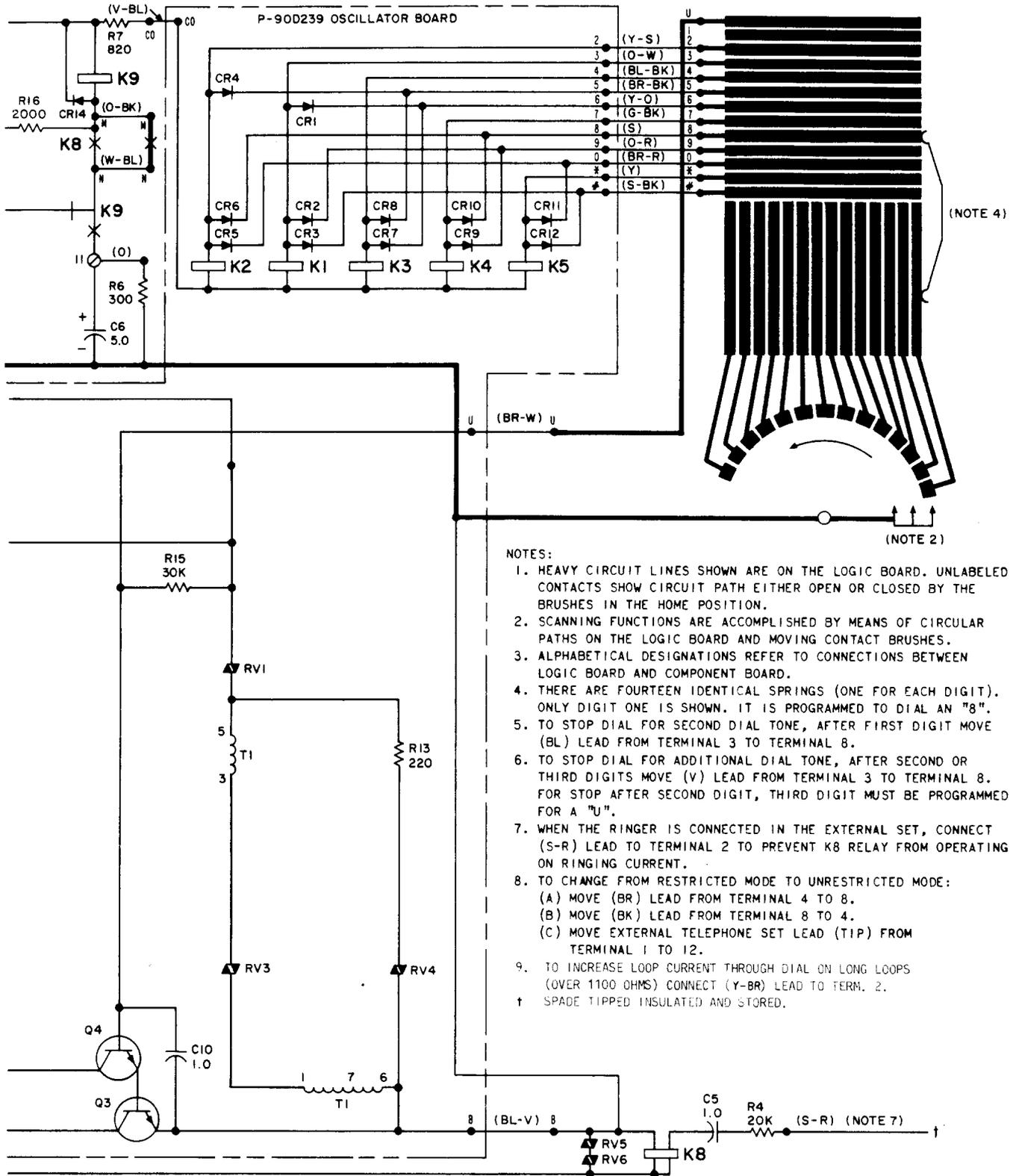


Fig. 11—53A Dial Connections, Factory Wired (Sheet 2 of 2)