

STATION DIALS—43B AND 53B

IDENTIFICATION, INSTALLATION, OPERATION, CONNECTIONS AND MAINTENANCE

EASE NOTE:
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GENERAL

1.01 The 43B dial and 53B dial (Fig. 1 and 2) are rotary and TOUCH-TONE® dials, respectively, which are capable of automatically dialing multiple telephone numbers. They consist primarily of a dialing mechanism and a number programming terminal board.

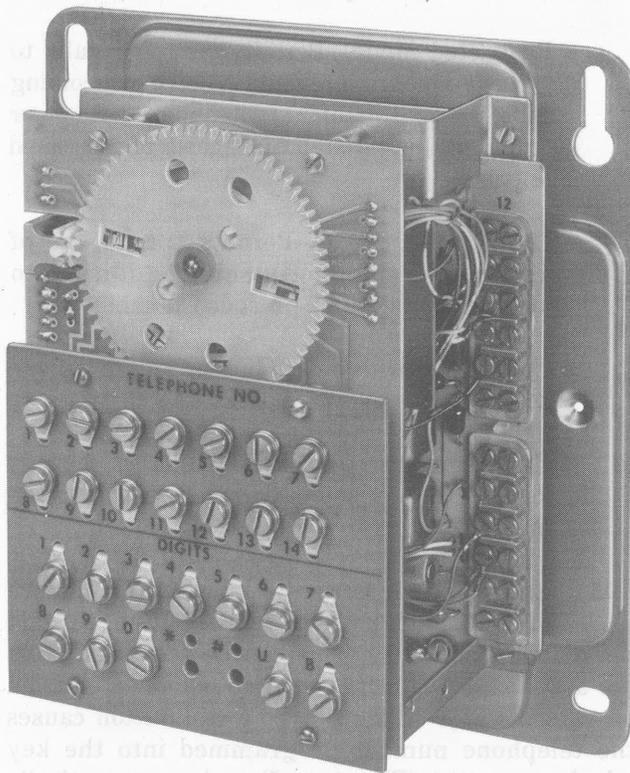


Fig. 1—43B Dial, Without P-47G557 Cover

1.02 This section is reissued to:

- Show 533B diodes replace the 400A diodes in Fig. 4, 5, 6, and 7 (229B and 227B KTU's)
- Add 533B diodes, Fig. 8

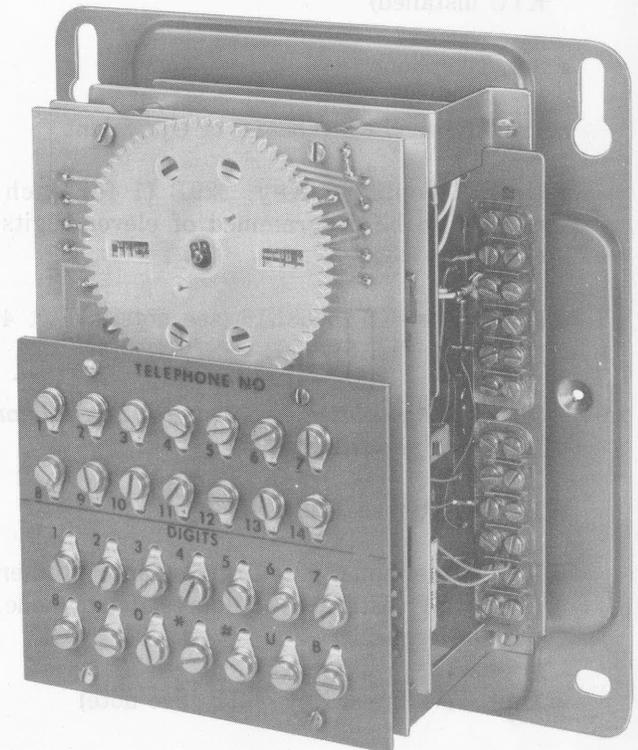


Fig. 2—53B Dial, Without P-47G557 Cover

- Show KS-15724L1 diode in Fig. 10 and 12 in place of 400A diode (telephone set)

- Add (Y-BR) lead in Table C and Fig. 14, also add Note 8, Fig. 14.

1.03 These dials may be used with most standard telephone sets. However, one isolated set of normally open line switch contacts must be used to provide a lock-up path between the dial and the 229B KTU's (used to program the various numbers to be dialed). If this set of line switch contacts must be used for A lead control, then the isolated contacts of an auxiliary relay operated by A lead control must be used.

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1.04 A separate single make contact switch (call button) and 229B KTU into which the telephone number is programmed is required for each telephone number to be dialed. A typical installation is shown in Fig. 3.

2. IDENTIFICATION

Ordering Guide

2.01 *Basic Dial:*

- Dial, 43B (Rotary)
- Dial, 53B (TOUCH-TONE service)

2.02 *Replaceable Components:*

- P-47G557 Cover

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

- Diode, 533B or equivalent (3 for each 229B KTU installed)
- Set, Telephone
- Transformer, KS-16886L2 or equivalent
- Unit, Telephone, Key, 229B (1 for each number to be programmed of eleven digits or less)
- Capacitor, KS-19658L16 (see note 9, Fig. 4 or note 8, Fig. 5)

2.04 *Optional Associated Apparatus or Equipment (ordered separately):*

- Backboard (see Table A)
- Unit, Telephone, Key, 229B (for customer control of restricted or nonrestricted mode, per station basis)
- Unit, Telephone, Key, 227B (See note)
- Diode 533B or equivalent (two for each 227B KTU installed)
- Unit, Telephone, Key, 265A (see note 9, Fig. 4 or note 8, Fig. 5)

Note: When *A* lead control must be used and spare line switch contacts are not available, per station basis, or when more than eleven digits are to be programmed on each 229B KTU, a 227B KTU slave relay may be used to gain additional contacts (Fig. 6).

Design Features

- Multinumber capacity.
- Facility to program stops after first, second, or third digit.
- Closure of a single make contact switch (call button) causes a preset number to be selected and automatically dialed.
- Restricted Mode—Permits outgoing calls to preset numbers; prevents receiving incoming calls, manual dialing, switchhook dialing, or tone signaling through transmitter of associated telephone set.
- Unrestricted Mode—Permits normal use of associated telephone set in addition to automatic dialing of precoded numbers.
- Compatible with single line or key telephone set.
- Can be operated from any line in a given key set or any set having access to a given line.

2.05 Each dial requires the momentary closure of a single make contact (call button) to start the dialing operation. This can be furnished from the associated telephone set if so equipped or from an external key. Operation of a call button causes the telephone number programmed into the key telephone unit(s) (Fig. 4 or 5) to be automatically dialed.

2.06 Custom installations are also possible with either dial, such as at airport or bus terminals to automatically dial motels, taxicabs, etc.

3. INSTALLATION

43B or 53B Dial and Associated KTU's

3.01 The dial and KTU's can be mounted in standard equipment cabinets or racks.

Mounting arrangements will vary depending on the number of telephone numbers to be dialed.

3.02 The dial mounting holes are spaced 5-7/8 inches horizontally and 6-5/8 inches vertically.

3.03 Three 533B diodes or equivalent must be wired to each 229B KTU installed in the system as shown in Fig. 4 or 5.

3.04 The number programming terminal board of these dials is arranged so that the top two rows of terminals (numerical order) are for the sequence of digits to be programmed. These leads are designated S leads (Fig. 4 and 5). The bottom two rows occupy the digits that can be programmed into each digit position. These leads are designated D leads.

3.05 Extend in numerical order all S leads from the number programming terminal board to the first KTU(s) as shown in (Fig. 7) and strap to succeeding KTU's, (Fig. 4 and 5). In addition to the S leads to be placed, certain control strapping is required. See (Fig. 4 and 5) for additional strapping between KTU's. Programming of telephone numbers is covered in 3.11.

Power Supply

3.06 Installations require between 22 and 28 volts AC, 60 Hz power for proper operation. A KS-16886L2 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.



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

Call Button

3.07 The maximum loop resistance between the call button and dial is 150 ohms.

Associated Telephone Set

3.08 These dials are compatible with single line or key telephone sets. They can be operated from any line in a given key telephone set or any set having access to a given line.

3.09 When either dial is associated with a line of 1A1 or 1A2 key telephone system, all

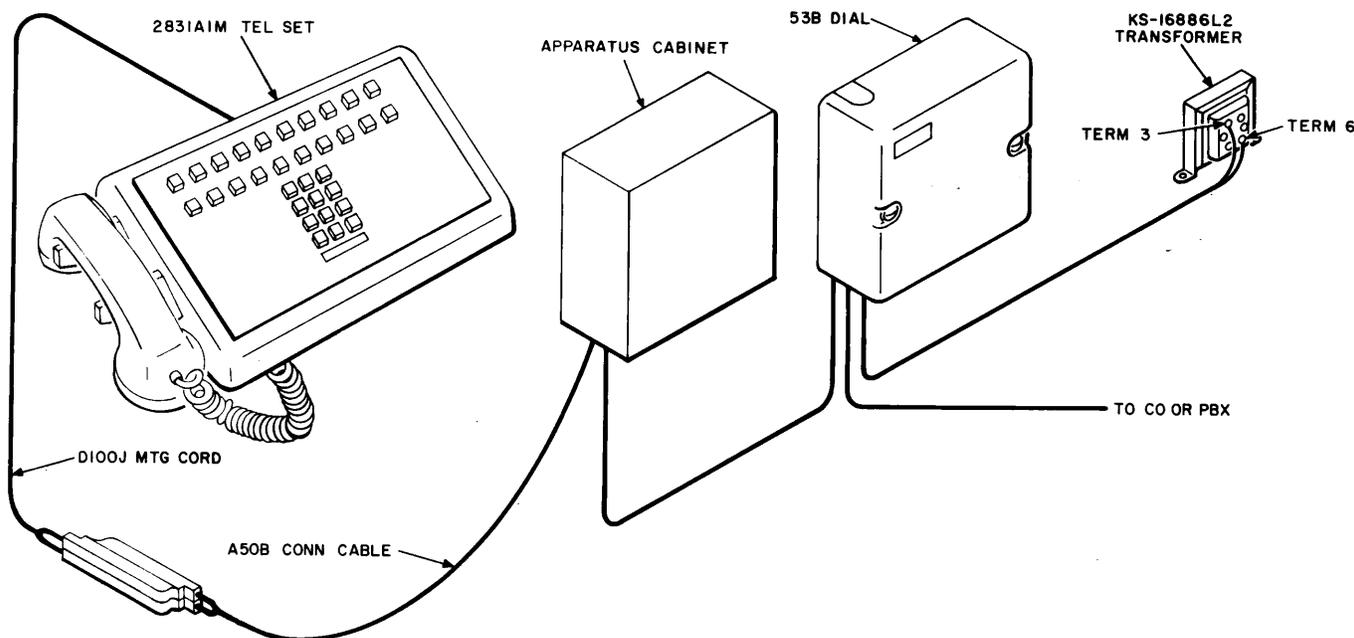


Fig. 3—Typical Installation Layout, 53B Dial

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telephone sets having access to that line must provide **A** lead control to the associated line circuit. To be used with 1A1 or 1A2 KTS, the associated telephone set line switch must furnish enough contacts for **A** lead control, line connections, and lock paths for the KTU's (busy lamp circuit, see 1.03).

3.10 Only those sets equipped with a varistor across the receiver (G-type handset or equivalent) should be used.

3.11 If converted key set pickup buttons are to be used as call buttons, set should have enough spare pickups to cover numbers to be called in addition to pickup for preset dial line, otherwise external keys must be utilized as call buttons.



*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

3.12 Programming is accomplished by connecting the D leads from the dialer to the KTU in the numerical order in which they are to be dialed, see (Fig. 4, 5, or 6).

3.13 Connect leads as follows:

- (1) Determine the 1st digit of the telephone number (i.e. the digit 6 on the 1st KTU in Fig. 4) and extend D6 lead from the dialer number programming terminal board to terminal 11 of 1st KTU.
- (2) Extend 2nd digit lead D3 to terminal 12 of 1st KTU.
- (3) Code rest of numbers in same manner using appropriate terminals of KTU(s), see (Fig. 7).
- (4) Connect all unused digits to the **U** terminal of dial.

Note: If a digit appears more than once in a telephone number, only one D lead is required from the dialer and the proper

terminals are strapped on the KTU, i.e., the digit one on 1st KTU (Fig. 4 or 5).

3.14 When programming numbers, apply the following:

- If stops after the first, second, or third digit are to be included, refer to Table C for dial wiring changes to be made.

Note: In order for the 43B dial to cycle to the **Talk** position before the switching equipment completes the connections and rings the called party, the last digit of a small number should be programmed later in the call cycle, i.e. the 10th position.

3.15 To check installation of dial in the restricted mode: (No manual dialing permitted.)

- (1) Remove handset from the associated telephone set. Dial tone should be present.
- (2) Actuate call buttons, telephone numbers programmed on associated relays should automatically be dialed.
- (3) Replace telephone handset on hook.
- (4) Verify that dial tone cannot be broken when the handset is off-hook and the line switch is manipulated.

3.16 To check installation of dial in the unrestricted mode:

- (1) Repeat 3.14 (1) through (3).
- (2) Verify that dial tone can be broken when the handset is off-hook and the line switch or manual dial button is operated.

4. OPERATION

Restricted Mode

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. This prohibits manual dialing and voice transmission from the telephone set.

4.02 Operating the call button operates and locks the KTU(s). The programmed telephone number is dialed and the dial steps to the *Talk* position reconnecting the transmitter to the line.

4.03 After completion of a call, going on-hook causes the dial to step to the *Home* position and releases the KTU(s) terminating the call.



In the restricted mode it is not possible to receive calls at the associated telephone set; therefore the telephone set ringer should be silenced.

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

4.05 If a call is abandoned before the dialing sequence is completed, the dial will step to the *Home* position when the handset is placed on-hook.

Unrestricted Mode

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

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

**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

5. CONNECTION INDEX

Table C—43B and 53B Dial Options

Fig. 4—Examples of Programming Three Numbers on 43B Dial, Single Line and Single Station Use, Restricted Mode, Connections

Fig. 5—Examples of Programming Three Numbers on 53B Dial, Single Line and Single Station Use, Restricted Mode, Connections

Fig. 6—Typical Connections For 229B KTU's Using 227B KTU as Slave Relay

Fig. 7—229B Key Telephone Unit

Fig. 8—227B Key Telephone Unit

Fig. 9—43B Dial, Key Telephone System Line and Multistation Use with Transfer From Restricted to Unrestricted Mode, Connections

Fig. 10—43B Dial, Key Telephone System Line and Single Station Use With Optional Mode, Connections

Fig. 11—43B Dial Connections, Factory Wiring, Restricted Mode

Fig. 12—53B Dial, Key Telephone System Line and Single Station Use With Optional Mode, Connections

Fig. 13—53B Dial, Key Telephone System Line and Multistation use With Transfer From Restricted to Unrestricted Mode, Connections

Fig. 14—53B Dial Connections, Factory Wiring, Restricted Mode

**TABLE B
MAXIMUM LOOP LENGTHS BETWEEN EITHER DIAL
AND POWER SOURCE**

D-STATION WIRE 22 GAUGE	DIW CABLE 24 GAUGE
1500 ft.	950 ft.

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6. MAINTENANCE

6.01 Maintenance is limited to checking wiring for secure and correct connections and replacement of dialer.

6.02 Defective components listed in the ordering guide which are available through supply channels may be replaced. *Do not attempt any maintenance to the dial mechanism.*

TABLE C
43B AND 53B DIAL OPTIONS

OPTION	DIAL SPADE-TIPPED LEADS							
	BR	BK	BL	V	S‡	Y-BR§	S-R	G-V
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 1st and 2nd Digit†			8	8				
Stop After 1st and 3rd Digit			8	8				
Short Loop (under 400 ohms total)‡					*	*		
Long Loop (over 400 ohms total)‡					2	2		
Ringing Start Protection							2	
Associated Tel Set								1¶

* Insulated and stored.

† Program 3rd digit for a "U" for stops after 2nd digit.

‡ 43B dial only.

§ 53B dial only.

¶ Applies only for TOUCH-TONE sets with the 53B dial in the unrestricted mode. In all other cases, insulate and store.

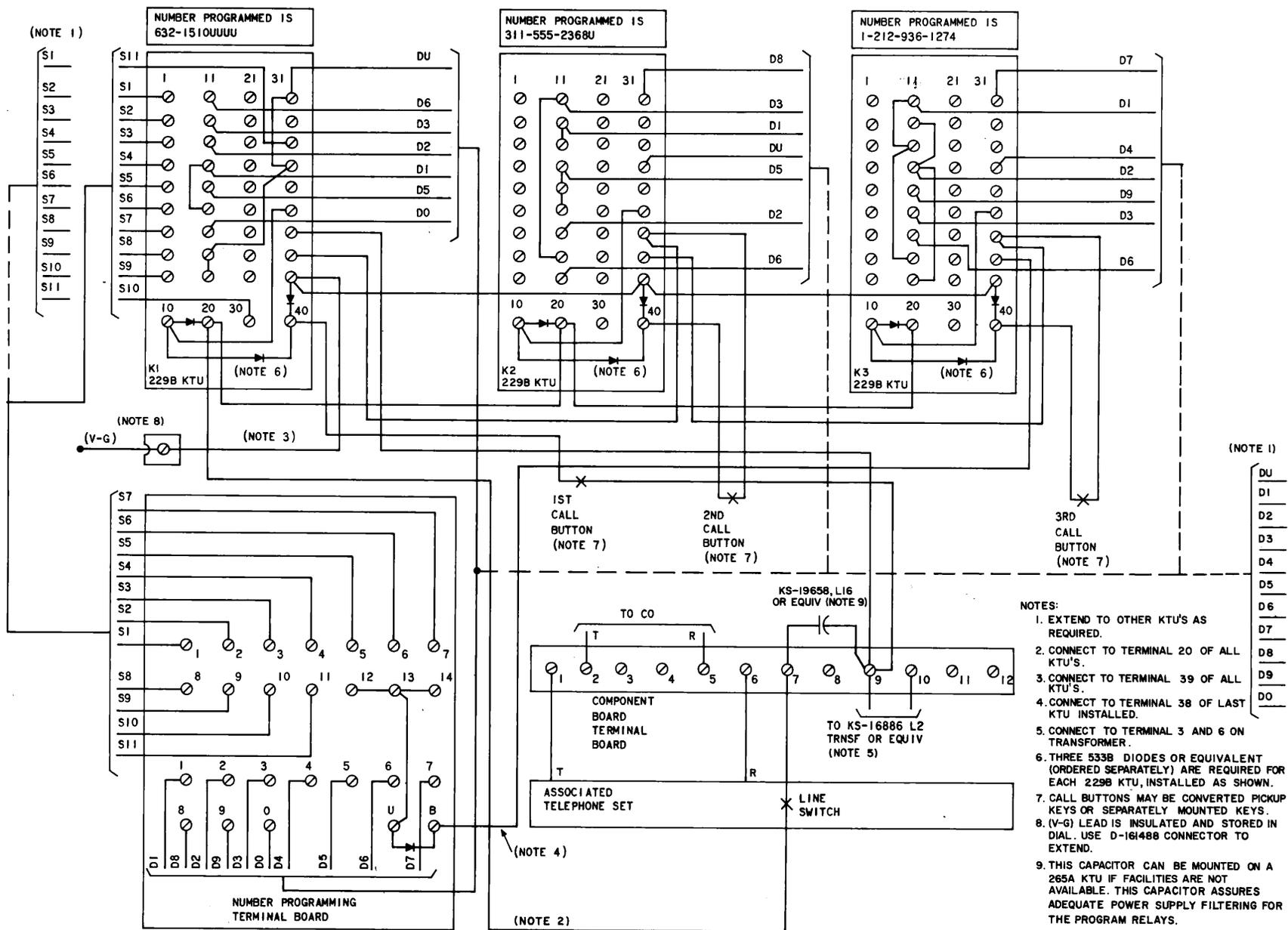


Fig. 4—Examples of Programming Three Numbers on 43B Dial, Single Line, and Single Station Use, Restricted Mode, Connections

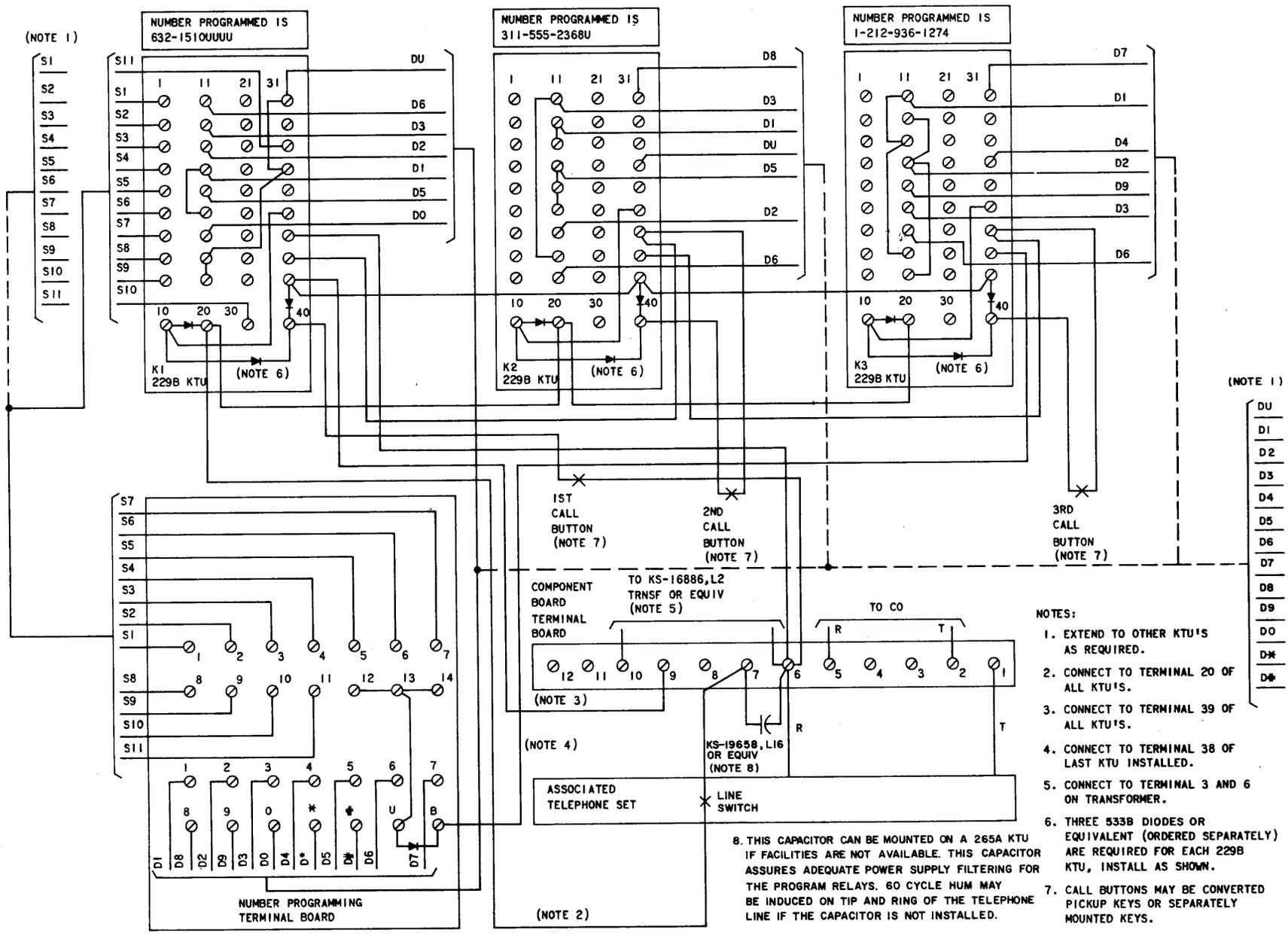
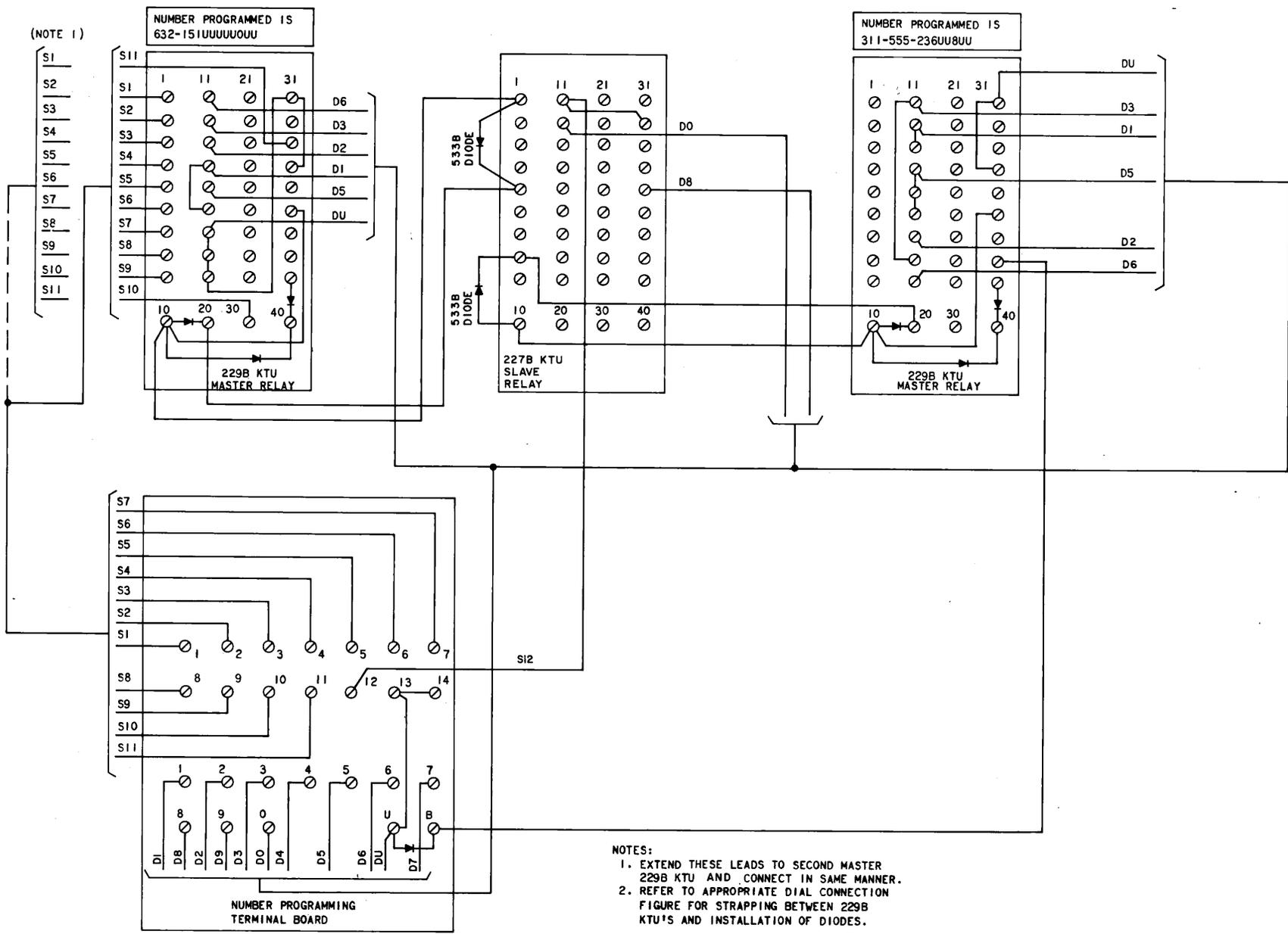


Fig. 5—Examples of Programming Three Numbers on 53B Dial, Single Line and Single Station Use, Restricted Mode, Connections



NOTES:
 1. EXTEND THESE LEADS TO SECOND MASTER 229B KTU AND CONNECT IN SAME MANNER.
 2. REFER TO APPROPRIATE DIAL CONNECTION FIGURE FOR STRAPPING BETWEEN 229B KTU'S AND INSTALLATION OF DIODES.

Fig. 6—Typical Connections for 229B KTU's Using 227B KTU as Slave Relay

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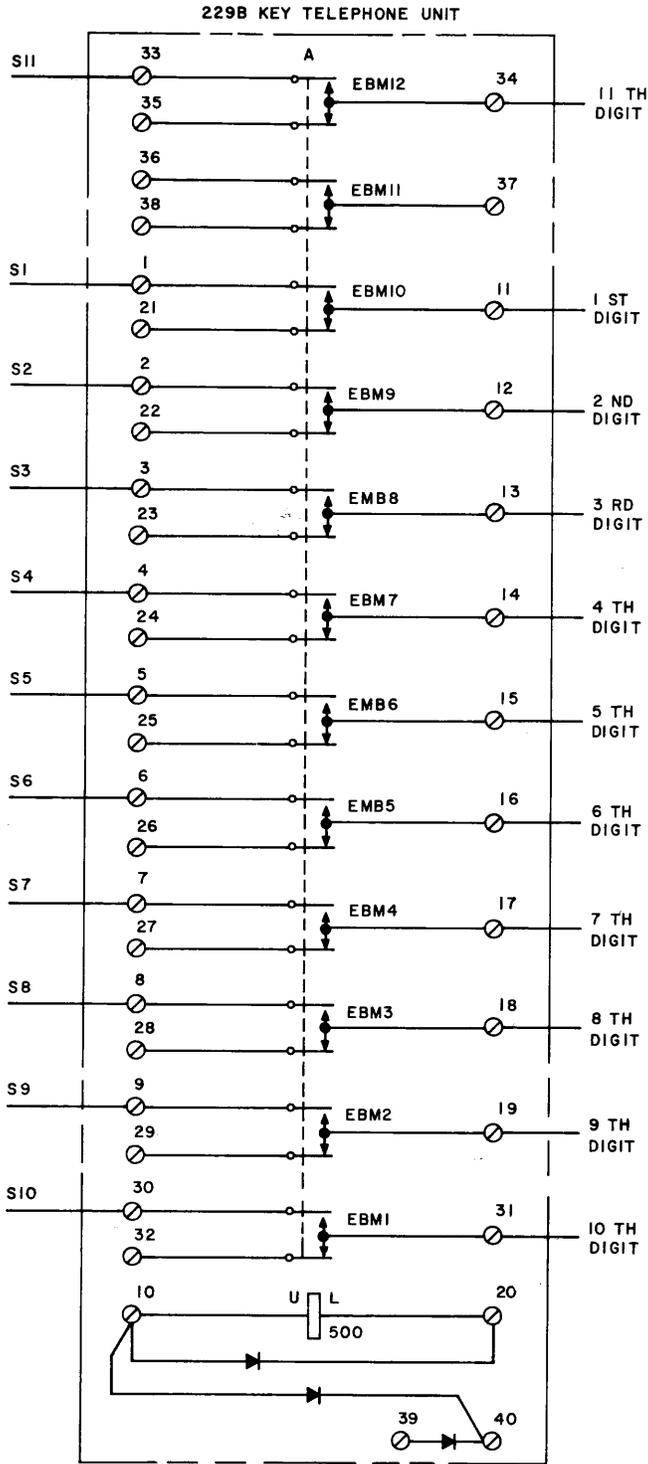


Fig. 7—229B Key Telephone Unit

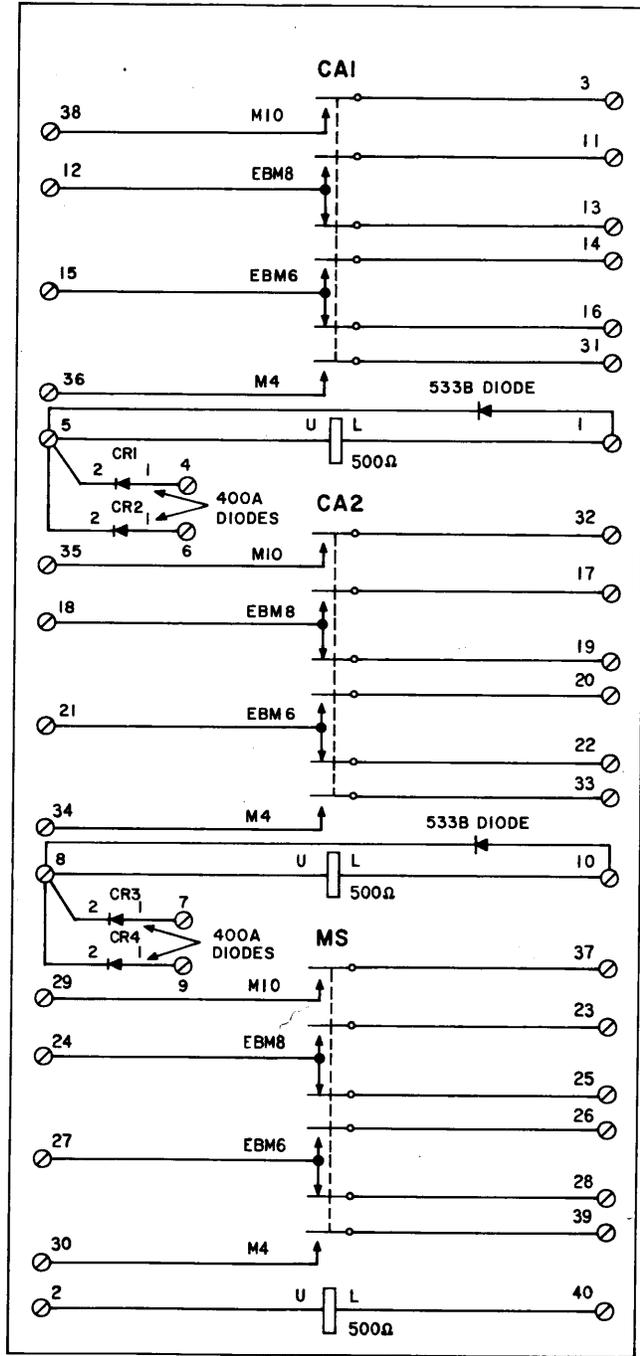
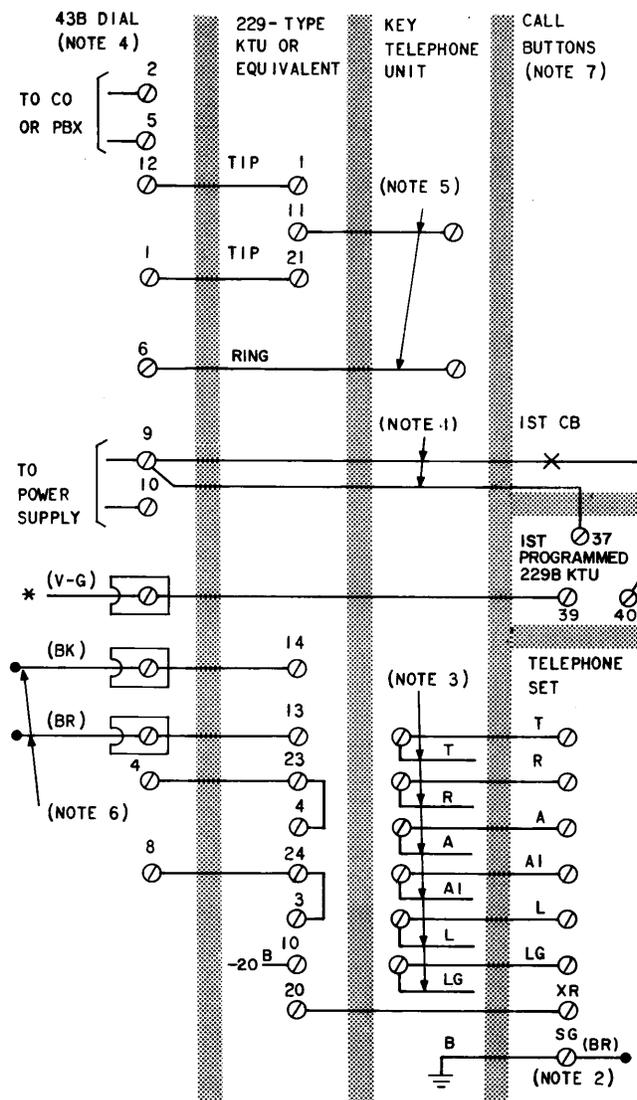


Fig. 8—227B Key Telephone Unit



* INSULATED AND STORED, EXTEND LEAD TO 229B KTU USING D-161488 CONNECTOR OR CONNECT TO SPARE TERMINAL.

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. USE BUSY LAMP CIRCUIT FOR ALL SETS PER FIG. 10.
4. WIRE 43B DIAL FOR FOLLOWING OPTIONS PER TABLE C:
 - RINGING START PROTECTION
 - OTHER OPTIONS AS REQUIRED
5. LINE CIRCUIT OF CO OR PBX LINE ASSIGNED TO PRESET LINE, STATION SIDE.
6. (BK) LEAD IS CONNECTED TO TERMINAL 8 AND (BR) LEAD TO TERMINAL 4 OF DIAL, PROVIDE D-161488 CONNECTORS TO EXTEND LEADS TO KTU.
7. SEE FIG. 4 FOR CONNECTIONS OF ADDITIONAL PROGRAMMED 229B KTU'S.

Fig. 9—43B Dial, Key Telephone System Line and Multistation Use With Transfer from Restricted to Unrestricted Mode, Connections

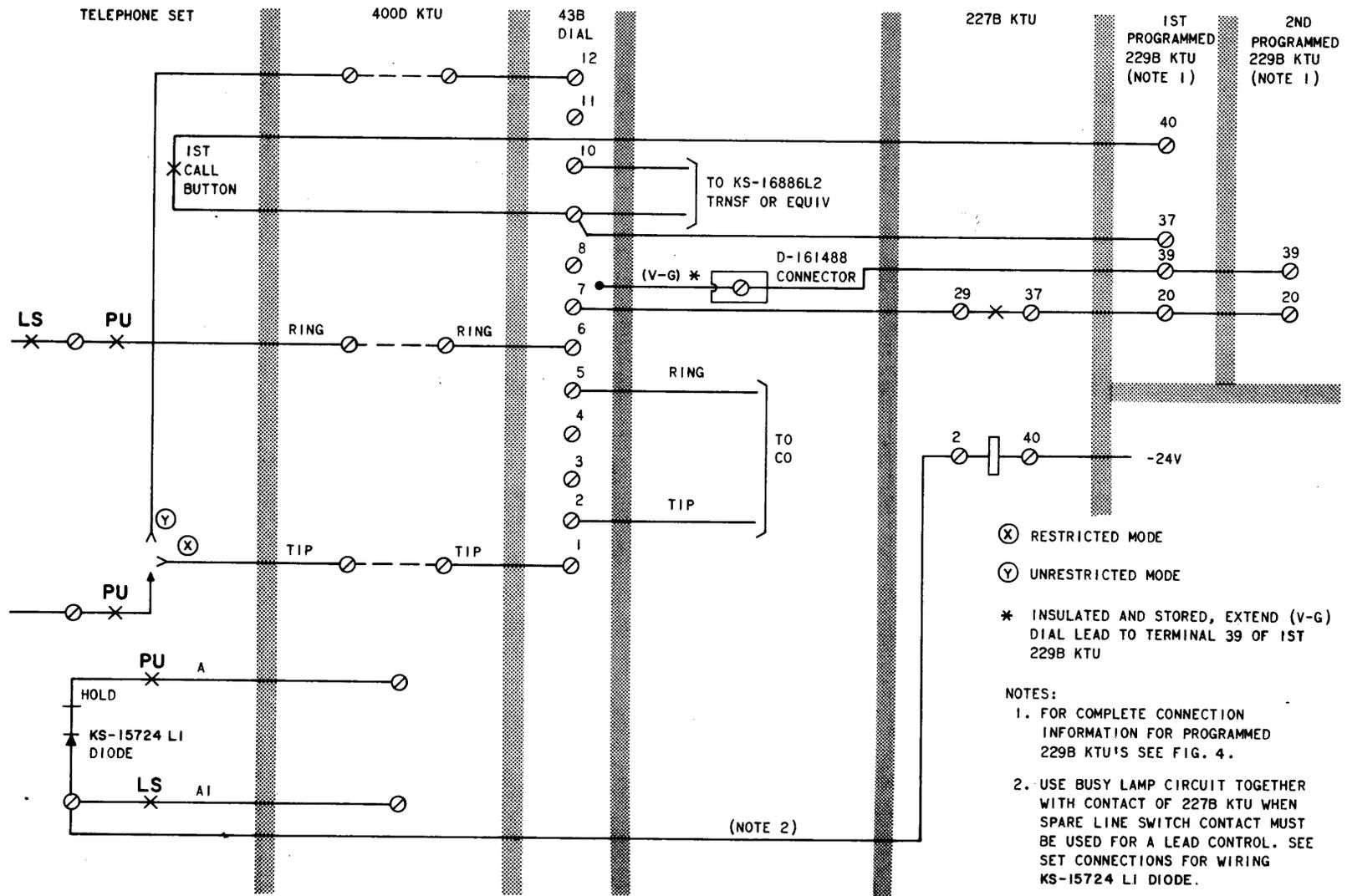
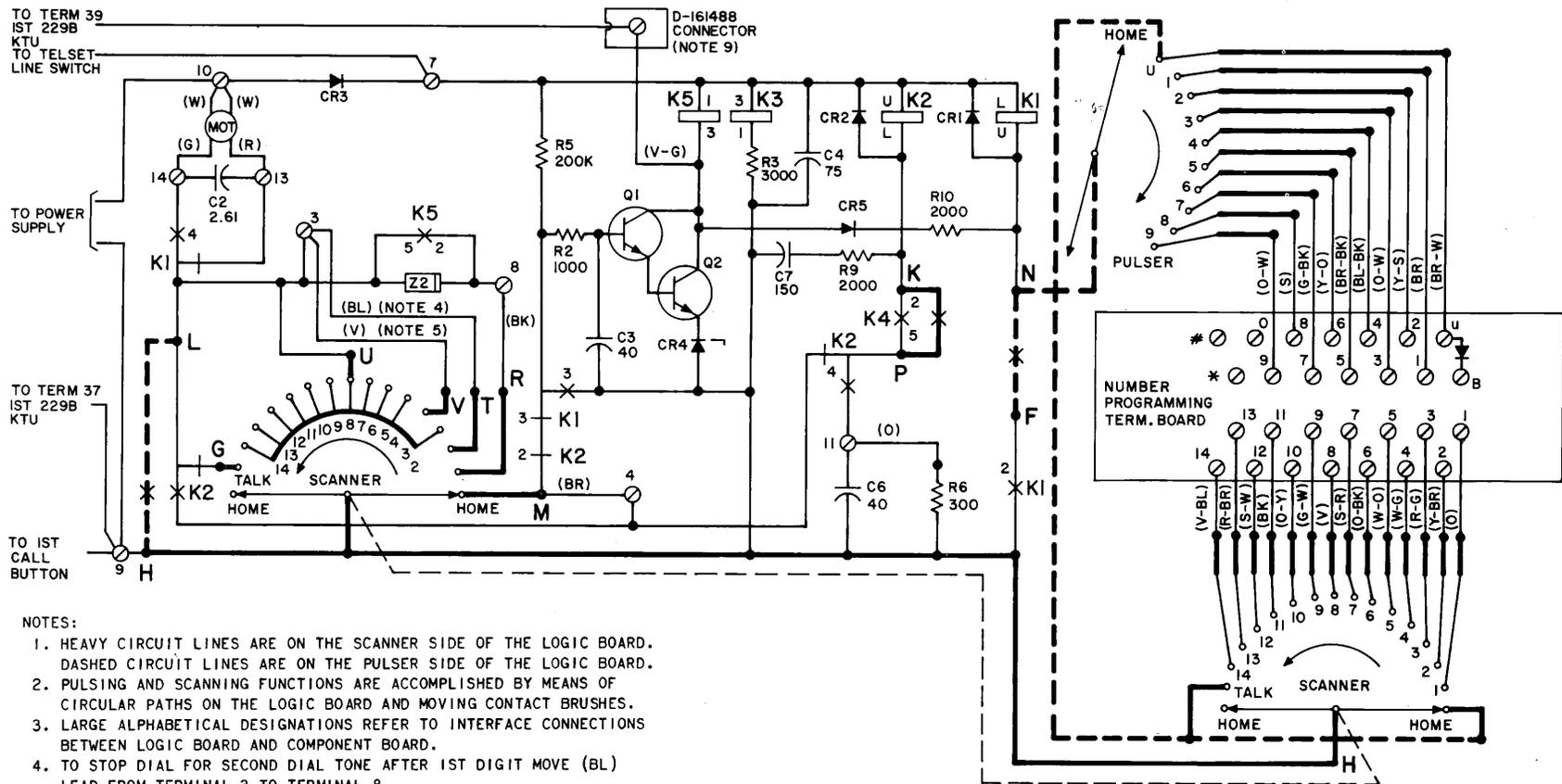


Fig. 10—43B Dial, Key Telephone System Line and Single Station Use With Optional Mode, Connections



NOTES:

1. HEAVY CIRCUIT LINES ARE ON THE SCANNER SIDE OF THE LOGIC BOARD. DASHED CIRCUIT LINES ARE ON THE PULSER SIDE OF THE LOGIC BOARD.
2. PULSING AND SCANNING FUNCTIONS ARE ACCOMPLISHED BY MEANS OF CIRCULAR PATHS ON THE LOGIC BOARD AND MOVING CONTACT BRUSHES.
3. LARGE ALPHABETICAL DESIGNATIONS REFER TO INTERFACE CONNECTIONS BETWEEN LOGIC BOARD AND COMPONENT BOARD.
4. TO STOP DIAL FOR SECOND DIAL TONE AFTER 1ST DIGIT MOVE (BL) LEAD FROM TERMINAL 3 TO TERMINAL 8.
5. TO STOP DIAL FOR ADDITIONAL DIAL TONE AFTER 2ND OR 3RD DIGITS MOVE (V) LEAD FROM TERMINAL 3 TO TERMINAL 8. FOR STOP AFTER 2ND DIGIT, 3RD DIGIT MUST BE PROGRAMMED FOR A "U".
6. WHEN THE RINGER IS CONNECTED IN THE EXTERNAL SET, CONNECT (S-R) LEAD TO TERMINAL 2 TO PREVENT K4 RELAY FROM OPERATING ON RINGING CURRENT.
7. TO INCREASE LOOP CURRENT THROUGH DIAL ON LONG LOOPS (OVER 400 OHMS), CONNECT (S) LEAD TO TERMINAL 2.
8. TO CHANGE FROM RESTRICTED MODE TO UNRESTRICTED MODE:
 - (A) MOVE (BR) LEAD FROM TERMINAL 4 TO 8
 - (B) MOVE (BK) LEAD FROM TERMINAL 8 TO 4
 - (C) MOVE EXTERNAL TELEPHONE SET LEAD (TIP) FROM TERMINAL 1 TO 12.
9. (V-G) LEAD IS INSULATED AND STORED IN DIAL. USE D-161488 CONNECTOR TO EXTEND LEAD.
- * SPADE TIPPED LEAD, INSULATED AND STORED.

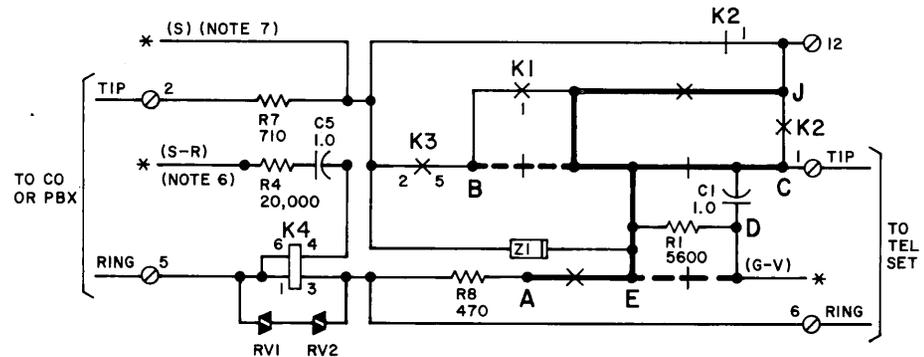


Fig. 11—43B Dial Connections, Factory Wiring, Restricted Mode

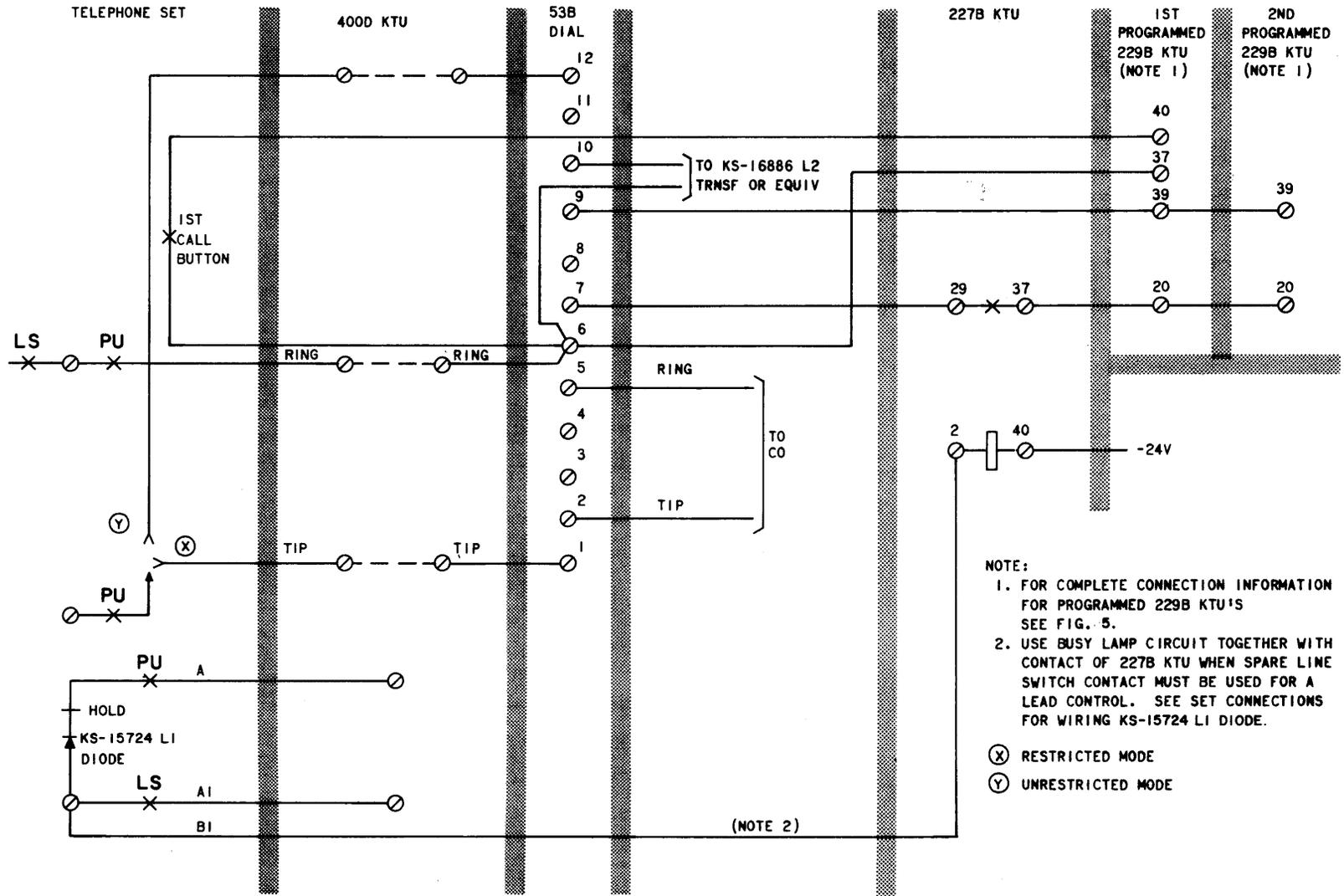


Fig. 12—53B Dial, Key Telephone System Line and Single Station Use With Optional Mode, Connections

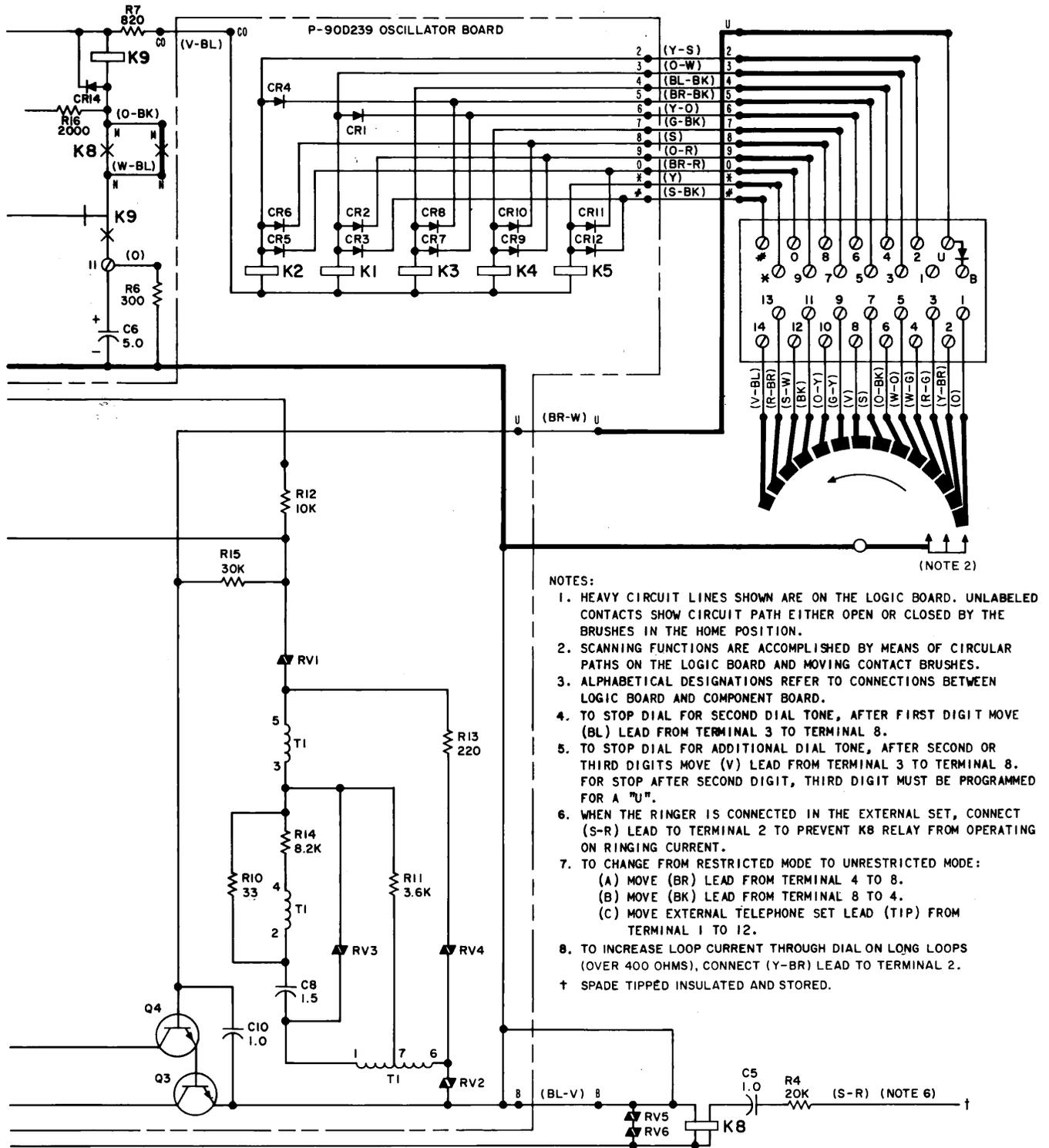


Fig. 14—53B Dial Connections, Factory Wiring, Restricted Mode (Sheet 2 of 2)