870B1M AND 2870B1M TOUCH-A-MATIC® 32 ADJUNCT DIAL

IDENTIFICATION, INSTALLATION, CONNECTIONS, OPERATION, AND

MAINTENANCE

1. **GENERAL**

1.01 This section contains information on the 870B1M (rotary service) and the 2870B1M (TOUCH-TONE® service) dials Fig. 1.

1.02 This section is reissued to:

- Add D-180837 Kit of Parts

- Add Fig. 5

- Revise Fig. 9, 10, 11, 12, and 13

- Revise Table B

- Add safety information on the 95B-type power unit.

1.03 These dials are factory-wired to provide manual or automatic rotary (870B1M) or TOUCH-TONE (2870B1M) dialing service when interfaced with minature plug and jack equipped single line telephone sets and connecting blocks. All other applications should use the 870A1 and 2870A1 dials. Single line installation with speakerphone service and the one touch calling option should also use the 870A1 and 2870A1 dials.

1.04 These dials are available in Ivory (-50) color only, except as indicated in paragraph 2.05(e).

2. **IDENTIFICATION**

2.01 These dials provide manual dialing, plus automatic dialing of 31 frequently called numbers, and a LAST NUMBER DIALED scratch pad memory.
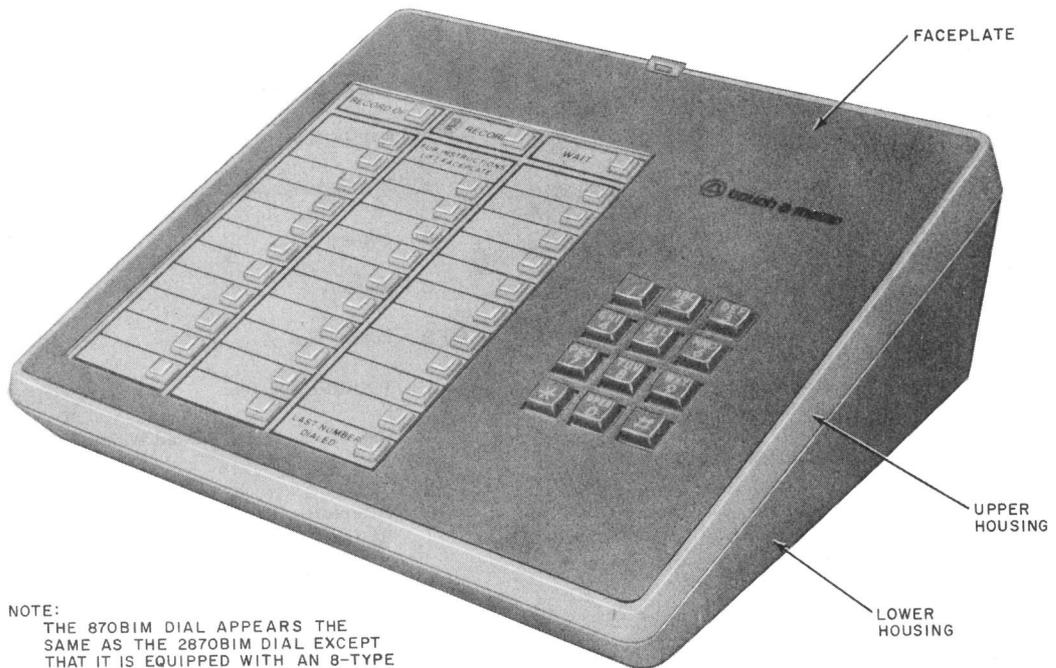
NOTE:
THE 870B1M DIAL APPEARS THE SAME AS THE 2870B1M DIAL EXCEPT THAT IT IS EQUIPPED WITH AN 8-TYPE ROTARY DIAL

Fig. 1—2870B1M Dial

A. Design Features

2.02 *Design Features:*

- Modular unit

- Integrated circuit memory

- Memory buttons from which to select preprogrammed telephone numbers for automatic dialing

- Capability to record and automatically dial 31 telephone numbers of up to 15 digits each

- Last number manually dialed memory

- Capability to detect when associated telephone set is off-hook

- Plug-in battery

- Capability to pause for subsequent dial tones during automatic dialing (WAIT input).

B. Optional Features

2.03 *Optional Features:*

- Decorative Faceplate.

- Dial Tone Detector: automatically starts dialer when precise TOUCH-TONE dial tone (350 Hz and 440 Hz) is present.

- D-180818 Kit of Parts provides the following features.

    (a) Record Disable: turns off recording feature to prevent accidental erasures of previously stored numbers. No recording possible except for LAST NUMBER DIALED memory which will store digits manually dialed from adjunct dial.

    (b) Record Disable and Dial Intermix Feature: digits dialed manually from adjunct dial and digits dialed automatically from memory may be intermixed without depressing RECORD OFF button. Memories cannot be altered and LAST NUMBER DIALED feature is inoperative.

- ▶D-180837 Kit of Parts (a low-level security key-lock switch located in the rear of the lower housing) provides the following features.

Note: Normally installed at the service center and not recommended for field installation.

Note: Adjunct dial must be equipped with either an 870B (rotary service) or 2870B (TOUCH-TONE service) memory.

Note: The 2870B1M dial must be equipped with a 4228-type network.

    (a) Record Disable Only - turns off recording to prevent accidental erasures of previously stored numbers. No recording possible except for Last Number Dialed memory which will automatically store digits dialed manually from the adjunct dial.

    (b) Record Disable and Dial Intermix - same as record disable feature plus.

        (1) Allow digits dialed with manual dial and from memory to be intermixed without having to depress the RECORD OFF button.

        (2) Disables the LAST NUMBER DIALED feature.

        (3) Last Number Dialed position functions like the other memories.

    (c) Record Disable and Manual Dial Lock-out.

        (1) Turns off record feature.

        (2) Manual dial electrically inoperative.

        (3) Last Number Dialed position can be utilized just like the other memory positions to store frequently dialed numbers.◀

2.04 *All options are implemented by:*

- Wiring changes in the applicable dial

- Wiring changes in the telephone set to which the dial is an adjunct

- Installation of appropriate additional items.

C. Ordering Guide

2.05 *Ordering Guide:*

(a) Either of these dials may be ordered as complete units:

- Dial, 870B1M-50 (Rotary Service)

- Dial, 2870B1M-50 (TOUCH-TONE Service).

(b) D4BU-29 mounting cords (2) must be ordered separately.

(c) The 870B1M-50 dial is comprised of the following component parts:

- 841365505 Housing, lower, (Ivory)

- Housing, upper, 870A1U-50

- Faceplate, 870B1-122 (Matte Aluminum)

- 841387574 Base, Dial, (includes the following):

  Unit, Power, 95B1

  Dial, 8EA-119

  841382880 Line Sensing Printed Wiring Board Assembly

  Jack, 623P4 (2)

  Cord, Power, M2SL-87

  Battery, KS-20390L4

  Memory, 870B

  841382617 Power Supply Printed Wiring Board (PSB) Assembly

  840393672 Directory Sheet Set

  Booklet, Instruction, Subscriber, SIB-2481B.

(d) The 2870B1M-50 dial is comprised of the following component parts:

- 841365505 Housing, (Ivory)

- Housing, upper, 870A1U-50

- Faceplate, 2870B1-122 (Matte Aluminum)

- 841387566, Base, Dial, (includes the following:

  Unit, Power, 95B1

  Dial, 35AG3A

  Line Sensing Printed Wiring Board Assembly, 841382880

  Jack, 623P4 (2)

  Cord, Power, M2SL-87

  Battery, KS-20390L4

  Memory, 2870B

  841382385 Power Supply Printed Wiring Board (PSB) Assembly

  840393672 Directory Sheet Set

  Booklet, Instruction, Subscriber, SIB-2481B.

(e) *Optional Apparatus (order as required):*

- Kit of Parts, D-180818 (Record Disable and Dial Intermix Feature)

- Kit of Parts, D-180493 (Dial Tone Detector)

- Housing, 870ADJ1-* (See Note)

- Housing, 870A1U-*

- Faceplate, 870B1-† or 2870B1-†.

Note: Nonmodular 870ADJ1-type housing must be modified with 798A tool (Fig. 8).

D. Operating Features

2.06 *Operating Features (Fig. 2).*

- Dial.

---

* Color suffix as follows: Black (-03), Green (-51), White (-58), and Light Beige (-60).

† Color suffix as follows: Teak Woodgrain (108) and Walnut Woodgrain (109).

- 32-button array of low force, low travel nonlocking memory buttons arranged in three columns. Left and right columns have eleven buttons, center column has ten buttons.

- LAST NUMBER DIALED button located in lower right corner of memory array, when momentarily depressed, automatically redials the last number manually dialed on the adjunct dial.

- RECORD button (nonlocking), when momentarily depressed, lights the RECORD lamp and enables the memory circuits to store telephone numbers.

- RECORD OFF button (nonlocking), when momentarily depressed extinguishes the RECORD lamp, indicating that the dialer is switched out of the record mode.

- WAIT button (nonlocking), when momentarily depressed during recording operation, enters a code into memory to initiate a halt in the automatic dialing sequence [used where access digit(s) required].

- Additional dial pulse muting (optional) paragraph 6.10.

3. INSTALLATION

STANDARD INSTALLATION

3.01 Connect a D4BU-29 mounting cord between the connecting block and the jack in the adjunct dial identified LINE. Connect a second D4BU-29 mounting cord between the jack in the adjunct dial identified SET and the telephone set. Refer to Fig. 9 for basic interface connections.

> *Caution: Do not plug in either battery or power unit until all connections and modifications are completed. Take extreme care not to damage the exposed components, circuit, etc. when the adjunct dial is opened.*

3.02 The dials are shipped from the factory with the battery disconnected. After all wiring changes and modifications have been completed, connect the battery by tilting the adjunct dial up and inserting the battery plug into the mating jack.

> *Note:* Write date of battery installation on label provided (Fig. 6).

3.03 Plug the power unit into an ac outlet not controlled by a switch (continuous ac power is required). A retaining clamp (841050818) will be shipped with the 95B-type power unit and should be mounted to the ac receptacle to hold power unit securely and prevent accidental loss of power.

> *Note:* The power unit must be located no closer than 1-1/2 feet from the dial in order to prevent a potential noise condition.

> *DANGER:* ▶*For safety, securely attach retaining clamp to ac outlet using outlet cover screw BEFORE attempting to install 95B-type power unit. The power unit and any other cord plugged into the ac outlet should always be unplugged completely from the outlet BEFORE attempting to attach or remove the retaining clamp. This will prevent the possibility of a loosened retaining clamp or metallic outlet cover making contact with the ac prongs of the power unit when partially withdrawn from outlet. Do not use retaining clamps on outlets where the cover mounting screw holds the duplex outlet in the box.*◀

> *Warning:* ▶*Care should be taken to trim and dress leads connecting to low voltage output terminals of 95B-type power unit to assure that inadvertent connection to conducting surfaces or other power source does not occur. If more than one power unit is plugged into a multiple receptacle power strip, there must be at least one inch separation between power units. Only UL listed receptacle power strips with adequate power rating shall be used. Use of a continuous terminal power strip that allows the secondary output terminals of the power unit to be in close proximity to the ac line source is not recommended.*◀

3.04 Station number card may be placed in the location provided on the dial (870B1M) or below the dial (2870B1M).
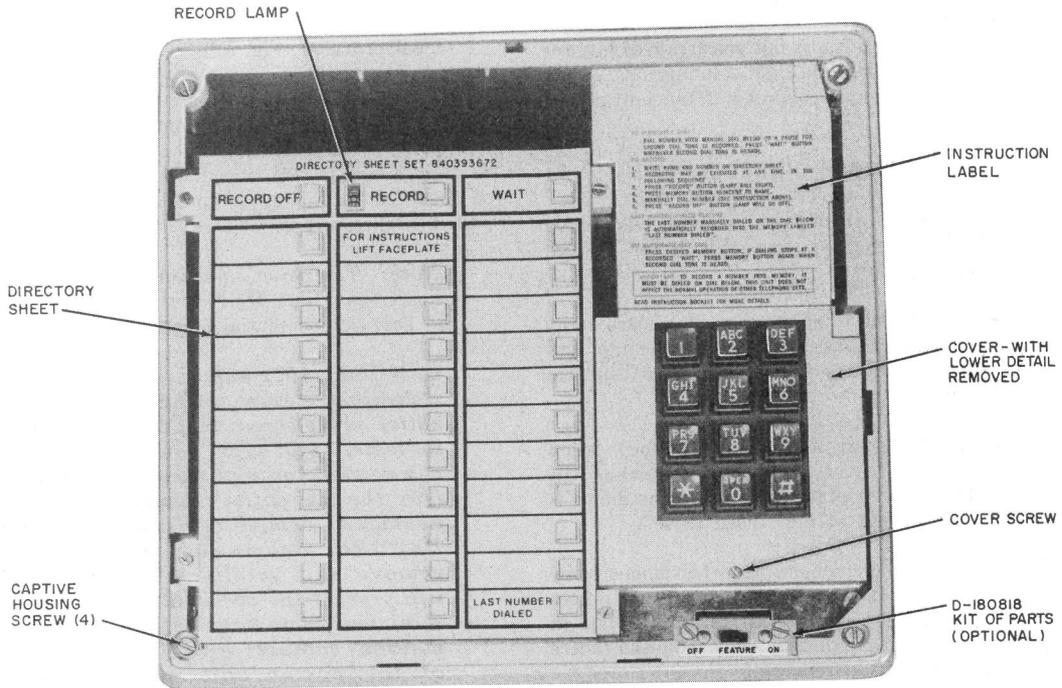
Fig. 2—2870B1M Dial, Faceplate Removed

3.05 Directory sheets (Fig. 2) are held in place by the faceplate. Additional sheets are available in directory sheet set, 840393672.

A. Installation Check Procedure

870B1M Dial

3.06 *870B1M (Rotary Service) Dial.*

(1) Check operation of the line sensing circuit as follows.

 (a) With handset on-hook, momentarily depress RECORD button. RECORD lamp shall light.

 (b) Go off-hook with handset. RECORD lamp shall extinguish.

(2) Using the dial on the telephone set, manually dial a known number to check that the telephone set operates correctly.

(3) For the adjunct dial, perform dial speed test as follows.

 (a) Obtain dial tone.

 (b) Dial code number for dial speed test.

 (c) After dial tone is heard again, manually dial digit 0. One of the following audible signals will indicate how the dial meets the requirements of the test:

 • Audible ringback-dial speed satisfactory

 • Rapidly interrupted dial tone—dial speed fast

• Slowly interrupted dial tone—dial speed slow.

(4) With the telephone handset on-hook, use the dial on the adjunct to record known telephone numbers, storing consecutive digits of the numbers in sequential memory locations except LAST NUMBER DIALED and the location immediately above it [paragraph 5.01 (4) through (7)].

(5) Automatically dial the telephone numbers stored in Step (4) by momentarily depressing the memory buttons in the same sequence in which the digits were recorded. Verify that the digits thus dialed produce the expected telephone numbers.

(6) Go off-hook and use the dial on the adjunct to record a known telephone number into memory location immediately above LAST NUMBER DIALED location [paragraph 5.01 (4) through (7)].

(7) Momentarily hang up handset and then automatically dial the number recorded in Step (6).

(8) Go off-hook and from the adjunct, manually dial a known telephone number.

Note: If a pause for second dial tone is required, dial the access digits. After the RECORD lamp relights, depress the WAIT button then dial the telephone number.

(9) Momentarily hang up handset and then automatically redial the number [dialed in Step (8)] by depressing the LAST NUMBER DIALED button.

Note: The dial should stop dialing if it reaches a stored WAIT input. Depress the LAST NUMBER DIALED button again and the remaining digits should be dialed.

The battery and power unit must be connected a minimum of five minutes before doing Step 10.

(10) Momentarily disconnect the power unit (for 5 to 10 seconds). After reconnecting power unit, momentarily depress memory buttons in same sequence in which digits were recorded in Step (4). Verify that the correct telephone numbers are dialed out.

(11) Dial the appropriate code for ring-back to test the telephone set ringer.

2870B1M Dial

3.07 *2870B1M (TOUCH-TONE Service) Dial.*

(1) Check operation of the line sensing circuit as follows.

(a) With the telephone handset on-hook momentarily depress the RECORD button. RECORD lamp should light.

(b) Go off-hook with handset. RECORD lamp should extinguish.

(2) Using the dial on the telephone set, manually dial a known number to check that the telephone set operates correctly.

(3) With the telephone handset on-hook, use the dial on the adjunct to record digits 1 through 0 in consecutive memory locations, storing one digit per memory. Fill all memory locations except LAST NUMBER DIALED and the memory location immediately above it [paragraph 5.01 (4) through (7)].

(4) Lift handset off-hook and record CO dial test and ringer circuit number into memory location immediately above LAST NUMBER DIALED location [paragraph 5.01 (4) through (7)]. After depressing RECORD OFF button, and when dial test circuit is ready, test dial frequencies by manually dialing digits 1 through 0 into the test circuit.

(5) Momentarily hang up handset and then automatically redial the test circuit number recorded in Step (4) by depressing button immediately above LAST NUMBER DIALED button and proceed as follows:

(a) Depress LAST NUMBER DIALED button. Digits 1 through 0 will be automatically dialed into test circuit. Verify that correct signal is returned from test circuit.

(b) Momentarily depress the memory buttons used in Step (3) in the same sequence in which the digits were recorded. Verify that the correct signal is returned from the test circuit.

The battery and power unit must be connected a minimum of five minutes before doing Step (C).

(c) Disconnect the power unit from the ac outlet. With the handset off-hook and using the telephone set dial, manually dial a known number to check that the telephone set operates correctly.

Note: With ac power removed, the adjunct dial is inoperative.

(6) Reconnect the power unit. Momentarily depress the LAST NUMBER DIALED button. Verify that the number dialed out is the same as that recorded in Step (4).

OPTIONAL APPARATUS INSTALLATION

A. D-180493 Kit of Parts (Dial Tone Detector)

3.08 *To install.*

(1) Remove the housing (paragraph 3.13), and access PSB terminal field (paragraph 3.10).

(2) Insert the dial tone detector board assembly from the back of the dial, so that the two tabs on the board assembly fit into the slots in the chassis (Fig. 3).

(3) Insert the self-threading screw through the side of the chassis to secure the board in position.

(4) Connect the dial tone detector as shown in Table B.

B. D-180818 Kit of Parts (Record Disable and Dial Intermix Feature)

3.09 *To install.*

(1) Remove faceplate (paragraph 3.11 or 3.12).

(2) Loosen the captive screw at the bottom of the cover around the dial and remove the cover.

(3) Disengage dial from chassis (paragraph 6.05 or 6.06).

(4) Loosen the four captive memory mounting screws (Fig. 3).

(5) Rotate the left edge of the memory upward as shown in (Fig. 4).

Note: If existing memory is 870A or 2870A, it must be replaced with 870B or 2870B, respectively. Carefully pack and return old memory according to local procedures.

(6) Mount switch below dial with the two screws provided.

(7) Connect switch lead connectors to post terminals on memory board per Table C.

(8) Set feature switch to OFF position and verify that dial operates in normal manner.

● Numbers can be recorded into memory

● Numbers can be automatically dialed.

(9) Set feature switch to ON position and verify feature provided.

● Record disable feature only.

    (a) RECORD lamp will not light when button is depressed.

    (b) No telephone numbers can be recorded in memory.

    (c) LAST NUMBER DIALED feature is still operative.

● Record disable and dial intermix feature.

    (a) RECORD lamp will not light when RECORD button is depressed.

    (b) No telephone numbers can be recorded in memory.
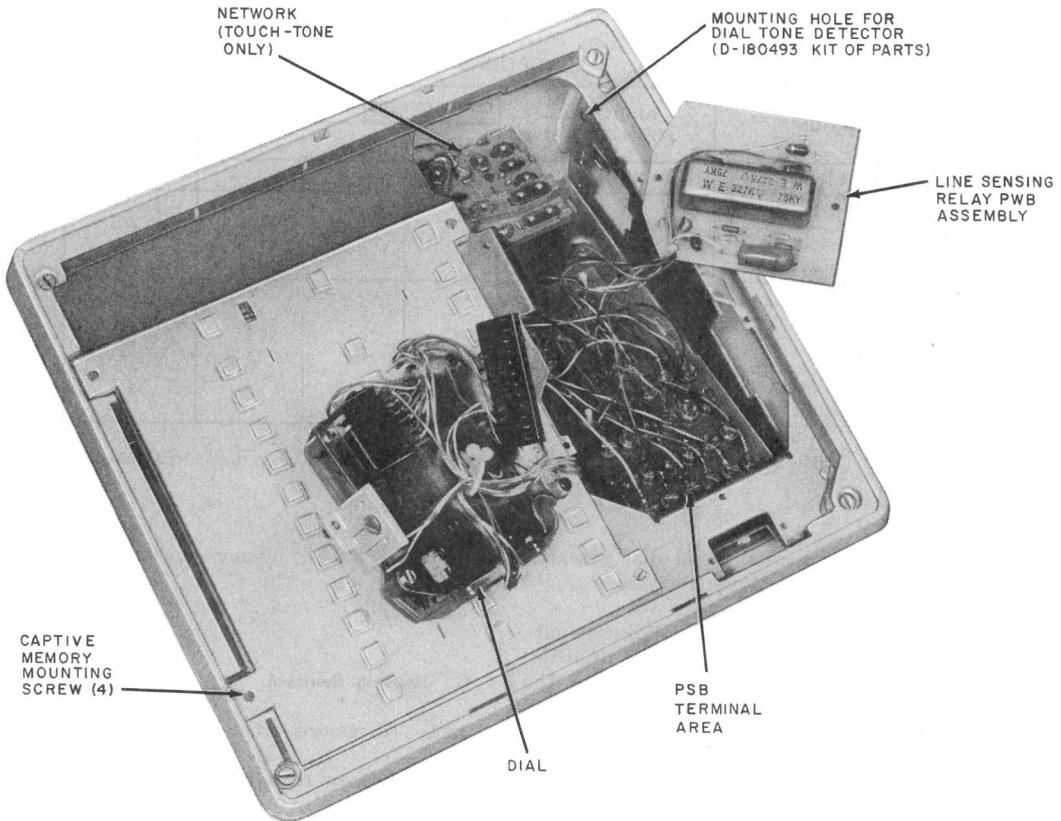
Fig. 3—2870B1M Dial, View to Show Terminal Area

(c) Manually and automatically dialed digits may be intermixed (depression of RECORD OFF button not required).

(d) LAST NUMBER DIALED feature is disabled and the LAST NUMBER DIALED position can be utilized just like the other memory positions to store frequently dialed numbers.

(10) Reassemble adjunct dial.

COMPONENT LOCATION AND ACCESS INFORMATION

Warning: When it is necessary to access component parts of terminal areas, ac power must be disconnected.

A. Power Supply Board (PSB), Terminals

3.10 To access the terminal field on the power supply board, proceed as follows.

(1) Disconnect power unit from ac outlet.

(2) Remove the faceplate (paragraph 3.11 or 3.12).

(3) Loosen the captive cover screw at the bottom of the cover around the dial (Fig. 2).

(4) Remove the cover.

(5) Loosen the two captive dial mounting screws.

Page 9

♦ TABLE A ♦

OPTIONS

OPTION	ADDITIONAL ITEMS REQUIRED	CONNECT 870BIM PER		CONNECT 2870BIM PER	
		FIG.	TABLE	FIG.	TABLE
Dial Tone Detector	D-180493 Kit of Parts	10B, F	B	12 B, H	B
Record Disable Only	D-180818 Kit of Parts (Note)	5	C	5	C
Record Disable and Dial Intermix					
Record Disable Only	D-180837 Kit of Parts (Note)		D		E
Record Disable and Dial Intermix					
Record Disable and Manual Dial Lock-out					

Note: Adjunct dial must be equipped with an 870B or 2870B memory when these kits are used.

Note: On units with metal dial brackets, the screws will have to be removed.

(6) To gain access to some of the PSB terminals, either place the 8-type dial aside (870B1M) or carefully disengage the connector of the 35-type dial and rotate the dial onto the memory button field (2870B1M).

(7) Remove the two mounting screws for the Line Sensing Relay Board and place the board assembly aside to access the remaining terminals on the PSB.

(8) To reassemble, reverse this procedure.

B.   Faceplate Removal

3.11   The B1-type faceplate is held in place by a spring clip attached to the 870A1U upper housing. To disengage the faceplate, lift up on the tab which protrudes from the center of the back edge of the faceplate.

Note: The B1-type faceplate is not a direct replacement for the A2-type faceplate described below. An 870A1U upper housing is also required (paragraph 6.08).

3.12   The 870A2-87 and 2870A2-87 faceplates are MD. For those adjunct dials equipped with either faceplate, it is held in place by two snaps bonded to fit holes in the chassis. To remove the

faceplate, grasp it by any convenient edge and lift off.

C.   Housing Removal

3.13   To remove, proceed as follows.

(a) *Lower Housings.*

(1) Disconnect the power unit from ac outlet.

(2) Remove the faceplate (paragraph 3.11 or 3.12).

(3) Disengage the captive housing screws (Fig. 2) one located in each of the four corners of the chassis.

(4) Separate the housing from the adjunct dial base while feeding the two cords through holes in bottom of housing.

(5) Before replacing the housing, lift the adjunct dial to check that the shoulders of the battery jack are against the two tabs of the chassis. Misalignment may cause the bottom of the housing to bow.

(b) *Upper Housings.*

(1) Disconnect the power unit from ac outlet.

TABLE B

CONNECTIONS FOR DIAL TONE DETECTOR ‡

APPARATUS		LEAD		870B1M DIAL		2870B1M DIAL	
		DESIG	COLOR	REMOVE FROM PSB	CONNECT TO PSB TERM.	REMOVE FROM PSB	CONNECT TO PSB TERM.
870B1M or 2870B1M Dial Adjunct		Strap	BK	11	*	19	*
		Strap	BK	23	*	26	*
D-180493 Kit of Parts	Dial Tone Dectector	Input	G-R		16		16
		PB	O-BK		7		9
		Input	G-R		2		L2†
		DT	O-Y		11		19
		LK	Y-G		*		*
		VDD	R-O		17		21
		SPR	Y-BL		*		*
		DR	Y-O		19		24
		COM	BK-O		20		29
		SPO	G-Y		*		*
		PL	O-R		22		25
		DTT	BL-Y		23		26
	Switch	NOT REQUIRED, DO NOT INSTALL					

* Insulate and store.

† Terminal on network.

‡ First dial tone may or may not be precise (350 Hz and 440 Hz) but all subsequent dial tones must be precise.

(2) Remove the faceplate (paragraph 3.11 or 3.12).

(3) Disengage the captive housing screws, one located in each of the four corners of the upper housing. This will release the lower housing.

(4) Pull the lower housing away from the chassis as each housing screw is backed out. This will separate the upper housing from the chassis.

Note: If the upper housing is being replaced, it will be necessary to remove housing screws.

(5) To reassemble, reverse procedure.

4. CONNECTIONS

4.01 Basic interface connections are shown in Fig. 9 for the 870B1M dial and the 2870B1M dial.

TERMINAL
POSTS FOR
D—180818 KIT
OF PARTS

MEMORY

COVER DETAIL-
REMOVED FOR
OPTIONAL SWITCHES

BATTERY
JACK

POWER SUPPLY
CONNECTOR
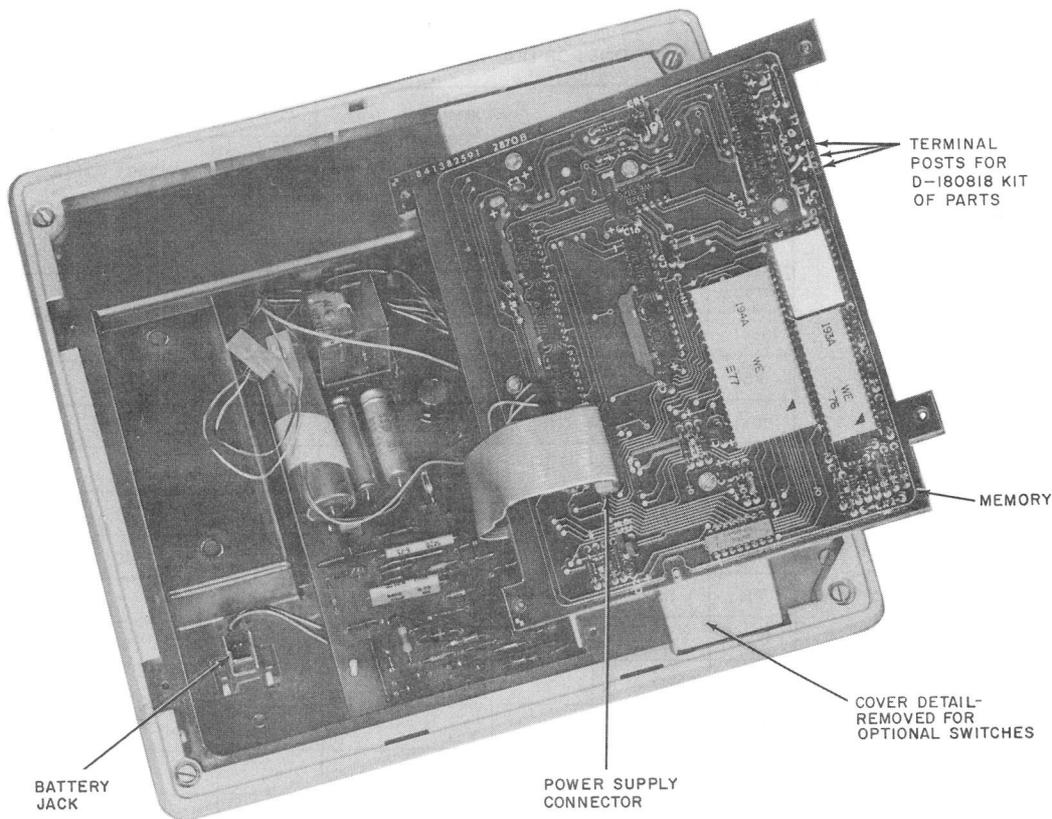
Fig. 4—2870B1M Dial, Internal View

4.02 Adjunct dial connections are shown in Fig. 10 for the 870B1M dial and in Fig. 12 for the 2870B1M dial.

4.03 Partial functional schematics are shown in Fig. 11 for the 870B1M dial and in Fig. 13 for the 2870B1M dial.

4.04 Connections for D-180837 Kit of Parts (record disable, dial intermix, plus disabling manual dial, installed at the service center) are shown in Tables D and E.

5. OPERATION

A. Record A Number Into Memory

5.01 To record, only the dial of the adjunct may be used. Digits manually dialed on the associated telephone set will not be recorded into memory.

(1) Remove the faceplate (paragraph 3.11 or 3.12).
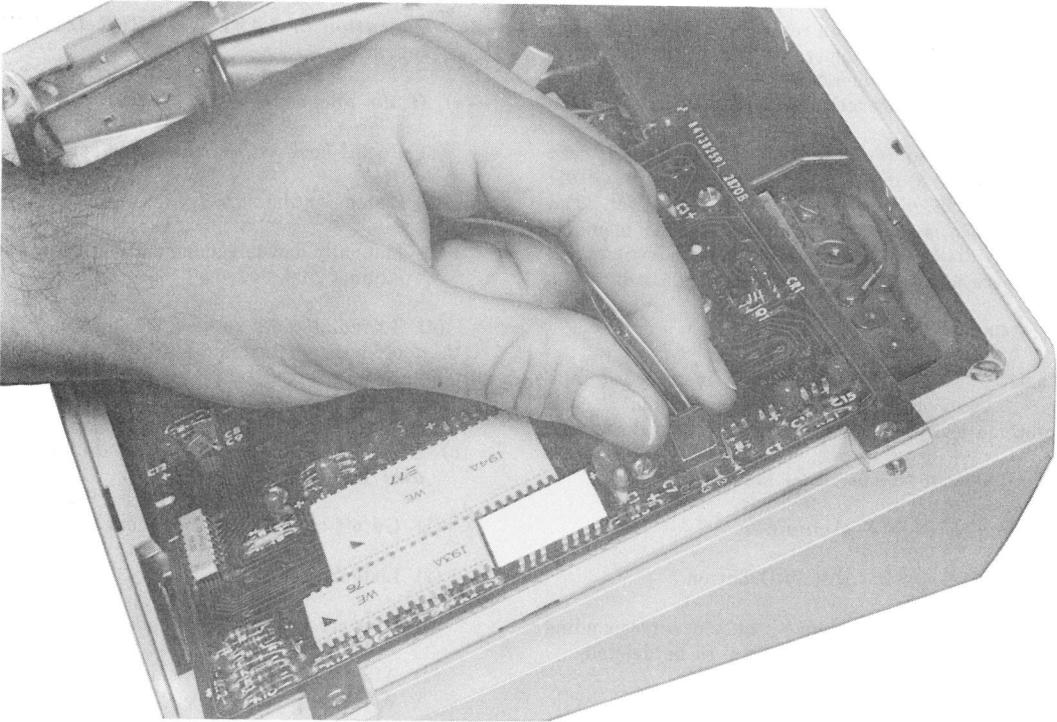
Fig. 5—2870B1M Dial, Connection of D-180818 Kit of Parts (Record Disable Feature Only)

(2) Write or type the desired name and telephone number for a selected memory button on the associated position of the directory sheet.

(3) Replace the directory sheet and faceplate.

(4) Depress the RECORD button. The RECORD lamp will light. (A number can be called and recorded simultaneously by lifting handset before depressing the RECORD button.)

Note: If equipped with the D-180818 or D-180837 Kit of Parts, switch should be placed in the OFF position.

(5) Depress memory button adjacent to the desired telephone number listed on the directory sheet.

(6) Using adjunct dial, manually dial the desired telephone number.

Note: If an access code and pause for second dial tone is required.

(a) Dial the access digit(s).

(b) Push the WAIT button after RECORD lamp relights. (The WAIT entry counts as one digit.)

(c) Using the adjunct dial, manually dial the telephone number.

Note: A number up to 15 digits in length may be recorded. The RECORD lamp will go out momentarily as each digit is dialed. If exactly 15 digits are recorded, the RECORD lamp will go out and stay out, indicating that

the dialer has been reset. If a memory button has not been depressed, the RECORD lamp will go out when the first digit is dialed and recording operation will be voided.

(7) Depress the RECORD OFF button if less than 15 digits are recorded. The RECORD lamp will go out. The dialer will be reset. The number is now stored in the selected memory. The dialer will also be reset by a switchhook operation longer than 300 milliseconds in duration.

B. Change A Number In Memory

5.02 Whenever a new number is recorded in a previously used memory position, it will automatically replace the previously stored number.

C. Delete A Number From Memory

5.03 *To delete a number.*

(1) Depress the RECORD button.

(2) Depress the memory button corresponding to the name and number to be deleted.

(3) Depress the RECORD OFF button.

D. Automatically Dial A Number From Memory

5.04 *To automatically dial a number.*

(1) Go off-hook on the telephone set, listen for dial tone, and depress the desired memory button. If wait input has been recorded, automatic dialing will stop. When second dial tone is heard, depress memory button again to complete automatic dialing.

(2) If the adjunct dial is equipped with the dial tone detector, go off-hook, listen for dial tone, and depress the memory button.

E. LAST NUMBER DIALED Feature

5.05 The adjunct dial automatically records into the LAST NUMBER DIALED position (Fig. 1) any number called using the dial of the adjunct. Each number in the LAST NUMBER DIALED position is automatically replaced by the next number manually dialed from the adjunct dial. Although the unit is recording, the RECORD lamp does not light at any time during this operation.

5.06 *Operation of LAST NUMBER DIALED feature.*

(a) *If no access digit(s) required.*

(1) Go off-hook on the telephone set.

(2) Listen for dial tone.

(3) Manually dial telephone number using the adjunct dial.

(4) To redial same number automatically, go off-hook on telephone set, listen for dial tone, and depress LAST NUMBER DIALED button.

(b) *If an access code and pause for second dial tone is required.*

(1) Go off-hook on the telephone set.

(2) Listen for dial tone.

(3) Dial access digit(s) using adjunct dial.

(4) After second dial tone is heard depress WAIT button.

(5) Manually dial telephone number using adjunct dial.

(6) To redial same number automatically, go off-hook, listen for dial tone, and depress LAST NUMBER DIALED button. When second dial tone is heard, depress LAST NUMBER DIALED button again to complete automatic dialing.

F. End-to-End Signaling (2870B1M Only)

5.07 For end-to-end signaling (such as data transmission) this set has the capability to intermix manual and automatic dialing.

(1) *Standard Operation:*

(a) If at any time digit(s) are keyed manually using the 2870B1M dial, the RECORD OFF button must be depressed before additional digits can be dialed automatically from memory. (The RECORD lamp will not light at any time but depressing the RECORD OFF button will remove the dial from the LAST NUMBER

DIALED mode to allow additional automatic dialing.)

(2) *Dial Intermix Mode (with D-180818 or D-180837 Kit of Parts).*

(a) Manually and automatically dialed digits may be intermixed as desired when the feature switch is in the ON position.

Note: In this mode, the RECORD button and the LAST NUMBER DIALED feature are inoperative.

6. MAINTENANCE

6.01 In case of power failure, the automatic dialing feature cannot be used. The battery retains the number associated with each of the memory buttons for at least 24 hours. If power loss exceeds 24 hours, the numbers may have to be rerecorded.

A. Trouble Analysis

6.02 When trouble is encountered, the subsequent procedure should be followed.

(1) Confirm improper operation either as a basic dial or as an automatic dialer (Part 5).

(2) Check connections.

(3) Refer to Trouble Analysis Table F for 870B1M dial and Table G for 2870B1M dial.

(4) If removal of adjunct dial is required proceed as follows.

(a) Disconnect power unit from ac outlet and unplug battery.

(b) Disconnect adjunct dial.

(c) Place battery plug sideways into housing slot below battery jack and tape into place.

Warning: Failure to restrain plug can result in plug damage requiring battery replacement.

B. Battery

6.03 The battery has an expected operational life of about 4 years. It can be replaced without loss of stored numbers provided that commerical ac power to dial is continuously maintained. To replace the battery proceed as follows.

(1) Tilt the front of the adjunct dial up.

(2) Unplug the battery.

(3) Loosen captive screw on the battery support.

(4) Remove battery support.

(5) Remove battery.

(6) Install and check new battery (paragraph 3.06 or 3.07). Write date of installation on battery (Fig. 6).

C. Memory

6.04 The memory may be replaced in the following manner.

(1) Disconnect power unit from ac outlet and unplug battery.

Note: Removal of the memory or ac and battery power results in loss of stored numbers.

(2) Remove the faceplate (paragraph 3.11 or 3.12).

(3) Loosen the four captive memory mounting screws (Fig. 3).

(4) Rotate the left edge of the memory upward and over dial area as shown in Fig. 4.

(5) Disengage the connector(s) by pulling on them perpendicular to the printed wiring board.

(6) Replace the memory by engaging the dial connector (2870B1M only) first. The connector(s) are keyed, one position is filled and should fit over the vacant position in the row of pins. The flat power supply cable should not be twisted.

(7) Reassemble adjunct dial.

Fig. 6—870B1M or 2870B1M Dial, Partial Bottom View

(8) Reconnect battery and power unit.

(9) Test per paragraph 3.06 or 3.07 as required.

(10) Reprogram memory, see Part 5.

D. Rotary Dial

6.05 *To replace rotary dial.*

(1) Disconnect power unit from ac outlet and unplug battery.

> *Note:* Removal of ac and battery power results in loss of stored numbers.

(2) Remove faceplate (paragraph 3.11 or 3.12).

(3) Loosen captive screw at bottom of the cover around the dial and remove cover.

(4) Remove the two dial mounting screws and lay dial aside.

(5) Disconnect dial leads from terminals on PSB.

(6) Remove dial.

(7) Reverse procedure to reassemble.

(8) Reconnect battery and power unit.

(9) Reprogram memory, see Part 5.

E. TOUCH-TONE Dial

6.06 *To replace TOUCH-TONE dial.*

(1) Disconnect power unit from ac outlet and unplug battery.

> *Note:* Removal of ac and battery power results in loss of stored numbers.

(2) Remove faceplate (paragraph 3.11 or 3.12).

(3) Loosen captive screw at bottom of the cover around dial and remove cover.

(4) Disengage the two dial mounting screws and lift the dial.

> *Note:* On early model units equipped with metal brackets, the mounting screws should be removed.

(5) Disengage the four captive memory mounting screws (Fig. 3).

(6) Gently raise the memory to a position that permits access to the dial connector.

(7) Carefully disengage the dial connector by pulling on it perpendicular to the printed wiring board.

(8) Disengage the second dial connector from the power supply printed wiring board.

(9) Lift the dial out.

(10) To replace with a new dial, reverse the previous steps. The connectors are keyed to orient them relative to the pins. Observe the correct orientation and do not force the connection.

Fig. 7—Removing Mounting Cord Jack or Interface Cord Jack From Dial Base

(11) Reconnect battery and power unit.

(12) Reprogram memory, see Part 5.

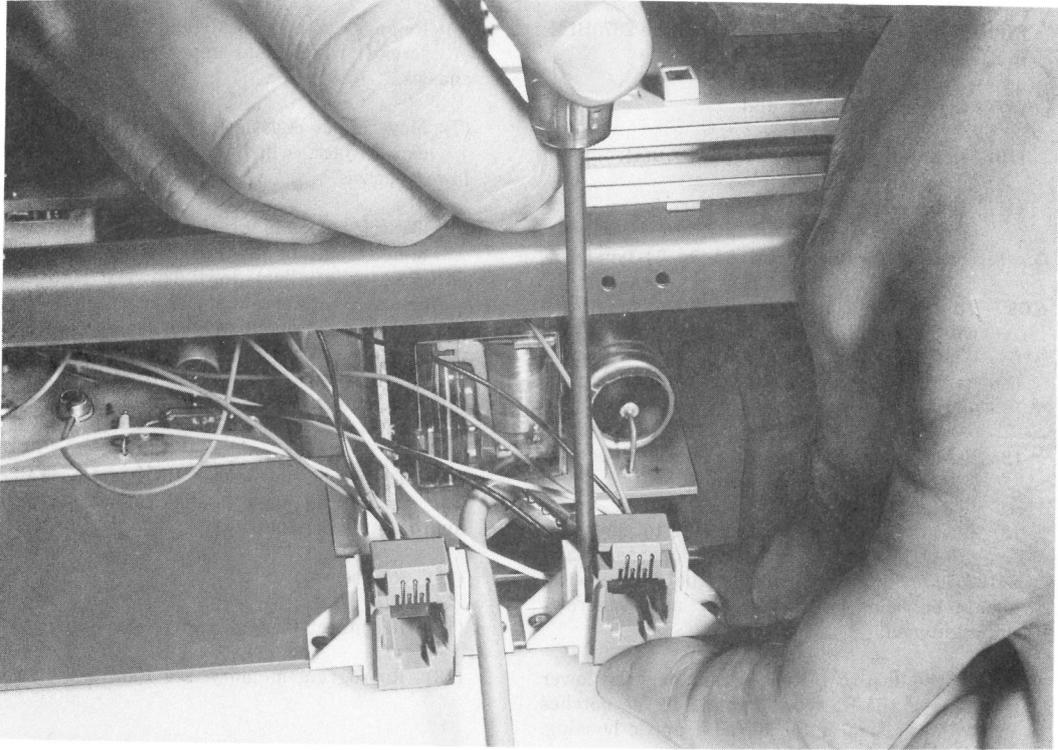### F. Line Sensing Relay Printed Wiring Board Assembly

6.07 To replace.

(1) Disconnect power unit from ac outlet and unplug battery.

   Note: Removal of ac and battery power results in loss of stored numbers.

(2) Remove faceplate (paragraph 3.11 or 3.12).

(3) Loosen captive screw at bottom of the cover around dial and remove cover.

(4) Remove the two dial mounting screws.

(5) On the 870B1M dial, place the rotary dial aside to gain access to the PSB terminals. On the 2870B1M dial, disengage the dial connector and carefully rotate the TOUCH-TONE service dial onto the memory button field.

(6) Remove the two mounting screws of the Line Sensing Relay Board.

(7) Disconnect the Line Sensing Relay Board leads from associated terminals on the PSB and remove the board assembly.

(8) Connect the leads of the replacement Line Sensing Relay Board to the appropriate terminals on the PSB (Fig. 10B and 10C for the

870B1M dial or Fig. 12B and 12C for the 2870B1M dial).

(9) Reassemble adjunct dial.

(10) Reconnect battery and power unit.

(11) Reprogram memory, see Part 5.

G. Faceplate (Conversion From A2- to B1-Type)

6.08 *To replace a 870A2 or 2870A2 faceplate with a 870B1 or 2870B1, proceed as follows.*

(1) Remove A2-type faceplate by lifting up on any of its edges.

(2) Remove the four captive housing screws (Fig. 2) from the chassis.

(3) Use the four housing screws to mount a 870A1U upper housing to the chassis and 841365505 (lower) housing. The three parts should be held tightly together as the screws are tightened.

(4) Place the two tabs located along the lower edge of the B1-type faceplate in the notches in the lower side of the 870A1U upper housing.

(5) Lower the faceplate to rest on the memory. The spring clip located in the center of the top side of the upper housing should retain the faceplate.

H. Jack (Mounting and/or Interface Cord)

6.09 *To replace.*

(1) Disconnect power unit from ac outlet and unplug battery.

Note: Removal of ac and battery power results in loss of stored numbers.

(2) Disconnect mounting cord and interface cord from mating jacks in adjunct dial.

(3) Remove faceplate (paragraph 3.11 or 3.12).

(4) Loosen captive screw at bottom of the cover around the dial and remove cover.

(5) Remove housings (paragraph 3.13).

(6) Remove 4 screws (located adjacent to housing screws) which hold upper chassis to lower chassis.

(7) Move upper chassis toward front of unit to expose jack, which is mounted to back of lower chassis.

(8) To release snap of the retainer, carefully slide blade of a thin-bladed screwdriver (KS-6854 or smaller) down between right side of jack and retainer, (as viewed from front of set), while pushing up on bottom of jack, and remove jack (Fig. 7).

(9) Disconnect leads from appropriate PSB terminals.

(10) To install new jack, slip it into retainer until snap engages and connect leads to appropriate terminals.

(11) Reassemble unit.

(12) Reconnect battery and power unit.

(13) Reprogram memory, see Part 5.

870ADJ1 HOUSING

798A TOOL

NOTE:
PLACE TOOL EVENLY
AGAINST HOUSING
AND HOLD TIGHTLY
IN POSITION
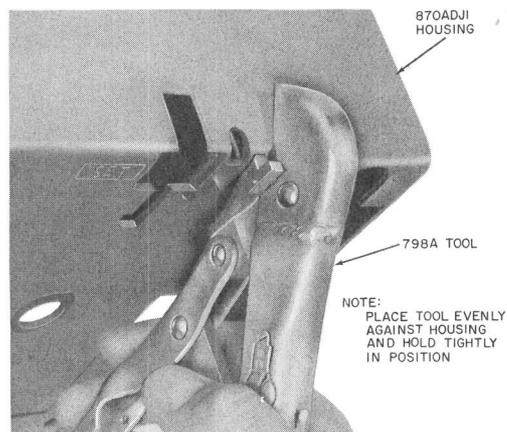
Fig. 8—Notched 870ADJ1 Housing
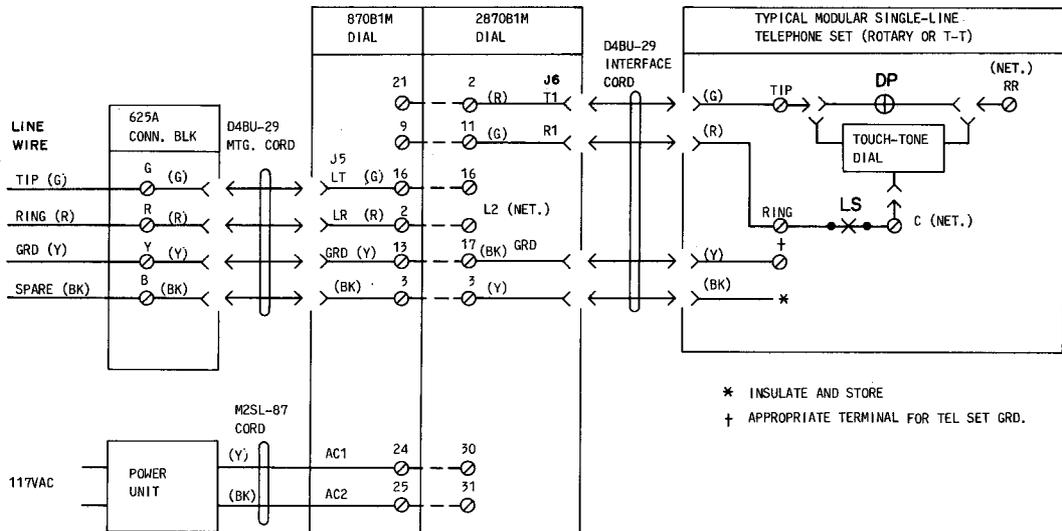
Fig. 9—Basic Interface Connections for 870B1M and 2870B1M Dials

I. Dial Pulse Muting

6.10 Additional dial pulse muting of the handset receiver is available in the 870B1M dial, if the (Y) and (BK) leads in the mounting cord are unused. Proceed as follows.

(1) Disconect power unit from ac outlet and unplug battery.

Note: Removal of ac and battery power results in loss of stored numbers.

(2) Access PSB terminal area (paragraph 3.10).

(3) Move (Y) interface cord jack lead on 870B1M dial from PSB-3 to PSB-1.

(4) Move (BK) interface cord jack lead on 870B1M dial from PSB-13 to PSB-8.

(5) Reassemble adjunct dial.

(6) Reconnect battery and power unit.

(7) Reprogram memory, see Part 5.

(8) Connect (Y) and (BK) mounting cord jack leads on the associated telephone set across the f-g line switch contacts.

Note: If the (Y) and (BK) leads are not available in mounting cord the 870A1 dial should be used to provide the desired muting.

J. Defective Dial Adjunct Which Has a D-180837 Kit of Parts Installed

6.11 To replace a defective dial adjunct which has a D-180837 Kit of Parts installed, it is necessary to move the lower housing of the defective dial to the new dial as follows.

(1) Disconnect power unit from ac outlet and unplug battery.

Note: Removal of ac and battery power results in loss of stored numbers.

(2) Remove faceplate (paragraph 3.11).

(3) Remove the upper housing [paragraph 3.13(b)].

(4) Remove memory [paragraph 6.04 (3), (4), and (5)] and disconnect switch leads from memory.

(5) Disconnect (Y) switch lead from chassis.

(6) Rotary dial only: Disconnect two (G) leads from power supply board.

(7) TOUCH-TONE dial only: Disconnect (BR) negative switch lead from connector housing in D-kit.

(8) TOUCH-TONE dial only: Disconnect (BR) negative switch lead from position No. 2 of connector J1.

(9) Remove lower housing and install on new dial adjunct (see Table D and E).

(10) Reconnect battery and power unit.

(11) Test per paragraph 3.06 to 3.07 as required.

(12) Reprogram memory, see Part 5.

TABLE C

CONNECTIONS FOR D-180818 KIT OF PARTS

D-KIT SWITCH LEADS		TERMINAL POSTS FOR SWITCH LEAD CONNECTORS	
DESIG	COLOR (Note 1)	RECORD DISABLE ONLY	RECORD DISABLE AND DIAL INTERMIX FEATURE (Note 2)
WDC	BK†	*	1
VDD	R	2	2
RCRD	BK	3	3

Notes:

1. There are connectors attached to the switch leads, a single pin connector with a (BK) lead and a double pin connector with a (R) and (BK) lead.

2. When this option is provided, the LAST NUMBER DIALED (LND) feature is disabled and the 32nd memory may be used just as any other memory.

* Insulate and store.

† Single pin connector.

TABLE D

**CONNECTIONS FOR D-180837 KIT OF PARTS
(870BIM ADJUNCT DIAL)**

FEATURE	LEAD		CONNECT TO	COMMENTS
	DESIG.	COLOR		
Record Disable Only	DP	G	*	
	DP	G	*	
	VDD	R	TP-2	Term. Posts on 870B Memory Board
	RCD	BK†	TP-3	
	WDC	BK†	*	
	GRD	Y	Chassis	
	Neg.	BR	*	
	Neg.	BR	*	
Record Disable and Dial Intermix	DP	G	*	
	DP	G	*	
	VDD	R	TP-2	Term. Posts on 870B Memory Board
	RCD	BK†	TP-3	
	WDC	BK†	TP-1	
	GRD	Y	Chassis	
	Neg.	BR	*	
	Neg.	BR	*	
Record Disable and Manual Dial Lock-out	DP	G	PSB-4	
	DP	G	PSB-5	
	VDD	R	TP-2	Term. Posts on 870B Memory Board
	RCD	BK†	TP-3	
	WDC	BK†	TP-1	
	GRD	Y	Chassis	
	Neg.	BR	*	
	Neg.	BR	*	

* Insulated and stored.
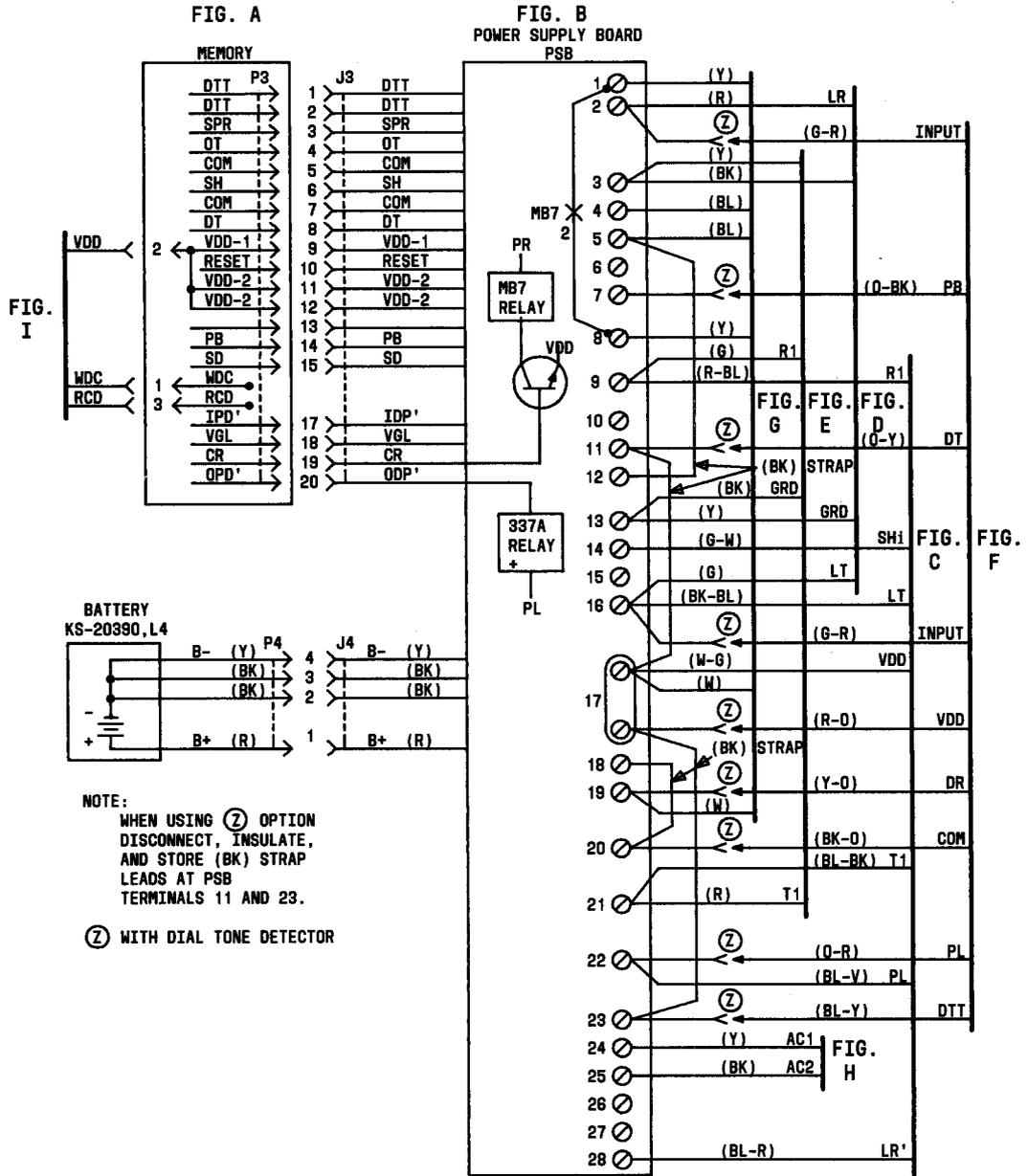
† (BK) leads are interchangeable.

Fig. 10—870B1M Dial, Connections (Sheet 1 of 2)

FIG. C
LINE SENSING RELAY
PWB ASSY 841382880

FIG. B
LT	(BK-BL)	1
VDD	(W-G)	2
R1	(R-BL)	3
T1	(BL-BK)	4
PL	(BL-V)	5
LR'	(BL-R)	6
SHi	(G-W)	7

FIG. D

FIG. B
LT	(G)
LR	(R)
GRD	(Y)
	(BK)

MTG CORD D4BU-29 J5

625A CONN BLK
| G |
| R |
| Y |
| B |

TO C.O.

FIG. E

FIG. B
T1	(R)
R1	(G)
GRD	(BK)
	(Y)

INTERFACE CORD D4BU-29 J6

ASSOCIATED SINGLE-LINE TEL SET
TIP
RING
†GRD
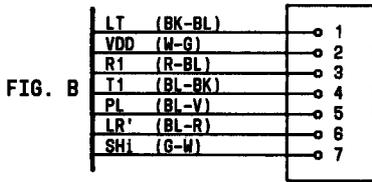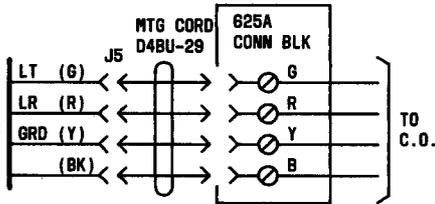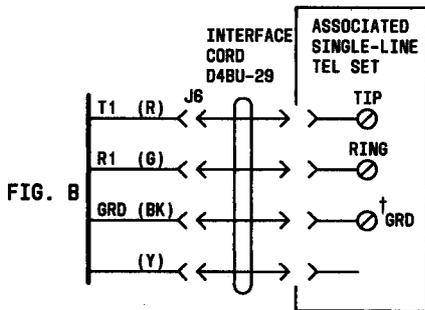
* INSULATE AND STORE
† APPROPRIATE TERMINAL

FIG. F
DIAL TONE DETECTOR
(D-180493)

FIG. B
INPUT	(G-R)	1
PB	(O-BK)	7
INPUT	(G-R)	2
COM	(BK-O)	8
DT	(O-Y)	5
VDD	(R-O)	10
DR	(Y-O)	6
PL	(O-R)	9
DTT	(BL-Y)	4
* SPR	(Y-BL)	3
* LK	(Y-G)	12
* SPO	(G-Y)	11
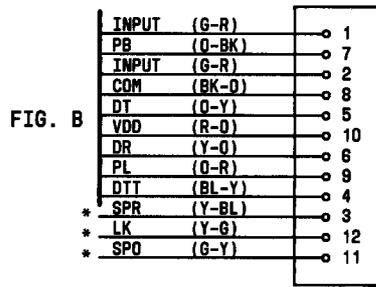
FIG. G
8EA-119 DIAL

DP
ON^1
ON^2

| (BL) |
| (BL) |
| (Y) |
| (Y) | FIG. B
| (W) |
| (W) |
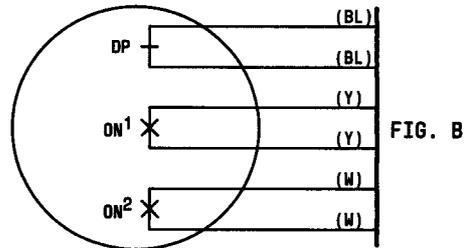
DP - DIAL PULSE
ON - OFF NORMAL

FIG. H
POWER UNIT
95B1 OR 95B2

CORD M2SL-87
FIG. B
| AC1 | (Y) |
| AC2 | (BK) |

117 VAC
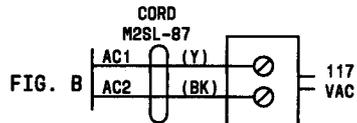
FIG. I
RECORD DISABLE AND DIAL
INTERMIX FEATURE (D-180818)

| (R) | VDD |
| (BK) | WDC | FIG. A
| (BK) | RCD |
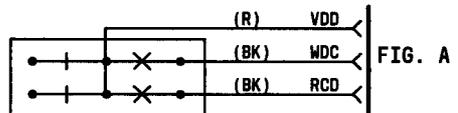
Fig. 10—870B1M Dial, Connections (Sheet 2 of 2)
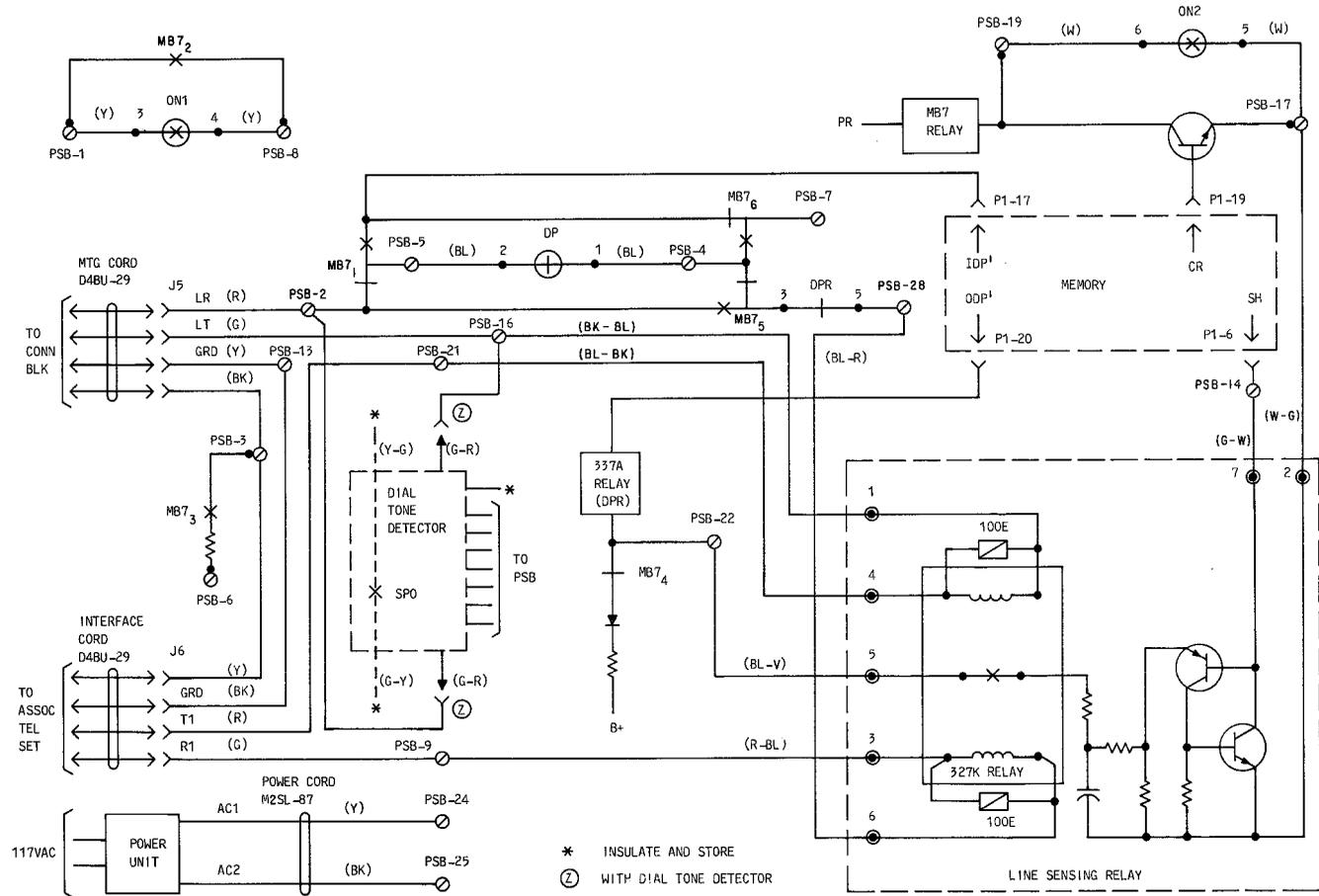
Fig. 11—870B1M Dial, Partial Functional Schematic

TABLE E

CONNECTIONS FOR D-180837 KIT OF PARTS
(2870BIM ADJUNCT DIAL)

FEATURE	APPARATUS	LEAD DESIG.	LEAD COLOR	REMOVE FROM	CONNECT TO	COMMENTS
Record Disable Only	D-180837 Kit of Parts	Neg.	BR (Male)		*	
		Neg.	BR (Female)		*	
		GRD	Y		Chassis	
		VDD	R		TP-2	Term. Posts on 2870B Memory
		RCD	BK†		TP-3	
		WDC	BK†		*	
		DP	G		*	
		DP	G		*	
Record Disable and Dial Intermix	D-180837 Kit of Parts	Neg.	BR (Male)		*	
		Neg.	BR (Female)		*	
		GRD	Y		Chassis	
		VDD	R		TP-2	Term. Posts on 2870B Memory
		RCD	BK†		TP-3	
		WDC	BK†		TP-1	
		DP	G		*	
		DP	G		*	
Record Disable and Manual Dial Lock-out	Dial	Neg.	BR	Position No. 2 on Conn. J1	Conn. Housing in D-kit	See Note
	D-180837 Kit of Parts	Neg.	BR (Male)		Conn. Housing in D-kit	
		Neg.	BR (Female)		Position No. 2 in Conn. J1	
		GRD	Y		Chassis	
		VDD	R		TP-2	Term. Posts on 2870B Memory
		RCD	BK†		TP-3	
		WDC	BK†		TP-1	
		DP	G		*	
		DP	G		*	

* Insulated and stored.

† (BK) leads are inter changeable.

Note: Connector J1 is the 12-position dial connector. Place pointed object or paper clip in slot No. 2 in the side of the connector housing and push gently to release spring latch while pulling on the (BR) lead.

Fig. 12—2870B1M Dial, Connections (Sheet 1 of 2)

FIG. C
LINE SENSING
RELAY PWB ASS'Y

LT   (BK-BL)   1
VDD   (W-G)   2
R1   (R-BL)   3
FIG. B   LT'   (BL-BK)   4
PL   (BL-V)   5
FIG. G   LR   (BL-R)   6
SHi   (G-W)   7

FIG. H
DIAL TONE DETECTOR
(D-180493)

FIG. G   INPUT   (G-R)   1
PB   (O-BK)   7
INPUT (G-R)   2
COM   (BK-O)   8
FIG. B   DT   (O-Y)   5
VDD   (R-O)   10
DR   (Y-O)   6
PL   (O-R)   9
DTT   (BL-Y)   4
* SPR   (Y-BL)   3
* LK   (Y-G)   12
* SPO   (G-Y)   11

FIG. D

MTG CORD   625A
D4BU-29   CONN BLK

J5
LT   (G)   G
FIG. G   LR   (R)   R   TO
FIG. B   GRD (Y)   Y   C.O.
(BK)   B

FIG. I
DIAL

C_C (G-W)
(G-W)
(R-G)
C_B (R)
(O)
C_F (BL)
(W-BL)   FIG. B
COMMON C_A (W)
SWITCH   (V-BL)
C_E (S-R)
(BR-W)
C_D (O-W)   FIG. A

FIG. E
INTERFACE
CORD
D4BU-29   **ASSOCIATED SINGLE-**
LINE TEL SET

J6   TIP
T1 (R)
RING
R1 (G)
FIG. B   GRD (BK)   †GRD
(Y)   *

FREQUENCY SWITCHES

(Y-G)
FIG.   (BR)   H2
B   L1
(W-BR)   1 2 3
A   (W-O)   L2
4 5 6
L3   (W-G)
7 8 9   L4
(W-S)
* 0 #
H1   H3
(Y-BR)   (Y-O)
FIG. A

FIG. F
95B1 OR 95B2
POWER UNIT

M2SL-87
POWER CORD
AC1   (Y)
FIG. B   117
AC2   (BK)   VAC

FIG. G
425K OR 4228B NETWORK

RR
(R-G)
FIG. B   C
(BK-O)
L2
FIG. C   LR (BL-R)
Z   (G-R)   INPUT   FIG. H
FIG. D   LR (R)
* INSULATE AND STORE
† APPROPRIATE TERMINAL

FIG. J
RECORD DISABLE AND DIAL INTERMIX
FEATURE (D-180818)

(R)   VDD
(BK)   WDC   FIG. A
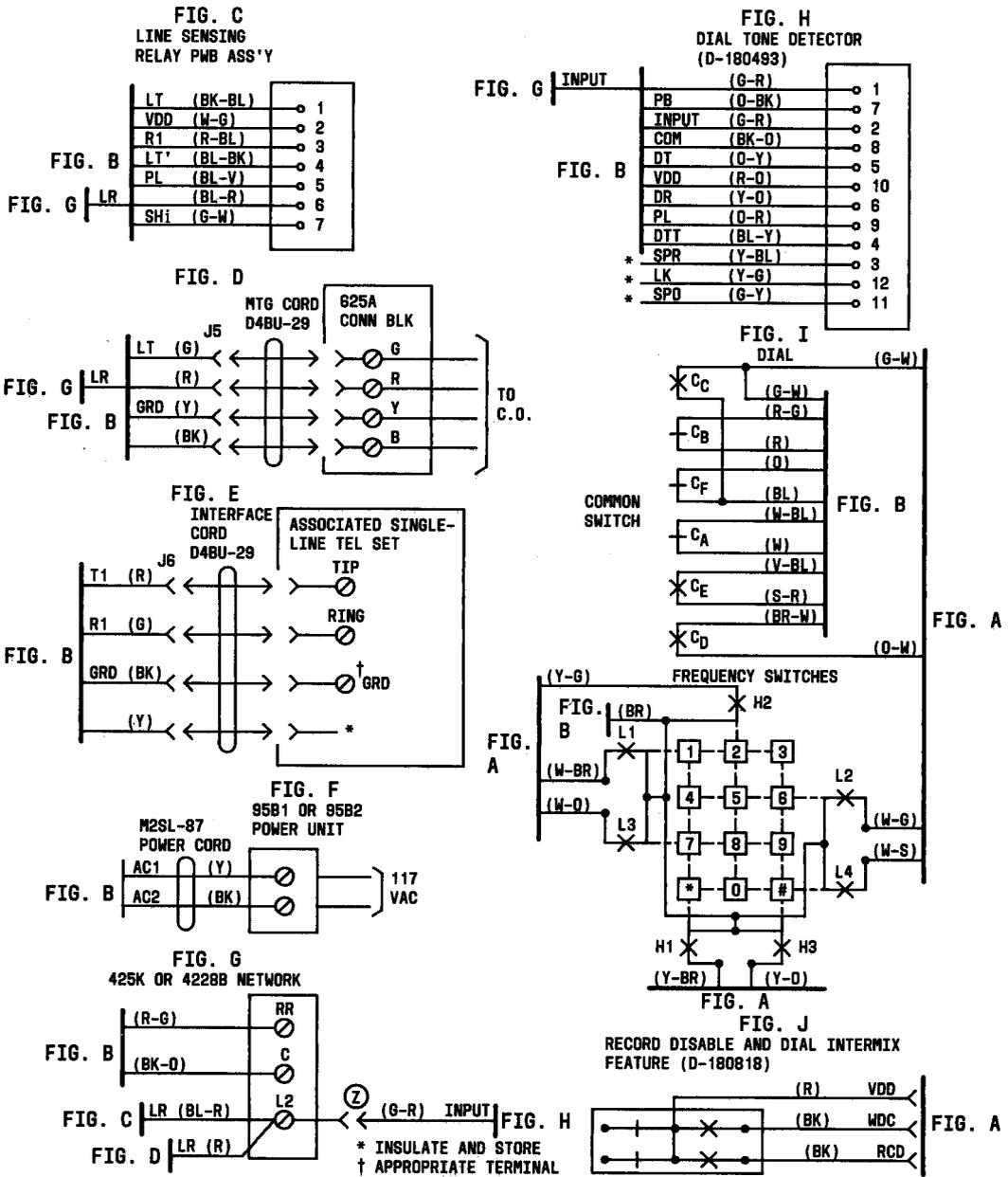(BK)   RCD

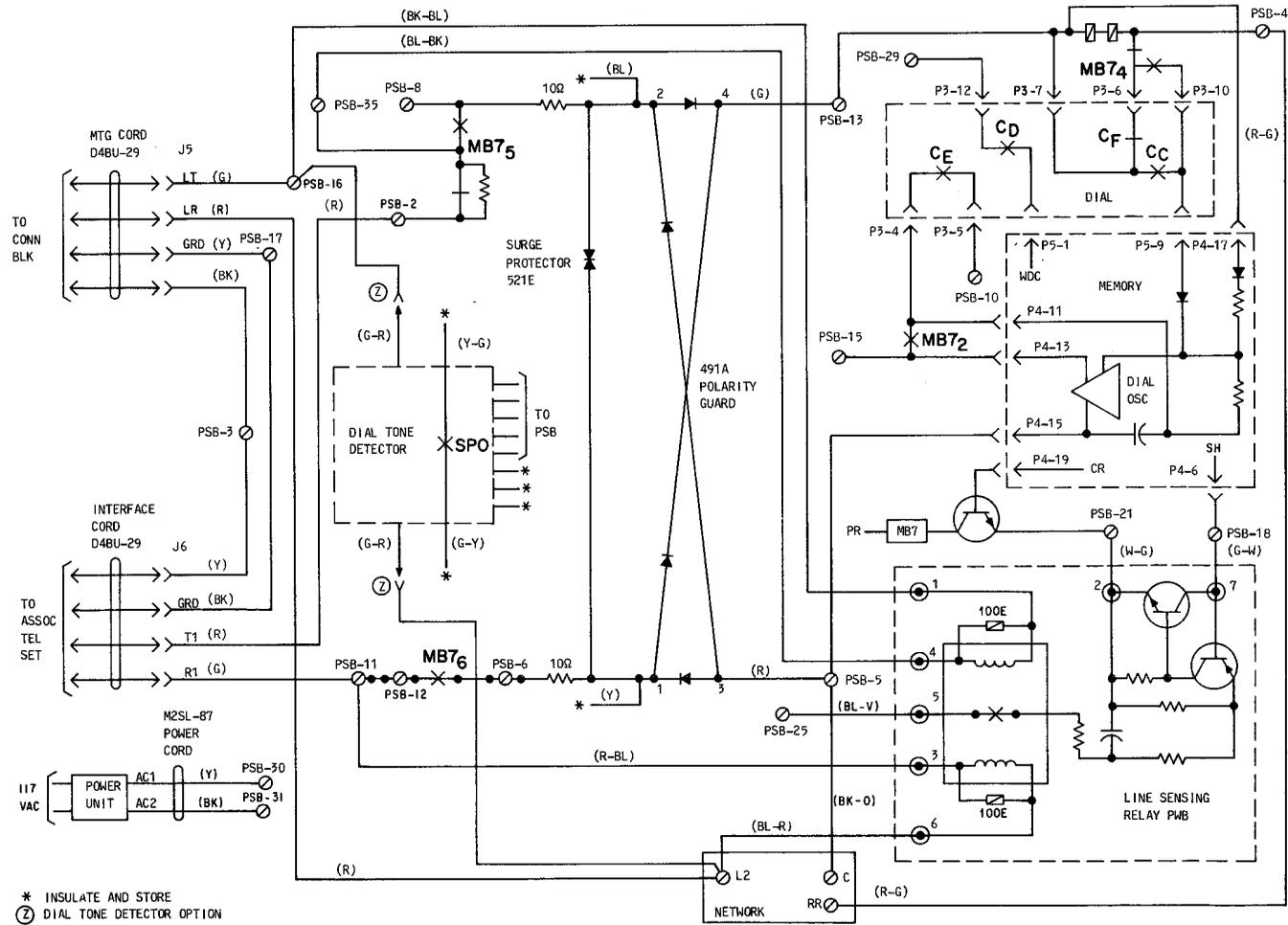**Fig. 12—2870B1M Dial, Connections (Sheet 2 of 2)**

Fig. 13—2870B1M Dial, Partial Functional Schematic

TABLE F

TROUBLE ANALYSIS — 870B1M DIAL

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
1	Dead set when off-hook	No dial tone. Cannot transmit or receive when off-hook using handset.	Mounting cord or interface cord improperly connected	Check cord insertions to connecting block, adjunct dial and telephone set
			Defective lead connections from Line Sensing Relay to terminals on PSB. See Fig. 11	Check continuity between PSB terminals 9 and 28 and between 16 and 21. (Nominal resistance is 8 ohms.) If open, replace Line Sensing Relay board
			Unknown	Replace adjunct dial*
2	Cannot manually dial when off-hook using either telephone set dial or adjunct dial	Cannot break dial tone or cannot hang-up set	Bridged set off-hook	Place bridged set on-hook
3	Cannot manually dial when off-hook using adjunct dial	When ac power is disconnected cannot dial using set dial but can manually dial using adjunct dial only	Improperly installed or defective Memory	1. Check connector cable 2. Replace Memory
			Defective PSB	Replace adjunct dial*
		No dialing clicks heard when dial is returning. Condition remains unchanged when power unit is disconnected.	Improperly installed or defective rotary dial	1. Check connections 2. Replace rotary dial
			Defective PSB	Replace adjunct dial*
4	RECORD lamp does not function properly	RECORD lamp does not turn on when RECORD button is depressed.	AC power not present	Check for commercial power
			Battery not connected	Connect battery
			Power unit not plugged in or defective	Check or replace power unit (should read 13.4 to 18 across screw terminals 24 and 25 on PSB)
			Defective M2SL-87 cord or improper connections	1. Check connections and cord 2. Replace cord

* Refer to 6.02 (4).

TABLE F (Contd)

TROUBLE ANALYSIS – 870B1M DIAL

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM ·	POSSIBLE CAUSE	REMEDIAL ACTION
4 (Contd)			RECORD OFF, WAIT, or memory button stuck down	Clear stuck button
			Defective lamp or lamp driver circuit	Replace Memory
			Switch of D-180818 or D-180837 Kit of Parts in ON position	Change switch position to OFF
			Unknown	Replace adjunct dial*
		Lamp turns off when any memory button is depressed	Defective logic	Replace Memory
			Unknown	Replace adjunct dial*
		Lamp does not turn off as dial is returning. No relay click heard at beginning of dial wind-up or at end of dial return.	Improperly connected or defective rotary dial (off-normal contact)	1. Check rotary dial connections 2. Replace rotary dial
			Unknown	Replace adjunct dial*
		Lamp does not turn off as dial is returning, but relay click is heard at beginning of dial wind-up and at end of dial return. Can manually dial off-hook.	Improperly connected or defective Memory	1. Check connector cable 2. Replace Memory
			Unknown	Replace adjunct dial*
		Lamp turns off as dial is returning and stays off.	Memory button was not depressed prior to the operation of the dial	Record per 5.01
			Defective Memory	Replace Memory
			Unknown	Replace adjunct dial*
5	Cannot record properly into the 31 memory positions or into LAST NUMBER DIALED position.	RECORD lamp functions properly and can manually dial using adjunct dial	Defective Memory	Replace Memory
			Unknown	Replace adjunct dial*

* Refer to 6.02 (4).

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
5 (Contd)		Party is reached when number is recorded as it is manually dialed; however, when number is subsequently dialed from memory, party is not reached—wrong number is dialed from memory	Check recording procedure	Record per 5.01
			Switch of D-180818 or D-180837 Kit of Parts in ON position	Change switch position to OFF
			Defective Memory	Replace Memory
			Unknown	Replace adjunct dial*
6	Cannot dial properly from memory	MB7 relay clicks when manual dial is operated, but no automatic dialing possible. RECORD lamp does not light.	Battery not connected	Connect battery
		MB7 relay does not operate (no click heard) when memory button is depressed	Memory not securely mounted.	Tighten Memory mounting screws
			Improper and/or defective strap from PSB terminal 18 to PSB terminal 20	Check and/or replace strap lead. See Fig. 10B
			Improper connection to or defective Memory	1. Check connector cable 2. Replace Memory
		Can dial from memory with temporary strap lead between PSB terminals 14 and 17	Improperly installed or defective Line Sensing Relay	1. Check connections 2. Replace Line Sensing Relay
			Unknown	Replace adjunct dial*
		MB7 relay operates (click heard) when memory button is depressed but no dialing clicks are heard. In addition, transmit and receive levels are very low	WAIT button is stuck down or defective	Free stuck WAIT button or replace Memory
			Unknown	Replace adjunct dial*
		No digits, random digits or all the same digits in memory location(s). Note: memory may or may not have functioned properly at some	AC power outage for 24 hours or longer	Reestablish ac power and rerecord numbers into memory

* Refer to 6.02(4).

TABLE F (Contd)

TROUBLE ANALYSIS — 870B1M DIAL

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
6 (Contd)		previous time.		
			Disconnected or defective battery	1. Plug in the battery 2. Allow the battery to be charged for a minimum of 5 minutes. Then momentarily remove the power unit from the ac power outlet for 10 seconds and reinsert 3. If previously stored numbers are not dialed from memory, replace the battery 4. Repeat procedure
			Defective Memory	Replace Memory
			Unknown	Replace adjunct dial*
		Automatically dials through a WAIT after pausing momentarily at the WAIT space on a train of recorded digits	Memory not securely mounted	Tighten Memory mounting screws
			Improper connection to PSB terminal 23	Check connection to and/or replace strap to PSB terminal 23
			Defective Memory	Replace Memory
			Unknown	Replace adjunct dial*
7	Cannot dial properly from memory when off-hook (wired for dial tone detector option)	MB7 relay clicks when manual dial is operated, but no automatic dialing possible. RECORD lamp does not light.	Battery not connected	Connect battery
		MB7 relay does not operate (no click heard) when memory button is depressed	Precise TOUCH-TONE® dial tone may not be present	Make sure precise (350 Hz and 440 Hz) dial tone is present
			Memory not securely mounted	Tighten Memory mounting screws

* Refer to 6.02 (4).

TROUBLE ANALYSIS — 870B1M DIAL

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
7 (Contd)			Improper installation of dial tone detector D-180493	Check connections for D-180493 installation See Fig. 10B and F and Table B.
		Same as above — Addition of strap lead between PSB terminals 11 and 20 does not correct problem	Improper connection to or defective Memory	1. Check connector cable 2. Replace Memory
		Addition of strap lead between PSB terminals 11 and 20 corrects problem.	Defective Memory	Replace Memory
			Defective dial tone detector	Replace D-180493 dial tone detector
			Unknown	Replace adjunct dial*

* Refer to 6.02 (4).

TABLE G
TROUBLE ANALYSIS — 2870B1M DIAL

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
1	Dead set when off-hook	No dial tone. Cannot transmit or receive when off-hook using handset.	Mounting cord or interface cord improperly connected	Check cord insertions to connecting block, adjunct dial, and telephone set
			Defective lead connections from Line Sensing Relay to terminals on PSB. See Fig. 13	Check continuity between PSB terminals 16 and 35 and between 11 and network terminal L2 (Nominal resistance is 8 ohms.) If open, replace Line Sensing Relay Board.
			Unknown	Replace adjunct dial*
2	Cannot manually dial when off-hook using telephone set dial or adjunct dial.	Clicking sounds or damped TOUCH-TONE signals heard when dial buttons are depressed. Cannot hang up set.	Bridged set off-hook.	Place bridged set on-hook.
3	Cannot manually dial when off-hook and using adjunct dial.	No audible TOUCH-TONE signal present.	20-pin power supply connector not properly inserted on Memory	Check connector insertion.
			Dial connectors not properly inserted.	1. Check connector insertion. 2. Replace 35-type dial
			Defective Memory.	Replace Memory.
			Unknown.	Replace adjunct dial*
4	Cannot manually dial some digits when off-hook using adjunct dial.		Open or loose leads to dial contacts.	Check for proper insertion of leads into 10-position dial connector.
			Defective frequency contacts on 35-type dial	Replace 35-type dial
			Defective Memory.	Replace Memory.
			Unknown.	Replace adjunct dial*

* Refer to 6.02 (4).

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
5	RECORD lamp does not function properly.	RECORD lamp does not turn on when RECORD button is depressed or RECORD lamp is on and cannot be turned off	Battery not connected, or defective	Connect or replace battery
		RECORD lamp does not turn on when RECORD button is depressed	AC power not present.	Check for commercial power.
			Power unit not plugged in or defective.	Check or replace power unit. Should read 13.4 to 18 V ac across screw terminals 30 and 31 on PSB.
			Switch of D-180818 or D-180837 Kit of Parts in ON position	Change switch position to OFF
			Defective M2SL-87 cord or improper connections	1. Check and connections and cord. 2. Replace cord.
			RECORD OFF, WAIT, or Memory button stuck down.	Clear stuck button.
			Defective lamp or lamp driver circuit	Replace Memory.
			Unknown.	Replace adjunct dial*
		Lamp turns off when any memory button is depressed or Lamp does not momentarily turn off when adjunct dial button is depressed.	Defective logic.	Replace Memory.
			Unknown	Replace adjunct dial*
6	Cannot record into memory.	See Trouble No. 5		
		RECORD lamp momentarily flashes when RECORD button is depressed.	Stuck RECORD OFF button	Check RECORD OFF button.
			WAIT contacts closed even when WAIT button is not depressed.	1. Check WAIT button. 2. Replace Memory.

* Refer to 6.02 (4)

TABLE G (Contd)

TROUBLE ANALYSIS — 2870B1M DIAL

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
6 (Contd)			Defective Line Sensing Relay PWB	Replace Line Sensing PWB
		Digits appear to be accepted correctly but cannot dial from memory	Dialing problem	See trouble No. 8
7	Cannot record properly into the 31 memory positions or into the LAST NUMBER DIALED position.	Warble tones heard when automatically dialing. Get "cannot complete" intercept for automatic or manual dialing.	WAIT contacts closed even when WAIT button is not depressed.	Replace Memory.
		Party is reached when number is recorded as it is manually dialed. However, when number is subsequently dialed from Memory, party is not reached—wrong number is dialed from Memory.	Incorrect dial contact sequence.	Replace dial.
			Defective logic.	Replace Memory.
			Open circuit on PSB.	Replace adjunct dial*
			Unknown.	
8	Cannot dial properly from memory.		Did not record properly.	1. Record per 5.01. 2. See trouble No. 6
			Battery not connected or defective	Connect or replace battery
		MB7 relay does not operate (no clicking sound heard) when memory button is depressed. No audible TOUCH-TONE signal is present.	Open circuit in power path.	Check for proper strap lead connections on PSB. See Fig. 12B.
			Defective logic.	Replace Memory.
		MB7 relay operates (clicking sound heard) but holds for less than 0.1 second for a 15 digit number.	Incorrect dial sequence.	Replace 35-type dial
		No audible TOUCH-TONE signal present.		

* Refer to 6.02 (4)

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
8 (Contd)		Audible gap in train of digits being dialed.		
		No digits or random digits in memory.	AC power outage for 24 hours or longer.	Reestablish ac power and rerecord numbers into memory.
			Disconnected or defective battery.	1. Plug in the battery. 2. Allow the battery to be charged for a minimum of 5 minutes. Then momentarily remove the power unit from the ac power outlet for 10 seconds and reinsert. 3. If previously stored numbers are not dialed from memory, replace the battery. 4. Repeat procedure.
			Defective power supply circuit.	Replace adjunct dial*
		No digits or all the same in random memory locations	Defective Memory.	Replace Memory.
		Two or more memory locations have same digits which are usually different from originally recorded digits.	Static discharge damage	1. Consult telephone company for proper grounding procedure. 2. Replace memory.
		Automatically dials through a "wait" after pausing momentarily at the "wait" space on a train of recorded digits.	Defective WAIT contacts or defective circuit components.	1. Replace Memory. 2. Replace dial tone detector PWB assembly of D-180493 Kit of Parts (if option is provided).
9	Cannot dial properly from memory when off hook. (Wired with dial tone detector option.)	MB7 relay does not operate (no click heard) when button is depressed.	Precise TOUCH-TONE dial tone may not be present.	Make sure precise dial tone (350 Hz and 440 Hz) is present.
			Battery not connected	Connect battery

* Refer to 6.02 (4).

TABLE G (Contd)

TROUBLE ANALYSIS — 2870B1M DIAL

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
9 (Contd)			Memory not securely mounted	Tighten Memory mounting screws.
			Improper installation of dial tone detector D-180493.	Check connections for D-180493 installation. See Table B
		Same as above - Addition of strap lead between PSB terminals 19 and 29 does not correct problem.	Improper connection to or defective Memory.	1. Check connector cable. 2. Replace Memory.
		Addition of strap lead between PSB terminals 19 and 29 corrects	Defective Memory.	Replace Memory.
			Defective dial tone detector.	Replace D-180493 dial tone detector.
			Unknown	Replace adjunct dial*

*Refer to 6.02 (4).