

## 2960A01M "TOUCH-A-MATIC®" 16 TELEPHONE SET

### IDENTIFICATION, INSTALLATION, CONNECTIONS, OPERATION, AND MAINTENANCE

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A. Record A Number Into Memory . .	15	1.01 This section contains information on the 2960A01M telephone set. This set is shipped	

#### NOTICE

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from the factory as a desk set (Fig. 1) and can easily be converted to a wall set with no additional parts required.

**1.02** This section is reissued to:

- Add the D-180894 Kit of Parts
- Show wiring changes on black (BK) shield lead.

**1.03** The 2960A01M telephone set is a single line set and is factory-wired for bridged ringing. It can be wired to provide A lead control for 1A1, 1A2, 6A, or 6B key telephone systems (KTS).

**1.04** The telephone set is available in Ivory (-50) only. For color selection of available faceplate, refer to Table A.

## 2. IDENTIFICATION

**2.01** The 2960A01M telephone set provides the standard features of a single line set plus manual TOUCH-TONE® dialing, automatic dialing of 15 frequently called or important numbers, and a LAST NUMBER DIALED scratch pad memory.

### A. Design Features

**2.02** The following are design features:

- Modular telephone set
- Integrated circuit memory and dial
- Surge protector
- Polarity guard

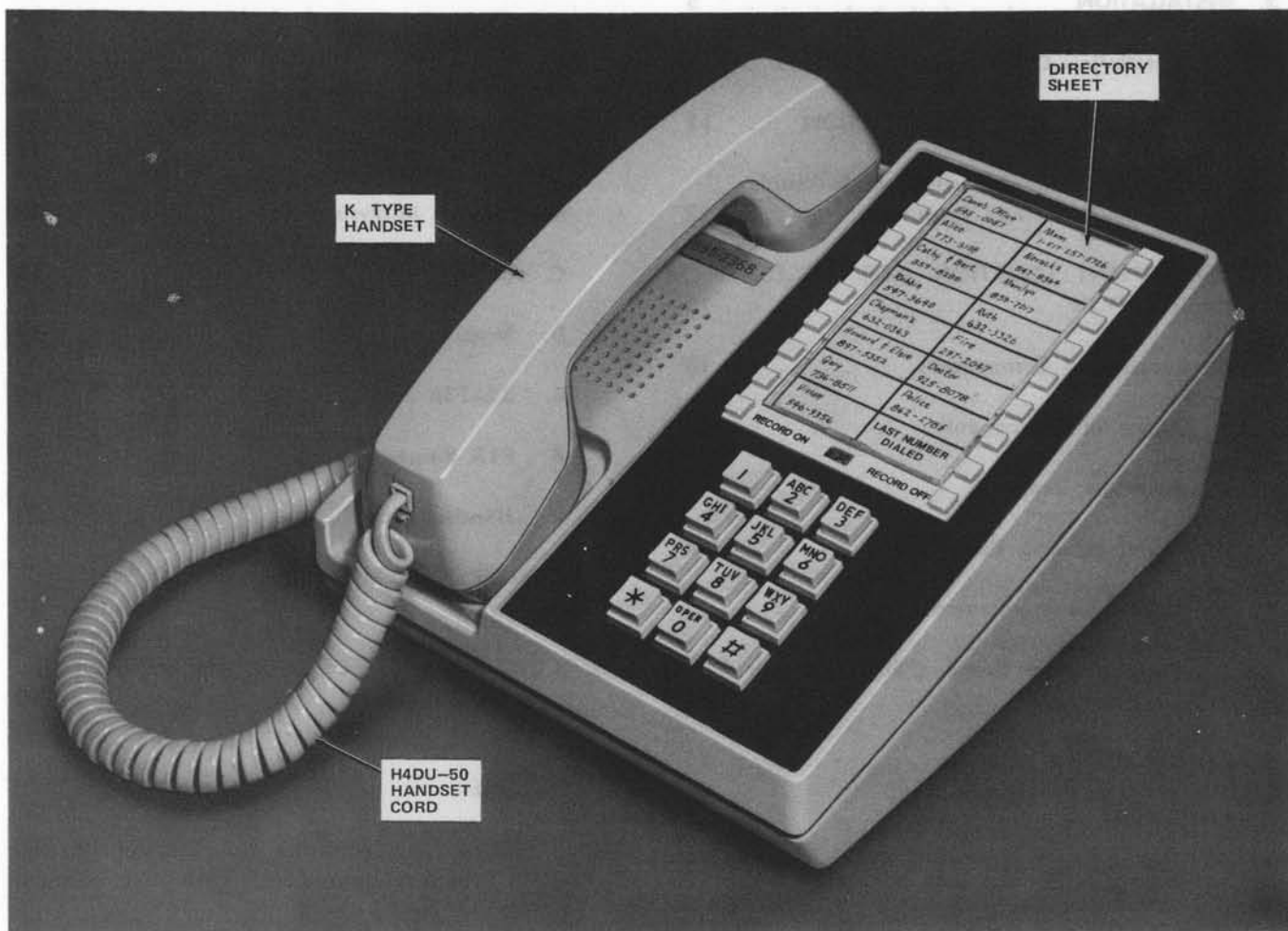


Fig. 1—2960A01M Telephone Set

- Memory buttons from which to select preprogrammed telephone numbers for automatic dialing
- Capability to record and automatically dial 15 telephone numbers of up to 15 digits each
- Last number manually dialed memory
- Battery for memory retention in event of ac power outage
- Battery OFF-ON switch
- Supplementary directory
- Directory Privacy (hidden directory)
- Convertability from a desk set to a wall set
- End-to-end signaling.

## B. Optional Features

### 2.03 *The following are optional features (Table B):*

- Selective ringing
- Tip party with identification ground
- 4-party full selective or 8-party semiselective ringing using an 11-type extender, 426N diode, or 28A ringer isolator as a coupling device
- A lead control for 1A1, 1A2, 6A, or 6B key telephone systems
- Speakerphone—either 3B (MD) or 4A speakerphone may be interfaced with the telephone set

**Note:** For use with a speakerphone, all dialing must be performed with the handset off-hook (paragraph 5.09). Speakerphone and tip party identification options cannot be provided at the same time.

- Multiline service—using adjunct key

**Note:** Replacing the handset each time a line is changed assures proper dialer operation (paragraph 5.10).

- 107-type loudspeaker set (SPOKESMAN® unit) may be interfaced with the telephone set (see Section 463-221-100)
- D-180812 Kit of Parts provides the following features.
  - (a) Record Disable (only)—turns off the recording feature to prevent accidental erasures of previously stored numbers.
  - (b) Record Disable and Dial Intermix—same as record disable feature plus—
    - (1) Allow digits dialed from manual dial and from memory to be intermixed without having to depress the RECORD OFF button (see paragraph 5.06).
    - (2) Disables the LAST NUMBER DIALED feature.

- D-180851 Kit of Parts provides the following features.

(a) Standard modular G-type handsets can be used with desk sets when modified with the D-180851 Kit of Parts. This kit consists of ivory colored transmitter and receiver caps used to replace the standard caps in the G-type handset. Modified G-type handsets can be used to provide the following features when the appropriate K-type handset is not available or is incompatible.

- (1) Amplified receiver (G6BM).
- (2) Amplified transmitter (G7BM).
- (3) Noisy location (G8BM).
- (4) Acoustic or inductive coupling to customer-provided equipment (G15A).

### 2.04 *All options are implemented by:*

- Wiring changes in the telephone set
- Installation of appropriate additional items.

**C. Operating Features**

**2.05 The following are operating features:**

- Dial (TOUCH-TONE dial), 35AT3A
- 16-button memory field of low force, low travel nonlocking buttons arranged in two columns; one along the left-hand edge of the memory and the second along the right-hand edge. Each column has eight memory buttons plus a ninth button (bottom button) for the record function
- LAST NUMBER DIALED button (the next to the bottom button in the right-hand column of nine buttons) when momentarily depressed, with the handset off-hook, initiates automatic redialing of the last number manually dialed
- RECORD button (the bottom button in the left-hand column of nine buttons) is nonlocking and when momentarily depressed, lights the RECORD lamp and enables the memory circuits to store telephone numbers manually dialed
- RECORD OFF button (the bottom button in the right-hand column of nine buttons) is nonlocking and when momentarily depressed, extinguishes the RECORD lamp indicating that the dialer is switched out of the record mode
- Battery OFF-ON switch (located on the bottom of the set, Fig. 2), should be in the OFF position when set is not in service.

**D. Ordering Guide**

**2.06 Order as follows:**

- (a) The 2960A01M telephone set is a modular type set and may be ordered as follows:

- Set, Telephone, 2960A01M-50

This includes.

- (1) ♦Adapter, 248B♦
- (2) Plug, 523B4, (used when converting from a desk set to a wall set) Fig. 12.

- (3) Cord, Handset, H4DU-50.

- (4) All components listed in (c) Replaceable Components, except faceplates and D4BU-29 cords.

**(b) Ordered separately:**

- ♦D-180894 Kit of Parts is required to provide ac powers for operation of the automatic dialer. The kit contains a 2012D transformer 248B-49 adapter, D4BU-29 (14 foot) line cord, and instruction sheet (840364194).♦

**Note:** A 2012A (MD) or 2012C transformer shall not be substituted for a 2012B (MD) or 2012D, as set will not operate properly on the lower voltage.

- Clamp, 2A (used to secure 2012B or 2012D) transformer to outlet)
- Faceplate, 260A-\* (Table A)
- Cord, Mounting, D4BU-29
- Cord, Mounting, D4BU-29 (line cord, maximum 14 feet)
- Cord Clips, B (for dressing cords as needed).

**(c) Replaceable Components:** may be ordered separately as follows:

- Lower Housing Assembly, 60AL-50
- Upper Housing Assembly, 60AU-50
- Faceplate, 260A-\* (Table A)
- Handset, K2C-50
- Cord, Handset, H4DU-50
- Cord, Mounting, D4BU-29
- Cord, Mounting, D4BU-29 (line cord, maximum 14 feet)
- Jack, Handset, 616J
- Battery, KS-20390L5

\* Add appropriate color suffix per Table A.

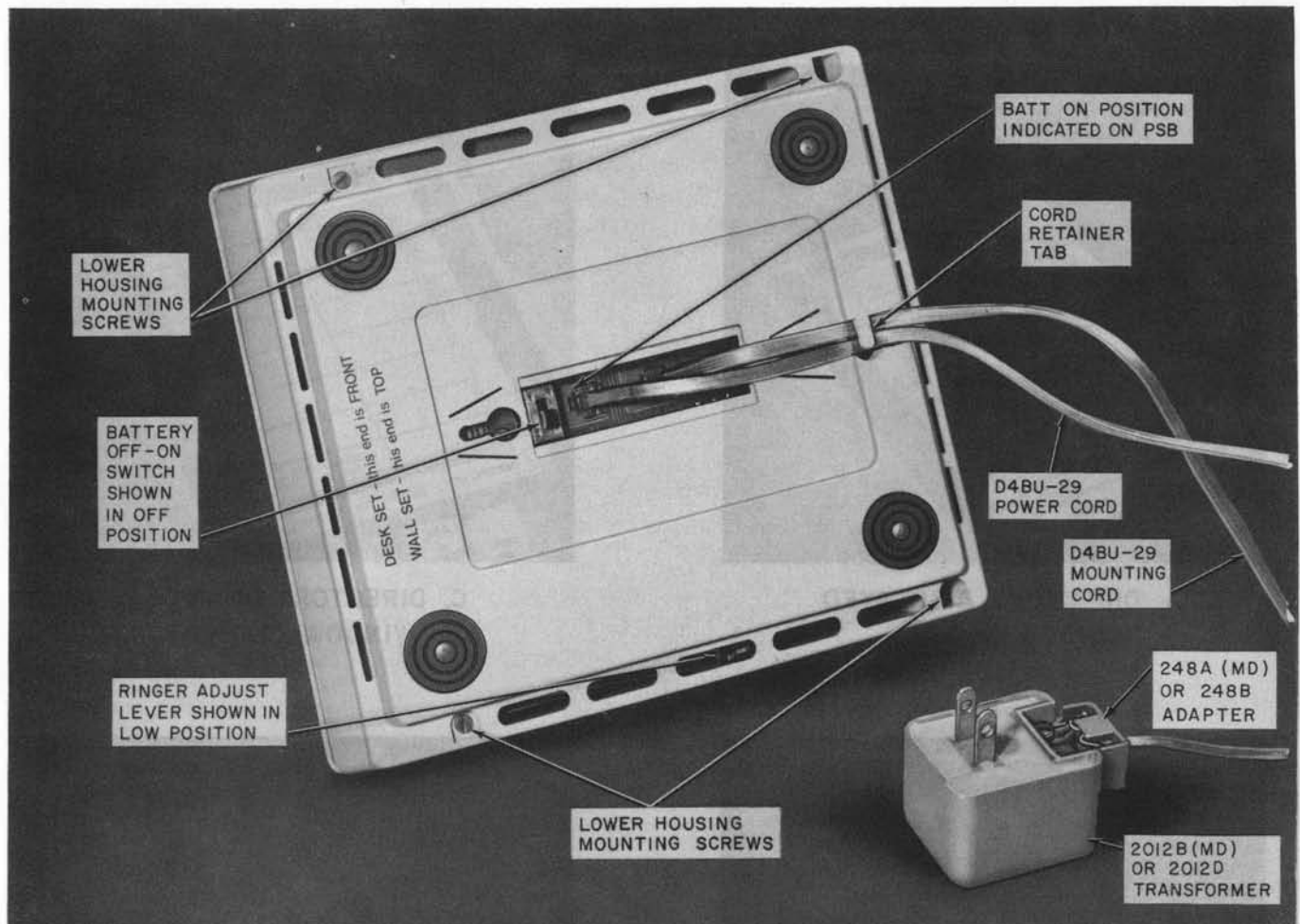


Fig. 2—2960A01M Telephone Set, Bottom View

- Ringer, P1A
- Dial, 35AT3A
- Memory, 960-type (includes button field)
- 841382245 Cover Assembly
- 841382146 Directory Sheet Set (includes four directory sheets and one sheet of color dots)
- 812558039 (P-25E803) Station Number Card Retainer
- 841381098 Handset Hook
- ♦Transformer, 2012D♦

**Note:** ♦A 2012A (MD) or 2012C transformer shall not be substituted for a 2012B (MD) or 2012D, as set will not operate properly on the lower voltage.♦

- 841417165 Shield and Lead Assembly (Fig. 4)
- Subscriber Instruction Booklet (SIB 2480C).

(d) **Optional apparatus:**

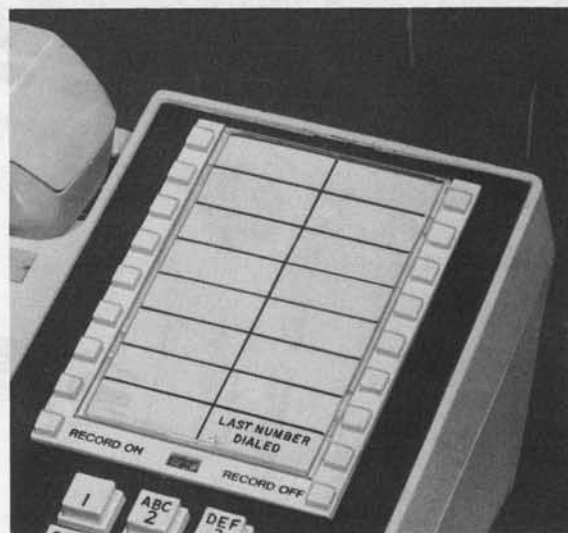
- See Table B for apparatus required

### 3. INSTALLATION

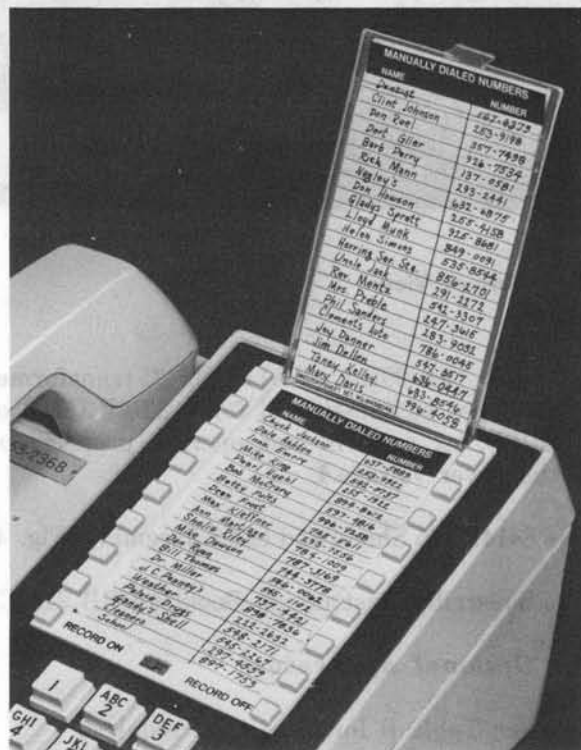
**Danger:** For safety, securely attach retaining clamp to ac outlet using outlet cover screw **BEFORE** attempting to install 2012B (MD) or 2012D



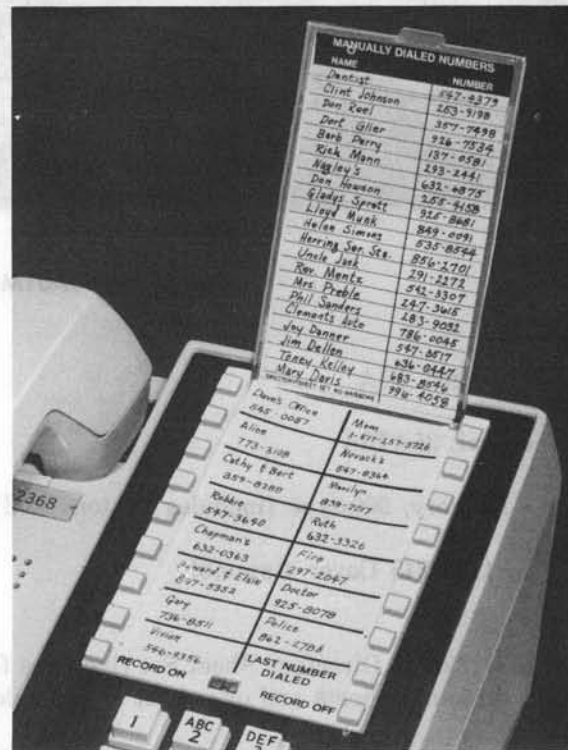
A. DIRECTORY DISPLAYED  
(WINDOW CLOSED)



C. DIRECTORY PRIVACY  
(WINDOW CLOSED)



B. DIRECTORY DISPLAYED  
(WINDOW OPEN)



D. DIRECTORY PRIVACY  
(WINDOW OPEN)

Fig. 3—Optional Methods of Installing Directory Cards

TABLE A

FACEPLATE ORDERING GUIDE (See Note)

CODE	COLOR
260A-100	Avocado
260A-108	Teak
260A-109	Walnut
260A-111	Gold
260A-112	Orange
260A-113	Brown
260A-114	Red
260A-115	Blue
260A-118	Black

**Note:** A display package containing all 9 color faceplates can be ordered as a D-180666 Kit of Parts. This package is intended for use as an aid to permit selection of color on customers premises. Cardboard insert shipped with set is discarded at time of installation.

**transformer. The transformer and any other cord plugged into the ac outlet should always be unplugged completely from outlet BEFORE attempting to attach or remove the clamp. This will prevent the possibility of a loosened retainer clamp or metallic outlet cover making contact with the ac prongs of the transformer when partially withdrawn from outlet. Do not use retaining clamp on outlets where cover mounting screw holds the duplex outlet in the box.**

**Caution:** Do not turn on the battery switch or plug in the 2012B or 2012D transformer until all connections and modifications are completed. Take extreme care not to damage the exposed components, circuits, etc. when the set is opened.

**Warning:** Care should be taken to trim and dress leads connecting to low voltage output terminals of 2012B or 2012D transformer to assure that inadvertent connection to conducting surfaces or other power source does not occur. If more than one transformer is plugged into a multiple receptacle power strip, there must be at least one inch separation between transformers. 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 transformer to be in close proximity to the ac line source is not recommended.

**3.01** Terminate the local loop into a jack or connecting block suitable for the D4BU-29 mounting cord. If this is to be a wall set installation, terminate loop into a 630A4 connecting block and refer to Part 7 of this section for conversion of set. For standard desk set installation, terminate loop into 625-type connecting block.

**Note:** For information on modular connecting blocks or adapters, refer to Section 503-100-100.

**3.02** Lay shield aside and make all wiring changes and telephone set modifications (Table B) before external connections are made to the set (paragraph 4.01). Remove upper housing (paragraph 3.16), if necessary, for set modification.



**On sets manufactured or repaired prior to November 1979, to protect the circuit from static discharge, the black (BK) shield lead was factory wired to the yellow (Y) lead of the mounting cord jack. Upon installation of the set the yellow (Y) lead was connected to earth ground through a 625 or 630-type connecting block. This placed the black (BK) shield lead at earth ground potential.**



**During wiring options, care had to be taken that the black (BK) shield lead remained connected to earth ground. Sets manufactured or repaired after October 1979 will have the black**



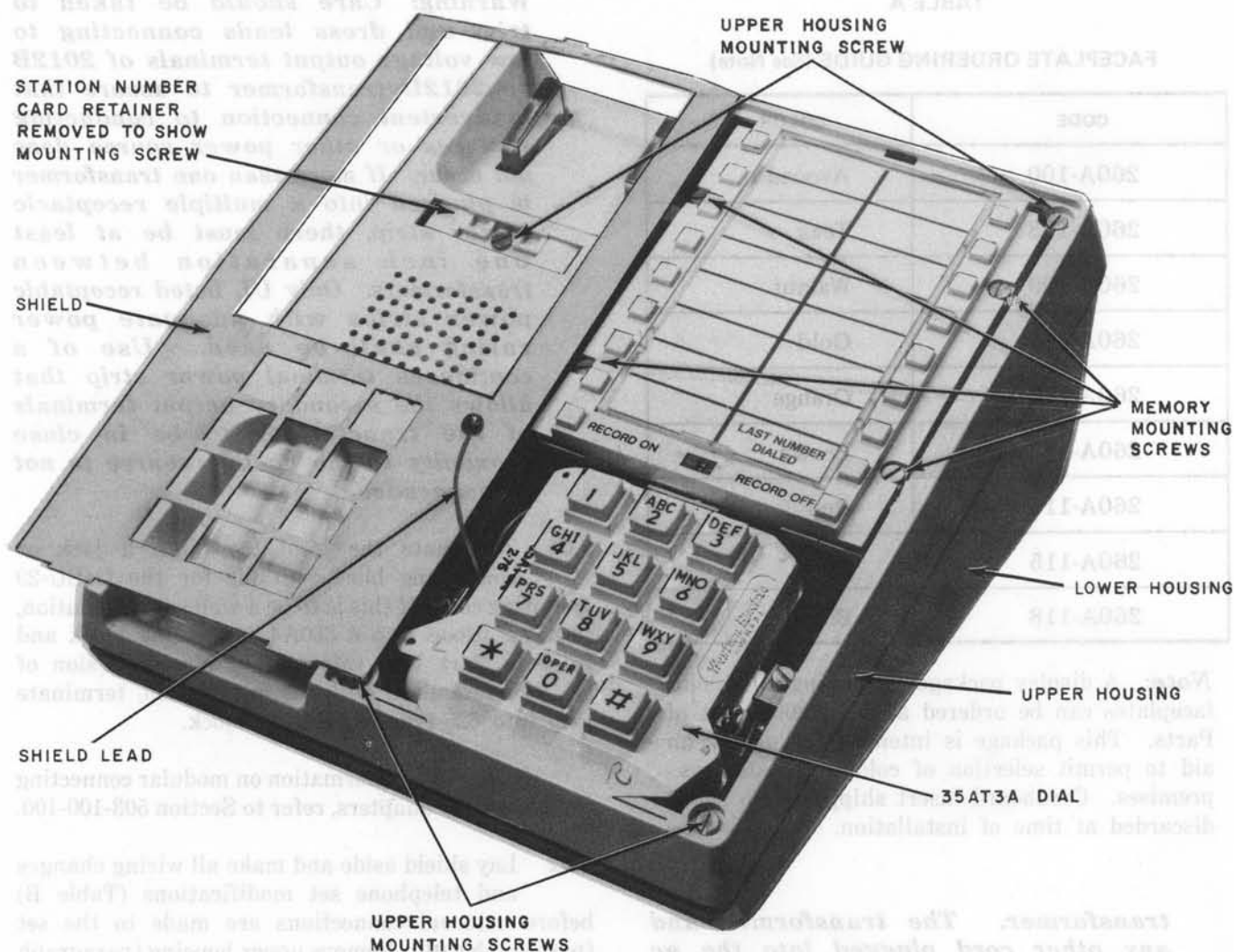


Fig. 4—2960A01M Telephone Set With Handset and Faceplate Removed and Shield Laid Aside

**(BK) shield lead connected to terminal 16 on the power supply board. This is the dialer common terminal. This wiring change will provide a discharge path for static electricity buildup.**



**In severe cases where radio frequency interference or memory scrambling due to static electricity is encountered the black (BK) static shield lead on terminal 16 can be reconnected to the yellow (Y) ground lead on terminal 1. This yellow (Y) lead should then be connected to an appropriate ground termination.**

**3.03** Replace upper housing and install faceplate of subscriber's choice, (see note, Table A).

**3.04** Attached 248A or 248B adapter to 2012B (MD) or 2012D transformer (Fig. 2) and plug into 110-117 volt ac outlet not controlled by a switch (continuous ac power is required). Plug one end of the D4BU-29 line cord (maximum 14 feet) into the power jack on the bottom of the set (Fig. 15D) and the other end into the 248A or B adapter attached to the transformer.

**Note:** The 2012B or 2012D transformer must be located no closer than 1-1/2 feet from the telephone set in order to avoid a potential noise condition.



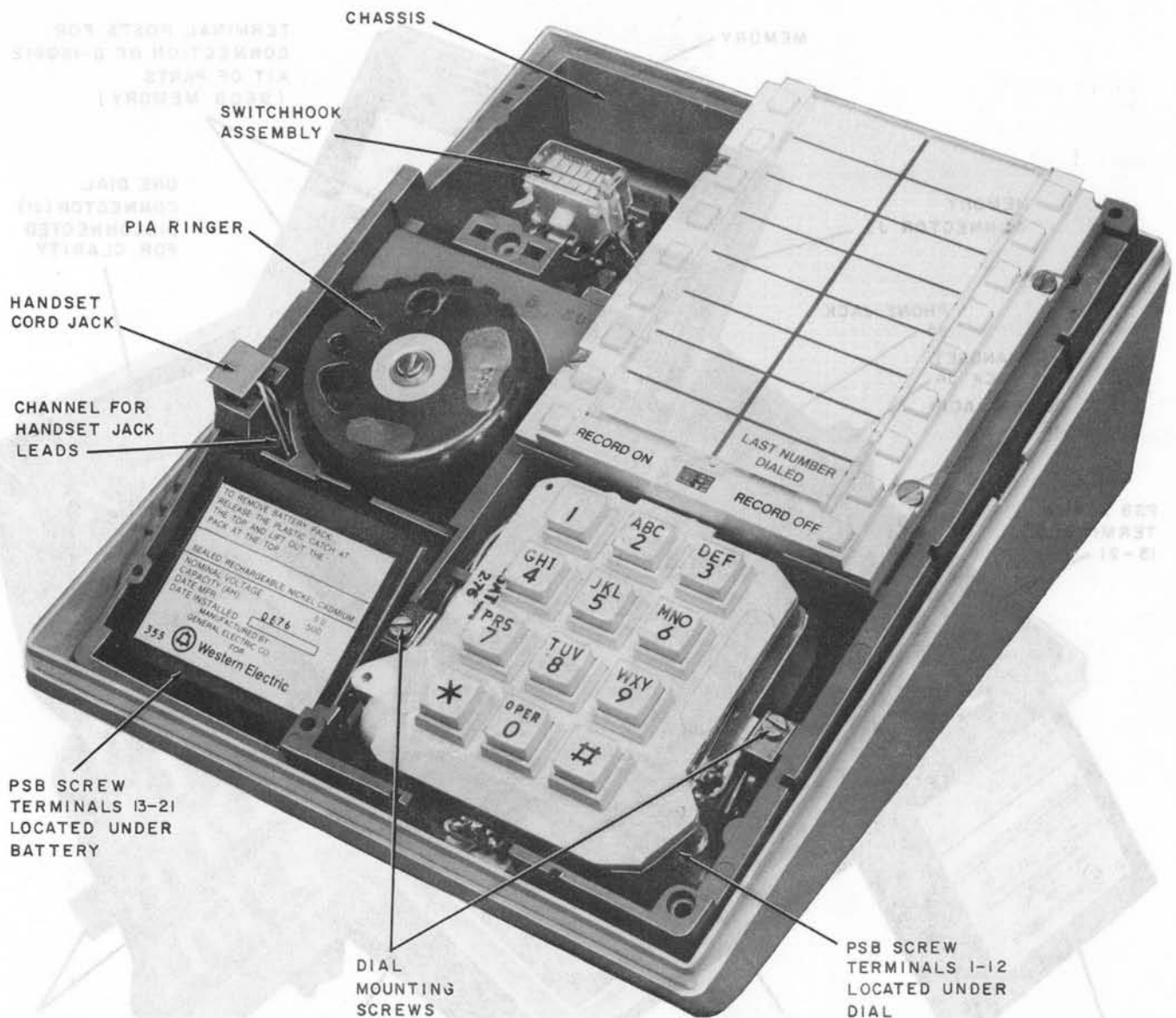


Fig. 5—2960A01M Telephone Set With Handset, Faceplate, Shield, and Upper Housing Removed

**3.05** The transformer may also be placed at a remote location with D-station or inside wire used for all or part of the connection. (See Fig. 15D for the wiring options and the maximum conductor lengths.) The transformer should not be used for furnishing power to anything other than this set.

**Caution:** The ac power to the 2960A01M telephone set shall not be provided over the BK and Y conductors of the modular mounting cord used for connecting to the line since these leads may be grounded for some

applications and neither ac power lead may be connected to earth ground.

**3.06** The set is shipped from the factory with the battery switch in the OFF position. After all wiring changes and modifications have been completed, tilt the set up and move the battery switch arm (visible in the bottom view of the set, Fig. 2) to the ON position.

**Note:** The switch ON position is indicated on the bottom of the printed wiring board, (Fig. 2) and if switch is not placed in ON

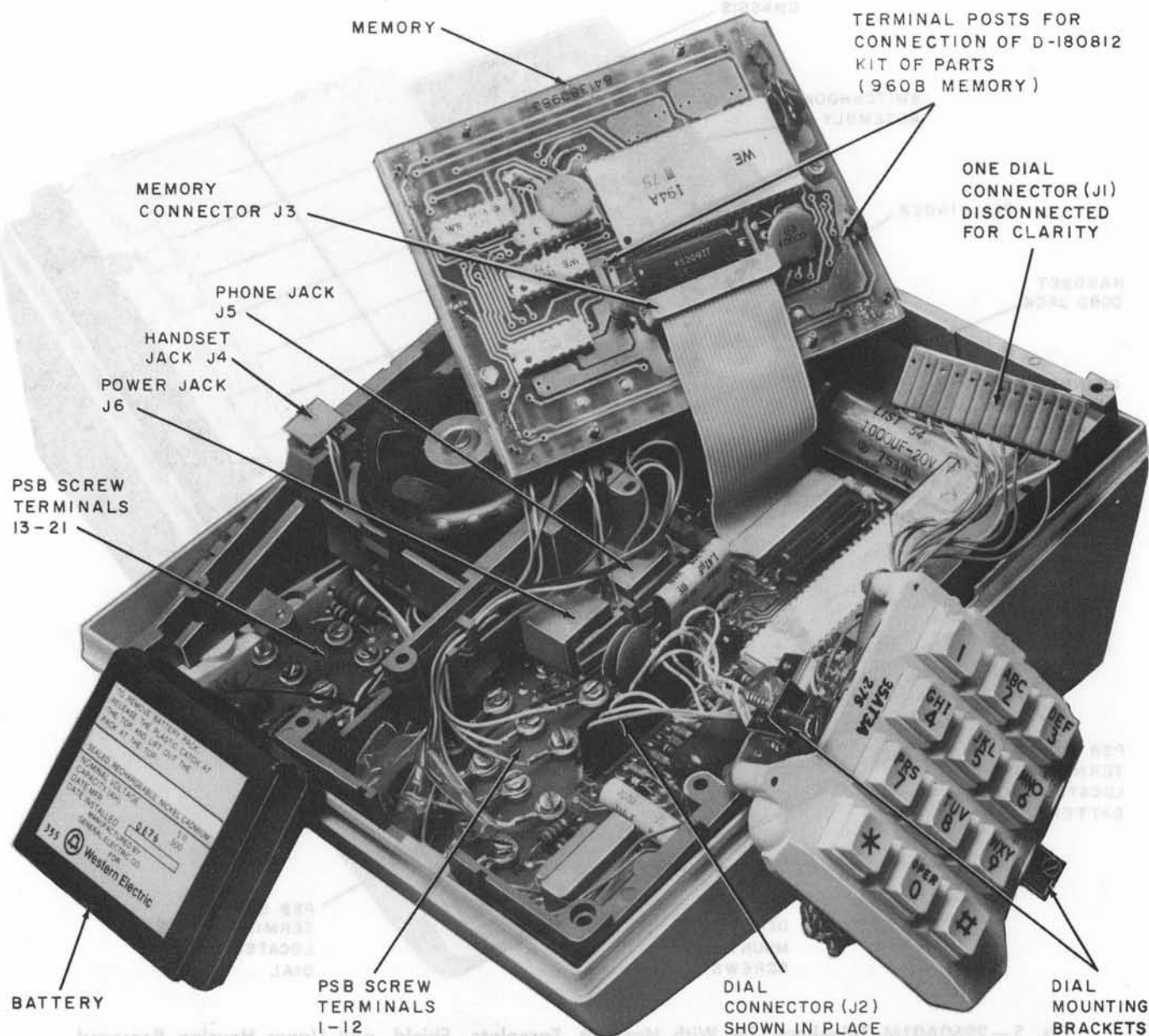


Fig. 6—2960A01M Chassis and Lower Housing With Dial, Memory, and Battery Laid Aside and Shield Removed

position the set will not record or automatically dial.

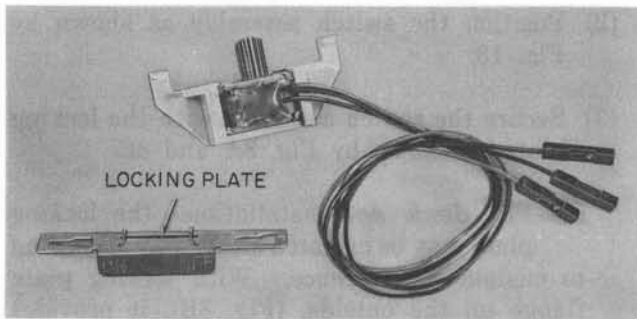
**3.07** For desk installation, connect mounting cord to phone jack on bottom of set and plug into 625-type connecting block. (For wall installation, refer to Part 7.)

**Note:** Dress all cords under retainer tab at bottom rear of housing, Fig. 2.

**Caution:** Stapling of the D4BU-29 cord can break the conductor. Use a B-cord clip for dressing.

**3.08** The side of the card labeled LAST NUMBER DIALED is installed by sliding the card between the underneath side of the cover (window) and the card retainer strip as shown in Fig. 3A.

**3.09** A second card with supplementary directory card side up is placed under the retainer



**Fig. 7—D-180812 Kit of Parts**

tabs and positioned on the top surface of the memory frame as shown in Fig. 3B.

**3.10** When the subscriber does not want the directory prominently displayed, the directory privacy option is used as follows.

- (a) A blank directory card with the side labeled **LAST NUMBER DIALED** up, is installed per paragraph 3.08 (Fig. 3C).
- (b) The actual directory card, with the side labeled **LAST NUMBER DIALED** up, is

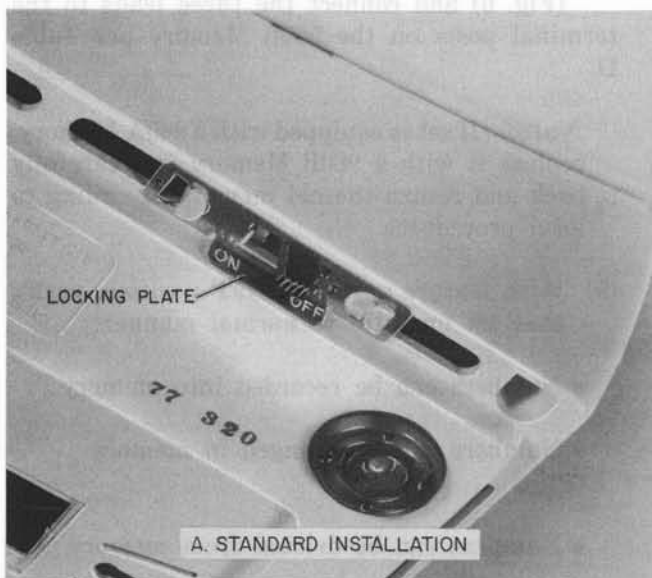
placed under the retainer tabs and positioned on the top surface of the memory frame (Fig. 3D).

**3.11** The station number card retainer 812558039 (P-25E803) snaps into the upper housing just below the well for the handset receiver.

#### **Installation Check Procedure**

**3.12** Check the telephone set installation per the following tests (refer to Part 5 for operation). In case of failure, refer to Trouble Analysis, Table G.

- (1) Disconnect the 2012B or 2012D transformer from ac power and manually dial the appropriate code for ring-back to test the ringer and to check that the basic telephone operates properly in the absence of commercial power.
- (2) Reconnect the 2012B or 2012D transformer to ac outlet.
- (3) With the handset on-hook, record digits 1 through 0 into all memory locations except **LAST NUMBER DIALED** and the button immediately above it [paragraphs 5.01 (4) through (7)].



**Fig. 8—Optional Methods of Installing Locking Plate of D-180812 Kit of Parts**

## SECTION 503-301-101

(4) Manually dial CO dial test and ringer circuit and simultaneously record into memory location immediately above LAST NUMBER DIALED button [paragraphs 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 automatically dial the test circuit number recorded in Step (4) by depressing the 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 the test circuit. Verify that the correct signal is returned from the test circuit.

(b) Depress buttons of the memory locations recorded in Step (3) and verify that the correct signal is returned from the test circuit each time.



***The KS-20390L5 battery switch must be in the ON position and the 2012B or 2012D transformer must be connected a minimum of five minutes before doing Step (c).***

(c) Momentarily disconnect from the 2012B or 2012D transformer (for 5 to 10 seconds). After reconnecting transformer and securing with a 2A clamp, depress the memory button immediately above the LAST NUMBER DIALED button which accesses the dial test and ringer circuit. When test circuit is ready, depress any other memory button and verify that correct signal is returned from test circuit. This verifies memory retention with commercial power disconnected.

### OPTIONAL APPARATUS INSTALLATION

#### D-180812 Kit of Parts (Record Disable and Dial Intermix)

**3.13** Install the D-180812 Kit of Parts (Fig. 7) as follows.

(1) Remove lower housing (paragraph 3.17).

(2) Position the switch assembly as shown by Fig. 13.

(3) Secure the switch assembly with the locking plate as shown by Fig. 8A and 8B.

(a) For **desk set** installations, the locking plate may be oriented either way according to customer preference. With locking plate flange on the outside, (Fig. 8B), it provides a more secure installation in regards to accidental operation of switch.

(b) For **wall set** installations, the switch assembly should be located as shown by Fig. 13. Locate locking plate per Fig. 8A so switch is accessible.

(4) Insert the three leads from the switch assembly between the circuit board and the chassis under the memory.

(5) Replace the lower housing and place the set upright.

(6) Remove faceplate (paragraph 3.15).

(7) Disengage the four captive memory mounting screws (Fig. 4).

(8) Rotate the right edge of the memory upward (Fig. 6) and connect the three leads to the terminal posts on the 960B Memory per Table D.

**Note:** If set is equipped with a 960A Memory, replace it with a 960B Memory and carefully pack and return the old memory according to local procedures.

(9) With feature switch in OFF position, verify that set operates in normal manner.

- Numbers can be recorded into memory

- Numbers can be changed in memory

- Numbers can be deleted from memory

- Manually dialed numbers are automatically entered into LAST NUMBER DIALED position.

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

- Record disable feature only.
  - (a) RECORD lamp will not light when RECORD button is depressed.
  - (b) No telephone numbers can be recorded, changed, or deleted from memory.
  - (c) LAST NUMBER DIALED feature is operative.
- Record disable and dial intermix features.
  - (a) RECORD lamp will not light when RECORD button is depressed.
  - (b) No telephone numbers can be recorded, changed, or deleted from memory.
  - (c) LAST NUMBER DIALED feature is disabled.
  - (d) Manually and automatically dialed digits may be intermixed (paragraph 5.06).

(11) Reassemble set.



*For complete memory security, the switch assembly may be installed through the housing from below, with the switch inside the housing. This type installation would make it necessary to remove the lower housing to make any changes in memory, or features provided, and is not recommended.*

## COMPONENT LOCATION AND ACCESS INFORMATION

### A. Location of Components

3.14 *The components are located as follows.*

- **Faceplate**—held in place by three tabs which align with mating slots in the upper housing cutout and is positioned over the dial and memory assembly with appropriate holes that align with the dial buttons and memory assembly (Fig. 1).
- **Shield**—underneath faceplate and is positioned over the dial and memory (Fig. 4).
- **Battery**—snaps into a cavity on the top side and left front corner of the chassis (Fig. 5).
- **Battery Switch**—soldered to power supply printed wiring board with switch arm accessible at bottom of set through opening near center of lower housing (Fig. 2).
- **Ringer**—fastened by two screws to bosses on the bottom of the chassis (Fig. 9) and rests in a cavity just to the rear of the battery cavity (Fig. 5).
- **Handset Jack**—slides into a cavity on the top left side wall of the chassis adjacent to the ringer and battery (Fig. 5).
- **Switchhook Assembly**—soldered to power supply printed wiring board and located at left-rear corner of power supply board (PSB) (Fig. 5).
- **TOUCH-TONE Dial**—fastened by two screws and located on the top side at right-front corner of the chassis (Fig. 4).
- **Memory**—fastened by four screws and located just to the rear of the dial on the top right side of the chassis (Fig. 4).
- **Network**—electronic components soldered to power supply printed wiring board replace the conventional network.
- **Power Supply Printed Wiring Board Assembly**—fastened by six screws to bosses on the bottom of the chassis (Fig. 9).
- **Power Supply Printed Wiring Board Screw Terminal Areas**—(Fig. 5 and 6).
- **Mounting Cord and Power Cord Jacks**—slide into adjacent cavities on the bottom side of the center wall of the chassis. Jacks are held in place when power supply board is fastened to bottom of chassis and are accessible through holes in the lower housing and power supply board (Fig. 2 and 9).



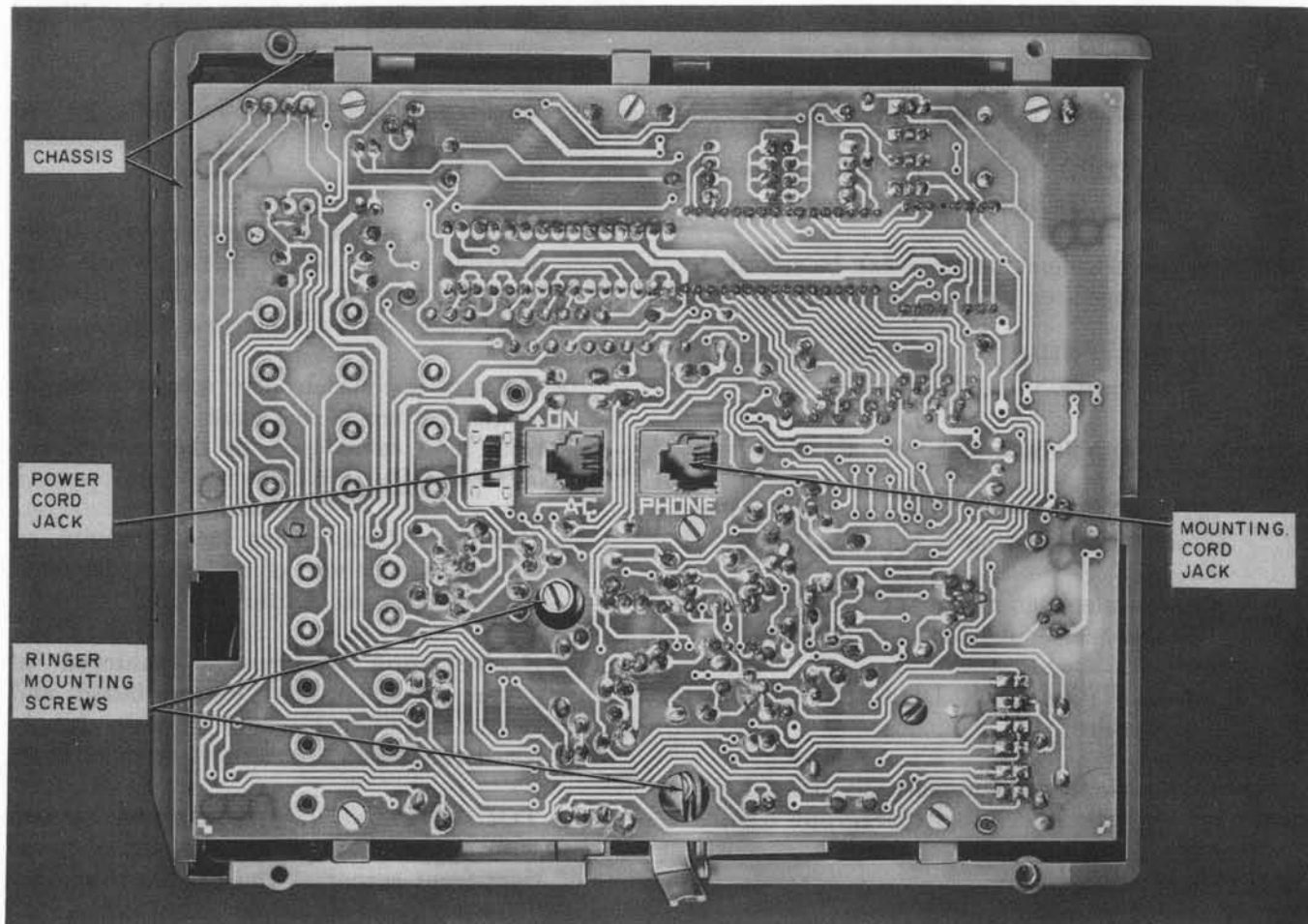


Fig. 9—Bottom View of Power Supply Board (Lower Housing Removed)

- **Lower Housing**—fastened by four screws to the bottom side of the chassis (Fig. 2).
- **Upper Housing**—fastened by four screws to the top side of the chassis (Fig. 4).
- **Chassis**—main structural member to which other component assemblies are fastened, including the upper and lower housings (Fig. 5 and 9).

#### B. Access of Components

##### Faceplate Removal

**3.15** The faceplate has one tab at the top center and two tabs near the bottom corners. To remove, gently bow the upper housing wall away from the top tab and pull up to free the faceplate

tab. This can be done by using the thumbnail of one hand on the housing and a fingernail of the other hand on the faceplate. Then slide the faceplate slightly upward to free the two bottom tabs and remove the faceplate. To reinsert the faceplate, slide the two bottom tabs into mating slots in the upper housing, lower the faceplate on to the top edge of the housing cutout and gently bow the upper housing wall away from the top tab of the faceplate. Push down top of faceplate and release housing.

##### Upper Housing Removal

**3.16** To remove the upper housing, proceed as follows.

- (1) Unplug the modular handset cord at the telephone set end and remove handset.



- (2) Remove the faceplate (paragraph 3.15) and place the shield aside (Fig. 4).

**Caution: Use extreme care when handling shield. Do not bend the shield or break solder connection of attached lead.**

- (3) Remove the station number card retainer and station number card.
- (4) Disengage the four captive upper housing screws (Fig. 4).
- (5) Remove the upper housing by slipping the shield through the faceplate cutout.
- (6) To replace the upper housing, reverse the procedure.

#### **Lower Housing Removal**

**3.17** To remove the lower housing proceed as follows.

- (1) Remove the modular mounting and power cords from under the retainer tab and unplug cords from jacks in the bottom of the telephone set (Fig. 2).
- (2) Disengage the four captive screws located at the corners of the lower housing on the bottom of the telephone set (Fig. 2).
- (3) Remove the lower housing.
- (4) To replace the lower housing, reverse the procedure.

#### **Power Supply Board (PSB) Terminals**

**3.18** To access the screw terminals 1 through 12 (under the dial) on the power supply board, proceed as follows.

- (1) Remove the faceplate (paragraph 3.15) and place the shield aside.
- (2) Disengage the two captive screws that hold the dial in place.
- (3) Gently lift dial, rotating counterclockwise to enable frequency switches located at lower front edge of dial to clear housing. As dial

rotates clear, it may be placed on memory assembly with dial buttons up as in Fig. 10.

- (4) Check that dial connections are properly seated and reassemble by reversing the procedure.

**3.19** To access screw terminals 13 through 21 (under the battery) on the power supply board, proceed as follows.

- (1) Remove the upper housing (paragraph 3.16).
- (2) Gently push back on the battery retainer catch and swing the rear edge of the battery upward to release the battery.
- (3) Carefully lift the battery from its cavity and lay aside.
- (4) To reassemble, reverse the procedure.

**Note:** To reinsert battery, position lower edge first and then push top of battery under retainer catch.

## **4. CONNECTIONS**

**4.01** Telephone set connections are shown in Fig. 15.

**4.02** Refer to Table B for connection information for all options.

**4.03** A partial functional schematic is shown on Fig. 20.

## **5. OPERATION**

**Note:** If the telephone set is used behind a PBX, etc., where an access code is required, see paragraph 5.07.

### **A. Record A Number Into Memory**

**5.01** To record.

- (1) Remove the directory sheet (Fig. 1).
- (2) Write or type (using light pressure), the desired name and telephone number for a selected memory button on the associated position of the directory sheet.

- (3) Replace the directory sheet.
- (4) Depress the RECORD button. The RECORD lamp adjacent to the RECORD button will light. (A number can be called and recorded simultaneously by lifting handset before depressing the RECORD button.)

**Note:** If set is equipped with a D-180812 Kit of Parts, switch must be placed in the OFF position.

- (5) Depress the specific memory button adjacent to the desired telephone number listed on the directory sheet.
- (6) Manually dial the desired 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 memory button was not 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 can also be reset by a switchhook operation.

#### B. Change A Number In Memory

**Note:** If set is equipped with a D-180812 Kit of Parts, switch must be placed in the OFF position.

- 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

**Note:** If set is equipped with a D-180812 Kit of Parts, switch must be placed in the OFF position.

- 5.03** Complete the following operations in sequence.

- (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 and listen for dial tone.
- (2) Depress the desired memory button.

#### E. LAST NUMBER DIALED Feature

**Note:** If set is equipped with a D-180812 Kit of Parts, and dial intermix feature is provided, switch must be placed in the OFF position.

- 5.05** Operation of LAST NUMBER DIALED feature.

- (1) Go off-hook.
- (2) Listen for dial tone.
- (3) Manually dial telephone number.
- (4) Hang up to reset dialer for automatic dialing.
- (5) To redial same number automatically, go off-hook, listen for dial tone, and depress LAST NUMBER DIALED button.

**Note:** Note that the RECORD lamp never comes on during LAST NUMBER DIALED operations.

#### F. End-to-End Signaling

- 5.06** For end-to-end signaling (such as data transmission) this set has the capability to intermix manual and automatic dialing. This can be accomplished if the following procedure is observed.

- (a) **Standard Operation:** If, at any time, digits are dialed manually, 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 set from the "last number dialed mode" and allow additional automatic dialing.)

(b) **Record Disable and Dial Intermix (D-180812 Kit of Parts):** With the switch in the ON position manually and automatically dialed digits may be intermixed as desired. Operation of the RECORD OFF button is not required.

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

#### G. Access Code

**5.07** If there is no break in dial tone after the access code, simply record the number prefixed by the access code.

**5.08** When a pause for second dial tone is required following an access code, one of the following procedures are necessary to record and automatically dial from memory.

(a) Use one memory button for access code as follows.

- (1) Record the required access code in one memory location.
- (2) Record the remaining number in a second memory location.

(3) To automatically dial a number:

(a) Go off-hook, listen for dial tone, and depress the memory button for the access code.

(b) Listen for a second dial tone and depress the appropriate memory button or the LAST NUMBER DIALED button for the telephone number.

(b) To save a memory location by not recording the access code, an alternate procedure may be used.

**Note:** LAST NUMBER DIALED feature can not be used with this procedure.

(1) Just record the desired telephone number into memory—do not record the access code.

(2) Go off-hook, listen for dial tone, manually dial the required access code, and depress (not necessary to depress RECORD OFF button with record disable and dial intermix feature) the RECORD OFF button. (This will remove set from LAST NUMBER DIALED mode and allow additional automatic dialing.)

(3) Listen for a second dial tone and depress the memory button for the desired telephone number.

#### H. Speakerphone Option

**5.09** Use speakerphone in normal manner except that all dialing must be done with handset off hook. After dialing, depress the speakerphone ON button and hold it depressed until the handset is placed on hook.

#### I. Multiline Service (using 6040/6050-type key)

**5.10** Replacing the handset each time a line key is changed assures proper dialer operation. If a number is dialed manually from one line and another line key is depressed to make another outgoing call without hanging up, the RECORD OFF button should be depressed before dialing. This will remove the set from the "last number dialed mode" to allow either automatic dialing or proper recording of a manually dialed number into LAST NUMBER DIALED position.

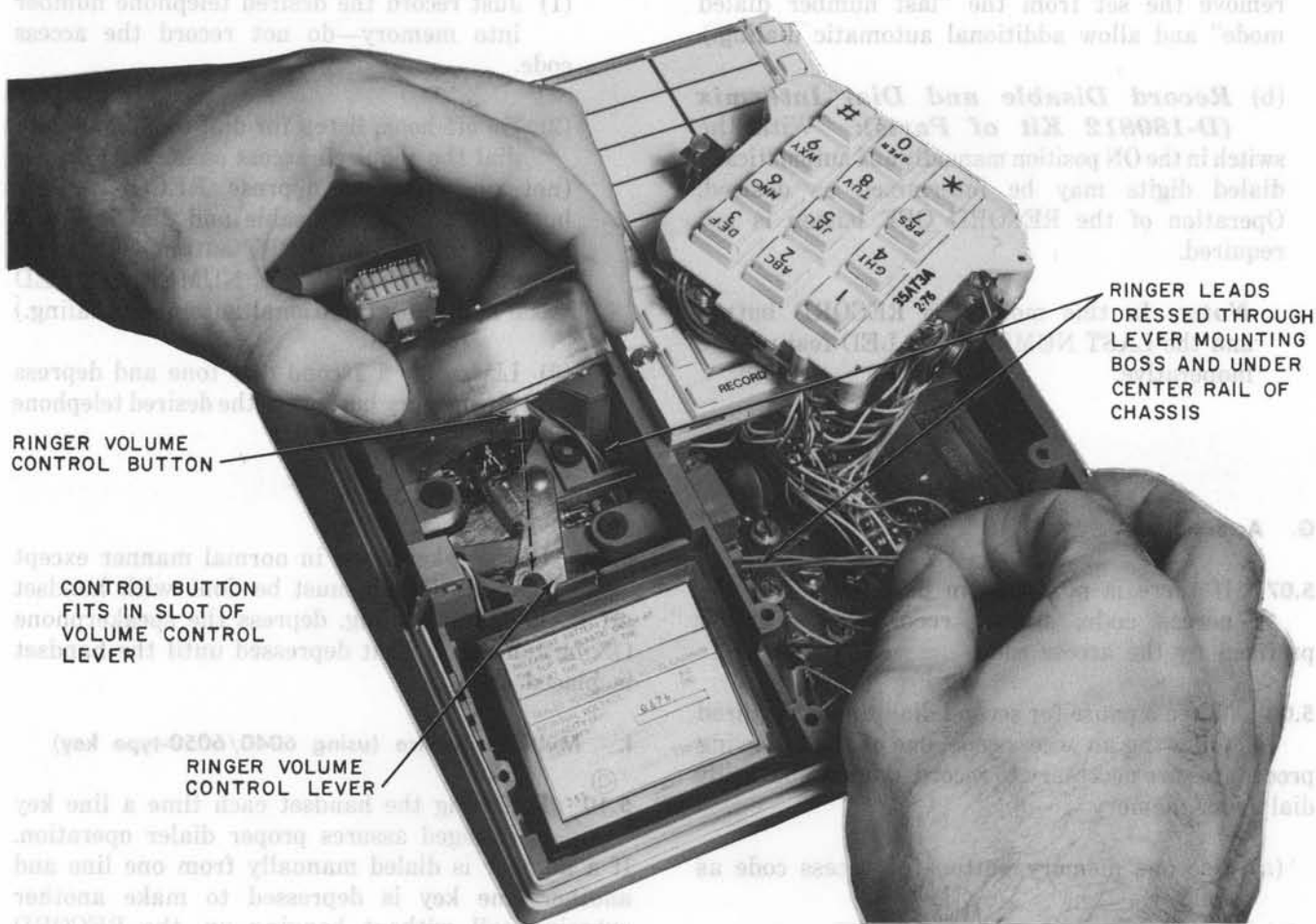
#### 6. MAINTENANCE

**Caution:** Operation of battery OFF-ON switch to OFF position will result in loss of memory if ac power is not present.

**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 16 hours. If power loss exceeds 16 hours, the numbers may have to be rerecorded.

#### A. Return Procedure

**6.02** Any replaced set or (component) should be returned in the carton of the replacement



**Fig. 10—Ringer Being Installed in 2960A01M Chassis With Dial Rotated onto Memory and Shield Removed**

with a label placed on the outside of the carton stating that contents are defective. When a set is not being replaced by a new one, use a D-180600 Kit of Parts for returning set to repair center.



**Always place battery switch in OFF position when set is removed from service.**

#### B. Trouble Analysis

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

- (1) Confirm trouble report either as an automatic dialer (Part 5), or as a basic telephone set.
- (2) Check for improper connections.

- (3) Refer to Table G and paragraphs 6.04 through 6.08.

#### C. Battery

**6.04** The KS-20390L5 battery has an expected life of about 4 years. It can be replaced without loss of memory provided that commercial ac power to the set is continuously maintained. To replace the battery, proceed as follows (Fig. 5).

- (1) Remove the upper housing (paragraph 3.16).
- (2) Release the battery [paragraph 3.19 (2) and (3)].
- (3) Disconnect the battery leads.

**Caution:** Do not short battery terminals.



**Fig. 11—2960A01M Telephone Set With Handset Hook Reversed for Wall Mounting**

- (4) Remove battery.
- (5) Install new battery.
- (6) Reassemble the set.



**Before doing Step 7 insure that:**

- (a) **The battery switch is in the ON position.**
- (b) **The new battery has been connected for a minimum of five minutes.**
- (c) **That there is a known telephone number recorded in a memory location.**

- (7) Momentarily disconnect the 2012B or 2012D transformer (for 5 to 10 seconds). After reconnecting the 2012B or 2012D and securing with a 2A clamp, automatically dial the previously recorded known telephone number. This will verify retention of memory by the new battery.

#### **D. Memory**

- 6.05** The memory may be replaced in the following manner.

**Note:** Removal of the memory results in loss of stored telephone number.

- (1) Disconnect 2012B or 2012D transformer.
- (2) Turn battery switch to OFF.
- (3) Remove the faceplate (paragraph 3.15) and place the shield aside.
- (4) Disengage the four captive memory screws (Fig. 4).
- (5) Rotate the right edge of the memory upward.
- (6) Disengage the connector at the memory (Fig. 6) by pulling it perpendicular to the circuit board.
- (7) Replace the memory by engaging the connector. The connector is keyed, one position is filled and should fit over the vacant position in the row of pins. The cable should not be twisted.
- (8) Tighten the four captive screws.
- (9) Replace the shield and faceplate.
- (10) Test per paragraph 3.12.
- (11) Place the old memory in the shipping container of the new memory (carton 900314535), affix a defective label and return to the repair location.

#### **E. 35AT3A Dial**

- 6.06** To replace.

- (1) Disconnect 2012B or 2012D transformer.
- (2) Turn battery switch to OFF.
- (3) Remove the faceplate (paragraph 3.15) and place the shield aside.
- (4) Disengage the two captive screws that hold the dial in place.

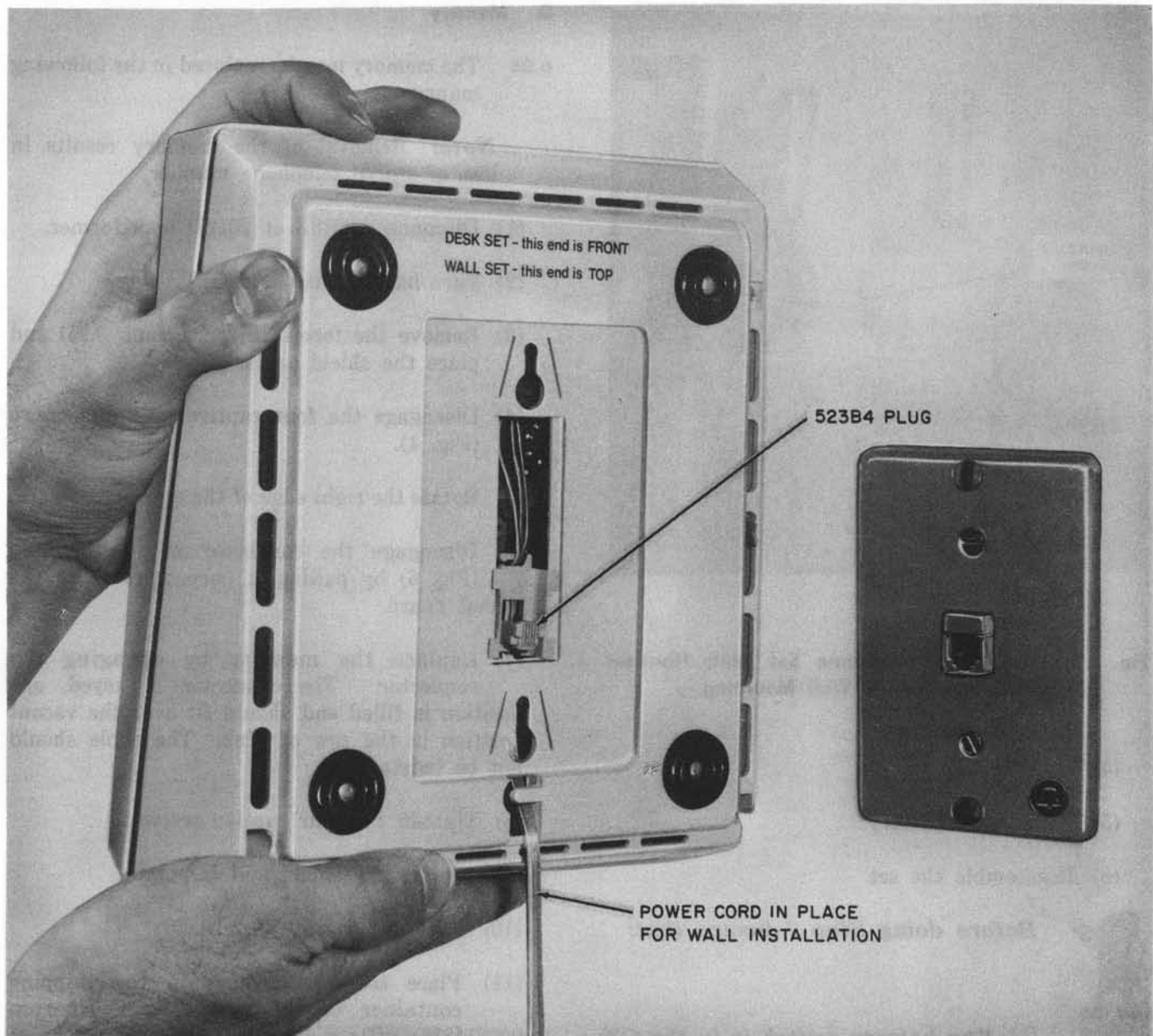


Fig. 12—2960A01M Wall Set and 630A4 Connecting Block

(5) Disengage the four captive memory screws (Fig. 4), gently lift and rotate memory counterclockwise and rest lightly on top of housing.

(6) Lift dial out and carefully disengage the dial connectors by pulling up perpendicular to the printed wiring board.

(7) Remove the two dial mounting brackets from the dial (Fig. 6).

(8) To install 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 connections.

(9) To test the dial for both manual and automatic operation.

(a) Go off-hook and manually dial a known telephone number.



- (b) Momentarily hang up handset and depress the LAST NUMBER DIALED button. The number automatically dialed should be the same as the number in Step (a).

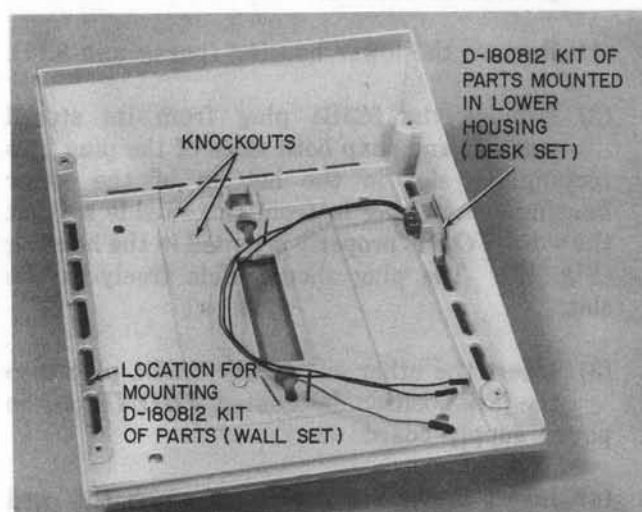
#### F. P1A Ringer

**6.07** To replace the P1A ringer proceed as follows.

**Note:** To perform Steps (11) and (14) a split blade expandable or a magnetic screwdriver will be required to install the new ringer.

- (1) Disconnect 2012B or 2012D transformer.
- (2) Turn battery switch to OFF.
- (3) Remove the lower housing (paragraph 3.17).
- (4) Disengage and remove the two ringer mounting screws which can be accessed through the clearance holes in the power supply board (Fig. 9).
- (5) Temporarily replace the lower housing and place the set on its feet.
- (6) Remove the upper housing (paragraph 3.16).
- (7) Remove the dial [paragraph 3.18 (2) and (3)] and place aside (Fig. 10).
- (8) Disconnect the ringer leads and remove ringer.
- (9) Dress the leads of the new ringer through the ringer adjust arm mounting boss and under the center rail of the chassis, and connect to the appropriate terminals.
- (10) As the ringer is lowered into its mounting position, pull any slack in the leads through to the dial side of the center rail (Fig. 10).
- (11) Replace the dial.
- (12) Remove the lower housing. Holding the ringer in position, turn the chassis over to expose the clearance holes in the power supply board.
- (13) Attach one ringer mounting screw onto the blade of a screwdriver, (see preceding note).

- (14) Insert the ringer mounting screw into one location and secure ringer.
- (15) Align the ringer adjust arm over the ringer volume control button (Fig. 10).
- (16) Replace the remaining ringer mounting screw with the "special" screwdriver and tighten ringer into place.
- (17) Replace the housings, and shield, faceplate, and handset.
- (18) Dial appropriate code for ring-back to test the ringer.



**Fig. 13—Lower Housing Removed Showing Knockouts for Access by Adjunct Cords and Locations for Mounting D-180812 Kit of Parts**

#### G. Handset Jack

**6.08** To replace the 616J handset jack (Fig. 5 and 6).

- (1) Disconnect 2012B or 2012D transformer.
- (2) Turn battery switch to OFF.
- (3) Remove the upper housing (paragraph 3.16).
- (4) Release the battery and place aside [paragraphs 3.19 (2) and (3)].

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- (5) Release the dial [paragraph 3.18 (2) and (3)] and place aside (Fig. 10).
- (6) Disconnect the appropriate leads (Fig. 15B) and remove jack.
- (7) Replace the jack and dress jack leads in channel behind jack (Fig. 5).
- (8) Reassemble set.
- (9) Verify proper handset operation.

### 7. CONVERSION FROM DESK SET TO WALL SET

**7.01** To convert from a desk set to a wall set, proceed as follows.

- (1) Remove the lower housing (paragraph 3.17).
- (2) Remove the 523B4 plug from its stored position and snap both sides of the plug into rectangular slot in the bottom of the lower housing. Snap plug in from the outside so that the word **TOP** is properly oriented in the housing (Fig. 12). The plug should slide freely in the slot.
- (3) Insert the other end of the 523B4 plug into the jack position designated **PHONE** on the power supply board.
- (4) Insert the power cord up through the cord opening below the plastic retainer tab in the bottom of the lower housing (Fig. 12).
- (5) Connect the power cord to the telephone set per the appropriate option of Fig. 15D.
- (6) Place the lower housing on the chassis according to the instructions on the bottom (Fig. 12).
- (7) Engage the four captive screws to fasten the lower housing to the bottom of the chassis.
- (8) Remove the station number card retainer and station number card from the upper housing.
- (9) Disengage the captive screw from the chassis and lift out the concealed handset hook and screw from the cavity in the upper housing.

(10) Completely remove the captive screw from one side of the handset hook and insert it into the other side.

(11) Place the handset hook back into its cavity in the upper housing, engage the screw with the chassis, and fasten the hook down (Fig. 11).

(12) Replace the station number card and card retainer.

(13) The converted wall set is intended to plug into and secure to a 630A4 connecting block (Fig. 12 and 16B).

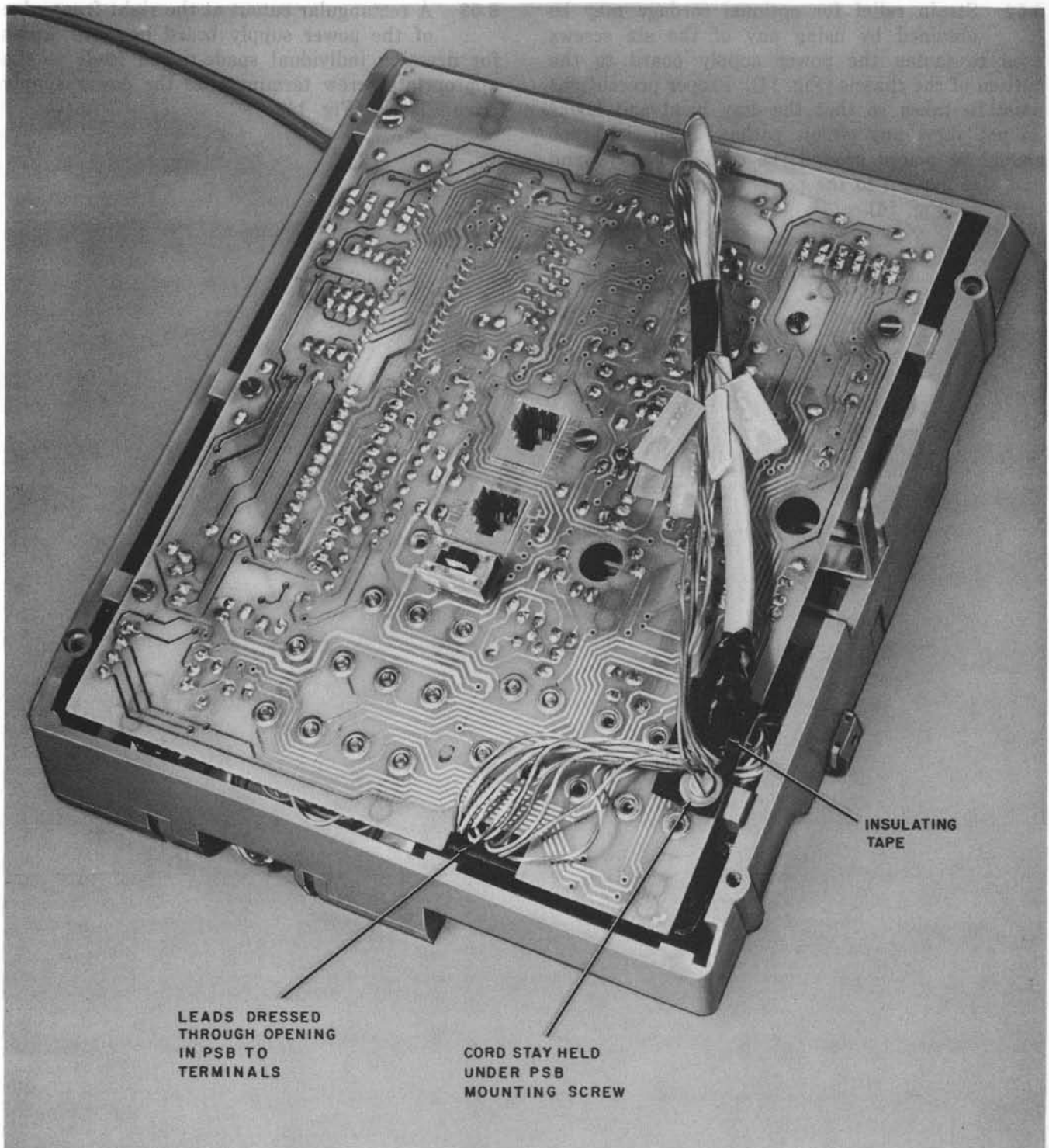
**7.02** When connecting set to wall, proceed as follows to prevent damage to 523B4 plug or to receptacle in 630A4 connecting block.

- (1) Begin with slight engagement of plug in receptacle.
- (2) Raise set (with plug slightly engaged) and push toward wall to engage studs in corresponding holes in base of set. (The plug will slide up and down in the base of the set.)
- (3) Pull set downward until firmly seated. (A snap should be felt.)
- (4) Gently tug on the top and then on the bottom of the set. If one of the studs is not engaged, that end of the set will move away from the wall. In that case, remove the set and repeat the procedure.

### 8. CORD DRESSING FOR OPTIONAL SERVICES (ADJUNCTS)

**8.01** Knockouts are provided in the bottom rear of the lower housing (Fig. 13), to accommodate the additional cords associated with the connections of wiring options such as speakerphone, SPOKESMAN® service, etc.

- (a) For small cords it is necessary to remove only the vertical portion of the knockouts on the rear of the housing.
- (b) For larger cords and connectors, the remainder of the knockout should be removed.



**Fig. 14—Bottom of Set With Lower Housing Removed Showing an Adjunct Cord Dressed Across Power Supply Board (PSB)**

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**8.02** Strain relief for optional cordage may be obtained by using any of the six screws used to fasten the power supply board to the bottom of the chassis (Fig. 14). Proper precautions must be taken so that the stay band and hooks do not short any circuit paths. Insulating tape should be placed around the cord and stay band and also applied to the power supply board under the cord (Fig. 14).

**8.03** A rectangular cutout at the right front edge of the power supply board provides access for dressing individual spade-tipped leads to the appropriate screw terminals on the power supply circuit board (Fig. 14).

TABLE B

## OPTIONS

OPTION		ADDITIONAL ITEMS REQUIRED		CONNECTION PER	
				FIG.	TABLE
Selective Ringing†					C
Tip Party Identification					C
A-Lead Control					C
Conversion to Wall Mounted Telephone Set		523B4 Plug‡		12 & 16 B	
		630A4 Connecting Blk			
Speakerphone	3B	760A Loudspeaker		17	E
		666B Transmitter		17	E
		Control Unit	55A*	17	E
			55B	17	E
		2012B (MD) or 2012D Transformer		17	E
		D6AD-87 Cord		17	E
	4A	108-Type Loudspeaker		18	F
		680-Type Transmitter		18	F
		223D Adapter		18	F
		85B1 Power Unit		18	F
Multiline Service		6040/6050-Type Key And Inter- face Cord (Min. of 6 Conductors)		19	
Record Disable Only		D-180812 Kit of Parts (See Note)		7, 8, & 13	D
Record Disable and Dial Intermix					
Amplifier-Type Handset		G6BM, G7BM, or G8BM Handset and D-180851 Kit of Parts			
Acoustic or Inductive Coupling to Customer Provided Equipment		G15A Handset and D-180851 Kit of Parts			

\* Modified for TOUCH-TONE® service.

† For selective ringing with superimposed ringing current, refer to Note 1 of Table C.

‡ Provided with set and taped inside lower housing.

*Note:* Telephone set must be equipped with a 960B Memory when these kits are used.

◆ TABLE C ◆

**CONNECTIONS – 2960A01M TELEPHONE SET FOR  
RINGER OR A-LEAD CONTROL OPTIONS**

OPTION		LEAD		REMOVE FROM PSB TERM.	CONNECT TO PSB TERM.	REMARKS			
		DESIG.	COLOR						
Selective Ringing (Note 1)	Ring Party	Ringer	BK	7	1	Ringing current from ring to Grd			
	Tip Party	Ringer	BK	7	1	Ringing current from Tip to Grd			
		Mtg Cord Jack	G	7	6				
			R	6	7				
Tip Party with Identification Ground		Ringer Leads	BK	7	1	Ringing current from Tip to Grd			
			S†	*	6				
			S-R	*	*				
		Mtg Cord Jack	G	7	5				
			R	6	7				
		Spade Tip Leads on PSB	BL	6	10				
			BK	11	9				
			G	*	11				
		A-Lead Control (Notes 2 and 3)		Mtg Cord Jack	Y				
BK	*				9	A			
Shield	BK			1	5	Sets manufactured prior to Nov. 1979			

**Note 1:** For 4-party full selective or 8-party semiselective, one of the following must be provided:

- (a) 426N diode. For connections, Refer to Section 501-320-100.
- (b) 11-type extender (MD) or 28A ringer isolator. These may also be used to extend the range of selective ringing and/or provide ringer isolation on all lines using grounded ringers. Refer to Section 501-322-101 for connection information using 11-type extender, or Section 501-375-101 for connection information using 28A isolator.

**Note 2:** No ringer option available (factory wired bridged ringer only) when A lead control option is used.

**Note 3:** Sets manufactured or repaired after October, 1979 have a black (BK) shield lead on terminal 16. Lead should not be removed for A lead control unless severe static electricity is encountered (see Reads in paragraph 3.02).

\* Insulated and stored.

† Approximately 2600 ohm identification ground only.



TABLE D

## CONNECTIONS FOR D-180812 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 (NOTE 2)
LND-LK	BK	*	27-LNK-LK
VDD	R	29-VDD	29-VDD
RCD-LK	BK	28	28-RCD-LK

\* Insulate and store.

*Note 1:* These are single pin connectors attached to the switch leads. There are 2 (BK) leads and 1 (R) lead. The (BK) leads are interchangeable.

*Note 2:* When this option is provided, the LAST NUMBER DIALED (LND) feature is disabled and the 16th memory may be used as any other memory.

TABLE E

**CONNECTIONS – 2960A01M TELEPHONE SET WITH  
3B (MD) SPEAKERPHONE SYSTEM**

APPARATUS	CORD OR WIRE	LEAD		CONNECT		
				FROM	TO	
		DESIG.	COLOR	PSB TERM.	CONTROL UNIT (NOTE 2)	
					55A* (NOTE 1)	55B
2960A01M Tel Set	D6AD-87 Cord	R1	BL-W	6	28	10
		T1	W-BL	7	19	1
		LK	G-W	10	11	35
		A1	O-W	5	12	2
		AG	W-G	9	5	11
			W-O	*	*	*
666B Trmtr	T7A Mtg. Cord	M1	S-BK		4	7
		P1	BL-R		13	8
		—15V	BK-S		14	16
		S	O-BK		3	18
		A1	Y-O		29	19
		F1	G-Y		2	17
		LK	BK-O		11	35
760A LSPK	R2FK-87 Mtg. Cord	SP1	R		33†	29†
		SP2	G		34	20
2012B Trnsf	D-Station Wire	AC1			27	27
		AC2			36	36

**Notes:**

1. 55A\* control unit modified by Western Electric for use with TOUCH-TONE dial equipped telephone sets.
2. Strap terminals 20 and 22 (55A\*) or 4 and 5 (55B). (See Fig. 17 for block diagram of interface.)

\* Insulate and store.

† To reduce loudspeaker volume, move SP1 lead to terminal 24 (55A\*) or 30 (55B).

TABLE F

**CONNECTIONS – 2960A01M TELEPHONE SET  
WITH 4A SPEAKERPHONE**

APPARATUS	CORDS (SEE NOTE)	LEAD		CONNECT TO
		DESIG.	COLOR	
2960A01M Tel Set	M16H Cord	AC	R-G	*
		AC	G-R	*
		LK	O-W	PSB-10
		Spare	O-R	*
		Spare	R-O	*
		K5M	BR-W	*
		IT	W-G	*
		IR	G-W	*
		T1	W-BL	PSB-7
		R1	BL-W	PSB-6
		K4C	S-W	*
		K5C	W-S	*
		K4B	BL-R	*
		K5B	R-BL	*
		AG	W-O	PSB-9
		A1	W-BR	PSB-5
680-Type Trmtr	D8S-87 Mtg. Cord			
108-Type LSPK	D20N-87 Mtg. Cord			
85B1 Power Unit	M2FG Cord	AC	BK	3
		AC	Y	4

**Note:** All cords plug into 223D adapter. (See Fig. 18 for block diagram of interface.)

\* Insulate and store

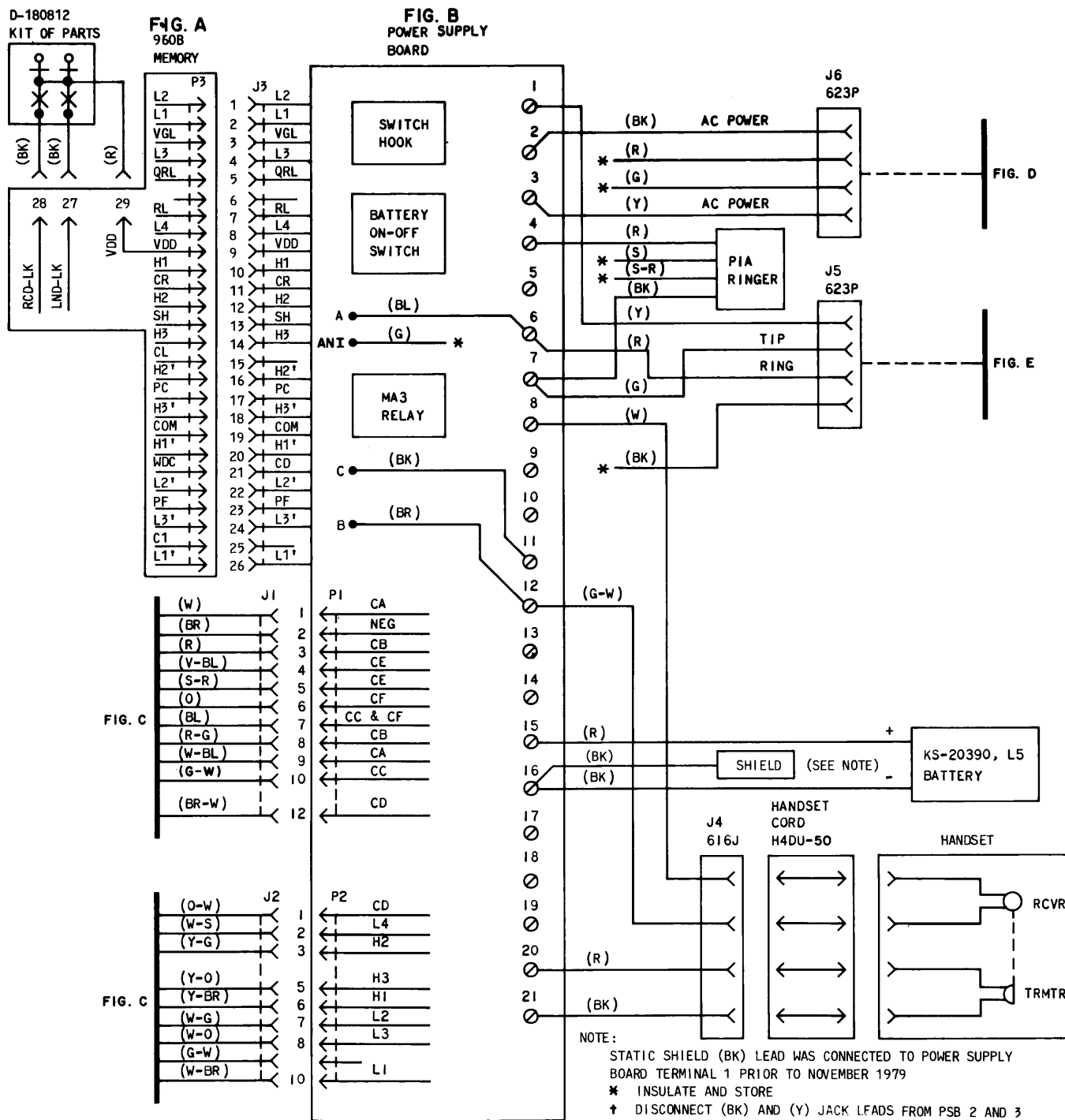
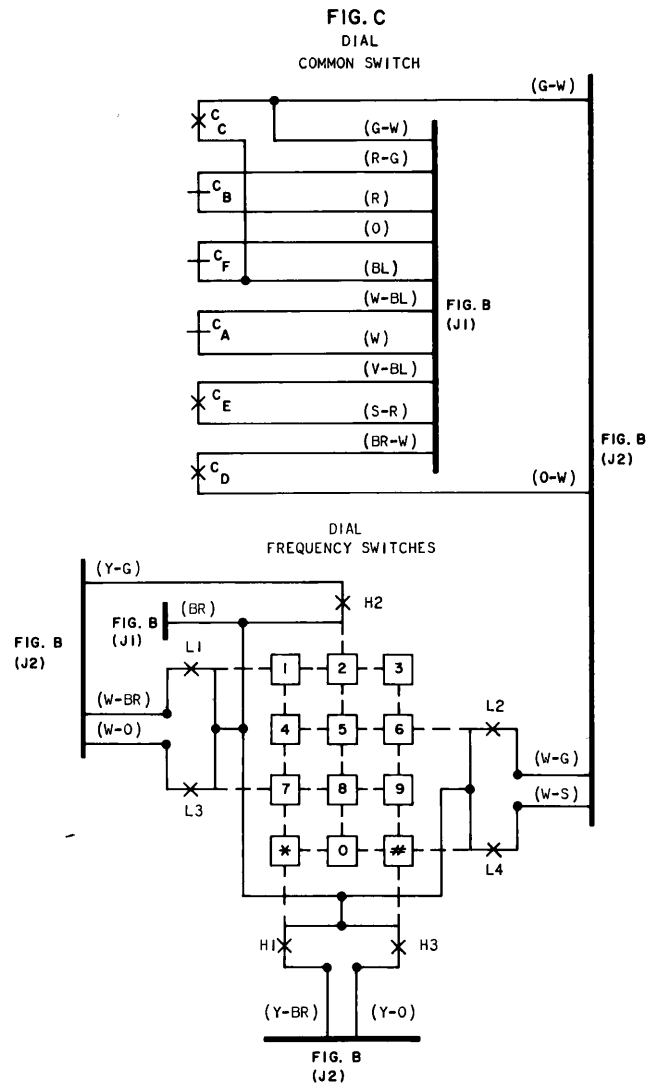


Fig. 15—2960A01M Telephone Set, Connections (Sheet 1 of 3)



**Fig. 15—2960A01M Telephone Set, Connections (Sheet 2 of 3)**

FIG. D  
POWER CONNECTIONS

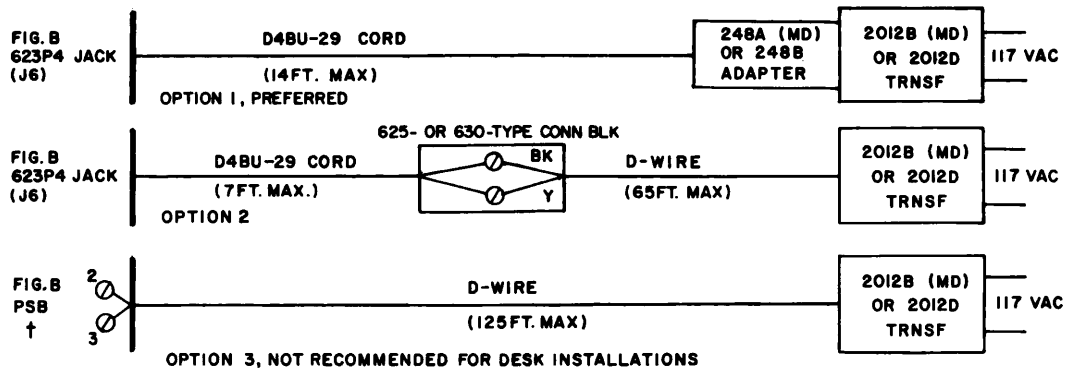


FIG. E  
LINE CONNECTIONS

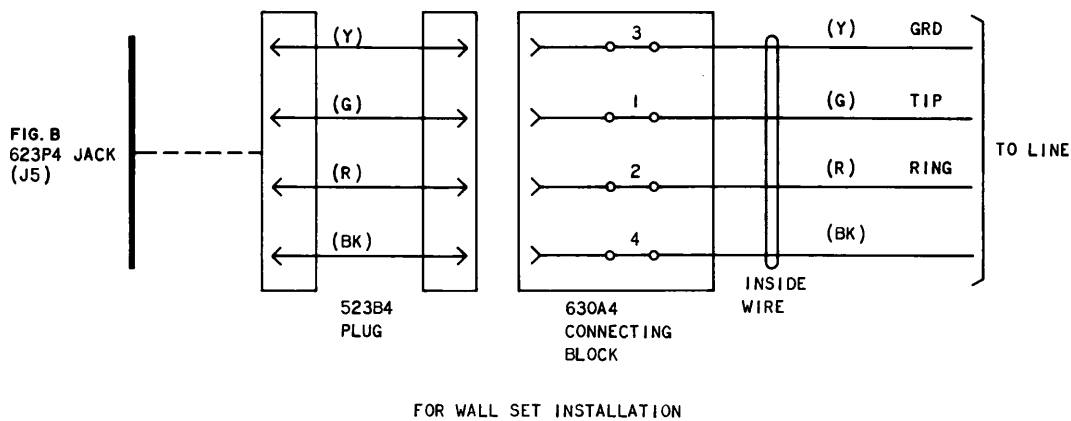
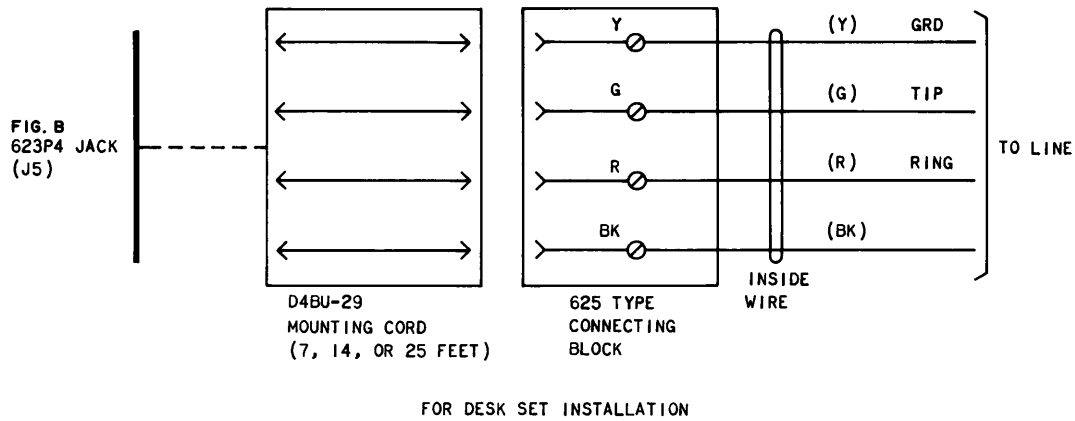


Fig. 15—2960A01M Telephone Set, Connections (Sheet 3 of 3)



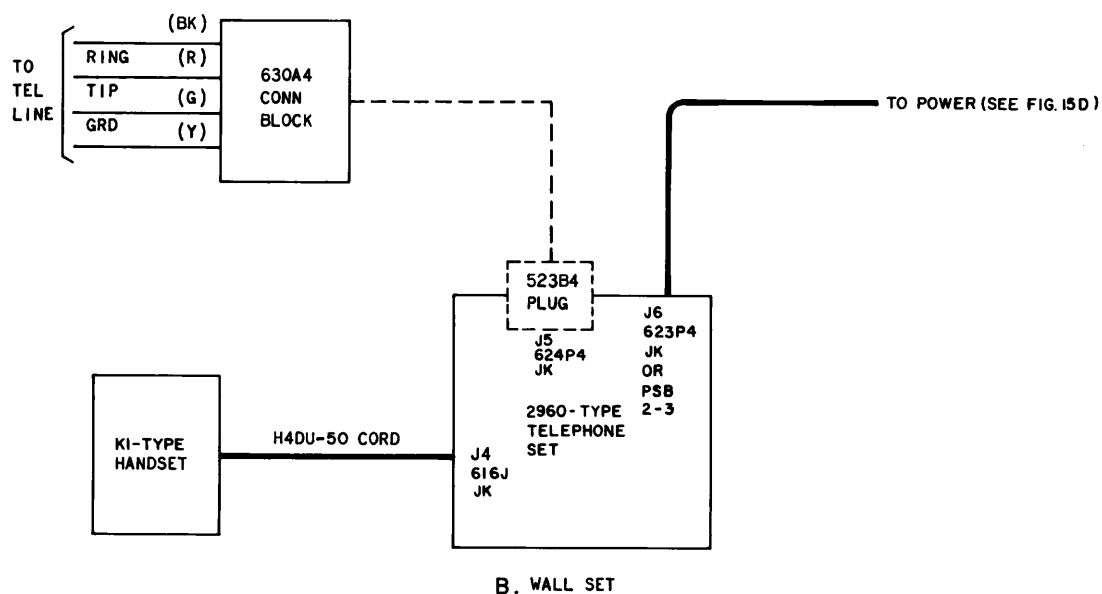
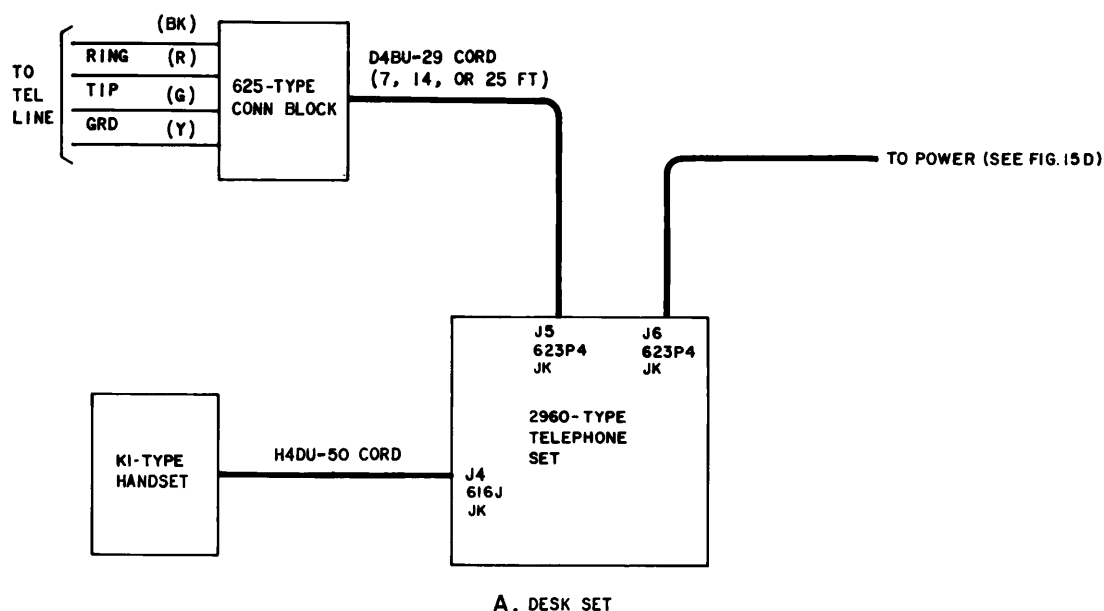
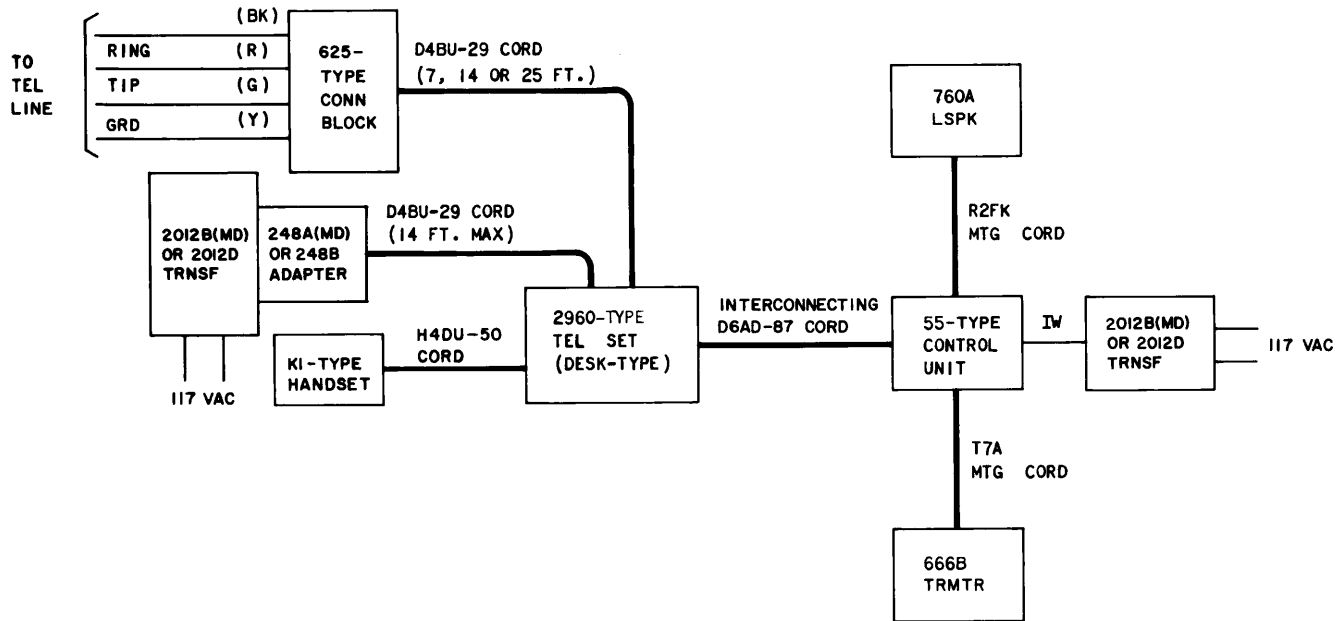
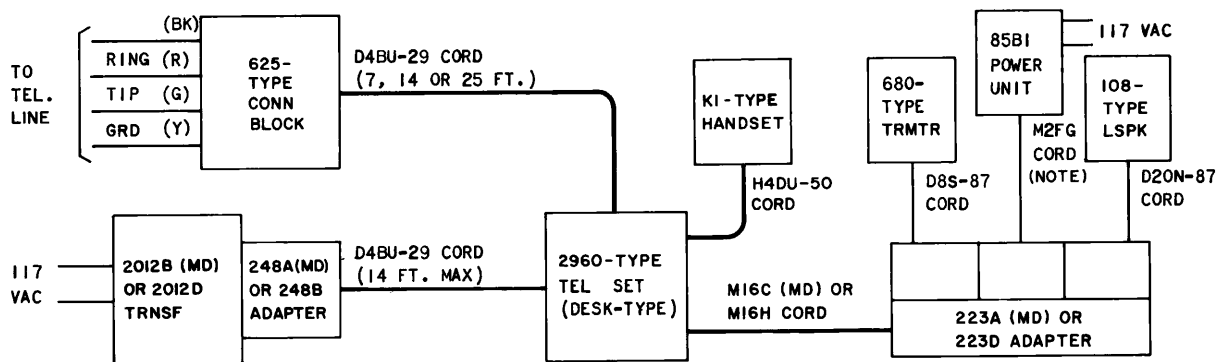


Fig. 16—Block Diagram—2960A01M Telephone Set, Desk- and Wall-Type

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**Fig. 17—Block Diagram—2960A01M Telephone Set With 3B (MD) Speakerphone**



NOTE:  
(R) AND (G) CONDUCTORS ARE NOT TERMINATED IN PLUG OF M2FG CORD.  
ONLY (BK) AND (Y) ARE USED.

**Fig. 18—Block Diagram—2960A01M Telephone Set With 4A Speakerphone**

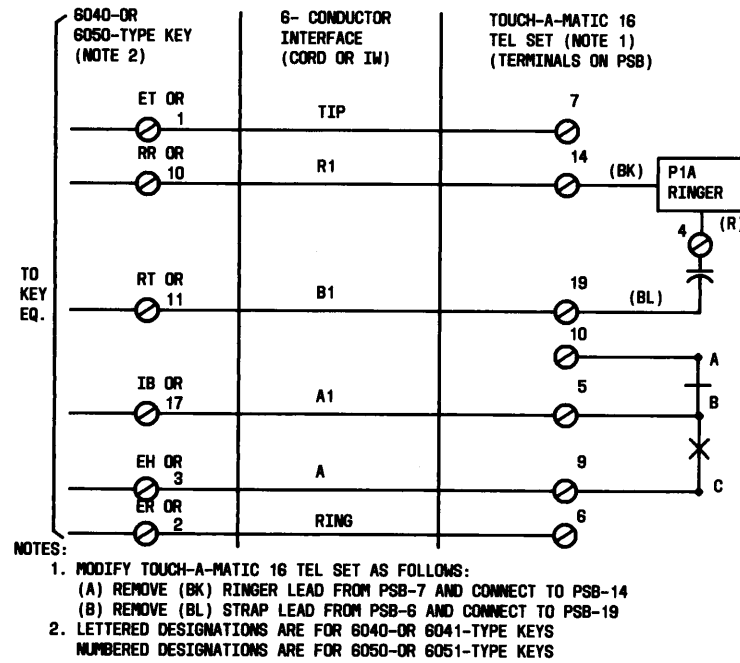
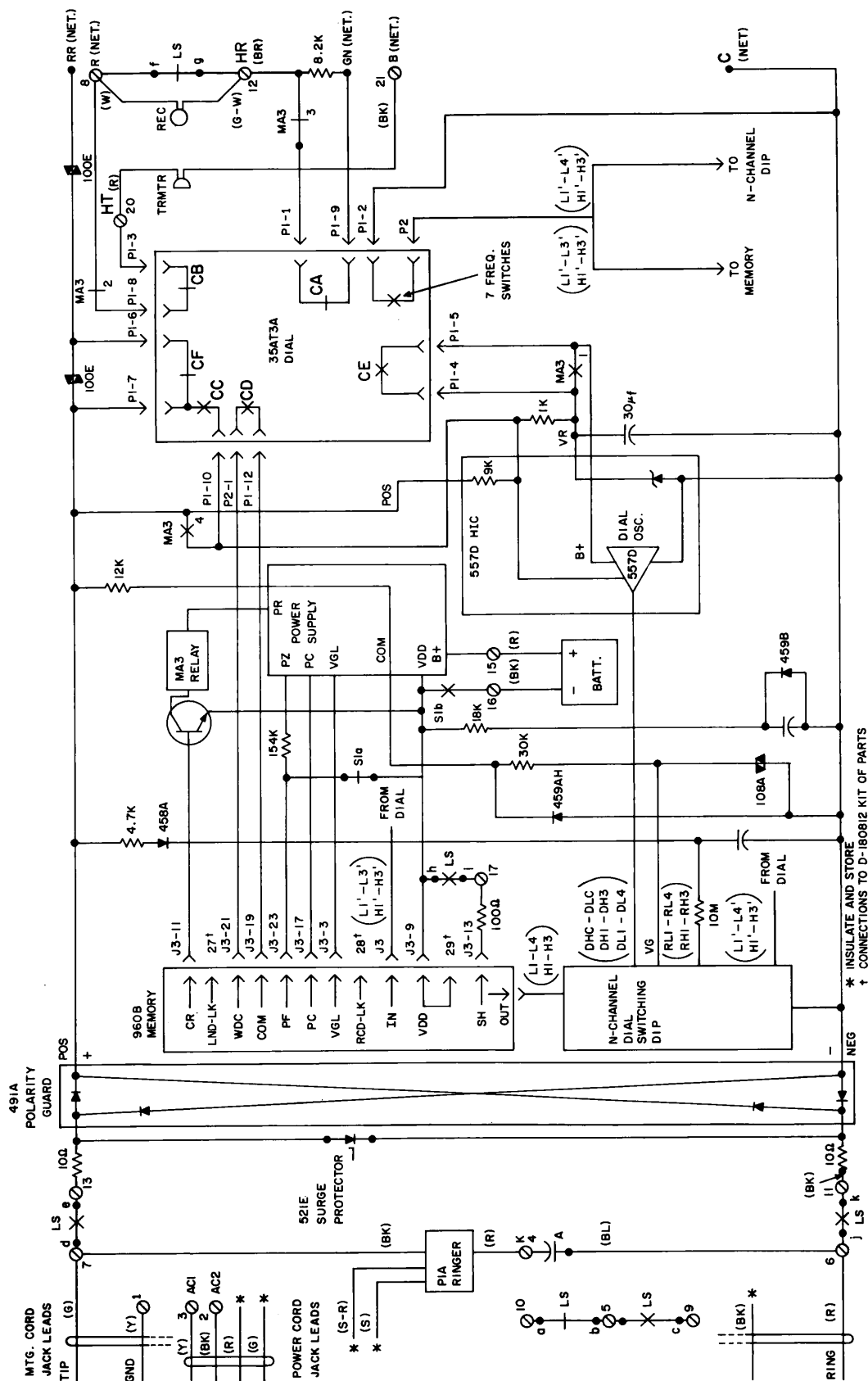


Fig. 19—Connections from Telephone Set to 6040/6050—Type Key



**Fig. 20—2960A01M Telephone Set, Partial Functional Schematic**

♦TABLE G♦

## TROUBLE ANALYSIS – 2960A01M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
1	Dead set	RECORD lamp does not turn on when RECORD button is depressed	Mounting and power cords reversed in jacks	Plug cords into proper jacks
			D4BU-29 mounting cord improperly inserted at set or connecting block.	Check mounting cord insertion at set and connecting block.
			Bad connection between handset and telephone set	1. Check handset cord connections 2. Check handset jack connections
			Defective handset	Replace handset
		With strap lead between screw terminals 7 and 13 and/or 6 and 11 on PSB, dial tone is present	Defective line switch contacts	Replace telephone set
2	Cannot transmit when off-hook		Unknown	Replace telephone set
			Bad connection	Check handset, handset cord, and handset jack connections
		Can transmit properly with a temporary strap lead between screw terminals 8 and 20 on PSB	Defective transmitter	Replace handset
			Defective contacts on 35AT3A dial	Replace 35AT3A dial
			Unknown	Replace telephone set
3	Cannot receive when off-hook		Bad connection	Check handset, handset cord, and handset jack connections
			Defective receiver	Replace handset
		Can receive properly with temporary strap lead between screw terminals 12 and 21 on PSB	Defective contacts on 35AT3A dial	Replace 35AT3A dial
			Unknown	Replace telephone set
4	Cannot manually dial when off-hook	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
		No audible TOUCH-TONE signal present	Dial connectors not properly inserted	1. Check connector insertion 2. Replace 35AT3A dial
			Defective dialing circuits on PSB	Replace telephone set
			Unknown	Replace telephone set

◆ TABLE G (Contd) ◆

## TROUBLE ANALYSIS – 2960A01M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
5	Cannot manually dial some digits when off-hook		Open or loose. leads to dial contacts	Check for proper insertion of leads into 10-position dial connector
			Defective frequency contacts on 35AT3A dial	Replace 35AT3A dial
			Defective dialing circuits on PSB	Replace telephone set
			Unknown	Replace telephone set
6	Cannot manually dial off-hook without ac power	Can manually dial off-hook with ac power on	Open path on PSB	Replace telephone set
7	RECORD lamp does not function properly	RECORD lamp does not turn on when RECORD button is depressed	Switch of D-180812 Kit of Parts in ON position	Change switch position to OFF
			AC power not present	Check for commercial power
			D4BU-29 power cord cord improperly inserted	Check cord insertion at set and at 248A or 248B adapter
			2012B or 2012D transformer not plugged in or defective	Check or replace 2012B or 2012D transformer. (Should read 13.4 to 18 Vac across screw terminals 2 and 3 on PSB)
			RECORD OFF button stuck down	Clear stuck button
			Battery switch OFF	Place switch to ON
			Defective lamp or lamp driver circuit	Replace memory assembly
			Unknown	Replace telephone set
		Lamp turns off when any memory button is depressed or Lamp does not momentarily turn off when a dial button is depressed	Defective Memory logic	Replace Memory assembly
			Unknown	Replace telephone set
8	Cannot record into Memory	RECORD lamp momentarily flashes when RECORD button is depressed	Stuck RECORD OFF button	Check RECORD OFF button
9	Cannot record properly into the 15 memory positions or into the LAST NUMBER DIALED position	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 35AT3A dial
			Defective Memory logic	Replace Memory assembly
			Open circuit on PSB	Replace telephone set



◆ TABLE G (Contd) ◆

## TROUBLE ANALYSIS – 2960A01M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
10	Cannot dial properly from Memory		Did not record properly	1. Record per 5.01 2. See trouble No. 7
		MA3 relay does not operate (no clicking sound heard) when memory button is depressed. No audible TOUCH-TONE signal present	Defective Memory logic	Replace Memory assembly
			Open circuit in power path	Replace telephone set
			Defective line switch h-i contacts	
		MA3 relay operates (clicking sound heard) but holds for less than 0.1 second for a 15 digit number	Incorrect dial sequence	Replace 35AT3A dial
		No audible TOUCH-TONE signal present		
		Audible gap in train of digits being dialed.		
		No digits or random digits in memory	An ac power outage for 16 hours or longer	Reestablish ac power and rerecord numbers into Memory
			Disconnected battery leads or defective battery	1. Check KS-20390L5 battery connections 2. Allow the battery to be charged for a minimum of 5 minutes. Then momentarily remove the 2012B or 2012D transformer from the ac power outlet and reinsert. 3. If previously stored numbers are not dialed from Memory, replace the battery 4. Repeat procedure
			Defective power supply circuit	Replace telephone set
11	All memory dialing functions are inoperative	RECORD lamp is on	RECORD ON button stuck down	Clear stuck button
		Can manually dial off-hook with ac power on or off	RECORD OFF or Memory button stuck down	Clear stuck button
			Battery switch off	Place switch to ON
			Defective Memory logic	Replace Memory assembly
			Unknown	Replace telephone set

◆ TABLE G (Contd) ◆

## TROUBLE ANALYSIS – 2960A01M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
12	Ringer does not operate	Operates with adjust level in HIGH position	Marginal operation with adjust lever in LOW position	Replace lever position
			Ringer lower limit stop screw removed	Replace lower limit stop screw in ringer
		Does not operate with adjust level in HIGH position	Open ringer leads	Check ringer lead connections
			Defective ringer	Replace ringer
13	Noisy Line	Hum on line when set is off-hook	One side of ac power to set is grounded	1. Check connections to PSB terminals 2 and 3 2. If IW is used to run power from 2012B or 2012D to PSB terminals 2 and 3, check for unwanted ground
			Defective power supply circuit	Replace telephone set
			Unknown	Replace telephone set
14	Reach wrong numbers when dialing from Memory locations (Numbers are not the same as were recorded)	Number can be rerecorded and dialing from Memory is proper	Improperly connected or defective (BK) lead from shield	Check lead and connection. (Lead must be connected to terminal 16 or GRD)
				Replace shield
			Improperly connected or defective (Y) lead from mounting cord jack J5	Check lead and connections — Must be connected to Grd *
				Replace jack J5
			Defective D4BU mounting cord	Replace cord
15	Electro-magnetic interference (EMI) Radio Frequency Interference (RFI)	Radio station heard in handset	( Y ) lead at connecting block not connected to earth ground	Check connections and insure that (Y) lead is dedicated as earth ground *
			Black shield lead connected to terminal 16	Move black shield lead to terminal 1 *
			Inductive coupling in cable	Change cable pair

\* Yellow (Y) lead does not have to be connected to ground on sets manufactured or repaired after October 1979 except where radio frequency interference or severe static electricity is encountered (see Read paragraph 3.02).