870A1M AND 870A2M TELEPHONE SETS

TOUCH-A-MATIC® AUTOMATIC DIALER

NOTICE

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1. GENERAL

1.01 This section contains identification, installation, connections, and maintenance information for the 870A1M (MD) or 870A2M telephone set (Fig. 1)

1.02 This section is reissued to:

- Add D-180818 Kit of Parts

- Show 870A2-87 faceplate MD

- Add 870B1-type faceplates

- Add 870A1U upper housing

- Revise Table H.

Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The 870A1M (MD) telephone set equipped with D6AD mounting cord or 870A2M telephone set equipped with 623P6 jack assembly is factory-wired for bridged or individual ringing. Mounting cord conductors provide for tip, ring, ac power (870A1M), and A-lead control for 1A1, 1A2, or 6A key telephone systems (KTS).

Caution: Telephone sets are factory-wired for A-lead control. If set is installed in a location where dial-light service is provided the A and A1 leads must be disconnected, insulated,
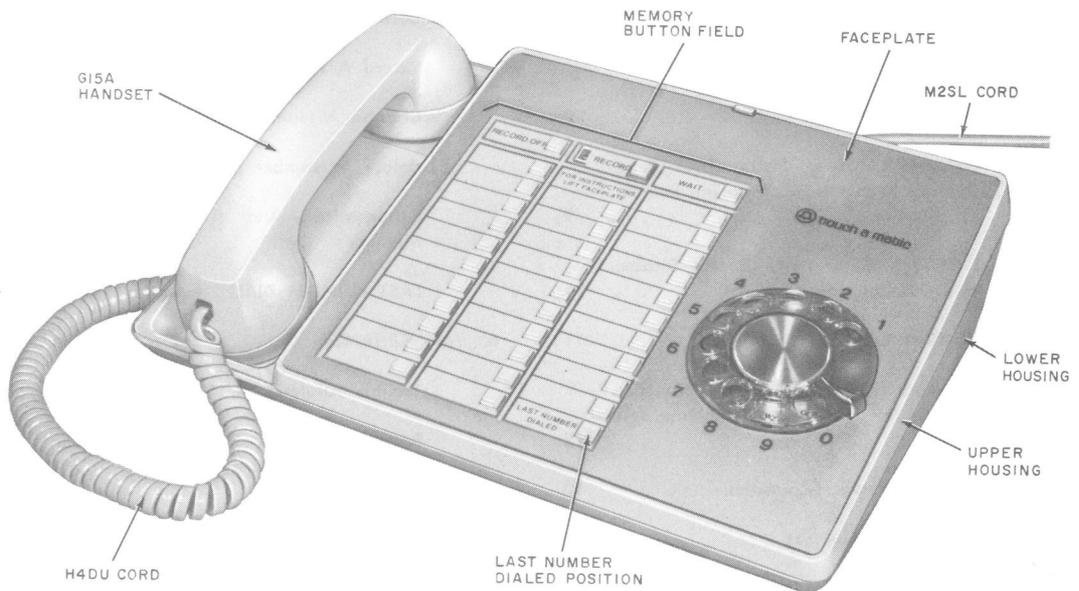

Fig. 1—870A2M Telephone Set

and stored at the connecting block to prevent shorting out dial light transformer.

1.04 The 870A2M telephone set is shipped with a modular 623P6 mounting cord jack assembly, M2SL-87 power cord, and 95B-type power unit installed.

1.05 The 870A1M telephone set is field convertible to modular.

1.06 The telephone sets are available in the following colors:

- Black (-03)

- Green (-51)

- White (-58)

- Lt. Beige (-60)

1.07 The 870B1-type faceplates are available in the following colors:

- Teak Woodgrain (-108)

- Walnut Woodgrain (-109)

- Matte Aluminum (-122)

1.08 The 870A2 (MD) faceplate is available in satin-silver (-87) only.

2. IDENTIFICATION

2.01 The 870A1M or 870A2M telephone set provides all standard features of a normal single line telephone set plus automatic dialing of 31 frequently called numbers, and a LAST NUMBER DIALED *scratch pad* memory.

2.02 *Design Features:*

- Modular telephone set, 870A2M (870A1M is convertible to modular)

- 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

- Plug-in battery

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

2.03 *Optional Features (Refer to Table A):*

- Decorative Faceplate

- Speakerphone—either 3B (MD) or 4A speakerphone system may be added to stations

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

- One-Touch Calling, (requires both Dial Tone Detector and speakerphone)—depressing one memory button will automatically turn on speakerphone, detect dial tone, and dial complete number

Note: All dial tones encountered in the process of placing a call must be precise TOUCH-TONE dial tone (350 Hz and 440 Hz) if the call is to be completed automatically.

- Record Disable: turns off the recording feature to prevent accidental erasures of previously stored numbers

- Dial Intermix: same as record disable feature plus.

  (a) Allows digits dialed from manual dial and from memory to be entermixed without having to depress the RECORD OFF button.

  (b) Disables the LAST NUMBER DIALED feature, and allows that memory position to be used as any other one.

- Plug-ended mounting cord (870A1M)

- KS-20419L1 buzzer

- Amplifying handset

- Head telephone set operation

- End-to-end signaling using 1035C3A (MD) or 1035AF3A Dial Adjunct (Section 501-164-130).

2.04 All options are implemented by:

- Wiring changes in the telephone set

- Installation of appropriate additional items.

2.05 Ordering Guide.

(a) The 870A2M (modular) telephone set may be ordered complete and ready to install as:

- Set, Telephone, 870A2M-* E/W 870B1-122 faceplate

(b) **Ordered Separately:**

- Unit, Power, 95B1 or 95B2 (870A1M)

Note: A 95B-type power unit is required for each telephone set.

- Cord, Mounting, D4BU-29 or D6AM-87 (870A2M).

(c) **Modular Components:**

(1) The 870A2M telephone set may also be ordered in its component parts as follows:

- Housing, 870A1-*

- Housing, Upper, 870A1U-* (used with 870B1 faceplate)

- Faceplate, 870B1-122 (matte aluminum)

- Handset, G15A-*

- Cord, Handset, H4DU-*

- Base, Telephone Set, 870A2M includes the following:

Dial, 8EA-119

Ringer, P1B

Network

Battery, KS-20390L2 or KS-20390L4

Jack, Handset, 616B

Jack, Mounting Cord, 623P6 (870A2M only)

Cord, Power, M2SL-87 [(7-foot) 870A2M only]

Unit, Power, 95B1 or 95B2 (870A2M only)

Memory, 870B

840393672 Directory Sheet Set

Subscriber Instruction Booklet, SIB-2455B

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

- Faceplate, 870B1-

  (a) Teak Woodgrain (-108)

  (b) Walnut Woodgrain (-109)

Note: If set is equipped with older 870A1 or 870A2 faceplate, then an upper housing of the appropriate color must be ordered.

- Kit of Parts, D-180568 (must be used for speakerphone service)

- Kit of Parts, D-180493 (Dial Tone Detector and One-Touch Calling switch)

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

Note: This kit of parts may be used only with sets equipped with an 870B Memory.

- Cord, Mounting, D4BU-29 or D6AM-87 (870A1M, conversion to modular)

- Jack, Mounting, 623P6 (870A1M, conversion to modular)

- Cord, Power, M2SL-87, 7-foot (separate power cord for 870A1M)

- Buzzer, KS-20419L1

- Handset, Amplifying (G6-*, G7-*, or G8-*type)

TABLE A

OPTIONS

OPTION		ADDITIONAL ITEMS REQUIRED	CONNECTION PER	
			FIG.	TABLE
Speakerphone	4A	108-type Loudspeaker	9	D, E
		680-type Transmitter	9	D, E
		223D Adapter	9	D, E
		85B1 Power Unit	9	D, E
		D-180568 Kit of Parts	7(C)	D, E
	3B	760A Loudspeaker	8	B, C
		666B Transmitter	8	B, C
		55-type Control Unit	8	B, C
		2012B Transformer	8	B, C
		D10R-87 Cord	8	B, C
		D-180568 Kit of Parts	7(C)	B, C
One-Touch Calling		D-180493 Kit of Parts	7(D,E)	C or E
		Speakerphone	7(B)	
Dial Tone Detector		D-180493 Kit of Parts	7(D)	F
Convert 870A1M to 870A2M (3.11)		623P6 Jack, D4BU Cord, M2SL Cord, 95B-Type Power Unit		
Buzzer (3.10)		KS-20419L1		
Amplifying Handsets (6.09)		G6, G7, or G8-Type Handset		
Adjunct Keys *		6040-, 6050-, or 6051-Type Key		
Decorative Faceplate (3.19)		870B1-108 (Teak Woodgrain)		
		870B1-109 (Walnut Woodgrain)		
Record Disable (3.09)		D-180818 Kit of Parts (Note)	7(A)	G
Dial Intermix (3.09)				
Head Telephone Set Operation (3.13)		Plantronics Jackset Model JS180-1 or JS180-2	Tables Provided For Plantronics Jackset	
		Desired Head Telephone Set		
End-to-End Signaling		1035C3A (MD) or 1035AF3A Dial Adjunct	Section 501-164-130	

Note: If set is equipped with 870A Memory, it must be replaced with an 870B Memory.

* When 6040-, 6050-, or 6051-type key is used in conjunction with the 870A1M telephone set, automatic dialing and recording features are not reset when switching lines. To reset the dialer, it will be necessary to go on-hook, flash the switchhook, or depress the RECORD OFF button after termination of each call. If 6-button key service is desired it is recommended that the 872A1M telephone set be used because the reset function is automatically provided.

• Set, Head Telephone [using Plantronics Jackset Model JS180-1 (2-foot cord) or JS180-2 (7-foot cord)].

*Add appropriate color suffix (1.06 or 1.07).

2.06 ***Operating Features (Fig. 1).***

• 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.

- 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) are required].

3. INSTALLATION

STANDARD INSTALLATION

3.01 Make all wiring changes and optional modifications (Table A) before external connections are made to the set (Fig. 7).

> *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 set is opened.*

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

> *Note:* Write date of battery installation on label provided (Fig. 5).

3.03 *Power Unit Connections.*

(1) For the 870A2M telephone set, the 95B-type power unit is factory-wired to terminals PSB-24 and PSB-25 via the M2SL-87 cord.

(2) For the 870A1M telephone set, install the 95B-type power unit within 150 feet (24 gauge conductors) of the telephone set. The power unit may be located at the equipment end of the cable and connected to the telephone set by the G-W and W-G conductors in the mounting cord. Alternatively it may be connected to terminals PSB-24 and PSB-25 by conductors separate from the mounting cord. When separate power conductors are used, disconnect, insulate and store the (G-W) and (W-G) mounting cord leads on PSB terminals 24 and 25.

> *Note:* The 95B-type unit must be located no closer than 1-1/2 feet from the telephone set in order to prevent a noise problem.

(3) 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.

> *Danger: Securely attach 841050818 or similar 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 outlet before attempting to attach or remove the clamp. Do not use 841050818 or similar retaining clamp on outlets where center mounting screw holds the duplex outlet in the box.*

3.04 The station number card shall be placed in the plastic fingerwheel of the dial. The silver disc provided with the dial shall be retained under the number card.

3.05 The directory sheets (Fig. 2) fit over the buttons of the Memory and are held in place by the faceplate. Additional sheets are available in the directory sheet set, 840393672.

Installation Check Procedure

3.06 Check telephone set installation per the following tests (refer to Part 5 for operation).

POWER UNIT

POWER CORD

COVER

INSTRUCTION LABEL

8-TYPE DIAL

COVER SCREW

SWITCHHOOK PLUNGER

CRADLE

DIRECTORY SHEET SET 840593675

DIRECTORY SHEET

RECORD OFF

RECORD

WAIT

FOR INSTRUCTIONS LIFT FACEPLATE

LAST NUMBER DIALED

DETAIL REMOVE WHEN D-180493 OR D-180818 KIT OF PARTS IS INSTALLED
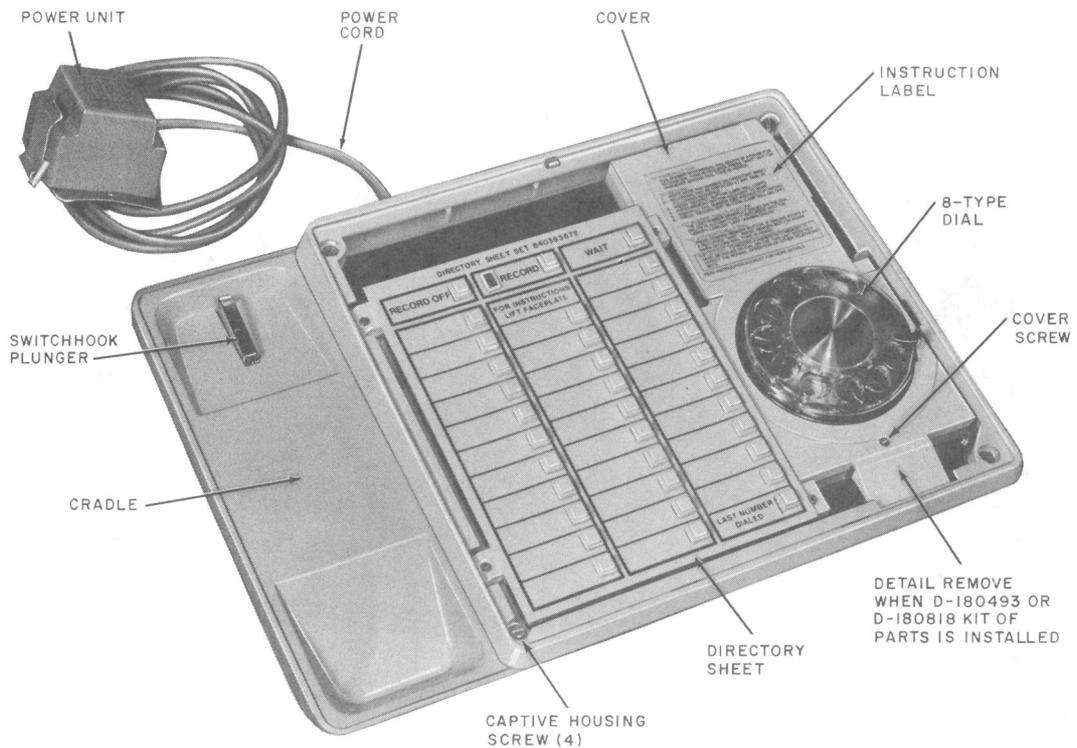
CAPTIVE HOUSING SCREW (4)

Fig. 2—870A2M Telephone Set—Faceplate and Handset Removed

In case of failure, refer to Trouble Analysis, Table H.

(1) Disconnect the power unit and manually dial a known telephone number to check that the telephone operates correctly in the absence of commercial power.

(2) Reconnect the power unit to ac outlet.

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

(4) Automatically dial the telephone numbers stored in Step (3) 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.

Note: The set should stop dialing if it reaches a stored WAIT input. Depress the memory button again and the remaining digits should be dialed.

(5) Go off-hook and simultaneously manually dial and record a known telephone number into memory location immediately above LAST NUMBER DIALED [5.01 (4) through (7)].

(6) Momentarily hang up handset and automatically dial the number recorded in Step (5) and verify that it is correct.

SWITCHHOOK ASSEMBLY | TERMINAL BOARD | MEMORY | TERMINAL POSTS FOR D-180818 KIT OF PARTS

ATTACH STAYBAND OF NONMODULAR HANDSET CORD | BUZZER MOUNTING BRACKET | BATTERY JACK | POWER SUPPLY CONNECTOR
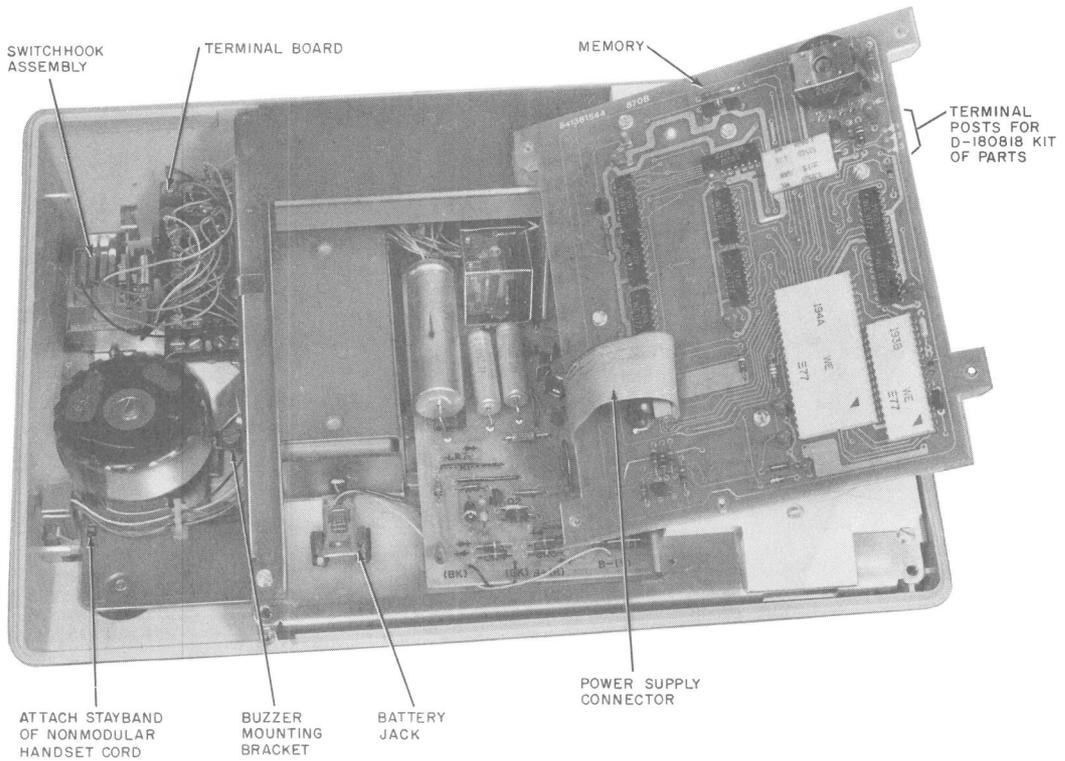
Fig. 3—870A2M Telephone Set—Internal View

(7) Go off-hook, manually dial a known telephone number with a *wait* input inserted in the number.

(8) Automatically dial the number by depressing the LAST NUMBER DIALED button.

Note: The set should stop dialing at the stored WAIT input. Depress the LAST NUMBER DIALED button again and the remaining digits should be dialed.

The battery and the power unit must be connected a minimum of five minutes before doing Step (9).

(9) 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 (3). Verify that the correct telephone number is dialed out.

(10) Dial the appropriate code for ring-back to test the ringer.

(11) If equipped with one-touch calling option (D-180493 Kit of Parts and speakerphone), and with set in on-hook condition, depress the memory button used in Step (5). The speakerphone should turn on, dial tone should automatically be detected, and the stored number should be automatically dialed.
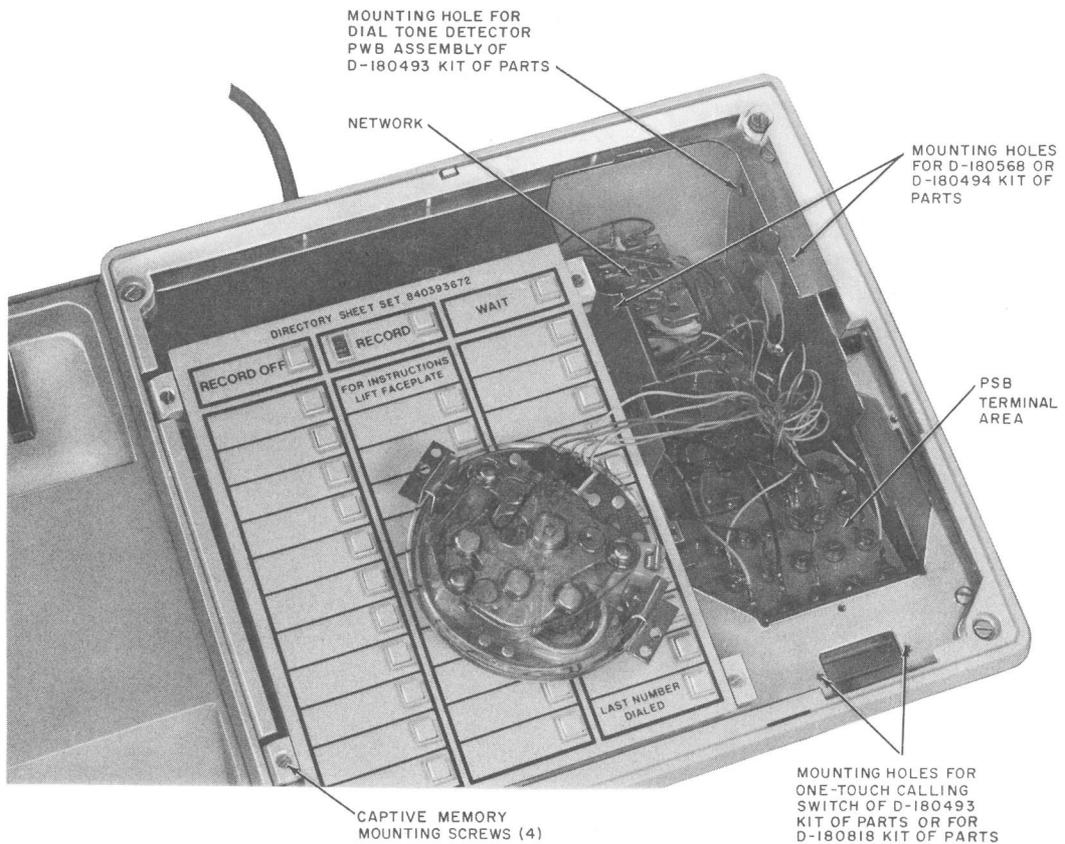
Fig. 4—870A2M Telephone Set—Dial Removed to Show Terminal Area

OPTIONAL APPARATUS INSTALLATION

D-180568 Kit of Parts (Speakerphone)

3.07 To install.

(1) Proceed as described in 3.18.

(2) Make connections per appropriate Table B, C, D, or E.

(3) Mount the kit assembly to the chassis with the screws provided (Fig. 4). Beveled corner of the printed wiring board (PWB) should be at lower right corner.

D-180493 Kit of Parts (Dial Tone Detector and One-Touch Calling Switch)

3.08 To install.

(1) Remove the housing (3.21), and access PSB terminal board (3.18).

(2) Insert the board assembly from the back of the set and locate as shown in Fig. 4, such that the two tabs on the board assembly fit into the slots in the chassis.

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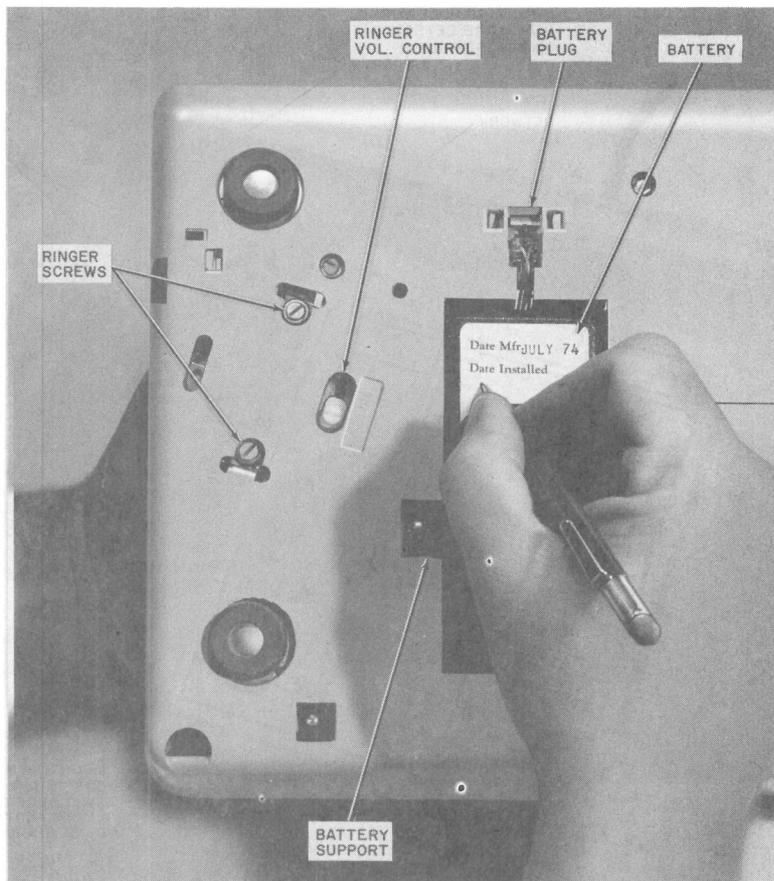
Fig. 5—Telephone Set, Bottom View

(3) Lock the board into position by inserting the accompanying self-threading screw through the right side of the chassis.

(4) Mount the one-touch calling switch below the dial with the two screws provided.

Note: If switch for D-180818 Kit of Parts is already present, the one-touch calling switch cannot be installed. The PSB terminals to which the switch leads should be connected (Tables C and E) shall be strapped together.

(The one-touch calling option **cannot be turned off** by the subscriber.)

(5) Make connections per Table C, E, or F.

(6) Break off the detail at the bottom of the cover (Fig. 2) and trim edge as required.

(7) Verify correct operation of option.

(8) Reassemble set.

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

3.09 To install.

(1) Remove faceplate (3.19).

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

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

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

(5) Rotate left edge of the memory upward as shown by Fig. 3.

Note: If the set is equipped with a 870A Memory, replace it with a 870B Memory and carefully pack and return the old Memory according to local procedures.

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

Note: If the one-touch calling switch (D-180493 Kit of Parts) has been provided, it must be removed. The PSB terminals to which the switch leads were connected (Table C or E) must be strapped together. (The one-touch calling option can no longer be turned off by the subscriber.)

(7) Connect switch lead connectors to post terminals on Memory board per Table G.

(8) With feature switch in OFF position, verify that set operates in normal manner:

● Numbers can be recorded into memory

● Numbers can be changed

● Numbers can be deleted from memory

● Numbers can be automatically dialed.

(9) Set feature 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 in 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 in memory.

(c) 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 set.

KS-20419L1 Buzzer

3.10 To install.

(1) Remove faceplate (3.19) and place handset aside.

(2) Remove handset cradle (3.20).

(3) Remove screw from buzzer mounting bracket, and mount buzzer on bracket shown in Fig. 3.

(4) Connect two blue buzzer leads to TB-15 and TB-16 (Fig. 7H), and connect to external 10 volt ac circuit by changing the 623P6 jack connections as follows:

(a) With no A-lead control.

(1) Move (BK) from TB-1 to TB-15.

(2) Move (Y) from TB-2 to TB-16.

(3) Connect buzzer power to appropriate terminals of modular connecting block.

(b) With A-lead control, use D6AM-87 cord and

(1) Move (BL) from insulated and stored to TB-15.

(2) Move (W) from insulated and stored to TB-16.

(3) Connect buzzer power to appropriate terminals of modular connecting block.

(5) Reassemble set (3.20 and 3.19).

Plug-Ended Mounting Cord (for conversion of 870A1M to 870A2M telephone set)

3.11 To convert.

(1) Remove the housing (3.21) and access the PSB terminals (3.18).

(2) Remove D6AD-87 mounting cord.

(3) Install the 623P6 jack as shown in Fig. 6.

(4) Connect the spade-tipped jack leads as follows.

   (a) (R) wire to TB-4.

   (b) (G) wire to TB-8.

   (c) (Y) wire to TB-2.

   (d) (BK) wire to TB-1.

   (e) Insulate and store (BL) and (W) conductors.

(5) Connect (Y) lead of M2SL-87 cord to PSB-24 and the (BK) lead to PSB-25 and route cord through housing.

(6) Connect the cord to the 95B-type power unit.

(7) Reassemble the set.

(8) Install a 625-type connecting block.

(9) Install the D4BU mounting cord.

Optional Power Connections

3.12 In some cases it may be possible and desirable to bring ac power into the set in a nonstandard
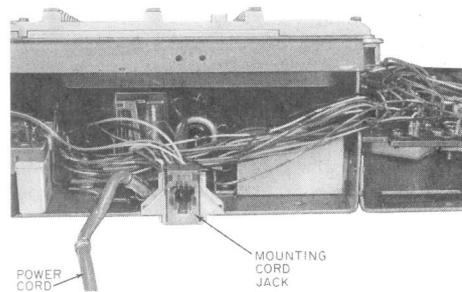
Fig. 6—870A2M Telephone Sett, Partial View

manner. The following methods are approved alternatives.

(a) *870A1M:* A M2SL-87 cord may be used to connect the 95B-type power unit to the telephone set.

(1) Remove the housing (3.21).

(2) Disconnect the (G-W) and (W-G) leads of the mounting cord from PSB-24 and PSB-25, and insulate and store.

(3) Thread the leads of the M2SL cord to the PSB area from the rear of the telephone set.

(4) Fasten the M2SL cord to the chassis by placing a No. 10-24 by 1/4-inch screw [804216471 (P-421647)] through the hole in the S-hook and into the tapped hole in the chassis located behind the 623P6 jack.

(5) Connect the (Y) lead to PSB-24 and the (BK) lead to PSB-25.

(6) Reassemble housing.

(7) Connect power unit to M2SL cord.

(b) *870A2M:* The ac power may be wired in at the connecting block and brought to the set via the mounting cord.

(1) With a D4BU-29 cord (no A-lead capability).

(a) Disconnect and remove the M2SL-87 cord.

(b) Move the (BK) jack lead from TB-1 to PSB-13 and the (Y) lead from TB-2 to PSB-16.

(c) Add strap leads from PSB-13 to PSB-24 and from PSB-16 to PSB-25.

(d) Connect the power unit to the appropriate terminals of the 625-type connecting block. Power unit shall be installed within 150 feet of telephone set using 24 AWG wire.

(2) With a D6AM-87 cord.

(a) Disconnect and remove the M2SL-87 cord.

(b) Connect the normally insulated and stored (BL) and (W) jack leads to PSB-13 and PSB-16, respectively.

(c) Add strap leads from PSB-13 to PSB-24 and from PSB-16 to PSB-25.

(d) Connect the power unit to the appropriate terminals of the 74D connecting block. Power unit shall be installed within 150 feet of telephone set using 24 AWG wire.

Head Telephone Set

3.13 To install.

(1) Remove housing (3.21).

(2) Access PSB terminal area (3.18).

(3) Remove cradle (3.20).

(4) Thread cord of jackset through hole in rear of housing and make connections per appropriate table provided for Plantronics Jackset.

(5) Reassemble telephone set.

(6) Insert head telephone set plug into jackset.

COMPONENT LOCATION AND ACCESS INFORMATION

Location of Components

3.14 The components are located in three areas as follows.

(a) Under the handset cradle (Fig. 3):

• Buzzer (optional)

• Ringer

• Switchhook assembly

• Handset jack

• Terminal board (TB).

(b) Under the faceplate, inside the set (Fig. 3 and 4):

• Battery jack (Fig. 3)

• Power supply board (PSB) terminal area (Fig. 4)

• Network (Fig. 4)

• Options (Fig. 4):

D-180568 (relay kit for speakerphone)

D-180493 (dial tone detector and one-touch calling switch kit)

D-180818 (record disable and dial intermix features kit).

(c) Bottom of telephone set (Fig. 5):

• Battery.

Mounting Cord

3.15 The D6AD-87 mounting cord (870A1M) is spade-tip ended at both ends. The conductors provide for tip, ring, ac power, and A-lead control.

3.16 The D4BU-29 plug-ended mounting cord (870A2M) conductors provided for tip, ring, and A-lead control.

Note: If two extra leads are required, a D6AM-87 cord may be used.

Network Terminals

3.17 For access to the network terminals.

(1) Remove the faceplate (3.19).

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

(3) Remove the cover.

(4) To replace the cover, the three tabs of the cover (one at the top center and one at each side just above the dial) must be aligned with holes in the chassis before the screw is refastened. Failure to do this will result in improper seating of the faceplate.

Power Supply Board (PSB) Terminals

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

(1) Remove the faceplate (3.19).

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

(3) Remove the cover.

(4) Remove the two screws that hold the dial in place.

(5) Gently raise the dial and move it aside.

(6) To reassemble; reverse procedure.

(7) To replace the cover, the three tabs of the cover (one at the top center and one at each side just above the dial) must be aligned with holes in the chassis before the screw is refastened. Failure to do this will result in improper seating of the faceplate.

Faceplate Removal

3.19 This will differ depending on faceplate being used.

(a) The 870B1-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 870B1 faceplate is not a direct replacement for the 870A2-87 faceplate. An 870A1U upper housing is also required with the 870B1 faceplate (6.10).

(b) The 870A2-87 faceplate is held in place by two snaps bonded to the faceplate and aligned to fit holes in the chassis. To remove the faceplate, grasp it by any convenient edges and lift.

Handset Cradle Removal

3.20 To remove the handset cradle from the housing, proceed as follows.

(1) Remove the faceplate (3.19), and place the handset aside.

(2) Remove upper housing, if provided [3.21(b)].

(3) Disengage the captive cradle screws located in the two tabs on the cradle.

(4) Lift the cradle by pulling up on the plunger, and remove.

(5) Replace the handset cradle by sliding it sideways to engage the clips with the mating tabs in the side of the housing.

Caution: The plunger must be held from the top side of the cradle as it is slid into position to prevent damage to the switchhook arm.

(6) Refasten the captive cradle screws.

Housing Removal

3.21 To remove, proceed as follows.

(1) *Lower housing.*

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

(2) Unplug the mounting cord (870A2M).

(3) Remove the faceplate (3.19).

(4) Remove upper housing if provided [3.21(b)].

(5) Remove the handset cradle (3.20).

Caution: Attempting to remove the housing without removing the handset cradle may damage the switchhook arm.

(6) Disengage the captive housing screws (Fig. 2) located in the extreme upper and lower edges of the chassis.

(7) Separate the housing from the telephone set base.

(8) Disconnect the 95B-type power unit from the M2SL-87 cord, if required (870A2M).

(9) Feed mounting cord through hole in bottom of housing as housing is removed.

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

(11) When replacing the housing, keep the handset jack from being trapped between the housing and chassis.

(b) *Upper housing.*

(1) Remove the faceplate (3.19).

(2) Disengage the captive housing screws located in each corner of the upper housing (Fig. 2). This will release the lower housing.

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

(4) If necessary, thread screws out of housing.

(5) To reassemble, reverse procedure.

4. CONNECTIONS

4.01 Telephone set connections are shown in Fig. 7.

4.02 Refer to Table A for connection reference for all options.

4.03 A partial functional schematic is shown in Fig. 10.

Caution: Telephone sets are factory-wired for A-lead control. If set is installed in a location where dial-light service is provided, the A and A1 leads must be disconnected, insulated, and stored at the connecting block to prevent shorting out of dial light transformer.

5. OPERATION

Record A Number Into Memory

5.01 To record.

(1) Remove the faceplate (3.19).

(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 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 D-180818 Kit of Parts, switch must be 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: If an access code and pause for second dial tone are required.

(a) Dial the access digit(s) for the outside line.

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

(c) 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 or speakerphone operation.

Change A Number In Memory

Note: If set is equipped with D-180818 Kit of Parts, switch must be in OFF position.

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

Delete A Number From Memory

Note: If set is equipped with D-180818 Kit of Parts, switch must be in OFF position.

(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.

Automatically Dial A Number From Memory

5.04 To automatically dial a number.

(a) For factory-wired sets, go off-hook, 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 the memory button again to complete automatic dialing.

(b) For sets equipped with the dial tone detector only, go off-hook, listen for dial tone, and depress the memory button.

(c) For sets equipped with the one-touch calling option (with speakerphone and dial tone detector), simply depress the memory button.

LAST NUMBER DIALED Feature

Note: If set is equipped with D-180818 Kit of Parts, and dial intermix feature is provided, the switch must be in OFF position.

5.05 The TOUCH-A-MATIC telephone set automatically records into the LAST NUMBER DIALED position (Fig. 1) any number called using the standard telephone dial. Each number in the LAST NUMBER DIALED position is automatically replaced by the next number manually dialed. 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) With no access digit(s) required.

(1) Go off-hook.

(2) Listen for dial tone.

(3) Manually dial telephone number.

(4) To redial same number automatically.

(a) For factory-wired sets, go off-hook, listen for dial tone, and depress LAST NUMBER DIALED button.

(b) For sets equipped with the dial tone detector only, go off-hook, listen for dial tone, and depress the LAST NUMBER DIALED button.

(c) For sets equipped with the one-touch calling option (with speakerphone and dial tone detector), depress the LAST NUMBER DIALED button.

(b) When an access code and pause for second dial tone are required.

(1) Go off-hook.

(2) Listen for dial tone.

(3) Dial access digit(s).

(4) Depress WAIT button after second dial tone is heard.

(5) Manually dial telephone number.

(6) To redial same number automatically.

(a) For factory-wired sets, go off-hook, listen for dial tone, and depress LAST NUMBER DIALED button. Automatic dialing will stop at the recorded *wait* input. When second dial tone is heard, depress LAST NUMBER DIALED button again to complete dialing.

(b) For sets equipped with the dial tone detector only, go off-hook, listen for dial tone, and depress the LAST NUMBER DIALED button.

(c) For sets equipped with the one-touch calling option (with speakerphone and dial tone detector), depress the LAST NUMBER DIALED button.

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.

Trouble Analysis

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

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

(2) Check for improper connections.

(3) Refer to Table H and the following paragraphs.

(4) If removal of the telephone set is required, do the following.

(a) Disconnect telephone set.

(b) Unplug the battery.

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

Caution: Failure to restrain plug can result in plug damage necessitating battery replacement.

Battery

6.03 The KS-20390L2 or L4 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) Tilt the front of the set up.

(2) Unplug the battery.

(3) Loosen captive screw on the battery support.

(4) Remove battery support.

(5) Remove battery.

(6) Install new battery.

(7) When battery has been connected at least five minutes, check memory retention by momentarily disconnecting ac power and then automatically dialing a prerecorded telephone number.

Memory

6.04 The Memory may be replaced in the following manner (Fig. 3).

Note: Removal of the Memory results in loss of the stored telephone numbers.

(1) Remove the faceplate (3.19).

(2) Loosen the four captive Memory mounting screws.

(3) Rotate the left edge of the Memory upward as shown in Fig. 3.

(4) Disengage the connector by pulling on it perpendicular to the printed wiring board.

(5) Replace the Memory. The connector is keyed; one position is filled and should fit over the vacant position in the row of pins. The cable from the connector should not be

twisted. It should form a loop as shown in Fig. 3 when connected to the board.

(6) Reassemble telephone set.

(7) Test per 3.06.

Dial

6.05 To replace.

(1) Access PSB terminal area [3.18 (1) through (5)].

(2) Disconnect dial leads and remove dial.

(3) To install a new dial, reverse the previous steps.

Ringer

6.06 To replace.

(1) Remove the faceplate (3.19) and place handset aside.

(2) Remove the upper housing, if provided [3.21(b)].

(3) Remove the cradle (3.20).

(4) Disconnect the ringer leads (Fig. 7H).

(5) Tilt the front of the set up.

(6) Unfasten ringer mounting screws (Fig. 5).

(7) Remove ringer.

(8) Install new ringer. The leads should be routed as shown in Fig. 3 to prevent contact with the gong and subsequent damping of the ringer output. Dial ringback code to test ringer.

(9) Reassemble set [3.20, 3.21(b), and 3.19].

Buzzer (optional)

6.07 To replace.

(1) Remove the faceplate (3.19), and place handset aside.

(2) Remove the upper housing, if provided [3.21(b)].

(3) Remove the cradle (3.20).

(4) Remove the buzzer mounting screw.

(5) Remove buzzer leads from the TB-15 and TB-16.

(6) Install new buzzer.

(7) Reassemble telephone set [3.20, 3.21(b), and 3.19].

Handset Jack (616B)

6.08 To replace.

(1) Remove the faceplate (3.19), and place handset aside.

(2) Remove the upper housing, if provided [3.21(b)].

(3) Remove the cradle (3.20).

(4) Disconnect the handset jack leads and remove jack.

(5) Install new 616B handset jack.

(6) Reassemble telephone set [3.20, 3.21(b), and 3.19].

Handsets

6.09 A defective G15A handset may be replaced or changed to a modular amplifying handset (G6BM, G7BM, or G8BM) by unplugging the H4DU cord and inserting it into the new handset. To replace the G15A handset with a nonmodular amplifying handset (G6B, G7B, or G8B) proceed as follows.

(1) Unplug H4DU handset cord at telephone set end.

(2) Remove faceplate (3.19), and place handset aside.

(3) Remove the upper housing, if provided [3.21(b)].

(4) Remove handset cradle (3.20).

(5) Disconnect 616B handset jack (6.08). (Jack may be removed or stored just to right of ringer.)

(6) Insert spade-tipped end of handset cord through hole in the side of the housing.

(7) Attach stayband hook to chassis (Fig. 3).

(8) Route leads through wire guide as shown in Fig. 3.

(9) Make connections (Fig. 7H).

(10) Reassemble set [3.20, 3.21(b), and 3.19].

Faceplate

6.10 To replace a 870A2-87 faceplate with a 870B1-type faceplate.

(1) Remove the 870A2-87 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 the 870A1U upper housing to the chassis and 870A1 housing. The three parts should be held together tightly as the screws are driven.

(4) Place the two tabs located along the lower edge of the 870B1 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 upper side of the upper housing should retain the faceplate.

Speakerphone

6.11 For maintenance information on the 3B (MD) or 4A speakerphone systems, refer to Sections 512-620-100 or 512-700-100, respectively.

6.12 For speakerphone connections, use applicable Tables B through E.

TABLE B

CONNECTIONS — 870A1M OR 870A2M TELEPHONE SET WITH 3B SPEAKERPHONE

APPARATUS	CORD OR WIRE	LEAD DESIG	LEAD COLOR	FROM TEL SET PSB	FROM TEL SET TB	44-TYPE BLOCK TERM.	TO TEL SET PSB	TO CONTROL UNIT (NOTE) 55A	TO CONTROL UNIT (NOTE) 55B
Tel Set	Mtg Cord D6AD-87 (870A1M)	R	BL-W			1			
		T	W-BL			2			
		A1	O-W			4			
		A	W-O			5			
		AC1	G-W			6			
		AC2	W-G			7			
	623P6 Jack Assy (870A2M) ‡	Spare	W						
		A	BK						
		R	R						
		T	G						
		A1	Y						
		Spare	BL						
	Speakerphone Interconnection Cord D10R-87	R1	BL-W	9				28	10
		T1	W-BL	2				19	1
		LK	O-W	27				11	35
		A1	W-BR		2			12	2
		SPO	S-W	21				*	*
		AG	W-O		1			5	11
		P3	W-G	3				21	4
		P4	G-W	6				30	13
		Spare	BR-W					*	*
		Spare	W-S					*	*
D-180568 Kit of Parts		Shi	G-W				14		
		VDD	W-G				17		
		SHa	R-BL				26		
		LK	BL-R				27		
666B Trmtr	T7A 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 Cord	SP1	G					34	20
		SP2	R					33†	29†

TABLE B (Cont)

CONNECTIONS — 870A1M OR 870A2M TELEPHONE SET WITH 3B SPEAKERPHONE

APPARATUS	CORD OR WIRE	LEAD		CONNECT					
				FROM			TO		
		DESIG	COLOR	TEL SET		44-TYPE BLOCK TERM.	TEL SET	CONTROL UNIT (NOTE)	
				PSB	TB		PSB	55A	55B
95B-Type PWR Unit (870A1M)	D-Station Wire	AC1				6			
		AC2				7			
95B-Type PWR Unit (870A2M)	M2SL-87 Cord	AC1	Y				24§		
		AC2	BK				25§		
2012B Trnsf	D-Station Wire	AC1						27	27
		AC2						36	36

* Insulate and store.

† To reduce loudspeaker volume, move SP2 lead to terminal 24 (55A) or 30 (55B).

‡ Accepts D4BU or D6AM mounting cord which connects set to modular connecting block.

§ Connected at Factory.

Note: Strap terminals 20 and 21 (55A) or 4 and 5 (55B).

TABLE C

CONNECTIONS - 870A1M OR 870A2M TELEPHONE SET WITH ONE-TOUCH CALLING (DIAL TONE DETECTOR AND 3B SPEAKERPHONE)

APPARATUS	CORD OR WIRE	LEAD DESIG	LEAD COLOR	TEL SET REMOVE FROM PSB	FROM TEL SET PSB	FROM TEL SET TB	FROM 44-TYPE BLOCK TERM.	TO TEL SET PSB	TO CONTROL UNIT 55A	TO CONTROL UNIT 55B
870-Type Tel Set	Mtg Cord D6AD-87 (870A1M)	R	BL-W				1			
		T	W-BL				2			
		A1	O-W				4			
		A	W-O				5			
		AC1	G-W				6			
		AC2	W-G				7			
	623P6 Jack Assy (870A2M)‡	Spare	W							
		A	BK							
		R	R							
		T	G							
		A1	Y							
		Spare	BL							
	Speaker-phone Inter-connection Cord D10R-87	R1	BL-W		9				28	10
		T1	W-BL		2				19	1
		LK	O-W		27				11	35
		A1	W-BR			2			12	2
		SPO	S-W		21				3	18
		AG	W-O			1			5	11
		P3	W-G		3				21	4
		P4	G-W		6				30	13
		Spare	BR-W						*	*
		Spare	W-S						*	*
		Strap	BK	11				*		
		Strap	BK	18				*		
		Strap	BK	23				*		
D-180493 Kit of Parts	Dial Tone Detector	Input	G-R						2	
		PB	O-BK						7	
		Input	G-R						9	
		DT	O-Y						11	
		VDD	R-O						17	
		SPR	Y-BL						18	
		DR	Y-O						19	

TABLE C (Cont)

CONNECTION — 870A1M OR 870A2M TELEPHONE SET WITH ONE-TOUCH CALLING (DIAL TONE DETECTOR AND 3B SPEAKERPHONE)

APPARATUS	CORD OR WIRE	LEAD DESIG	LEAD COLOR	TEL SET REMOVE FROM PSB	FROM TEL SET PSB	FROM TEL SET TB	TO 44-TYPE BLOCK TERM.	TO TEL SET PSB	TO CONTROL UNIT (NOTE) 55A	TO CONTROL UNIT (NOTE) 55B
D-180493 Kit of Parts (Cont)	Dial Tone Detector (Cont)	COM	BK-O					20		
		SPO	G-Y					21		
		PL	O-R					22		
		DTT	BL-Y					23		
		LK	Y-G					27		
	Switch†	S1	S					15		
		S2	S					20		
D-180568 Kit of Parts		SHi	G-W					14		
		VDD	W-G					17		
		SHa	R-BL					26		
		LK	BL-R					27		
666B Trmtr	T7A 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 Cord	SP1	G						34	20
		SP2	R						33§	29§
95B-Type Pwr Unit (870A1M)	D-Station Wire	AC1					6			
		AC2					7			
95B-Type Pwr Unit (870A2M)	M2SL-87 Cord	AC1	Y					24¶		
		AC2	BK					25¶		
2012B Transf	D-Station Wire	AC1							27	27
		AC2							36	36

* Insulate and store.
† One touch calling switch must be set to ON position.
‡ Accepts D4BU or D6AM mounting cord which connects set to modular connecting block.
§ To reduce loudspeaker volume move SP2 lead to terminal 24 (55A) or 30 (55B)
¶ Connected at factory.

Note: Strap terminals 20 and 21 (55A) or 4 and 5 (55B).

TABLE D

CONNECTIONS — 870A1M OR 870A2M TELEPHONE SET WITH 4A SPEAKERPHONE

APPARATUS	CORD OR WIRE	LEAD		CONNECT TO			
		DESIG	COLOR	44-TYPE BLK. TERM.	TEL SET		223D ADAPTER
					PSB	TB	
Tel Set	Mtg Cord D6AD-87 (870A1M)	R	BL-W	1			
		T	W-BL	2			
		A1	O-W	4			
		A	W-O	5			
		AC1	G-W	6			
		AC2	W-G	7			
	623P6 Jack Assy (870A2M)‡	Spare	W				
		A	BK				
		R	R				
		T	G				
		A1	Y				
		Spare	BL				
D-180568 Kit of Parts		SHi	G-W		14		
		VDD	W-G		17		
		SHa	R-BL		26		
		LK	BL-R		27		
223D Adapter	M16H Cord ¶	AC	R-G		*		
		AC	G-R		*		
		LK	O-W		27		
		SPO	O-R		21		
		Spare	R-O		*		
		K5M	BR-W		*		
		P3	W-G		3		
		P4	G-W		6		
		T1	W-BL		2		
		R1	BL-W		9		
		K4C	S-W		*		
		K5C	W-S		*		
		K4B	BL-R		*		
		K5B	R-BL		*		
		AG	W-O			1	
		A1	W-BR			2	
95B-Type Pwr Unit (870A1M)	D-Station Wire	AC1		6			
		AC2		7			
95B-Type Pwr Unit (870A2M)	M2SL-87 Cord	AC1	Y		24§		
		AC2	BK		24§		

TABLE D (Cont)

CONNECTIONS — 870A1M OR 870A2M TELEPHONE SET WITH 4A SPEAKERPHONE

APPARATUS	CORD OR WIRE	LEAD		CONNECT TO			
		DESIG	COLOR	44-TYPE BLK. TERM	TEL SET		223D ADAPTER
					PSB	TB	
680-Type Trmtr	D8S Cord						Plugs into Adapter
108-Type LSPK	D20N Cord						
85B1 Pwr Unit	M2FG Cord†	AC1	BK				
		AC2	Y				

* Insulate and store.

† Only (Y) and (BK) leads are terminated in plug of M2FG cord.

‡ Accepts D4BU of D6AM mounting cord which connects set to modular connecting block.

§ Connected at factory.

¶ To provide strain relief, the S-hook of the M16H cord shall be retained by the screw in the telephone set already used to retain the D6AD-87 cord (870A1M) or the M2SL-87 cord (870A2M).

TABLE E

CONNECTIONS — 870A1M OR 870A2M TELEPHONE SET WITH ONE-TOUCH CALLING
(DIAL TONE DETECTOR AND 4A SPEAKERPHONE)

APPARATUS	CORD OR WIRE	LEAD		TEL SET REMOVE FROM PSB	CONNECT TO			
		DESIG	COLOR		44-TYPE BLOCK TERM.	TEL SET PSB	TB	223D ADAPTER
Tel Set	Mtg Cord D6AD-87 (870A1M)	R	BL-W		1			
		T	W-BL		2			
		A1	O-W		4			
		A	W-O		5			
		AC1	G-W		6			
		AC2	W-G		7			
	623P6 Jack Assy (870A2M)‡	Spare	W					
		A	BK					
		R	R					
		T	G					
		A1	Y					
		Spare	BL					
		Strap	BK	11		*		
		Strap	BK	18		*		
		Strap	BK	23		*		
D-180493 Kit of Parts	Dial Tone Detector	Input	G-R			2		
		PB	O-BK			7		
		Input	G-R			9		
		DT	O-Y			11		
		VDD	R-O			17		
		SPR	Y-BL			18		
		DR	Y-O			19		
		COM	BK-O			20		
		SPO	G-Y			21		
		PL	O-R			22		
		DTT	BL-Y			23		
		LK	Y-G			27		
	Switch†	S1	S			15		
		S1	S			20		
D-180568 Kit of Parts		SHi	G-W			14		
		VDD	W-G			17		
		SHa	R-BL			26		
		LK	BL-R			27		

TABLE E (Cont)

CONNECTIONS — 870A1M OR 870A2M TELEPHONE SET WITH ONE-TOUCH CALLING (DIAL TONE DETECTOR AND 4A SPEAKERPHONE)

| APPARATUS | CORD OR WIRE | LEAD | | TEL SET REMOVE FROM PSB | CONNECT TO | | | |
		DESIG	COLOR		44-TYPE BLOCK TERM.	TEL SET PSB	TB	223D ADAPTER
		AC	R-G			*		
		AC	G-R			*		
		LK	O-W			27		
		SPO	O-R			21		
		Spare	R-O			*		
223D Adapter	M16H Cord	K5M	BR-W			*		
		P3	W-G			3		
		P4	G-W			6		
		T1	W-BL			2		
		R1	BL-W			9		
		K4C	S-W			*		
		K5C	W-S			*		
		K4B	BL-R			*		
		K5B	R-BL			*		
		AG	W-O				1	
		A1	W-BR				2	
95B-Type Pwr Unit (870A1M)	D-Station Wire	AC1			6			
		AC2			7			
95B-Type Pwr Unit (870A2M)	M2SL-87 Cord	AC1	Y			24 ¶		
		AC2	BK			25 ¶		
680-Type Trmtr	D8S Cord							Plugs into Adapter
108-Type LSPK	D20N Cord							
85B1 Pwr Unit	M2FG Cord§	AC	BK					
		AC	Y					

* Insulate and store

† One touch calling switch must be set to ON position.

‡ Accepts D4BU or D6AM mounting cord which connects set to modular connecting block.

§ (Y) and (BK) leads only are terminated in plug of M2FG cord.

¶ Connected at factory.

TABLE F

**CONNECTIONS — 870A1M OR 870A2M TELEPHONE SET WITH
DIAL TONE DETECTOR (NOTE 1)**

APPARATUS	CORD OR WIRE	LEAD		TEL SET REMOVE FROM PSB	CONNECT TO	
		DESIG	COLOR		TEL SET PSB	44-TYPE BLK. TERM.
Tel Set	Mtg Cord D6AD-87 (870A1M)	R	BL-W			1
		T	W-BL			2
		A1	O-W			4
		A	W-O			5
		AC1	G-W			6
		AC2	W-G			7
	623P6 Jack Assy (870A2M)‡	Spare	W			
		A	BK			
		R	R			
		T	G			
		A1	Y			
		Spare	BL			
		Strap	BK	11	*	
		Strap	BK	23	*	
D-180493 Kit of Parts	Dial Tone Detector	Input	G-R		2	
		PB	O-BK		7	
		Input	G-R		9	
		LK	Y-G		*	
		DT	O-Y		11	
		VDD	R-O		17	
		DR	Y-O		19	
		COM	BK-O		20	
		PL	O-R		22	
		DTT	BL-Y		23	
		SPR	Y-BL		*	
		SPO	G-Y		*	
	Switch (Note 2)	S1	S		15	
		S2	S		15	
95B-Type Power Unit (870A1M)	D-Station Wire	AC1				6
		AC2				7
95B-Type Power Unit (870A2M)	M2SL-87 Cord	AC1	Y		24†	
		AC2	BK		25†	

* Insulate and store
† Connected at factory.
‡ Accepts D4BU or D6AM mounting cord which connects set to modular connecting block.
Note 1: May be used for installations where first dial tone is not precise (350 Hz and 440 Hz), but all subsequent dial tones are precise.
Note 2: Switch is not required.
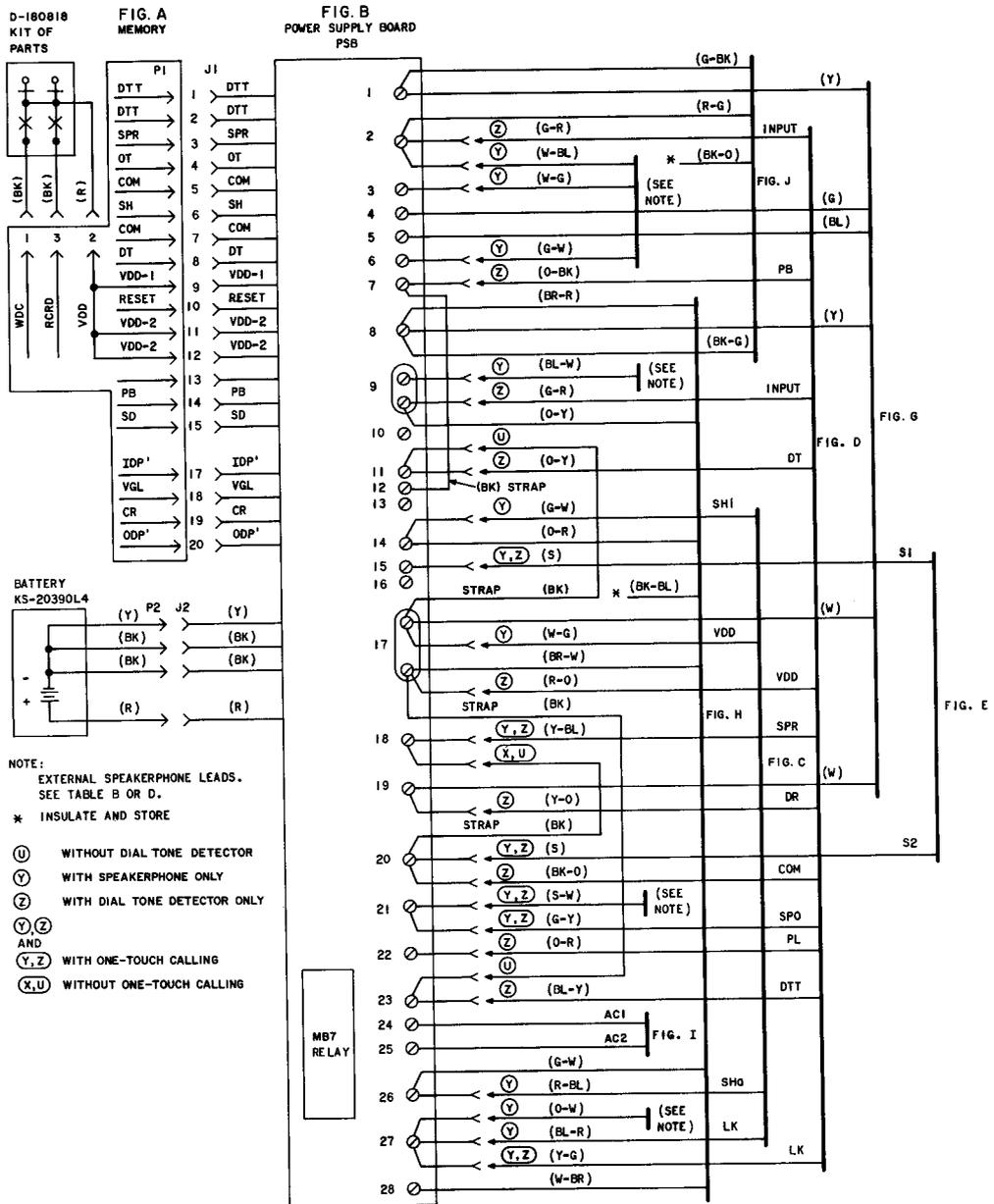
TABLE G

CONNECTIONS FOR D-180818 KIT OF PARTS

D-KIT SWITCH LEADS		TERMINAL POSTS FOR SWITCH LEAD CONNECTORS (NOTE 3)	
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

* Insulate and store.
† Single position connector.

Notes:

1. These are connectors attached to the switch leads. A single position connector with a (BK) lead and a double position 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 like any other memory.
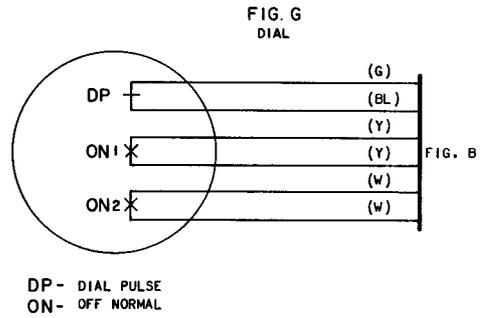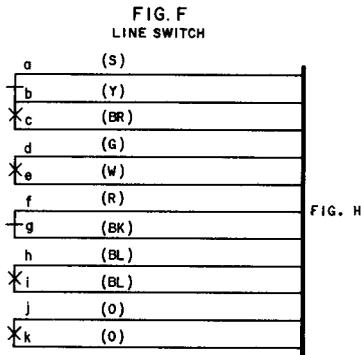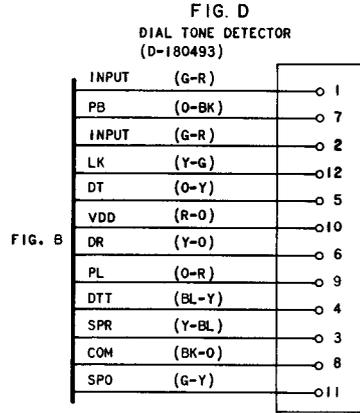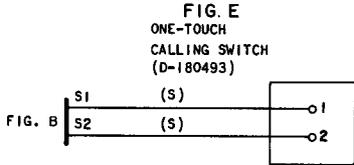3. These posts are on the 870B memory PWB (Fig. 3).

Fig. 7—Telephone Set, Connections (Sheet 1 of 3)

FIG. C
RELAY PRINTED
WIRING BOARD
(D-180568)

SHa	(R-BL)	o1
LK	(BL-R)	o2
SHi	(G-W)	o3
VDD	(W-G)	o4

FIG. B

FIG. D
DIAL TONE DETECTOR
(D-180493)

INPUT	(G-R)	o 1
PB	(O-BK)	o 7
INPUT	(G-R)	o 2
LK	(Y-G)	o12
DT	(O-Y)	o 5
VDD	(R-O)	o10
DR	(Y-O)	o 6
PL	(O-R)	o 9
DTT	(BL-Y)	o 4
SPR	(Y-BL)	o 3
COM	(BK-O)	o 8
SPO	(G-Y)	o11

FIG. B

FIG. E
ONE-TOUCH
CALLING SWITCH
(D-180493)

S1	(S)	o1
S2	(S)	o2

FIG. B

FIG. F
LINE SWITCH

a	(S)
b	(Y)
c	(BR)
d	(G)
e	(W)
f	(R)
g	(BK)
h	(BL)
i	(BL)
j	(O)
k	(O)

FIG. H

FIG. G
DIAL

DP	(G)
	(BL)
	(Y)
ON1	(Y)
	(W)
ON2	(W)

FIG. B
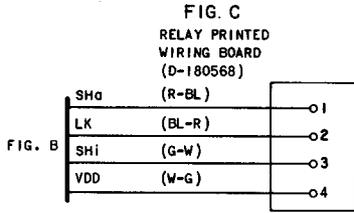
DP- DIAL PULSE
ON- OFF NORMAL

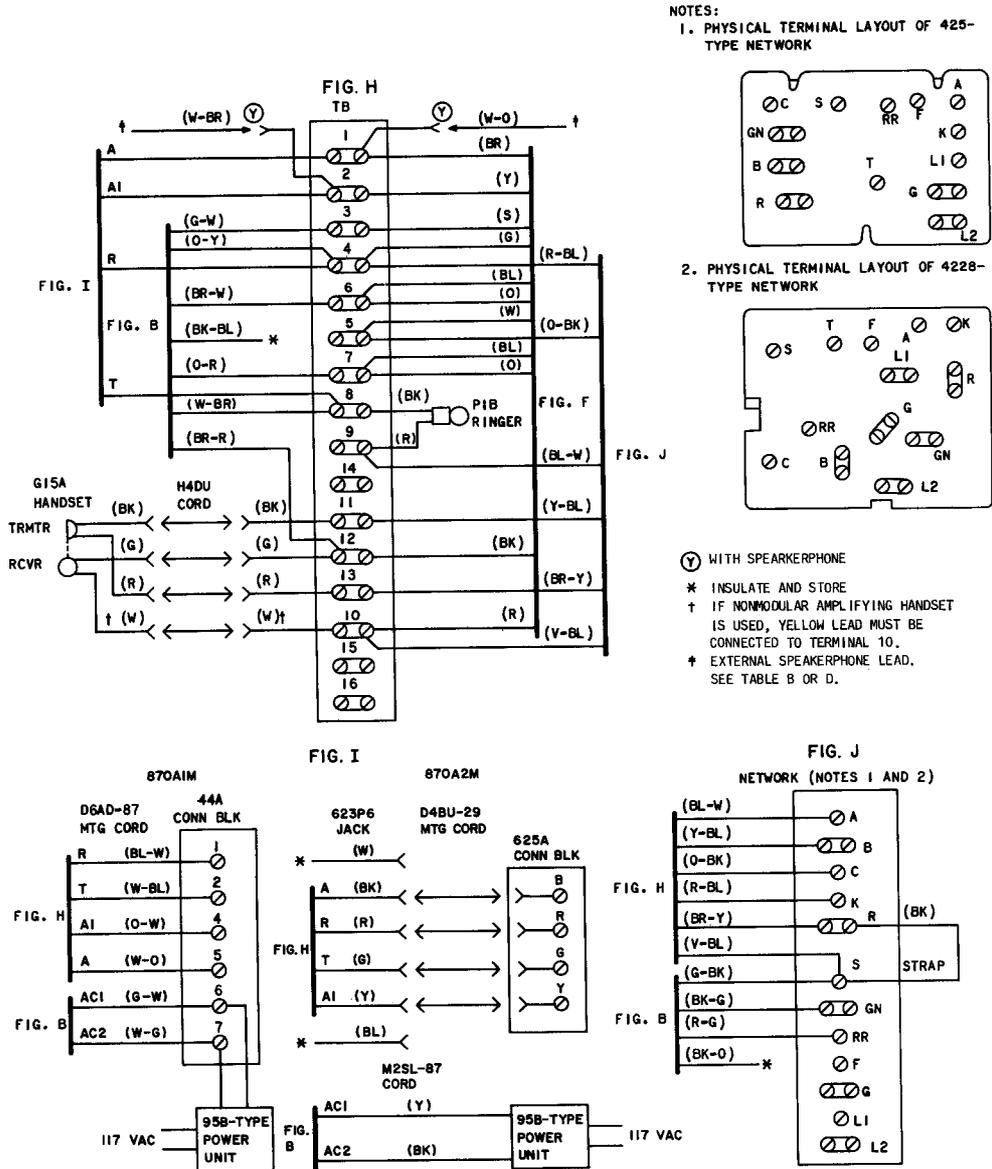**Fig. 7—Telephone Set, Connections (Sheet 2 of 3)**
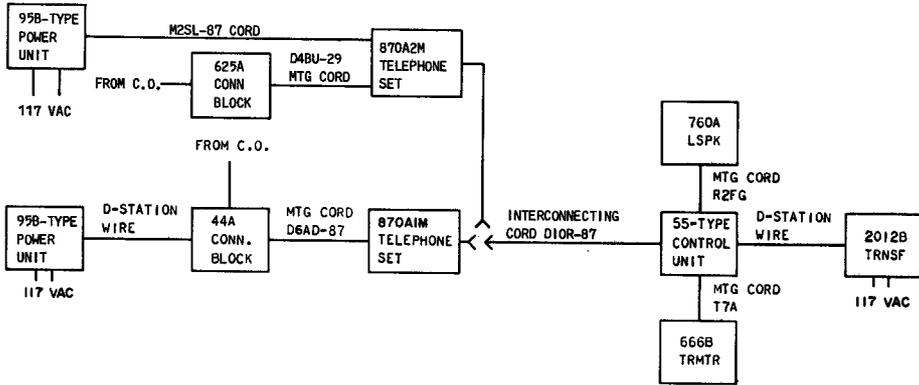
Fig. 7—Telephone Set, Connections (Sheet 3 of 3)

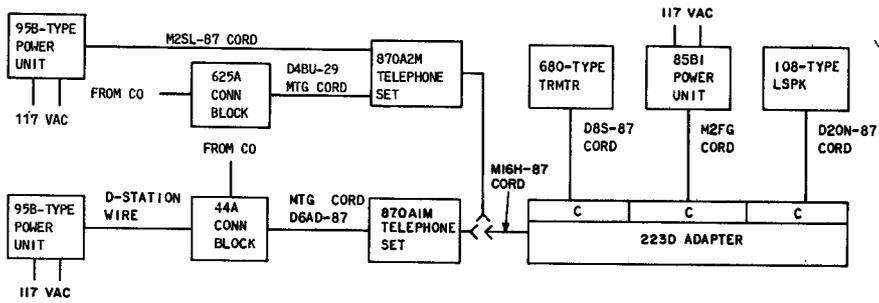Fig. 8—Block Diagram—Telephone Set With 3B (MD) Speakerphone

Fig. 9—Block Diagram—Telephone Set With 4A Speakerphone
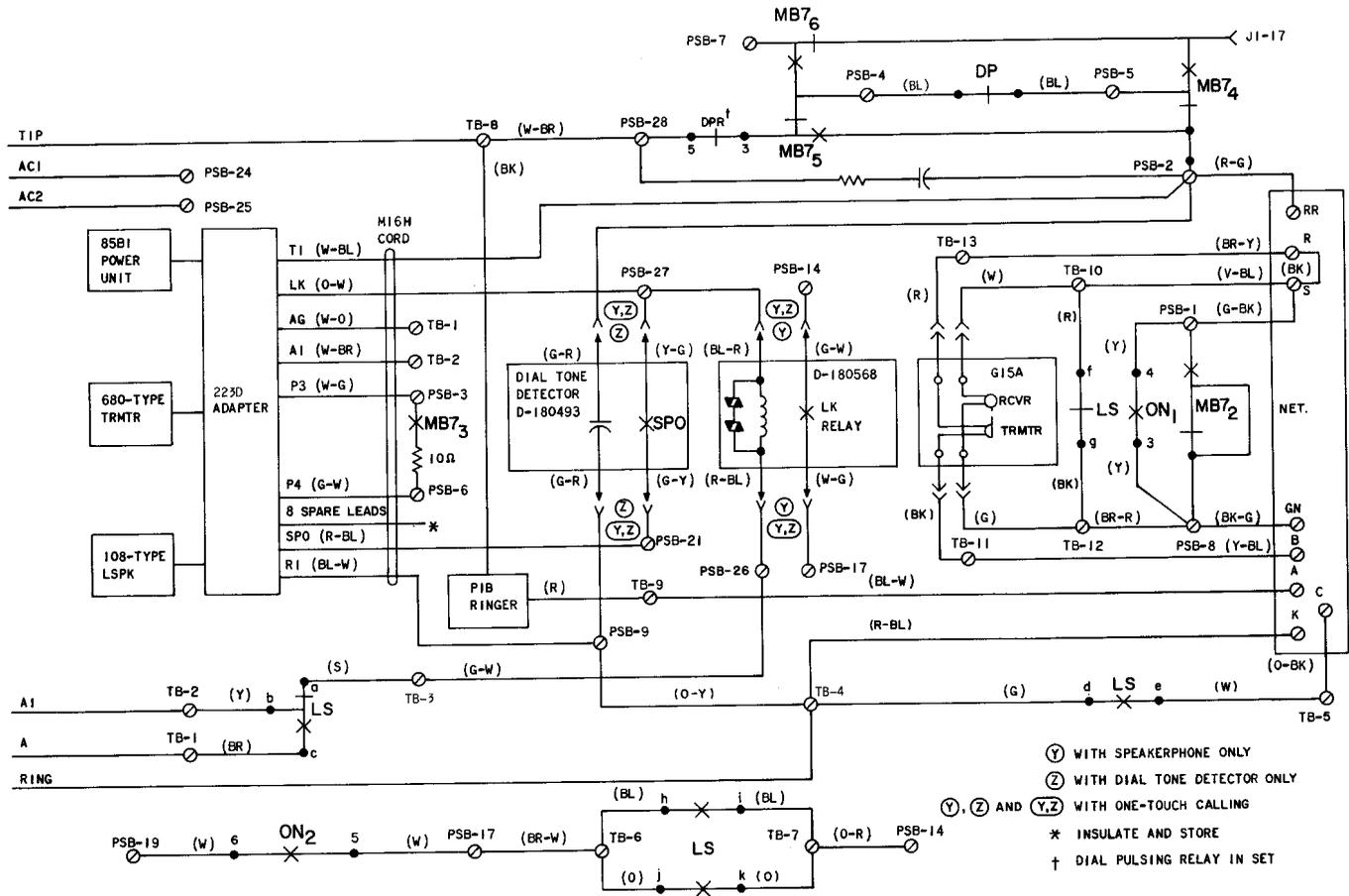
Fig. 10—Telephone Set, Partial Functional Schematic

TABLE H

TROUBLE ANALYSIS — 870A1M OR 870A2M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYSMPTON	POSSIBLE CAUSE	REMEDIAL ACTION
1	Dead set when off-hook on handset		Mounting cord improperly connected at equipment end	Check cord connections
		Set remains dead when 95B-type power unit is disconnected.	Bad connection between handset and telephone set	1. Check handset cord connections 2. Check handset jack connections
			Defective reciever	Check handset
			Open tip or ring lead	Check leads and connections
			Unknown	Replace telephone set*
		Set becomes active when 95B-type power unit is disconnected	Improperly installed or defective Memory	1. Check connector insertion 2. Replace Memory
			Defective PSB	Replace telephone set*
2	Dead set only when speakerphone is on	Set is active when off-hook on handset.	Improperly connected or defective speakerphone	1. Check connections 2. See appropriate speakerphone BSP for trouble analysis
3	Cannot transmit when off-hook on handset.	Dial tone present, but sidetone absent.	Handset cord improperly inserted into either handset or jack in telephone set	Check handset cord and/or handset
			Defective transmitter	Replace transmitter or handset
			Defective 616B jack	Replace 616B jack
			Defective network	Replace telephone set*
4	Cannot manually dial when off-hook on handset (dial tone is present).	Dialing clicks heard (in handset) when dial is returning.	Bridged set off-hook	Place bridged set on-hook
			Speakerphone, improperly installed or defective	Check appropriate speakerphone BSP for analysis
		No dialing clicks heard when dial is returning. Condition remains unchanged when 95B-type power unit is disconnected.	Improperly installed or defective rotary dial	1. Check connections 2. Replace rotary dial
			Unknown	Replace telephone set*

* Refer to 6.02 (4)

TABLE H (Cont)

TROUBLE ANALYSIS — 870A1M OR 870A2M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYSMPTON	POSSIBLE CAUSE	REMEDIAL ACTION
4 (Cont)		No dialing click heard when dial is returning. With 95B-type power unit disconnected, set can manually dial.	Improperly installed or defective Memory	1. Check cable 2. Replace Memory
			Defective PSB	Replace telephone set*
5	Cannot manually dial when speakerphone is on. (Dial tone is present.)	Set does manually dial when off-hook on handset	Improperly installed or defective speakerphone	1. Check connections 2. See appropriate speakerphone BSP for trouble analysis
			Defective line switch contacts	Replace telephone set*
6	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 plugged in	Plug in battery
			Switch of D-180818 Kit of Parts in ON position	Change switch position to OFF
			95B-type power unit not plugged in or defective	Check or replace power unit (should read 13.4 to 18 Vac across screw terminals 24 and 25 PSB)
			Open in IW	Check IW and connections
			Memory, RECORD OFF or WAIT button stuck down	Clear stuck button
			Improperly installed or defective Memory	1. Check connector cable 2. Replace Memory
			Unknown	Replace telephone set*
		RECORD lamp flashes or lights erratically	Battery plug not connected	Connect battery plug
			Unknown	Replace telephone set*
		Lamp turns off, flashes or lights erratically when any memory button is depressed	Improperly installed or defective Memory	1. Check connector cable 2. Replace Memory
			Unknown	Replace telephone set*

* Refer to 6.02 (4).

TABLE H (Cont)

TROUBLE ANALYSIS — 870A1M OR 870A2M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTON	POSSIBLE CAUSE	REMEDIAL ACTION
6 (Cont)		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. Can manually dial off-hook.	Improperly connected or defective rotary dial (off-normal contact)	1. Check rotary dial connections 2. Replace rotary dial
			Unknown	Replace telephone set*
		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 telephone set*
		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 telephone set*
7	Cannot record properly into the 31 memory positions or into LAST NUMBER DIALED position.	RECORD lamp functions properly and set dials manually	Defective Memory	Replace Memory
			Unknown	Replace telephone set*
		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 (4) through (7)]
			Defective Memory	Replace Memory
			Unknown	Replace telephone set*
8	Cannot dial properly from Memory using handset.	MB7 relay clicks when manual dial is operated, but no automatic dialing possible. RECORD lamp does not light.	Battery not plugged in	Plug in 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. 7B

* Refer to 6.02 (4).

TABLE H (Cont)

TROUBLE ANALYSIS — 870A1M OR 870A2M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTON	POSSIBLE CAUSE	REMEDIAL ACTION
8 (Cont)			Improper connection to or defective Memory	1. Check connector cable 2. Replace Memory
			Unknown	Replace telephone set*
		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 telephone set*
		No digits, random digits or all the same digits in memory location(s). Note: Memory may not have functioned properly at some previous time.	An ac power outage for 24 hours or longer.	Reestablish ac power and record numbers
			Defective battery	1. Allow the battery to be charged for a minimum of 5 minutes. Then momentaritly remove the 95B-type power unit from the ac power outlet and reinsert 2. If previously stored numbers are not dialed from memory replace the battery 3. Repeat procedure
			Defective Memory	Replace Memory
			Unknown	Replace telephone set*
		Two or more Memory locations have same digits which are usually different from originally recorded digits.	Static discarge damage	1. Consult TELCO engineer for proper grounding procedure 2. Replace Memory
		Automatically dials through a WAIT.	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 telephone set*

* Refer to 6.02 (4).

TABLE H (Cont)

TROUBLE ANALYSIS — 870A1M OR 870A2M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTON	POSSIBLE CAUSE	REMEDIAL ACTION
9	Cannot dial properly from Memory when on the handset (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 plugged in	Plug in 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
			Improper installation of dial tone detector D-180493	Check connections for D-180493 installation
		Same as above — Addition of strap lead between PSB terminals 20 and 23 does not correct problem	Improper connection to or defective Memory	1. Check connector cable 2. Replace Memory
		Addition of strap lead between PSB terminals 20 and 23 corrects problem.	Defective Memory	Replace Memory
			Defective dial tone detector	Replace D-180493 dial tone detector
			Unknown	Replace telephone set*
		Automatically dials through a wait.	Memory not securely mounted	Tighten Memory mounting screws
			Improper connection to PSB terminals 23 and 11	Check installation of D-180493 Kit of Parts
10	Cannot turn speakerphone on when ON button is depressed (wired for speakerphone option).	Speakerphone indicator lamp does not turn on.	Handset off-hook	Place handset on-hook
			Improper connections or defective 85B1 power unit (or 2012B transformer)	1. Check for commerical power 2. Check that power unit or transformer is plugged into commercial ac power outlet 3. Check connections per Tables B, C, D, and E

* Refer to 6.02 (4).

TABLE H (Cont)

TROUBLE ANALYSIS — 870A1M OR 870A2M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTON	POSSIBLE CAUSE	REMEDIAL ACTION
10 (Cont)				4. Check output of power unit or transformer: 85B1: 18-25 Vac open circuit 2012B: 15-18 Vac open circuit
		No dial tone heard, but indicator lamp turns on.	Open T1 or R1 leads	Check leads and connections
		With temporary strap lead added between PSB screw terminals 26 and 27, speakerphone turns on when ON button is depressed.	Improper connections or defective D-180568 Kit of Parts	Check connections to and/or replace D-180568 Kit of Parts
		With temporary strap lead added between screw terminals 2 and 3 on TB, speakerphone turns on when ON button is depressed..	Defective switchhook a-b contacts	Replace telephone set*
		With temporary strap lead added between screw terminals TB-3 and PSB-26, speakerphone turns on when ON button is depressed	Defective connecting lead	Replace (G-W) harness lead between screw terminal 3 on TB and PSB terminal 26
			Defective speakerphone	See appropriate speakerphone BSP for trouble analysis
11	RECORD lamp does not turn off when speakerphone ON button is depressed (wired for speakerphone option).	With temporary strap lead added between PSB screw terminals 14 and 17, speakerphone turns on when ON button is depressed and RECORD lamp goes off	LK relay circuit defective on D-180568 Kit of Parts	Replace D-180568 Kit of Parts
		Operation of RECORD OFF button turns RECORD lamp off.	Defective switchhook h-i or j-k contacts	Replace telephone set*
12	Cannot turn speakerphone off when handset is lifted off-hook (wired for speakerphone option).	Speakerphone turns off when OFF button is depressed but turns back on when OFF button is released	Short circuit between screw terminals 2 and 3 on TB	Clear short
			Defective switchhook a-b contacts	Replace telephone set*

* Refer to 6.02 (4).

TABLE H (Cont)

TROUBLE ANALYSIS — 870A1M OR 870A2M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTON	POSSIBLE CAUSE	REMEDIAL ACTION
13	Cannot hear dial clicks when dialing with speakerphone on (wired for speakerphone option).	With the speakerphone ON button depressed, dialing clicks can be heard.	Physical spacing between speaker-phone, loudspeaker and transmitter units is too close	See appropriate speakerphone BSP for proper placement of units
14	Speakerphone does not turn on when a memory button is momentarily depressed in the automatic dialing mode (wired for one-touch option).	MB7 relay clicks when manual dial is operated, but no automatic dialing possible. RECORD lamp does not light.	Battery not plugged in	Plug in battery
			Defective 223D adapter	Check continuity from PSB-21 to LSPK-21
		With temporary strap between PSB screw terminals 15 and 20, speakerphone turns on when a memory button is depressed	One-touch calling switch turned off or defective	1. Turn one-touch calling switch on 2. Replace one-touch calling switch assembly of D-180493 Kit of Parts
			Defective dial tone detector D-180493 Kit of Parts	Replace dial tone detector PWB assembly of D-180493 Kit of Parts
		With temporary strap between PSB screw terminals 27 and 21 speakerphone turns on when a memory button is depressed.	Defective connections between dial tone detector and PSB	Check (Y-G) and (G-Y) leads to PSB terminals 27 and 21, respectively
			Defective dial tone detector D-180493 Kit of Parts	Replace dial tone detector PSB assembly of D-180493 Kit of Parts
15	Speakerphone turns on but set does not automatically dial when memory button is depressed (wired for one-touch option).		(BK) Strap leads from screw terminals 11 and 23 on PSB were not disconnected when option was wired	Disconnect, insulate and store strap leads
		Set automatically dials when screw terminals 20 and 23 on PSB are temporarily shorted.	Precise TOUCH-TONE dial tone not present or a defective dial tone detector	1. Check CO line for presence of precise TOUCH-TONE dial tone (350 Hz and 440 Hz) 2. If correct dial tone is present, replace dial tone detector PWB assembly of D-180493 Kit of Parts

* Refer to 6.02 (4).

TABLE H (Cont)

TROUBLE ANALYSIS — 870A1M OR 870A2M

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTON	POSSIBLE CAUSE	REMEDIAL ACTION
16	Delay time between depression of a memory button and initiation of automatic dialing exceeds 3 seconds (wired for one-touch option).		Defective timing circuit	1. Replace Memory 2. Replace dial tone detector PWB assembly of D-180493 Kit of Parts
17	Cannot turn speakerphone off (wired for one-touch option)	Speakerphone turns off when OFF button is depressed but turns on when OFF button is released.	(BK) strap lead from terminal 18 on PSB was not disconnected when option was wired	Disconnect, insulate and store strap lead
		Speakerphone turns off and stays off when (Y-BL) lead is disconnected from terminal 18 on PSB and OFF button is depressed.	Defective logic	Replace Memory
		Speakerphone turns off when handset is taken off-hook but turns on when handset is placed on-hook	Defective circuit on D-180493 Kit of Parts	Replace dial tone detector board assembly of D-180493 Kit of Parts
		Normal conversational level on speakerphone	Defective muting circuit	Replace telephone set*
18	Set dials automatically but does not wait for dial tone (wired for one-touch calling).		Noise on line	1. Add 0.05 uf capacitor between PSB-17 and PSB-23 2. Remove above capacitor and add resistor (10KΩ to 50KΩ) in series with (G-R) dial tone detector input lead
19	Automatic dialing commences for no apparent reason (wired for one-touch calling).		Static discharge damage	1. Consult TELCO engineer for proper grounding procedure 2. Replace Memory

* Refer to 6.02 (4).